

Intense 3D Pro 3400

Installation Guide

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INTERGRAPH
COMPUTER SYSTEMS

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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.

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.

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 exigences du Règlement sur le matériel 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 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.

Product Serial Number

Record the serial number printed on the Intense 3D Pro 3400 board before installing the board in your computer. You will need this number to get technical support and warranty service. You can record the serial number in Chapter 2, "Preparing for Installation."

Warranty

Intergraph Computer Systems 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 Computer Systems 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 Computer Systems. 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 Computer Systems. 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 Computer Systems 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 Computer Systems. The purchaser shall bear shipping, packaging, and insurance costs for delivering the product to Intergraph Computer Systems. Intergraph Computer Systems will provide return shipment to the purchaser.

1 Introduction

Congratulations! In choosing Intense 3D Pro 3400, you are equipping your personal computer or personal workstation with powerful and professional 3D graphics. Intense 3D Pro 3400 infuses Intel® 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 3400 offers these high-end 3D graphics features:

- ◆ Performance up to 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.
- ◆ 16 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), 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 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 capability is available by using multiple Intense 3D Graphics Accelerators (up to four cards to drive four screens).

Hardware Requirements

Intense 3D Pro 3400 hardware requires these PCI expansion slots:

<u>Number of Screens</u>	<u>PCI Expansion Slots</u>
Single screen	One slot
Multiple screens (up to four)	One slot per screen

WARNING You must leave an open slot adjacent to side 1 (the side with the texture memory module) of each installed Intense 3D Pro 3400 card, unless you install the card in a slot in which side 1 is not adjacent to another slot. This ensures proper cooling for the card's high-power components.

Software

Intense 3D Pro 3400 uses the Intense 3D 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 3400 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 3400 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.

2 Preparing for Installation

Follow these instructions to prepare your computer for Intense 3D Pro 3400.

Make Sure Your Computer Is Ready

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

- ◆ A Pentium Pro or Pentium II processor.
- ◆ A high-resolution multi-sync analog RGB monitor.
- ◆ Windows NT 4.0 operating system.
- ◆ 3 MB of free space on the computer's hard disk.
- ◆ PCI expansion slots that support PCI bus mastering.
- ◆ A power supply and system board that provide +3.3V to the PCI bus.

Take Antistatic Precautions

Static electricity can damage the components inside a computer or on a printed circuit card. 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 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.
- ◆ Do not remove a card from its antistatic bag until you are ready to install it.
- ◆ Handle a card as little as possible and by the edges only.

Collect Materials and Tools

Collect the following materials and tools:

- ◆ One or more Intense 3D Pro 3400 cards.
- ◆ Genlock cables with two, three, and four connectors (available in the multi-screen cable kit, if installing multiple cards).
- ◆ Diskette containing the Intense 3D Pro 3400 video display driver.
- ◆ Flat-head or Phillips screwdriver, as required to prepare your computer's PCI slots for installation of the option cards.
- ◆ Monitor cable supplied with your computer or its monitor.
- ◆ Your computer's documentation.

Retain all packaging materials. You must return your Intense 3D Pro 3400 hardware in its original packaging to obtain warranty service.

Record the Card's Serial Number

You must have the serial number of your Intense 3D Pro 3400 card to get technical support or warranty service.

Before you install the Intense 3D Pro 3400 card in your computer, record the serial number printed on the card here:

If you are installing multiple Intense 3D Pro 3400 cards, record the serial number of each card before installation.

Make a Copy of the Video Display Driver Diskettes

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

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

Read the Instructions

Before installing Intense 3D Pro 3400, 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 diskettes as well.

Review your computer’s documentation for instructions on opening and closing the computer, identifying PCI expansion slots, disabling system board graphics devices (if present), and adding expansion cards.

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 system board graphics devices (if present), and adding expansion cards.

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 card, disable it.
4. Select the PCI expansion slots into which you will install the Intense 3D Pro 3400 card. Select one open PCI slot for each card you want to install.

WARNING You must leave an open slot adjacent to side 1 (the side with the texture memory module) of each installed Intense 3D Pro 3400 card, unless you install the card in a slot in which side 1 is not adjacent to another slot. This ensures proper cooling for the card's high-power components.

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

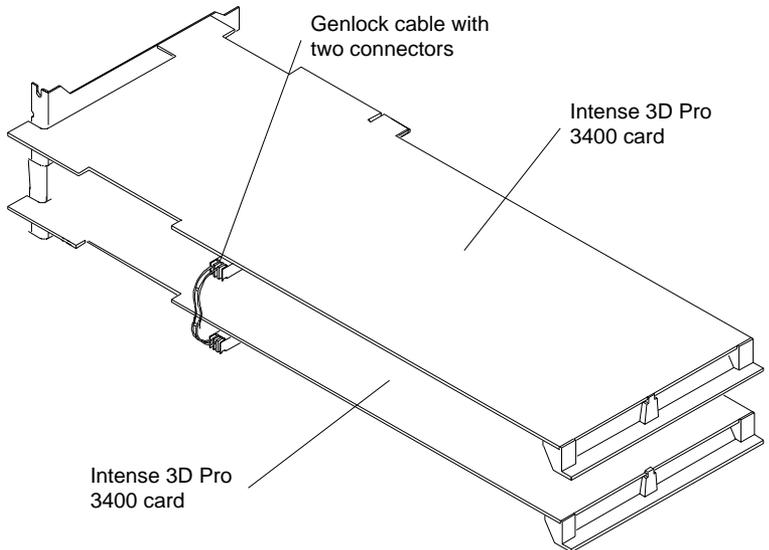
Install the Cards

To install an Intense 3D Pro 3400 card:

1. Align the card with the PCI expansion slot, making sure the gold-fingered connectors on the card's edge are aligned properly with the slot connector.
2. Push the card 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 reinstall the card.
4. Use the screws you removed previously to secure the card to the computer's chassis.

5. If you are installing multiple cards, repeat steps 1 through 4 for each card.
6. If you installed multiple cards, connect each of the cards with one of the Genlock cables available in the multi-screen cable kit. Use the Genlock cable with two, three, or four connectors, depending on how many cards you installed.

For example, if you installed two cards, use the Genlock cable with two connectors. Connect the two cards by pushing one connector into the Genlock pin slot on the first card, and then pushing the other connector into the Genlock pin slot on the second card. The Genlock cable connectors are keyed for proper insertion. The following figure shows an example of connecting two cards with a two-connector Genlock cable.

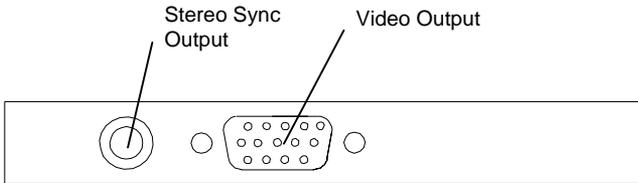


Finish the Installation

To finish the installation:

1. Close the computer.
2. Connect the computer monitor's video cable to the blue video output port on the Intense 3D Pro 3400 card. See the following figure.

If you installed multiple cards for multiple screens, connect a video cable from each computer monitor to the blue video output port on each card.



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 card, 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 you want to use a stereoscopic display device, connect the controller's stereo sync cable to the stereo sync output port on the card. See the previous figure.
4. Turn on the computer. The video display starts in VGA mode.
5. Install the Intense 3D Pro 3400 video display driver as instructed in Chapter 4, "Installing the Software."

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 Video Display Driver

To install the Intense 3D video display driver:

1. Insert the first diskette containing the Intense 3D 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. Create a directory on the computer's hard disk, and copy the contents of the Intense 3D 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, enter the pathname of the directory you created in step 3, and click OK.
8. Verify that the Intergraph Intense 3D 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 diskette to your computer'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 informed that the computer must be restarted for the new settings to take effect, remove the diskette from the computer's floppy disk drive and click Yes to restart the computer.

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.
15. 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 3400 Graphics Accelerator. For example, click the Settings tab to change the screen resolution.

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 3400 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. From the operating system Start menu, go to Settings/Control Panel/System.
2. 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 version of the operating system. The video display runs in VGA mode when the Intense 3D Pro driver is not running.

Activate Multi-Screen Behavior

If your computer is configured for multi-screen display (with multiple Intense 3D Pro 3400 Graphics Accelerators 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 computer. You must restart the computer for the change to take effect.

5 Getting Help

Use the information in this chapter if you encounter a problem with Intense 3D Pro 3400, if you want to get product information or fixes, or if you want to contact Intergraph Computer Systems 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 3400 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 3400).
- ◆ 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.

Getting Warranty Service

Contact the original place of purchase to get warranty service for your Intense 3D Pro 3400 card. If your warranty period has expired, you may still be eligible for warranty service from Intergraph Computer Systems. Refer to the warranty statement at the beginning of this document for details.

To get warranty service for Intense 3D Pro 3400:

1. Call the Customer Response Center at 1-800-633-7248. Tell the operator you want to return an Intense 3D Pro 3400 card for service, and give the operator the serial number found on the card.

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 card to Intergraph Computer Systems for repair or replacement. Intergraph Computer Systems will send you a new or repaired card as soon as possible.

- Accept a replacement card by overnight shipment, subject to availability of parts. You must provide a credit card number, and you must return the failing card within 30 days or be charged for a new card.
3. Make a copy of the original sales receipt or other document that supports your proof of purchase.
 4. Put the failing card in its original packaging along with your proof of purchase, and return it to Intergraph Computer Systems by the carrier of your choice.

You can check the status of your service request by calling the Warranty Administrator at 1-800-557-4484. 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

Item	Specification
System	PCI Local Bus Standard 2.1
Card Size	12.25 in x 3.875 in; full-length PCI card
Interrupts	PCI-assigned -- Interrupt A for Intense 3D
Power Requirements	25W maximum +12V 250 mA maximum -12V 35 mA maximum +5V 2.0 A maximum +3.3V 4.5A maximum

Monitor Resolutions

Intense 3D Pro 3400 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, 85, 60 i
1280 x 1024	5 x 4	100	60, 75, 85, 60 i

Intense 3D Pro 3400 supports Intergraph InterView-20, InterView-21, and InterView-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)

Intense 3D Pro 3400 supports InterView 28hd96 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	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 Pro 3400 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

The Intense 3D Pro 3400 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.

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 16 MB texture memory 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 3400 Graphics Accelerator provides hardware support for the Display Data Channel (DDC) standard for communication between a host computer and its monitor. Intense 3D Pro 3400 supports the DDC2B standard, which allows for bidirectional 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 3400 Graphics Accelerator has two interfaces: a video output port and a stereo sync output port. These interfaces are described in the following sections.

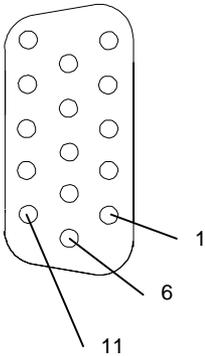
Video Output Port

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

<u>Pin</u>	<u>Signal Name</u>	<u>Pin</u>	<u>Signal Name</u>
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.

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

