# Intense 3D Pro 2200

*Installation Guide*

April 1998

DHA019250

# INTERGRAPH
## COMPUTER SYSTEMS

## Notice

Information in this document is subject to change without notice and should not be considered a commitment by Intergraph Computer Systems. Intergraph Computer Systems shall not be liable for technical or editorial errors in, or omissions from, this document. Intergraph Computer Systems shall not be liable for incidental or consequential damages resulting from the furnishing or use of this document.

All warranties given by Intergraph Computer Systems about equipment or software are set forth in your purchase contract. Nothing stated in, or implied by, this document or its contents shall be considered or deemed a modification or amendment of such warranties.

## Trademarks

Intergraph Computer Systems and the Intergraph Computer Systems logo are registered trademarks of Intergraph Computer Systems. Intense 3D is a trademark of Intergraph Corporation.

Other brands and product names are trademarks of their respective owners.

## FCC/DOC Compliance

This equipment has been tested and found to comply with the limits for a Class B 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 residential installation. This equipment generates, uses, and can radiate radio frequency energy. If the equipment is not installed and used in accordance with the instructions, it may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, try to correct the interference as follows: re-orient or relocate the affected device; increase the separation between this equipment and the affected device; connect this equipment to an outlet on a circuit different from the circuit to which the affected device is connected; consult a dealer or an experienced radio/television technician for help.

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations. Cet appareil numérique de la classe B 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 comply with FCC Class B limits, you must use shielded cables with this device.

**Notes**

This device is for use only with U.L. listed personal computers that have installation instructions detailing user installation of card cage accessories.

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.

**Warranty**

Intergraph Corporation warrants to the purchaser of this product that it will be free from defects in material and workmanship for a period of three (3) years from the date of purchase. If the product should become defective within the warranty period, Intergraph will, at its option, repair or replace it, provided it is delivered at the purchaser's expense to the place of purchase or to Intergraph. No other warranty is expressed or implied.

This limited warranty does not cover any loss or damage resulting from shipping, weather, improper installation or maintenance, accident, misuse, abuse or neglect, adjustment, repair, modification, or installation of options or parts by anyone other than Intergraph Corporation. The limited warranty also does not cover improper environment, excessive or inadequate heating or cooling, or irregularities in electrical power service. This limited warranty applies only to the original purchaser and is not transferrable.

Intergraph Corporation is not liable for damages arising out of the use or inability to use this product. Some states do not allow the exclusion or limitation of incidental or consequential damages for consumer products, so these limitations may not apply to you.

To obtain warranty service during the warranty period, the purchaser shall return the product in its original packaging to the place of purchase along with proof of purchase showing the purchase date. If the reseller's warranty period has expired, the purchaser shall return the product directly to Intergraph. The purchaser shall bear shipping, packaging, and insurance costs for delivering the product to Intergraph. Intergraph will provide return shipment to the purchaser.

# 1    Introduction

Congratulations!  In choosing Intense 3D Pro 2200, you are equipping your personal computer or personal workstation with powerful and professional 3D graphics.  Intense 3D Pro 2200 infuses Intel ® Pentium™, Pentium Pro, and Pentium II computers running the Microsoft® Windows NT™ operating system with workstation-class 3D graphics features and performance.

## Features

Intense 3D Pro 2200 offers these high-end 3D graphics features:

- Performance up to 1.2 million triangles per second (3D, Z-buffered, 25 pixel, Gouraud shaded).

- Support for Windows NT graphics -- Graphic Device Interface (GDI) and OpenGL.

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

- Support for Heidi and Intergraph RenderGL graphics libraries.

- 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.

- Video plane sets of 100 bits per pixel (at 1280 x 1024), 128 bits per pixel (up to 1152 x 864), and four video lookup tables.

- 10-bit gamma correction.

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

- Peripheral Component Interconnect (PCI) interface with direct memory access (DMA).

- Genlock support for dual-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).

## Hardware

Intense 3D Pro 2200 hardware is available in these configurations:

| Designation | Configuration |
|---|---|
| Intense 3D | Graphics Accelerator |
| Intense 3D-4T | Graphics Accelerator + 4 MB Texture Memory |
| Intense 3D-16T | Graphics Accelerator + 16 MB Texture Memory |

Texture memory is available through a single add-on texture memory module. Dual-screen capability is available by using two Intense 3D Graphics Accelerators.

Intense 3D Pro 2200 hardware requires the following PCI expansion slots:

| Designation | PCI Expansion Slots |
|---|---|
| Intense 3D, Intense 3D-4T, Intense 3D-16T | One slot |
| Dual-screen capability | One additional slot |

## Software

Intense 3D Pro 2200 software uses the Intense 3D Pro 2200 video display driver. The video display driver installs as a standard Windows NT driver, and provides both GDI and OpenGL graphics compatibility.

Intense 3D Pro 2200 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 Pro 2200 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. More information on the Heidi Device Driver and Intergraph's RenderGL graphics library is available on Intergraph Computer Systems' World Wide Web site (see Chapter 5).

# 2 Preparing for Installation

Follow these instructions to prepare your computer for Intense 3D Pro 2200.

## Make Sure Your Computer Is Ready

Make sure your IBM PC-compatible computer has the following:

◆ A Pentium, Pentium Pro, or Pentium II processor.

◆ A high-resolution multi-sync analog RGB monitor.

◆ Windows NT 4.0 operating system.

◆ A BIOS that supports PCI-to-PCI bridges.

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

◆ Open PCI expansion slots that support PCI bus mastering, one for each board you want to install.

◆ A power supply that provides +3.3V to the PCI bus.

## Take Antistatic Precautions

Static electricity can damage the components inside a computer or on a printed circuit board. To keep the possibility of electrostatic discharge to a minimum, do the following:

◆ Turn off power to the computer.

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

◆ Wear a properly connected grounding wrist strap when handling a board 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.

◆ Do not remove a board from its antistatic bag until you are ready to install it.

◆ Handle a board as little as possible and by the edges only.

## Collect Materials and Tools

Collect the following materials and tools:

- Intense 3D Pro boards and texture memory modules (if needed).

- Diskette containing the Intense 3D Pro 2200 video display driver.

- Flat-head or Phillips screwdriver, as required to prepare your computer's PCI slots for installation of the option boards.

- Monitor cable supplied with your computer or its monitor.

- Your computer's documentation.

Retain all packaging materials. You must return your Intense 3D Pro 2200 hardware in its original packaging to obtain warranty service.

## Make a Copy of the Video Display Driver Diskette

Make a copy of the diskette containing the Intense 3D Pro 2200 video display driver as a precaution. Should anything happen to the copy, you will still have the original diskette.

See your computer's documentation to make a backup copy of the video display driver diskette. Store the original video display driver diskette in a safe place, and use the backup video display driver diskette during the installation.

## Read the Instructions

Before installing Intense 3D Pro 2200, read Chapter 3, "Installing the Hardware," and Chapter 4, "Installing the Software" completely. You may want to review the README.TXT file on the video display driver diskette as well.

Review your computer's documentation for instructions on opening and closing the computer, identifying PCI expansion slots, disabling on-board graphics acceleration, and adding expansion boards.

Review the Microsoft Windows NT documentation and online Help for information on using the Display application, and for instructions on installing drivers and software application programs.

# 3    Installing the Hardware

Refer to your computer's documentation for instructions on opening and closing the computer, identifying PCI expansion slots, disabling on-board graphics acceleration, and adding expansion boards.

## Add Texture Memory

If you want to add texture memory to a Graphics Accelerator, do so before you install the board in the computer.

**To add texture memory:**

1.  Place the Graphics Accelerator board on a solid, flat, non-static surface.

2.  Remove the screw from the standoff attached to the board near the texture memory module connectors.  Refer to the following figure.

3.  Align the two connectors on the texture memory module with the two texture memory module connectors on the board.  Refer to the following figure.

4.  Push the module firmly onto the board.  Apply even pressure to the entire module to seat it firmly in the connectors.

5.  Install the screw through the module and the standoff to secure the module to the board.  Refer to the following figure.
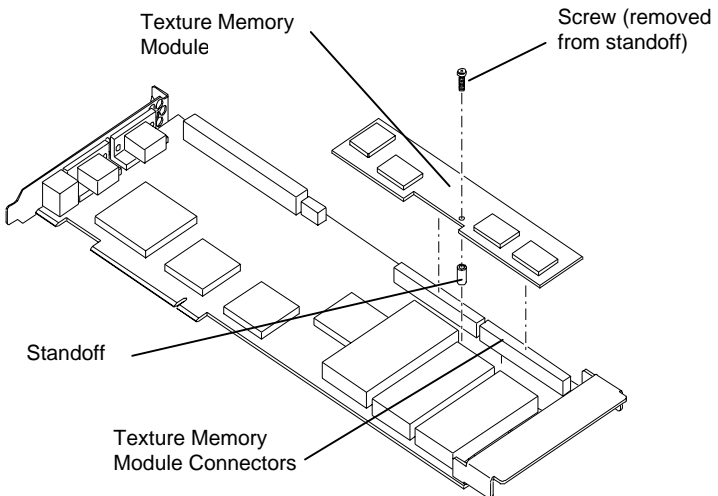
## Start the Installation

**To start the installation:**

1. Turn off power to the computer and to the monitor.

2. Open the computer to gain access to the PCI expansion slots.

3. If your computer has an installed graphics accelerator, remove it. If your computer has a graphics accelerator integrated onto the system board, disable it.

4. Select the PCI expansion slots into which you will install the boards. Select one open PCI slot for one Graphics Accelerator, or two open PCI slots for two Graphics Accelerators (to provide dual-screen capability).

5. Remove the slot covers from the selected PCI slots. Retain the screws from the slot covers; you will use them to secure the boards to the computer's chassis.

## Install the Boards

**To install a Graphics Accelerator board:**

1. Align the board with the PCI expansion slot, making sure the gold-fingered connectors on the board's edge are aligned properly with the slot connector.

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

3. Visually inspect the connection. If it does not appear to be correct, remove and re-install the board.

4. Use the screws you removed previously to secure the board to the computer's chassis.

## Finish the Installation

**To finish the installation:**

1. Close the computer.

2. Connect the computer monitor's video cable to the **<u>blue</u>** video output port on the Graphics Accelerator. Refer to the following figure.

If installing two Graphics Accelerators for dual screen-capability, connect a video cable from each computer monitor to the **<u>blue</u>** video output port on each Graphics Accelerator.

**CAUTION**   Do not connect the monitor's video cable to the **<u>black</u>** VGA input port on an installed Graphics Accelerator. If you do, the computer will boot to a blue screen and stop, or video will not display.

Stereo Sync Output      Video Output (Blue)      VGA Input (Black)
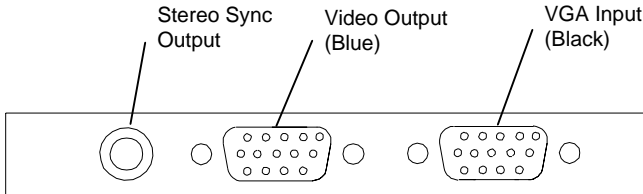
If a computer monitor has no built-in video cable, use a shielded video cable with a 15-pin (D-sub) video connector at one end for the video output port on the Graphics Accelerator, and the appropriate connectors at the other end for the video input port on the computer monitor.

**NOTE**   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 the computer monitor supports stereoscopic viewing, connect the computer monitor's stereo sync cable to the stereo sync output on the Graphics Accelerator. Refer to the previous figure.

4.   Turn on the computer. The video display starts in VGA mode.

5.   Install the Intense 3D Pro 2200 video display driver as instructed in Chapter 4, "Installing the Software."

# Using Another VGA Video Display Device

You can use another VGA video display device, such as a computer system's onboard VGA controller, instead of using the on-board VGA support provided with Intense 3D Pro 2200.

**To use another VGA display device:**

1.   Connect a jumper (not supplied) across jumper connector J1 on the Graphics Accelerator to disable its VGA support. J1 is also labeled VGA DIS, and is located next to the Vertex data bus connector.

2. Connect a video cable (not supplied) from the video output port on the other VGA video display device to the **<u>black</u>** VGA input port on the Graphics Accelerator.  Refer to the figure on the previous page.

See Chapter 6, "Technical Information," for detailed information on ports.

# 4    Installing the Software

Refer to the Microsoft Windows NT documentation and online Help for more information on installing drivers and software application programs, and configuring your computer's video display.

## Install the Intense 3D Pro 2200 Video Display Driver

**To install the Intense 3D Pro 2200 video display driver:**

1.  Insert the diskette containing the video display driver into the computer's floppy disk drive.

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

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

3.  In the Windows NT Control Panel, open Display to view the Display Properties dialog.

4.  Click Settings (tab), then click Display Type, and then click Change. The Change Display dialog displays.

5.  Click Have Disk. The Install From Disk dialog displays.

6.  Type the driver path name (for example, **a:\** ), and then click OK.

7.  Verify that the Intergraph Intense 3D driver is highlighted in the Change Display dialog, and then click OK.

8.  Click Yes when asked if you want to install a third-party driver. The driver files are then copied from the diskette to your computer's hard drive.

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

10. Click Close to exit the Display Type dialog.

11. Click Close to exit the Display Properties dialog.

12. When informed that the computer must be restarted for the new settings to take effect, remove the diskette from the floppy disk drive and click Yes to restart the computer.

13. 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.

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

**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 Show warning at startup check box.

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

## Configure the Video Display

Open Display in the Control Panel to view the Display Properties dialog.  Use the dialog tabs to configure the operation of the computer's video display when it is controlled by the Intense 3D Pro 2200 Graphics Accelerator.  For example, click the Settings tab to change the screen resolution, or click the Hardware Settings tab to choose the monitor type.

**NOTE**   If you change any video attribute settings other than gamma correction and screen resolution, you must restart the computer to make the changes take effect.

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

## Verify the Default Video Display Driver

After you configure the video display as desired, verify that the Intense 3D Pro 2200 video display driver is the default video display driver that runs automatically when you start the computer.

**To verify the default video display driver:**

1. In the Windows NT Control Panel, open System.

2. In the System dialog, on the Startup/Shutdown tab, verify that Windows NT Workstation Version 4.00 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 mode" version of  the operating system. The video display runs in VGA mode when the Intense 3D Pro driver is not running.

## Activate Dual-Screen Behavior

If your computer is configured for dual-screen display (with two Intense 3D Pro 2200 Graphics Accelerators installed), the video display driver treats the combined display area of the dual screens as a single canvas that covers both screens. In this Full Canvas style, windows centered on the canvas are split between the two screens. This includes most system dialog boxes.

**To activate dual-screen behavior:**

1.  In the Windows NT Control Panel, open Display to view the Display Properties dialog.

2.  Click Hardware Settings (tab).

3.  Select Dual Screen, Horizontal or Dual Screen, Vertical from the Screen Options list, and then click Apply.

4.  Click OK to exit the Display Properties dialog.

5.  Click Yes to restart your computer. You must restart the computer for the dual screen change to take effect.

# 5    Getting Help

Use the information in this chapter if you encounter a problem with Intense 3D Pro 2200, if you want to get product information or fixes, or if you want to contact Intergraph for help.

## World Wide Web

If your computer has a World Wide Web browser, connect to the Intense 3D Pro pages at **http://www.intergraph.com/ics/intense3d** for the latest Intense 3D Pro information and driver software.

## Intergraph Bulletin Board Service

If your computer has a modem, log on to the Intergraph Bulletin Board Service (IBBS).  You can use the IBBS to get the latest Intense 3D Pro information and driver software.

**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 1-205-730-8786.  Outside the United States, call one of the mirror sites listed on the 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.  For the latest Intense 3D Pro 2200 information and driver software, go to (I) Intergraph Product Centers, (W) Consumer Products, (F) File Libraries, and (B) Intense 3D.

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 1-205-730-1413.

## FAXLink

**To use the FAXLink:**

◆  Call 1-800-240-4300 with questions about how to get technical support information using the FAXLink.

◆  Call 1-205-730-9000 to get documents (up to five per call).

## Telephone

**To get customer support by telephone:**

◆ In the United States, call 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:**

◆ Product name (Intense 3D Pro 2200).

◆ Your computer's vendor.

◆ Your computer's model number, or its system board vendor and chip set.

◆ Your computer's BIOS manufacturer and version number.

◆ Your name and telephone number.

◆ A brief description of the question or problem.

## Warranty Service

Contact the original place of purchase to get warranty service for your Intense 3D Pro 2200 board. If your warranty period has expired, you may still be eligible for warranty service from Intergraph. Refer to the warranty statement at the beginning of this document for details.

**To get warranty service for Intense 3D Pro 2200:**

1. Call the Customer Response Center. Tell the operator you want to return an Intense 3D Pro 2200 board for service, and give the operator the serial number found on the board. The operator will give you a Returned Goods Authorization (RGA) number. The operator will also submit your service request to the Warranty Administrator, who will call you back as soon as possible.

2. When the Warranty Administrator calls, choose one of the following service options:

   − Return the board to Intergraph for repair or replacement. Intergraph will send you a new or repaired board as soon as possible.

   − Accept a replacement board by overnight shipment, subject to availability of parts. You must provide a credit card number,

and you must return the failing board within 30 days or be charged for a new board.

3. Make a copy of the original sales receipt or other document that supports your proof of purchase.

4. Put the failing board in its original packaging along with your proof of purchase, and return it to Intergraph by the carrier of your choice.

You can check the status of your service request by calling the Warranty Administrator at 800-557-4484.  You will be asked for the RGA number so your service request status can be checked.

# 6    Technical Information

The following information is subject to change without notice.

## Hardware Specifications

| | |
|---|---|
| System | PCI Local Bus Standard 2.0 |
| Board Size | 12.25 in x 3.875 in; full-length PCI board |
| Interrupts | PCI-assigned -- Interrupt A for VGA, Interrupt B for Intense 3D |
| Power Requirements | +12V 70 mA<br>−12V 30 mA<br>+5V 1.5 A<br>+3.3V 5.5 A |

## Monitor Resolutions

Intense 3D Pro 2200 supports standard multi-sync monitors, including Intergraph 17-inch and 21-inch multi-sync monitors, at the following resolutions and maximum refresh rates (Hz).  Note that **i** indicates an interlaced frequency.

| 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, 60**i** |
| 1280 x 1024 | 5 x 4 | 100 | 60, 75, 60**i** |

Intense 3D Pro 2200 supports Intergraph InterVue-20, InterVue-21, and InterVue-27 monitors at the following resolutions and maximum refresh rates (Hz). Note that **i** indicates an interlaced frequency.

| 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) |

## VGA Support

The Intense 3D Pro 2200 Graphics Accelerator provides onboard VGA video display support. The maximum resolution supported is 800 x 600, 4 bits per pixel, at 60 Hz vertical refresh.

A VGA input port, and a jumper (J1 or VGA DIS) on the Graphics Accelerator board, allow the use of another VGA video display device, such as a computer system's onboard VGA controller.

## Texture Processing

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

Texture processing performance can be increased with the addition of either a 4 MB or a 16 MB optional texture memory module. The 4 MB module provides texture acceleration up to 1 Mtexel at 32 bits per texel (RGBA) and supports a map size up to 512 x 512 (MIP-mapped or non-MIP-mapped). The 16 MB module provides texture acceleration up to 4 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

The Intense 3D Pro 2200 Graphics Accelerator provides hardware support for the Display Data Channel (DDC) standard for communication between a host computer and its monitor. Intense 3D Pro 2200 supports the DDC2B standard, which allows for bi-directional communication.

The Graphics Accelerator provides hardware support for the Display Power Management Signaling (DPMS) standard.  DPMS allows for a host computer to send its monitor a signal to enter a power-saving mode.

# Interfaces

The Intense 3D Pro 2200 Graphics Accelerator has three interfaces:  a video output port, a VGA input port, and a stereo sync output port.

### Video Output

The video output port is a **blue**, female, 15-pin, D-Sub connector.  The port provides connection to a computer 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 | | |

\* Bi-directional Data (SDA) for DDC
\*\* Data Clock (SCL) for DDC
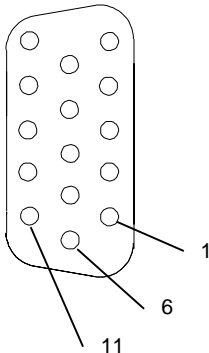
**VGA Input**

The VGA input port is a **black**, female, 15-pin, D-Sub connector.  The port allows connection of a VGA device for the system to use in VGA graphics mode.

| Pin | Signal Name | Pin | Signal Name |
| --- | --- | --- | --- |
| 1 | Red Analog Video | 9 | No Connect |
| 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 | Cable Sense * | 13 | Horizontal Sync |
| 6 | Ground | 14 | Vertical Sync |
| 7 | Ground | 15 | Monitor ID (bit 3) *** |
| 8 | Ground | | |

* Must be on video cable for board to sense cable's presence
** Bi-directional Data (SDA) for DDC
*** Data Clock (SCL) for DDC

1

6

11
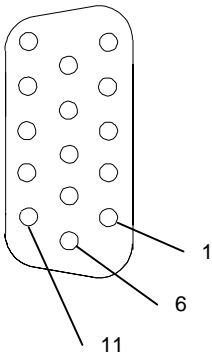
**Stereo Sync Output**

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  |