

RealizM II Graphics

Hardware User's Guide

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INTERGRAPH
COMPUTER SYSTEMS

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Contents

Preface	v
About This Document	v
Document Conventions	v
Operating System Information.....	v
Customer Support.....	vi
Hardware and Software Support Services	vi
World Wide Web	vi
Intergraph Bulletin Board Service.....	vi
FAXLink.....	vii
Telephone.....	vii
More Support Options.....	vii
1 Getting Started	1
RealizM II Cards	1
RealizM II Features and Functions.....	1
RealizM II Graphics Configurations	2
Connecting Monitors to RealizM II Cards	2
Starting Windows NT.....	3
Configuring RealizM II Video Display Properties	4
Changing the Default Video Display Driver	5
2 Upgrading RealizM II Graphics and Replacing RealizM II Cards	7
Taking Antistatic Precautions.....	7
Installing Texture Memory.....	8
Replacing RealizM II Cards or the Optional Geometry Accelerator Card	10
Installing a Multiple-screen Upgrade	12
Reinstalling the RealizM II Video Display Driver	13
Troubleshooting the Installation.....	13
Diagnostics.....	13
Video Display	14
Obtaining a Usable Video Resolution	14
Determining a Defective Unit	15
3 Technical Information	17
General Specifications.....	17
Monitor Resolutions	17
Cooling System	18
Texture Memory.....	19
Geometry Accelerator Support.....	19
Interfaces	20
Stereo Sync Output Port.....	20
Video Output Port	21
VGA Input Port.....	22

Index	23
Returned Goods Authorization (RGA) Form	
Warranty Procedure	
Repair Depot Address Labels	

Preface

The *RealizM II Graphics Hardware User's Guide* provides instructions for installing Intergraph Computer Systems' RealizM II three-dimensional (3D) graphics accelerators into your workstation. This guide provides hardware and software installation procedures, troubleshooting information, and specifications.

About This Document

The *RealizM II Graphics Hardware User's Guide* is organized as follows:

- ◆ Chapter 1, "Getting Started," introduces RealizM II cards, and lists their features, functions, and configurations. This chapter also gives instructions for connecting monitors to RealizM II cards, starting Windows NT, configuring video display properties, and changing the default video display driver.
- ◆ Chapter 2, "Upgrading RealizM II Graphics and Replacing RealizM II Cards," provides instructions for installing optional texture memory, replacing RealizM II cards, installing or replacing the optional Geometry Accelerator, installing multiple-screen upgrades, reinstalling the RealizM II video display driver, and troubleshooting any hardware or software problems.
- ◆ Chapter 3, "Technical Information," provides technical information for the RealizM II cards.

Document Conventions

Bold	Commands, words, or characters that you key in literally.
<i>Italic</i>	Variable values that you supply, or cross-references.
Monospace	Output displayed on the screen.
SMALL CAPS	Key names on the keyboard, such as D, ALT or F3; names of files and directories. You can type filenames and directory names in the dialog boxes or the command line in lowercase unless directed otherwise.
CTRL+D	Press a key while simultaneously pressing another key; for example, press CTRL and D simultaneously.

Operating System Information

For more detailed information on the Windows NT operating system, refer to the printed and online Microsoft documentation delivered with the system.

Customer Support

Intergraph Computer Systems offers an assortment of customer support options.

Hardware and Software Support Services

Intergraph Computer Systems provides a variety of hardware services for Intergraph and third-party equipment. Services include warranty upgrades, repair depot service, on-site hardware maintenance, system administration, and network consulting. Hardware purchased from Intergraph Computer Systems includes a factory warranty ranging from 30 days to three years. A detailed warranty description is available on the World Wide Web; see the Support pages at <http://www.intergraph.com/ics>.

Intergraph Computer Systems provides complimentary software support for 30 or 90 days following shipment of a hardware or software product. This includes World Wide Web access, Intergraph Bulletin Board Service access, FAXLink service, and telephone (Help Desk) support. At the end of the complimentary support period, you can purchase other levels of software support.

World Wide Web

You can visit Intergraph Computer Systems on the World Wide Web at <http://www.intergraph.com/ics>. On these pages, you can get news and product information, technical support information, software updates and fixes, and more.

Intergraph Bulletin Board Service

On the Intergraph Bulletin Board Service (IBBS), you can get technical support information, software updates and fixes, and more.

To connect to the IBBS:

1. Set your system's communications protocol for eight (8) data bits, no parity, one (1) stop bit, and any baud rate up to 14,400.
2. Using a modem, call 1-256-730-8786. Outside the United States, call one of the mirror sites listed on World Wide Web; see the Software Support pages at <http://www.intergraph.com>.
3. At the login prompt, key in your user ID. If you have not connected before, key in **new** to create a user ID.
4. Follow the menus to find what you need. The IBBS provides clear choices and online help.

If you have trouble connecting to or using the IBBS, call the Customer Response Center at 1-800-633-7248 (product entry IBBS) or leave a message for the IBBS System Operator at 1-256-730-1413.

FAXLink

To use the FAXLink:

- ◆ Call 1-800-240-4300 with questions on how to get technical support information using the FAXLink.
- ◆ Call 1-256-730-9000 to get documents (up to five per call).

Telephone

To get customer support by telephone:

- ◆ In the United States, call the Customer Response Center at 1-800-633-7248 between the hours of 7:00 a.m. and 7:00 p.m. Central Time, Monday through Friday (except holidays).
- ◆ Outside the United States, contact your local Intergraph Computer Systems subsidiary or distributor.

Have the following information available when you call:

- ◆ Your service number, which identifies your site to Intergraph Computer Systems. You use your service number for warranty or maintenance calls.
- ◆ Your Customer Personal Identification Number (CPIN). You get a CPIN the first time you call the Customer Response Center; it is associated with your service number for future call logging.
- ◆ The product's name or model number.
- ◆ The product's serial number. Software product serial numbers are included in the product packaging. Hardware product serial numbers are on a sticker affixed to the hardware product.
- ◆ Your name and telephone number.
- ◆ A brief description of the question or problem.

More Support Options

For information on more customer support options:

- ◆ Visit the Support pages on the World Wide Web at <http://www.intergraph.com/ics>.
- ◆ For hardware support questions in the United States, call 1-800-763-0242.

- ◆ For software support questions in the United States, call 1-800-345-4856.
- ◆ Outside the United States, contact your local Intergraph Computer Systems subsidiary or distributor.

1 Getting Started

This chapter introduces Intergraph Computer Systems' RealizM II graphics accelerators. It also provides information on connecting the monitors and getting started using a workstation equipped with a RealizM II card.

RealizM II Cards

RealizM II cards are high-performance, OpenGL-based, 3D graphics accelerators that include rasterization, optional texturing, and optional geometry acceleration:

- ◆ ZX13, VX113, and VX113 AGP include 16 MB of frame buffer memory and support resolutions up to 1.3 Mpixels (1280 x 1024).
- ◆ ZX25 and VX25 include 32 MB of frame buffer memory and support resolutions up to 2.5 Mpixels (1824 x 1368).

RealizM II Features and Functions

RealizM II graphics accelerators offer many advanced features and functions, including the following:

- ◆ Hardware support of Windows NT graphics (both GDI and OpenGL graphics operations)
- ◆ Gouraud shading support and antialiased vector support
- ◆ 16 MB (ZX13, VX113, VX113 AGP) or 32 MB (ZX25 and VX25) of frame buffer memory
- ◆ Industry-standard Peripheral Component Interconnect (PCI) bus interface with high-speed direct memory access (DMA) engine (ZX13, VX113, ZX25, and VX25)
- ◆ Industry-standard Accelerated Graphics Port (AGP) interface with high-speed DMA engine (VX113 AGP)
- ◆ 128 video planes
- ◆ Support of industry standard multi-sync monitors
- ◆ Optional hardware texture processing support with 4 MB, 16 MB, 32 MB, or 64 MB of texture memory (ZX13, ZX25, VX25); standard 16 MB texture memory for hardware texture processing support (VX113 and VX113 AGP)
- ◆ Optional geometry acceleration for lighting and transformation operations

RealizM II Graphics Configurations

RealizM II graphics configurations are designated by the maximum resolution supported, and by the support of texture memory and geometry acceleration:

- ◆ The last two digits of the number denote the maximum supported resolution. For example, ZX13 and VX113 indicate support for a maximum resolution of 1.3 Mpixels.
- ◆ The -T suffix denotes support for texture processing.
- ◆ The -G suffix denotes support for optional geometry acceleration.

The available RealizM II graphics configurations are as follows:

Designation	Configuration
ZX13	1.3 Mpixels
ZX13-T	1.3 Mpixels, texture processing
ZX13-G	1.3 Mpixels, geometry acceleration
ZX13-GT	1.3 Mpixels, geometry acceleration, texture processing
VX113-T	1.3 Mpixels, texture processing
VX113-GT	1.3 Mpixels, geometry acceleration, texture processing
VX113 AGP-T	1.3 Mpixels, texture processing
VX113 AGP-GT	1.3 Mpixels, geometry acceleration, texture processing
ZX25, VX25	2.5 Mpixels
ZX25-T, VX25-T	2.5 Mpixels, texture processing
ZX25-G, VX25-G	2.5 Mpixels, geometry acceleration
ZX25-GT, VX25-GT	2.5 Mpixels, geometry acceleration, texture processing

Connecting Monitors to RealizM II Cards

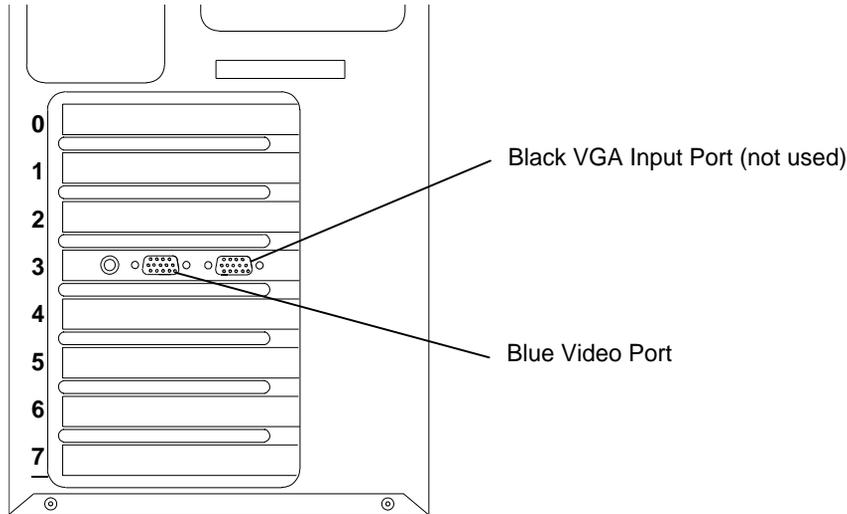
If your workstation was shipped with one or more RealizM cards installed, the video display driver is already installed. All you need to do to use your workstation is to connect the monitors to it, power it on, and start Windows NT. Use the following instructions to connect monitor cables as required.

CAUTION On a ZX13, ZX25, or VX25, do not connect a monitor cable to the black VGA input port. If you do, the video will not display.

NOTE The VX113 and VX113 AGP do not have a VGA input port.

For a single-screen configuration:

Connect the monitor cable to the blue video port shown in the following figure. In this sample configuration, the numbers on the left show numbering of the workstation's expansion slots, so the RealizM II card is in slot 3.



For a multi-screen configuration:

Connect a monitor cable from each monitor to the blue video port on a RealizM II card. After you start the system, you may have to switch cable connections to the RealizM II cards if the screen display is not correct. For example, in a side-by-side monitor configuration, if the right half of the Windows NT desktop displays on the left screen, and the left half of the desktop displays on the right screen, switch the cable connections to the RealizM II cards.

Starting Windows NT

After setting up a workstation equipped with RealizM II cards, or after upgrading or replacing RealizM II cards and associated components as described in Chapter 2, you can turn on system power and start the Windows NT operating system.

CAUTION Make sure the monitors are connected to the proper ports on the RealizM II cards before applying power to the monitors and to the workstation base unit.

To start Windows NT:

1. Turn on power to the monitor(s) and to the workstation base unit.
2. At the boot screen, select the non-VGA version of Windows NT.

3. When prompted, press CTRL+ALT+DEL to log on to Windows NT.
4. Log on to Windows NT. Refer to Windows NT documentation and Help for instructions, if necessary.

Configuring RealizM II Video Display Properties

To enable your workstation to use its RealizM II card, you must configure the display properties of the RealizM II video display driver. The RealizM II video display driver is installed on the system's primary hard disk drive. The Display Properties dialog is available from the Control Panel to determine the system configuration and installed options. Display Properties lets you change the video display settings to meet your needs.

To configure RealizM II video display properties:

1. From the Start menu, go to Settings/Control Panel/Display.
2. When the Notice dialog displays, click OK.
3. On the Display Properties dialog, click Intergraph Monitor (tab).

When a supported video display driver is running on your system, the Intergraph Monitor tab displays text describing the graphics hardware and monitor present on your system. The tab allows you to review and change the settings of your system's video attributes, such as monitor type.

NOTE

If this is your first time to install the video display driver (for example, when reinstalling Windows NT), the Intergraph Monitor tab does not display until you restart the system.

4. Select and change the supported settings as desired. Refer to Help for information about each setting. Context-sensitive help is available by selecting a setting and pressing F1.
5. Click Color Calibration to change the gamma correction for your monitor, if desired. The Color Calibration dialog displays.

The appearance of the Color Calibration dialog varies, depending on your graphics hardware and selected video display settings. If your system is configured with multiple screens, for example, you can use the pull-down menu to select which screen to modify.

NOTE

The Color Calibration dialog is available only when the driver is running.

6. Click OK to close the Color Calibration dialog, or click Cancel to close Color Calibration without applying the changes.
7. Click OK to close the Display Properties dialog, or click Cancel to close Display Properties without applying the changes.
8. If you have changed video attribute settings other than gamma correction, restart the system for the changes to take effect.

Changing the Default Video Display Driver

Once you have configured the RealizM II video display properties as desired, change the default display driver so the RealizM II video display driver runs automatically when you start or restart the system.

To make the RealizM II video display driver the default video display driver:

1. From the Start menu, go to Settings/Control Panel/System.
2. In the System Properties dialog, click Startup/Shutdown (tab).
3. In the Startup box, select the non-VGA version of Windows NT from the pull-down list.

NOTE

Do not select the VGA version of the operating system. The system operates in VGA mode when the video display driver is not running to accommodate all monitor types.

4. Click OK.

2 Upgrading RealizM II Graphics and Replacing RealizM II Cards

This chapter describes upgrading or replacing a RealizM II graphics accelerator in your workstation. It provides instructions for the following:

- ◆ Taking antistatic precautions
- ◆ Installing optional texture memory on ZX13, ZX25, or VX25
- ◆ Replacing RealizM II cards or the optional Geometry Accelerator card
- ◆ Installing a multiple-screen upgrade
- ◆ Reinstalling the RealizM II video display driver
- ◆ Troubleshooting the installation

Refer to your workstation's hardware documentation for detailed information on opening and closing the system, avoiding electrostatic discharge, and installing and replacing expansion cards.

Taking Antistatic Precautions

Static electricity can damage the components inside the workstation base unit, and can damage cards or texture memory. To reduce the possibility of electrostatic discharge, do the following:

- ◆ Do not remove texture memory or a card from its antistatic bag until you are ready to install it.
- ◆ Handle texture memory or a card as little as possible and by the edges only. Do not drop texture memory or a card, and do not expose them to extremes of temperature or moisture.
- ◆ Use an antistatic foam pad to support a card when installing texture memory.
- ◆ Use an antistatic wrist strap when handling texture memory or a card. There is no increased risk of electrical shock when using the wrist strap. If the wrist strap does not snugly contact bare skin, static protection will not be effective.

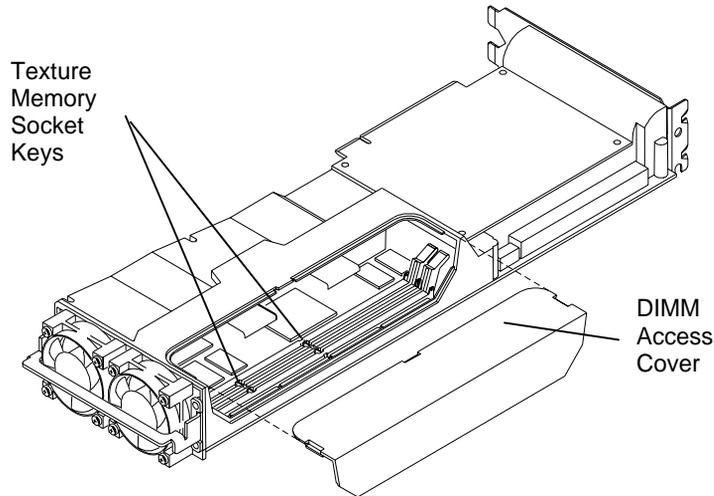
To use an antistatic wrist strap:

1. Remove the antistatic wrist strap from its envelope. Unfold the wrist strap and wrap the exposed adhesive side firmly around your bare wrist.
2. Peel the liner from the wrist strap copper foil; then attach the adhesive side of the copper foil to a bare metal surface (electrical ground) inside the system base unit.

Installing Texture Memory

The texture memory on a ZX13, ZX25, or VX25 card contains two sockets for dual inline memory modules (DIMMs). The texture memory on a VX113 or VX113 AGP consists of a 16 MB texture memory module directly mounted on the card. For VX113 or VX113 AGP, no other texture memory options are available.

For a ZX13, ZX25, or VX25 card, upgrade kits are available for 4 MB, 16 MB, 32 MB, and 64 MB of texture memory. Each kit contains two DIMMs, an antistatic foam pad to support the card, and an antistatic wrist strap. You should use 16 MB of texture memory or larger with the VX25. The following figure shows the keys which align with the DIMM notches for proper installation.

**To install texture memory:**

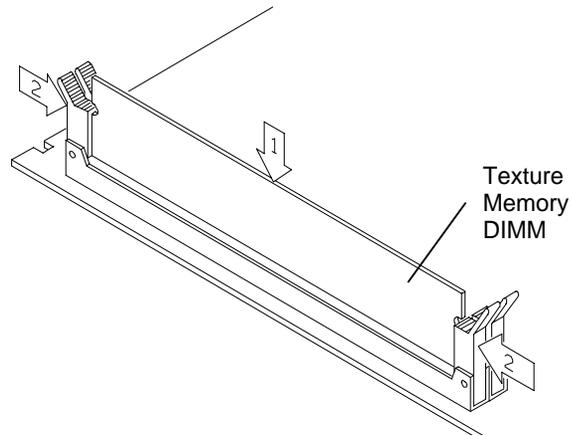
1. Remove the RealizM II card from the system. Refer to “Replacing RealizM II Cards or the Optional Geometry Accelerator Card” later in this chapter for instructions.
2. Place the card on the antistatic foam pad for protection and support.

CAUTION Failure to use the antistatic foam pad could cause damage to the card.

3. Remove the DIMM access cover.
4. Remove a DIMM from its static protective bag.

CAUTION Do not bend, twist or drop DIMMs. They may be damaged as a result.

5. Align the DIMM notches with the keys in one of the texture memory sockets on the card, and insert the DIMM into the socket. Refer to the following figure.
6. Push on the top edge of the DIMM until it snaps into the socket. Refer to the following figure.



7. Repeat steps 4 through 6 for the second DIMM.

NOTE For proper operation, you must install DIMMs of the same memory size in both sockets.

8. Replace the DIMM access cover.
9. Replace RealizM II the card into the system.
10. Close the system base unit.
11. Turn on system power and log on to the Windows NT operating system.
12. Open Display in the operating system Control Panel. The Intergraph Settings tab of the Display Properties dialog displays the proper texture memory size. If not, shut down and power off the system. Ensure that both DIMMs are properly seated in their sockets, and that both DIMMs are the same memory size.

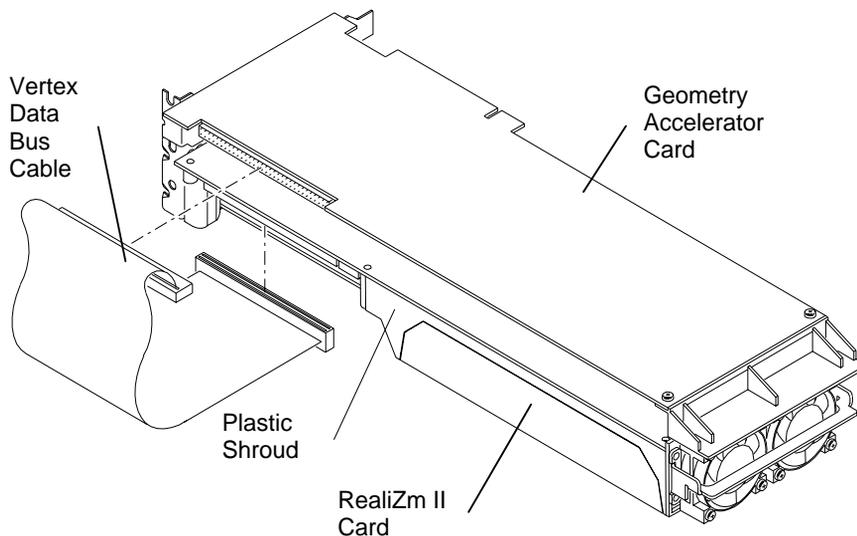
Replacing RealizM II Cards or the Optional Geometry Accelerator Card

An installed ZX13, VX25, or ZX25 card requires two adjacent PCI slots. An installed VX113 card requires one PCI slot. An installed VX113 AGP card requires one AGP slot. An installed optional Geometry Accelerator card requires one PCI slot.

NOTE The VX113 and VX113 AGP do not have the plastic shroud shown in the illustrations in the following procedure. However, the card and cable installation is the same as for the other RealizM II cards.

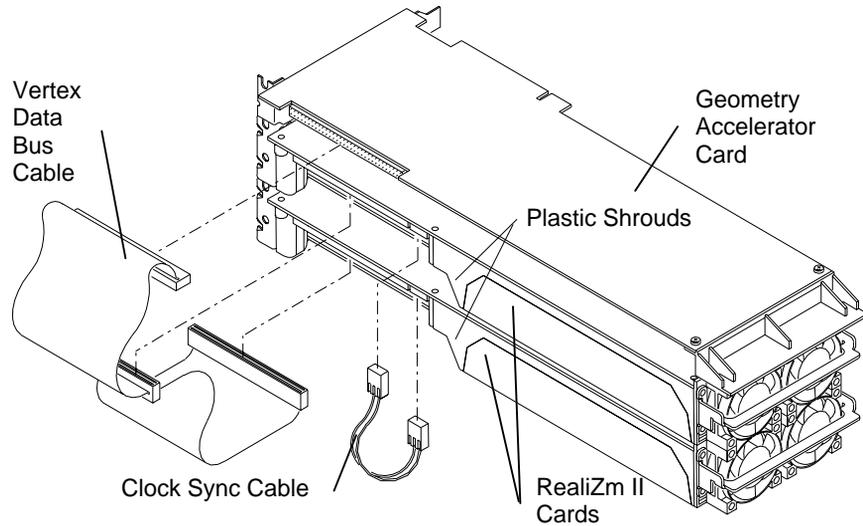
To replace a RealizM II or optional Geometry Accelerator card:

1. Shut down the system and turn off system power.
2. Disconnect the cables from the video ports on the back of the system base unit.
3. Open the system base unit as required to gain access to the slots.
4. If a Geometry Accelerator card is already installed in a single-screen configuration, disconnect the vertex data bus cable between it and the RealizM II card(s). The following figure shows one RealizM II card.

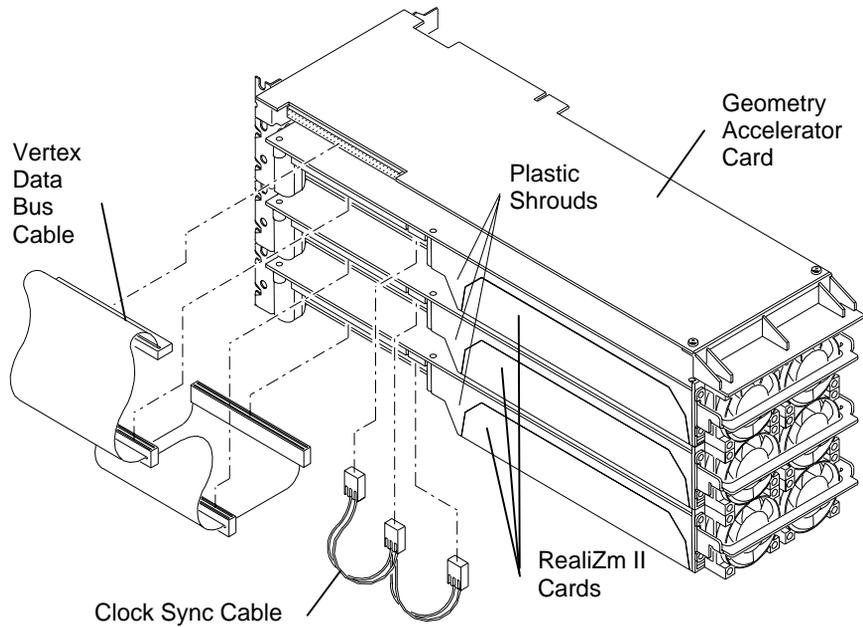


If a Geometry Accelerator card is already installed in a multiple-screen configuration, disconnect the vertex data bus cable between it and the RealizM II cards; then disconnect the clock sync cable between the RealizM II cards.

The following figure shows two RealizM II cards.



The following figure shows three RealizM II cards.



5. Use a quarter-inch nutdriver to remove the screws that secure the card(s) to the system chassis. Retain the screws.

If you are installing a new Geometry Accelerator card, use a quarter-inch nutdriver to remove the blanking plate from the slot into which you want to install the card. Retain the screw.

6. Remove the installed card(s) from the system.
7. Install the new RealizM II card(s) or Geometry Accelerator card in the slots from which you removed the previously installed cards.
8. Install the screws that were previously removed to secure the RealizM II or Geometry Accelerator card(s) to the system chassis.
9. If you are installing or reinstalling a Geometry Accelerator card, connect the vertex data bus cable between it and the RealizM II card(s). Refer to the figure in step 4.

NOTE The connector of the vertex data bus cable can be installed in only one orientation.

10. If you are replacing RealizM II cards in a multiple-screen configuration, connect the clock sync cable between the RealizM II cards. Refer to the figure in step 4.

CAUTION The clock sync cable installs only one way. Do not force the keyed connector. Ensure pin 1 of both cable connectors engages pin 1 on both card connectors. The black wire connects to pin 4.

11. Close the system base unit.
12. Go to “Connecting Monitors to RealizM II Cards” in Chapter 1 to connect the monitor cables.
13. Restart the system and log on to the Windows NT operating system.
14. To recognize multiple screens, use Display in the Control Panel to configure the video display driver. See “Configuring RealizM II Video Display Properties” in Chapter 1 for more information on video display properties.

Installing a Multiple-screen Upgrade

A multiple-screen upgrade provides components to upgrade your workstation from a single-screen configuration to a dual- or triple-screen configuration. Verify that you have the following items.

- ◆ RealizM II cards
- ◆ Dual- or triple-screen vertex data bus cable (used only if optional Geometry Accelerator is installed)
- ◆ Dual- or triple-screen clock sync cable
- ◆ Antistatic wrist strap

To install a multiple-screen upgrade, follow the instructions given in “Replacing RealizM II Cards or the Optional Geometry Accelerator Card.”

Reinstalling the RealIZm II Video Display Driver

Follow these instructions if you need to reinstall the RealIZm II video display driver.

To reinstall the RealIZm II video display driver:

1. Turn on system power and log on to the Windows NT operating system.
2. From the Start menu, go to Settings/Control Panel/Display/Settings.
3. In the Settings tab, click Display Type.
4. In the Display Type dialog, click Change.
5. In the Change Display dialog, click Have Disk.
6. Insert the diskette containing the RealIZm II video display driver into the system's floppy disk drive; then click OK.
7. At Change Display, click OK.
8. At the third-party driver warning, click Yes.
9. At the Installing Driver dialog, click OK.
10. At the Display Type dialog, click Close.
11. If desired, configure the video display according to the system configuration and your preferences. Refer to your system documentation, or select a setting and press F1, for more information.
12. Click Apply at the bottom of the dialog to apply the changes.
13. Remove the diskette from the system's floppy disk drive.
14. Restart the system.

Troubleshooting the Installation

If you suspect a hardware problem, use the following troubleshooting procedures to help determine which hardware assembly to return for repair.

Diagnostics

Diagnostic utilities for checking the RealIZm II and Geometry Accelerator cards and instructions for using them are available on the World Wide Web or from the Intergraph Bulletin Board Service (IBBS). Refer to the Preface of this document for more information.

Video Display

The following table lists some common video configuration problems.

Problem	Action
Display is black, not synchronized, or distorted.	Restart Windows NT in VGA mode.
Monitor does not support a selected resolution or refresh rate.	Select a supported resolution and refresh rate.
Two or three RealIZm II cards installed, but you cannot select the Multiple Screen option.	Verify proper installation of all RealIZm II cards (only one card was detected).
A dim line, rolling vertically, is visible on the screen (for multiple screens only).	Verify proper installation of the clock sync cable.

Obtaining a Usable Video Resolution

The system operates in VGA mode when the video display driver is not running to accommodate all monitor types. VGA mode is used during initial installation of the video display driver and when experiencing video problems. If you select a resolution that causes the monitor to display incorrectly, do not press CTRL+ALT+DEL to log on to the Windows NT operating system. Instead, use the Last Known Good option to return to the last known good configuration recorded by Windows NT.

To use the Last Known Good option:

1. Restart the system.
2. Press the space bar at the following prompt:

Press space bar NOW to invoke the Last Known Good Menu

If using the Last Known Good option fails to correct the video display problems, you can obtain a functional video resolution by restarting the system in VGA mode.

To restart the system in VGA mode:

1. Restart the system.
2. At the boot screen, select the VGA version of the operating system.

Determining a Defective Unit

If the monitor display is distorted, ensure the software setup is correct for the monitor type. If the software setup is correct, use a similar type monitor (if available and functioning properly) to determine if the workstation is defective.

To determine a defective unit:

1. Save and exit from all files, if possible; and then shut down Windows NT.
2. Turn off the power to the monitor and to the system base unit.

CAUTION Always turn off the power to the workstation before connecting or disconnecting the cables.

3. Check and reseat all card and cable connections as needed.
4. Turn on the monitor power. If the Power On LED does not illuminate, return the monitor.
5. Turn on the power to the system base unit. If the Power On LED on the base unit does not illuminate, or if the BIOS beep codes indicate a failure, return the workstation.

3 Technical Information

The following technical information is subject to change without notice.

General Specifications

<u>Graphics Card</u>	<u>Max Screen Resolution</u>	<u>Frame Buffer</u>	<u>Texture Memory</u>	<u>Geometry Acceleration</u>
ZX13	1.3 Mpixels	16 MB SDRAM		
ZX13-T	1.3 Mpixels	16 MB SDRAM	4 - 64 MB SDRAM	
ZX13-G	1.3 Mpixels	16 MB SDRAM		✓
ZX13-GT	1.3 Mpixels	16 MB SDRAM	4 - 64 MB SDRAM	✓
VX113-T	1.3 Mpixels	16 MB SDRAM	16 MB SDRAM	
VX113-GT	1.3 Mpixels	16 MB SDRAM	16 MB SDRAM	✓
VX113 AGP-T	1.3 Mpixels	16 MB SDRAM	16 MB SDRAM	
VX113 AGP-GT	1.3 Mpixels	16 MB SDRAM	16 MB SDRAM	✓
ZX25	2.5 Mpixels	32 MB SDRAM		
ZX25-T	2.5 Mpixels	32 MB SDRAM	4 - 64 MB SDRAM	
ZX25-G	2.5 Mpixels	32 MB SDRAM		✓
ZX25-GT	2.5 Mpixels	32 MB SDRAM	4 - 64 MB SDRAM	✓
VX25	2.5 Mpixels	32 MB SDRAM		
VX25-T	2.5 Mpixels	32 MB SDRAM	4 - 64 MB SDRAM	
VX25-G	2.5 Mpixels	32 MB SDRAM		✓
VX25-GT	2.5 Mpixels	32 MB SDRAM	4 - 64 MB SDRAM	✓

Monitor Resolutions

RealiZm II cards support standard and Intergraph multi-sync monitors at the following resolutions and maximum refresh rates (Hz).

<u>Resolution</u>	<u>ZX13</u>	<u>VX113</u>	<u>VX113 AGP</u>	<u>ZX25</u>	<u>VX25</u>
640 x 480	85	85	85	85	85
800 x 600	85	85	85	85	85
1024 x 768	85	85	85	85	85
1152 x 864	85	85	85	85	85
1280 x 960	85	85	85	85	85
1280 x 1024	85	85	85	85	85
1600 x 1200				75	75
1824 x 1368				65	65

RealizM II cards support Intergraph's high definition InterView 24-inch monitors at the following resolutions and maximum refresh rates (Hz).

<u>Resolution</u>	<u>ZX13</u>	<u>VX113</u>	<u>VX113 AGP</u>	<u>ZX25</u>	<u>VX25</u>
640 x 480	60	60	60	60	60
1280 x 800	90	90	90	90	90
1280 x 1024	75	75	75	75	75
1440 x 900	85	85	85	90	90
1600 x 1024				76	76
1600 x 1200				75	75
1824 x 1128				75	75
1920 x 1080				72	72
1920 x 1200				70	70

RealizM II cards support Intergraph's high definition InterView 28-inch monitors at the following resolutions and maximum refresh rates (Hz).

<u>Resolution</u>	<u>ZX13</u>	<u>VX113</u>	<u>VX113 AGP</u>	<u>ZX25</u>	<u>VX25</u>
640 x 480	75	75	75	75	75
800 x 600	75	75	75	75	75
856 x 480	75	75	75	75	75
1024 x 768	75	75	75	75	75
1280 x 720	75	75	75	75	75
1360 x 766	90	90	90	90	90
1520 x 856	85	85	85	90	90
1600 x 1200				70	70
1920 x 1080				75	75
2048 x 1152				72	72

Cooling System

RealizM II cards include high-power components that require proper cooling to ensure proper operation. On a ZX13, ZX25, or VX25 card, a duct covers the card and directs air over the components from two fans mounted at one end of the card. Air from inside the assembly moves outside the system at the I/O end of the card. On the VX113 and VX113 AGP cards, heat sinks provide component cooling.

Texture Memory

A ZX13, ZX25, or VX25 card provides texture memory by adding two dual inline memory module (DIMM) sockets. Both DIMM sockets must be populated with the same density DIMM. A slide-out cover provides easy access to the texture memory sockets. Although the VX25 card supports 4 MB of texture memory, 16 MB or larger is recommended for maximum performance.

The VX113 or VX113 AGP cards provide texture memory by including 16 MB of memory on the card. No other texture memory options are available.

Texture Memory	Bits Per Texel (RGBA)	Total Texels
4 MB	32	1 MTexels
16 MB	32	4 MTexels
32 MB	32	8 MTexels
64 MB	32	16 MTexels

Geometry Accelerator Support

An optional Geometry Accelerator card provides lighting and transformation operations for RealizM II cards, to offload the system's processors and provide for higher benchmark and application performance.

- ◆ The Geometry Accelerator card for VX113 and VX113 AGP uses twelve digital signal processors (DSPs).
- ◆ The Geometry Accelerator card for ZX13, VX25, and ZX25 uses six DSPs.

The Geometry Accelerator card sends data to the RealizM II cards via a dedicated vertex data bus, which has the following features:

- ◆ Dedicated 60-pin ribbon cable interface
- ◆ Peak transfer rate of 132 MB per second
- ◆ Up to three RealizM II cards can be interfaced to a single Geometry Accelerator card

Interfaces

A ZX13, ZX25, or VX25 card has three interface connections: a stereo sync output port, a video output port, and a VGA input port.

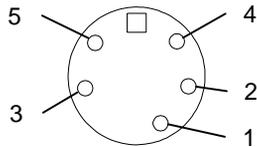
A VX113 or VX113 AGP graphics card has two interface connections: a stereo sync output port and a video output port.

Stereo Sync Output Port

The stereo sync output port provides connection to the LCD shutter glasses' emitter module. The following table provides the pin connections for the stereo sync output port.

<u>Signal Name</u>	<u>Pin</u>
Ground	1
Ground	2
+12V	3
Stereo Sync	4
No Connect	5

The stereo port is female, 5-pin, mini-DIN as shown in the following figure.

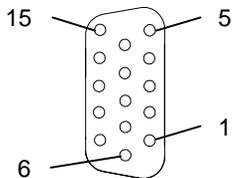


Video Output Port

The video output port provides connection to the monitor. The recommended cable length is less than three meters. The following table provides the pin connections for the video output port.

Signal Name	Pin
Red Analog Video	1
Green Analog Video	2
Blue Analog Video	3
Monitor ID [2]	4
Ground	5
Ground	6
Ground	7
Ground	8
Supply +5V	9
Ground	10
Monitor ID [0]	11
Monitor ID [1] or Bidirectional Data (SDA) for DDC	12
Horizontal/Composite Sync	13
Vertical Sync	14
Monitor ID [3] or Data Clock (SCL) for DDC	15

The video output port is female, 15-pin, D-Sub as shown in the following figure.



VGA Input Port

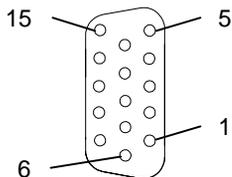
The VGA input port allows connection of a VGA device to be used by the system while in VGA graphics mode.

NOTE When the VGA input port is not used, an on-board VGA device assumes this function.

The following table provides the pin connections for the VGA input port.

Signal Name	Pin
Red Analog Video	1
Green Analog Video	2
Blue Analog Video	3
Monitor ID [2]	4
Cable Sense	5
Ground	6
Ground	7
Ground	8
No Connect	9
Ground	10
Monitor ID [0]	11
Monitor ID [1] or Bidirectional Data (SDA) for DDC	12
Horizontal/Composite Sync	13
Vertical Sync	14
Monitor ID [3] or Data Clock (SCL) for DDC	15

The VGA input port is female, 15-pin, D-Sub as shown in the following figure.



Index

A

About this document, v
Antistatic precautions, 7

C

Changing the default video display driver, 5
Clock sync cable
 dual-screen connection, 11
 triple-screen connection, 11
Configuring
 RealizM II video display properties, 4
Connection
 clock sync cable
 dual-screen, 11
 triple-screen, 11
 monitor cables, 2
 multi-screen, 3
 single-screen, 3
 vertex data bus cable
 dual-screen, 11
 single-screen, 10
 triple-screen, 11
Cooling system, 18
Customer support, vi

D

Default video display driver,
 changing, 5
Defective unit
 determining, 15
Diagnostics, 13
Document
 about, v
 conventions, v

F

FAXLink, vii

G

Geometry Accelerator
 installing, 10
 replacing, 7
 support, 19
Getting started, 1
 changing default video display driver, 5
 configuring RealizM II video display properties, 4
 RealizM II
 cards, 1
 configurations, 2
 connecting monitors, 2
 features and functions, 1
 starting Windows NT, 3

H

Hardware support services, vi

I

Installing
 Geometry Accelerator cards, 10
 multiple-screen upgrade, 12
 RealizM II cards, 10
 texture memory, 8
Interfaces, 20
 stereo sync output port, 20
 VGA input port, 22
 video output port, 21
Intergraph Bulletin Board Service (IBBS), vi

L

Last known good, 14

M

Monitor

- cables, connecting, 2
- resolutions, 17
- Multiple-screen
 - monitor connection, 3
 - upgrade, installing, 12
- O**
- Operating system information, v
- P**
- Packing list
 - multiple-screen option, verifying, 12
- Pinouts
 - stereo sync output port, 20
 - VGA input port, 22
 - video output port, 21
- Port
 - stereo sync output, 20
 - VGA input, 22
 - video output, 21
- Powering on the system, 3
- Precautions, 7
- R**
- RealIZm II
 - cards, 1
 - configurations, 2
 - configuring video display properties, 4
 - connecting monitors, 2
 - features and functions, 1
 - graphics, upgrading, 7
 - reinstalling the video display driver, 13
 - replacing, 7, 10
 - upgrading graphics, 7
- Reinstalling
 - RealIZm II video display driver, 13
- Replacing
 - Geometry Accelerator card, 7, 10
 - RealIZm II cards, 7, 10

- S**
- Selecting
 - last known good, 14
 - VGA mode, 15
- Single-screen connection, 3
- Software support services, vi
- Specifications, 17
 - cooling system, 18
 - Geometry Accelerator support, 19
 - interfaces, 20
 - monitor resolutions, 17
 - InterView 24-inch, 18
 - InterView 28-inch, 18
 - multi-sync, 17
 - RealIZm II cards, 17
 - texture memory, 19
- Stereo sync output port pinouts, 20
- Support options, vii
- Support services
 - hardware, vi
 - software, vi
 - telephone, vii
- System, powering on, 3
- T**
- Telephone support services, vii
- Texture memory, 19
 - installing, 8
 - socket, 8
- Troubleshooting, 13
- U**
- Upgrading
 - RealIZm II graphics, 7
- Usable video resolution, 14
- V**
- Vertex data bus cable
 - dual-screen connection, 11
 - single-screen connection, 10
 - triple-screen connection, 11
- VGA

input port pinouts, 22
mode, 15

Video

display
 properties, 4
 troubleshooting, 14
driver, reinstalling, 13

output port pinouts, 21
resolution, usable, 14

W

Windows NT, starting, 3
World Wide Web, vi

Returned Goods Authorization (RGA) Form

Date Returned _____ Base Serial No. _____
(On white bar code ID plate on back of base unit)

RGA No. _____ (From Intergraph Customer Response Center)

From Customer Name _____

Customer Contact _____ Phone _____

Mail Address _____

Reason for Return _____

NOTE All returned equipment MUST be shipped in original Intergraph packaging to obtain warranty service.

WARNING Back up disk drives before returning equipment. Intergraph is not responsible for data lost in shipping or repair process.

Warranty Procedure

Some malfunctioning equipment cannot be repaired in the field, and you must return it to Intergraph for repair. Follow these steps to obtain a Returned Goods Authorization (RGA) log number and return the malfunctioning equipment.

1. Determine the serial number of the system. The serial number is located on the white bar code identification label on the back of the base unit.
2. Call the Intergraph Customer Response Center at 1-800-633-7248, and identify your call to the operator as a Warranty Call. After giving the operator the serial number of the system, you will be assigned a RGA log number.
3. Complete the RGA Form on the previous page, entering the RGA log number obtained from the Customer Response Center. Ensure that the address in the From section is the location to which you want the equipment to be returned.
4. Place the RGA form in the box containing the equipment. This form must accompany returned equipment.
5. Secure a Repair Depot address label from the next page to the box containing the equipment.
6. Ship the box containing the equipment to Intergraph.

When the service activity has been completed by Intergraph, the repaired or replaced equipment will be shipped to the address listed on the RGA Form.

NOTE Parts damaged during shipping and parts not covered by the warranty are liable for repair charges.

TO Repair Depot RGA No. _____
Intergraph Corporation
9805 Kellner Road
Huntsville AL 35894

TO Repair Depot RGA No. _____
Intergraph Corporation
9805 Kellner Road
Huntsville AL 35894

TO Repair Depot RGA No. _____
Intergraph Corporation
9805 Kellner Road
Huntsville AL 35894
