Intense 3D Wildcat 4000 Graphics

Hardware User's Guide

October 1998

DHA032300

INTERGRAPH
COMPUTER SYSTEMS

FCC/DOC Compliance

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy. If the equipment is not installed and used in accordance with the instruction manual, it may cause harmful interference to radio communications.

Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations. Cet appareil numérique de la classe A respecte toutes les exigencies du Règlement sur le materiél brouilleur du Canada.

Warnings

Changes or modifications made to the system that are not approved by the party responsible for compliance could void the user's authority to operate the equipment.

To reduce the risk of electrical shock, do not attempt to open the equipment unless instructed. Do not use a tool for purposes other than instructed.

Notes

This device is designed and manufactured to comply with approved safety standards for information processing and business equipment.

Read all operating instructions before using this device. Keep these instructions for future reference. Follow all warnings on the device or in the operating instructions.

Contents

Preface

The *Intense 3D Wildcat 4000 Graphics Hardware User's Guide* provides information and technical specifications on Intergraph Computer Systems' Intense 3D Wildcat 4000 three-dimensional (3D) graphics accelerators.

About This Document

The *Intense 3D Wildcat 4000 Graphics Hardware User's Guide* is organized as follows:

- ◆ Chapter 1, "Getting Started," introduces Intense 3D Wildcat 4000 and its features, and describes how to get started using Intense 3D Wildcat 4000 in your workstation.

- ◆ Chapter 2, "Replacing and Upgrading Intense 3D Wildcat 4000," provides instructions for replacing Intense 3D Wildcat 4000 hardware, installing cards for single- and multi-screen configurations, reinstalling driver software, and troubleshooting the installation.

- ◆ Chapter 3, "Technical Information," provides technical information for Intense 3D Wildcat 4000.

Document Conventions

Bold	Commands, words, or characters that you key in literally.
Italic	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 the Intense 3D Wildcat 4000 graphics accelerator and describes how to get started using it in your workstation.

Features

Intense 3D Wildcat 4000 offers these high-end graphics features:

◆ 3D performance up to 3.4 million triangles per second (Z-buffered, 25 pixel, Gouraud shaded).

◆ Hardware Geometry Acceleration providing vertex processing rates up to 15 million vertices/sec.

◆ Support for Windows NT graphics -- Graphic Device Interface (GDI) and OpenGL -- and for Heidi and Intergraph RenderGL graphics libraries.

◆ Support for resolutions up to 1.3 megapixels (1280 x 1024).

◆ Support for graphics features such as Gouraud shading, 2D and 3D vectors and triangles, texture processing, rectangle fills, antialiased vectors, clipping, alpha blending, fog, and stenciling.

◆ 16 MB of Synchronous Dynamic RAM (SDRAM) frame buffer memory and 64 MB of SDRAM texture memory.

◆ Video plane sets of 100 bits per pixel (at 1280 x 1024), 128 bits per pixel (up to 1152 x 864).

◆ Four video lookup tables.

◆ 10-bit gamma correction.

◆ 24- or 32-bit double-buffering and 24- or 32-bit Z-buffering.

◆ Genlock support for multi-screen capability.

◆ Integrated VGA video support.

◆ Support for industry standard and Intergraph multi-sync monitors.

◆ Hardware support for stereoscopic viewing, Display Data Channel (DDC), and Display Power Management Signaling (DPMS).

◆ Multi-screen support.

Hardware

A single-screen Intense 3D Wildcat 4000 configuration uses a basic two-card set. Multi-screen configurations use the basic two-card set and one or more Intense 3D Wildcat 4000 multi-screen options.

Intense 3D Wildcat 4000 requires the use of these expansion slots:

Number of Screens	Expansion Slots
Single screen	One Advanced Graphics Port (AGP) slot Two Peripheral Component Interconnect (PCI) slots
Additional screens (up to four)	Two additional PCI slots for each additional screen

Software

Intense 3D Wildcat 4000 uses the Intense 3D Wildcat 4000 video display driver. The video display driver installs as a standard Windows NT driver, and provides both GDI and OpenGL graphics compatibility.

Intense 3D Wildcat 4000 can use Intergraph's Heidi Device Driver, which works with the video display driver to support software applications based on the Heidi graphics library.

Intense 3D Wildcat 4000 also works with applications built with Intergraph's RenderGL graphics library. RenderGL works with OpenGL to enable hardware acceleration of high-quality, photorealistic features on 3D models.

Connecting Monitors

In a workstation purchased with Intense 3D Wildcat 4000, the appropriate cards are already installed in the workstation base unit.

To connect monitors to Intense 3D Wildcat 4000:

1. Connect the workstation monitor's video cable to the blue video output port on the Intense 3D Wildcat 4000 two-card set. See the following figure.

Stereo Sync Output Port   Video Output Port (blue)
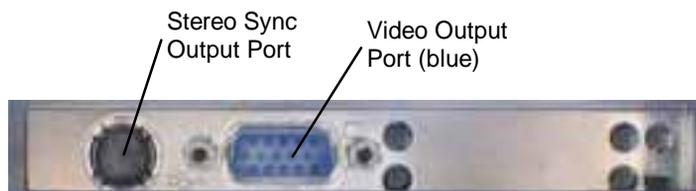
2. If your workstation includes any Intense 3D Wildcat 4000 multi-screen options, connect a video cable from each workstation monitor to the blue video output port on each multi-screen option. See the previous figure.

NOTE If a workstation monitor has no built-in video cable, use a shielded video cable with a 15-pin (D-sub) video connector at one end for the video output port on the card, and the appropriate connectors at the other end for the video input port on the workstation monitor.

Monitor input ports are usually D-sub or Bayonet Nut Connect (BNC) connectors. Shielded cables usually have a ferrite core (a box- or cylinder-shaped attachment) near each end to reduce interference with radio frequencies.

3. If you want to use a stereoscopic display device, connect the controller's stereo sync cable to the stereo sync output port on the Intense 3D Wildcat 4000 two-card set. See the previous figure, and see the documentation delivered with the stereoscopic display device for connection instructions.

4. Turn on power to the workstation. The video display starts in VGA mode.

If the screen display does not appear correct on multi-screen configurations, you may need to change the order in which the monitors and the Intense 3D Wildcat 4000 multi-screen options are connected. For example, in a three-monitor configuration, if the displays are reversed on the second and third monitors, swap the cable connections from these monitors to the Intense 3D Wildcat 4000 multi-screen options.

Configuring the Video Display

After connecting the monitors, you can turn on system power, start the Windows NT operating system, and configure the video display.

CAUTION Make sure the monitors are connected to the proper Intense 3D Wildcat 4000 ports before applying power to the monitors and to the workstation.

To start Windows NT:

1. Turn on power to the monitors and to the workstation.

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.

To enable your workstation to use Intense 3D Wildcat 4000, you must configure the display properties of the Intense 3D Wildcat 4000 driver software. The driver software is installed on the system's primary hard disk drive. The Display Properties dialog is available from the Windows NT 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 Intense 3D Wildcat 4000 driver software:

1. Close all open applications.

2. From the operating system Start menu, go to Settings/Control Panel/Display.

3. Use the dialog tabs to configure the operation of the workstation's video display when it is controlled by Intense 3D Wildcat 4000. For example, click the Settings tab to change the screen resolution.

4. Click OK to close the Display Properties dialog, or click Cancel to close Display Properties without applying the changes.

5. If you have changed video attribute settings other than gamma correction, restart the system for the changes to take effect.

For more detailed configuration information, refer to the README.TXT file delivered on the diskette containing the video display driver.

After you configure the video display as desired, verify that the Intense 3D Wildcat 4000 driver is the default video display driver that runs automatically when you start the workstation.

To verify the default video display driver:

1. From the operating system Start menu, go to Settings/Control Panel/System.

2. On the Startup/Shutdown tab, verify that the non-VGA version of Windows NT is selected in the Startup list. If it is not, select it from the list and click Apply.

3. Click OK to close the System dialog.

NOTE   Do not select the VGA version of the operating system. The video display runs in VGA mode when the Intense 3D Wildcat 4000 driver is not running.

If your workstation is configured for multi-screen display (with Intense 3D Wildcat 4000 multi-screen options installed), the video display driver treats the combined display area as a single canvas that covers all screens. In this Full Canvas style, windows centered on the canvas may be split between screens. This includes most system dialog boxes.

To activate multi-screen behavior:

1. From the operating system Start menu, go to Settings/Control Panel/Display/Intergraph Monitor.

2. Select the desired monitor orientation, and click Apply.

3. Click OK to exit the Display Properties dialog.

4. Click Yes to restart your workstation. You must restart the workstation for the change to take effect.

2   Replacing and Upgrading Intense 3D Wildcat 4000

Follow the instructions in this chapter if you must replace Intense 3D Wildcat 4000 in your workstation, or if you want a multi-screen configuration. Refer to your workstation's documentation for instructions on opening and closing the system, identifying AGP and PCI expansion slots, and adding expansion cards.

Taking Antistatic Precautions

Static electricity can damage the components inside a computer or on a printed circuit card. To reduce the possibility of electrostatic discharge:

- ◆   Turn off power to the computer.

- ◆   Touch the metal chassis of the computer to drain off any static electricity before touching a card.

- ◆   Wear a properly connected grounding wrist strap when handling a card or working in a computer.

- ◆   Do not wear wool or polyester clothing.

- ◆   Work in an area with a relative humidity of at least 50 percent.

- ◆   Keep cards in antistatic bags until you are ready to install them.

- ◆   Handle cards as little as possible and by the edges only.

Collecting Materials and Tools

Make sure you have the following materials and tools, as appropriate:

- ◆   Intense 3D Wildcat 4000 card set (one AGP and one PCI).

- ◆   For multi-screen configurations, Intense 3D Wildcat 4000 multi-screen options.

- ◆   For multi-screen configurations, the multi-screen cable kit (which includes vertex data bus cables and genlock cables).

- ◆   Diskette with the Intense 3D Wildcat 4000 video display driver.

- ◆   Flat-head or Phillips screwdriver, as required to prepare your workstation for installation of the multi-screen options.

Removing and Installing Cards

To remove installed Intense 3D Wildcat 4000 cards:

1. Turn off power to the workstation and to the monitors.

2. Open the workstation to gain access to the expansion slots.

3. If you are replacing the two-card set, disconnect the vertex data bus cable from the AGP card and the PCI Card. If Intense 3D Wildcat 4000 multi-screen options are installed in the system, disconnect the genlock cable from the PCI card of the two-card set. See the following figure.

4. If you are replacing one or more Intense 3D Wildcat 4000 multi-screen options, remove the vertex data bus cable and the genlock cable from each of the options you are replacing.

5. Remove the two-card set and the multi-screen options, as appropriate. Keep the screws; you will use them to secure the cards to the workstation's chassis later.
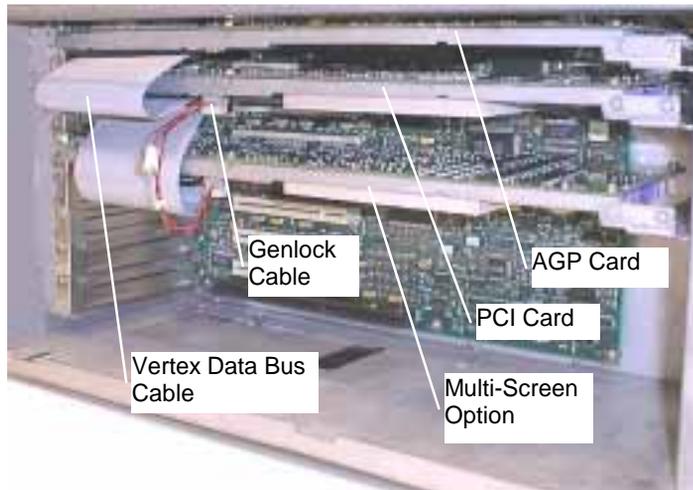
To install Intense 3D Wildcat 4000 cards:

CAUTION For a multi-screen configuration, you must use the appropriate vertex data bus cable and genlock cable. The vertex data bus cable connects to all of the cards, so use the vertex data bus cable with the same number of connectors as there are cards. The genlock cable connects only the Intense 3D Wildcat 4000 PCI card and multi-screen options, so use the genlock cable with the same number of connectors as there are screens. You <u>must</u> connect the vertex cable and (if applicable) the genlock cable to a card <u>before</u> you insert the next card.

1. For the basic two-card set, align the AGP card with the AGP expansion slot, making sure the gold-fingered connections on the card's edge are aligned properly with the slot connector.

2. Push the AGP card into the AGP slot firmly and evenly until it is fully seated in the AGP slot connector.

3. Visually inspect the connection. If it does not appear to be correct, remove and reinstall the AGP card.

4. Use the screws you removed previously to secure the AGP card to the workstation's chassis.

5. Plug one end of the vertex data bus cable into the connector on the AGP card. The connector is keyed for proper insertion.

CAUTION   You <u>must</u> connect the vertex cable to the AGP card <u>before</u> you insert the PCI card.

6. Identify the PCI slot next to the AGP slot.

7. Align the PCI card with the PCI expansion slot, making sure the gold-fingered connection on the card's edge are aligned properly with the slot connector.

8. Push the PCI card into the slot firmly and evenly until it is fully seated in the slot connector.

9. Visually inspect the connection. If it does not appear to be correct, remove and reinstall the card.

10. Use the screws you removed previously to secure the card to the workstation's chassis.

11. Plug the other end of the vertex data bus cable into the connector on the PCI card. The connector is keyed for proper insertion.

The following figure shows an example installation of the single-screen configuration.

To complete a single-screen installation, skip the rest of this section and follow the instructions in "Finish the Installation" later in this chapter.
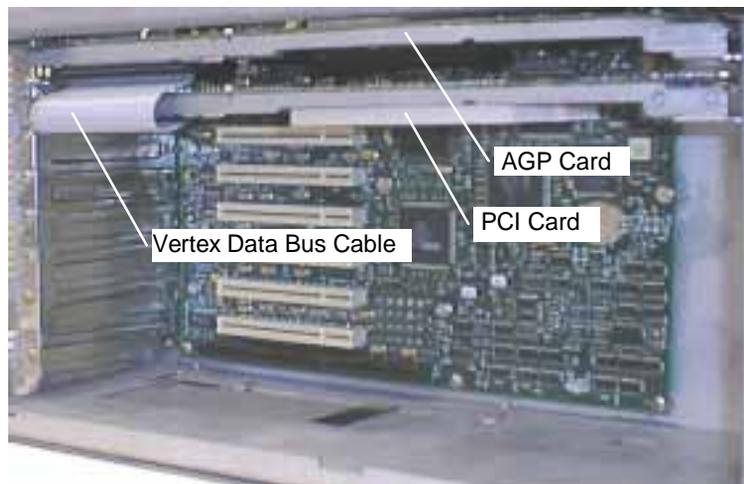
12. Plug one end of the appropriate genlock cable (for two, three, or four screens) into the connector on the PCI card. The connector is keyed for proper insertion.

CAUTION You <u>must</u> connect the genlock cable <u>before</u> you insert the multi-screen option.

13. Identify the PCI slots you will use for the Intense 3D Wildcat 4000 multi-screen options. You will skip the PCI slot adjacent to the Intense 3D Wildcat 4000 PCI card you installed in steps 6 through 12. For each additional multi-screen option, you will use two PCI slots, leaving an open PCI slot between multi-screen options.

CAUTION You <u>must</u> leave an open PCI slot between multi-screen options.

14. Repeat steps 7 through 12 for each multi-screen option you want to install.

CAUTION Connect the vertex data bus cable connector and the genlock cable connector to each multi-screen option before installing the next one.

The following picture shows an example installation of a two-screen configuration.
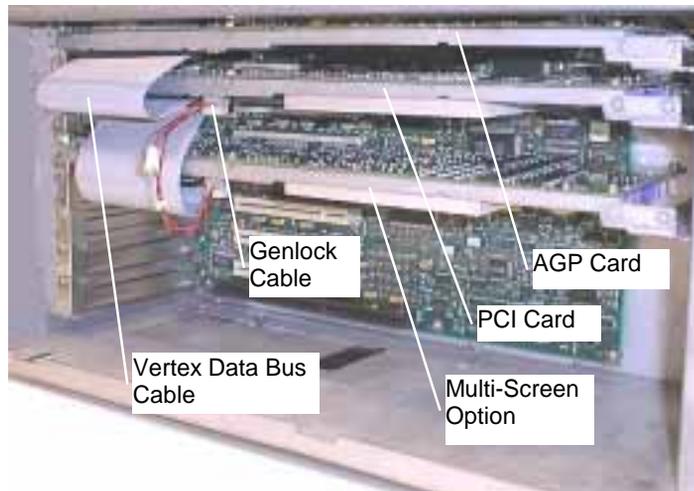
Finishing the Installation

To finish the installation:

1. Close the workstation.

2. Connect the workstation's monitors as described in Chapter 1, "Getting Started."

Reinstalling Driver Software

Follow these instructions if you have to reinstall Intense 3D Wildcat video display driver software. Refer to the Microsoft Windows NT documentation and online Help for more information on installing drivers and software application programs, and configuring your workstation's video display.

Make sure your workstation has the following before attempting to install Intense 3D Wildcat driver software:

◆ Windows NT Workstation 4.0 (or later) operating system with the latest Service Pack software installed. Use either Service Pack 3 and the appropriate Quick Fix Engineering (QFE) product (QFE_NT*), or Service Pack 4.

◆ 3 MB of free space on the computer's primary system disk.

To install Intense 3D Wildcat 4000 driver software:

CAUTION Make sure you have the correct driver to use with the Windows NT 4.0 (or later) operating system. If you are unsure, refer to the README.TXT file on the driver diskette for this information.

1. Insert the first diskette containing the Intense 3D Wildcat 4000 driver software into the workstation's floppy disk drive.

2. Log on to Windows NT using an account that has administrative privileges.

NOTE If the screen display appears does not appear correct on multi-screen configurations, you may need to change the order in which the monitors and the multi-screen options are connected. 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, swap the cable connections to the multi-screen options.

3. Create a directory on the workstation's primary system disk, and copy the contents of the Intense 3D Wildcat 4000 video driver diskettes to that directory.

4. From the operating system Start menu, go to Settings/Control Panel/Display/Settings.

5. Click Display Type, and then click Change.

6. In the Change Display dialog, click Have Disk.

7. In the Install From Disk dialog, type the path to the directory you created in step 3, and click OK.

8. Verify that the Intergraph Intense 3D Wildcat 4000 driver is highlighted in the Change Display dialog, and click OK.

9. Click Yes when asked if you want to install a third-party driver. The driver files are copied from the directory on your workstation's primary hard disk drive.

10. After the driver files are successfully copied, a message that the driver successfully installed displays. Click OK.

11. Click Close to exit the Display Type dialog.

12. Click Close to exit the Display Properties dialog.

13. When told that the workstation must be restarted for the new settings to take effect, remove the diskette from the workstation's floppy disk drive and click Yes to restart the workstation.

14. After the system restarts and you log in, a message displays. The message states that a new graphic driver has been installed, and that you should use the Display option in the Control Panel to select the preferred display resolution. Click OK.

CAUTION   When you select Display in the Windows NT Control Panel, a message displays. Click OK to close the message. This message displays every time you select Display unless you clear the check box for Show warning at startup.

15. If you want to change the display resolution or other display settings, see the following section, "Configure the Video Display."

For more detailed installation information, refer to the README.TXT file delivered on the diskette containing the video display driver.

Troubleshooting the Installation

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.	Restart the computer, boot into VGA mode, and select a supported resolution and refresh rate.
Two or three cards installed, but you cannot select the Multiple Screen option.	Verify proper installation of all 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 genlock cable.

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.

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; then shut down Windows NT.

2. Turn off the power to the monitor and to the workstation.

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.

Hardware Specifications

Item	Specification
System	PCI Local Bus Standard 2.1 and AGP 2.0
Card Sizes	12.25 in x 3.875 in full-length AGP card
	12.25 in x 3.875 in full-length PCI card
Interrupts	PCI-assigned -- Interrupt A for Intense 3D

Monitor Resolutions

In the following tables, **i** indicates an interlaced frequency.

Intense 3D Wildcat 4000 supports standard multi-sync monitors, including Intergraph 17-inch and 21-inch multi-sync monitors, at the following resolutions and maximum refresh rates (Hz).

Resolution	Aspect Ratio	Bits Per Pixel	Vertical Refresh Rates (Hz)
640 x 480	4 x 3	128	60, 72, 75, 85, 60**i**
800 x 600	4 x 3	128	60, 72, 75, 85, 60**i**
1024 x 768	4 x 3	128	60, 70, 75, 85, 60**i**
1152 x 864	4 x 3	128	60, 70, 75, 85, 60**i**
1280 x 960	4 x 3	100	60, 75, 85, 60**i**
1280 x 1024	5 x 4	100	60, 75, 85, 60**i**

Intense 3D Wildcat 4000 supports Intergraph InterView-20, InterView-21, and InterView-27 monitors at the following resolutions and maximum refresh rates (Hz).

Resolution	Aspect Ratio	Bits Per Pixel	Vertical Refresh Rates (Hz)
640 x 480	4 x 3	128	154 (20), 185 (21), 151 (27)
800 x 600	4 x 3	128	126 (20), 153 (21), 123 (27)
1024 x 768	4 x 3	128	99 (20), 122 (21), 98 (27)
1280 x 960	4 x 3	100	81 (20), 79 (27)
1280 x 1024	5 x 4	100	76 (20), 72**i** (20), 74 (27), 70**i** (27)

Intense 3D Wildcat 4000 supports InterView 28hd96 monitors at the following resolutions and maximum refresh rates (Hz).

Resolution	Aspect Ratio	Bits Per Pixel	Vertical Refresh Rates (Hz)
640 x 480	4 x 3	128	75
800 x 600	4 x 3	128	75
1024 x 768	4 x 3	128	75
856 x 480	16 x 9	128	50, 60, 75
1280 x 720	16 x 9	128	50, 60, 75
1360 x 766	16 x 9	100	72, 75, 85, 90, 60**i**
1520 x 856	16 x 9	100	60, 70, 75, 85, 60**i**

Intense 3D Wildcat 4000 supports Sony GDM-W900 monitors at the following resolutions and maximum refresh rates (Hz).

Resolution	Aspect Ratio	Bits Per Pixel	Vertical Refresh Rates (Hz)
640 x 480	4 x 3	128	60
1280 x 1024	5 x 4	100	75
1280 x 800	16 x 10	128	60, 75, 85, 90
1440 x 900	16 x 10	100	60, 75, 85

VGA Video Display Support

Intense 3D Wildcat 4000 provides onboard VGA video display support. The maximum resolution supported is 800 x 600, 4 bits per pixel, at 60 Hz vertical refresh.

Geometry Processing

Geometry processing is provided by the onboard programmable geometry processing engine. This engine can execute up to 3,000 million floating point operations per second (MFLOPS).

Geometry operations that are hardware-accelerated include:

- Model View matrix transformation of vertex and normal coordinates.

- Texture matrix transformation of texture coordinates.

- Full lighting calculations with multiple light sources.

- Up to six user clip planes.

- Perspective transformation.

- Viewport transformation.

- View volume clipping.

- Local Display List storage and processing.

Texture Processing

Texture processing is provided by the onboard graphics/texture processing engine. Full texture processing is supported, including trilinear interpolation of MIP-mapped images.

The 64 MB texture memory provides texture acceleration up to 16 Mtexels at 32 bits per texel (RGBA) and supports a map size up to 1K x 1K (MIP-mapped or non-MIP-mapped).

DDC and DPMS Support

Intense 3D Wildcat 4000 provides hardware support for the Display Data Channel (DDC) standard for communication between a workstation and its monitor. Intense 3D Wildcat 4000 supports the DDC2B standard, which allows for bidirectional communication.

Intense 3D Wildcat 4000 provides hardware support for the Display Power Management Signaling (DPMS) standard. DPMS allows for a workstation to send its monitor a signal to enter a power-saving mode.

Interfaces

Intense 3D Wildcat 4000 has two interfaces: a video output port and a stereo sync output port. These interfaces are described in the following sections.

Video Output Port

The video output port is a blue, female, 15-pin, D-Sub connector. The port provides connection to a workstation monitor. The recommended cable length is less than three meters.

Pin	Signal Name	Pin	Signal Name
1	Red Analog Video	9	+5V Supply
2	Green Analog Video	10	Ground
3	Blue Analog Video	11	Monitor ID (bit 0)
4	Monitor ID (bit 2)	12	Monitor ID (bit 1) *
5	Ground	13	Horizontal Sync
6	Ground	14	Vertical Sync
7	Ground	15	Monitor ID (bit 3) **
8	Ground		

* Bidirectional Data (SDA) for DDC
** Data Clock (SCL) for DDC
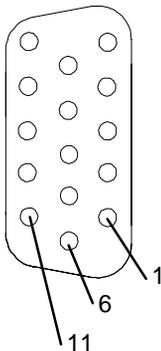
Stereo Sync Output Port

The stereo sync output port is a female, 5-pin, mini-DIN connector. The port provides connection to the emitter module of a pair of LCD shutter glasses.

Pin	Signal Name
1	Ground
2	Ground
3	+12V
4	Stereo Sync
5	No Connect
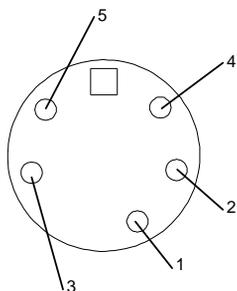
Returned Goods Authorization (RGA) Form

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

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        Huntsville AL 35894

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