3DImàge985

AGP
High Performance 3D/2D
GUI/Video Accelerator

User's Guide

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October 1997, Rev A

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Expert Installation

The information contained in the Expert Installation section is only for "Expert" who have had prior experience in installation of a display card and its drivers. Please skip this entire section and read through the rest of this user's guide if installation of a display card and its drivers is not familiar to you.

If your display card came with a "Display Driver CD", please follow the information contained in the README file located in the root directory of the Display Driver CD for driver installation information.

If your display card came with a set of Display Driver and Utility diskettes, please follow the information stated below for quick driver installation information.

Windows 95 Display Driver Installation

1. ENSURE that MS Windows 95 is up and running properly.

2. INSERT the Drivers & Utilities Diskette # 2 into your floppy drive A.

3. POSITION the mouse cursor in the wall paper area of your Windows 95 desktop and then press the right mouse button.

4. SELECT the "Properties" selection bar.

5. SELECT the "Settings" page inside of Display Properties windows.

6. SELECT either the "Change Display Type" or the "Advanced Properties" selection bar, and then SELECT the "Change" button next to Adapter Type.

7. On the "Select Device" page, SELECT the "Have Disk" button.

8. SELECT the "Browse" button to browse the directory "A:\WIN95" of your diskette drive.

9. SELECT "OK" to start installing the driver files from the diskette drive.

10. SELECT "OK" button to close the "SELECT DEVICE" window.

11. CLOSE the Display Properties window and Windows 95 will prompt you to restart Windows 95.

12. Windows 95 will be using the Trident accelerated driver once it's re-started.

Windows NT 4.0 Display Driver Installation

1. SELECT the "Display" icon in control panel and then SELECT the "Settings" page.
2. SELECT "Display Type..." button in the "Settings" page.
3. SELECT "Change..." button from the Adapter type section.
4. SELECT "Have Disk..." button from the Change Display page.
5. Microsoft Windows NT 4.0 will prompt you for the correct path where the Trident drivers are located. ENTER the path "A:\NT40" after you have inserted the Drivers & Utilities Diskette # 3 into your floppy drive A.
6. If the driver "Trident Video Accelerator" is listed under the Display list, SELECT the "OK" button to continue.
7. Once the driver files are copied, RESTART Microsoft Windows NT 4.0 for the changes to take effect.
8. SELECT the desired color palette (the number of colors), desktop area (resolution), and refresh frequency in the settings page of Display Properties and then SELECT the "Test" button in the same page to determine whether your selection works properly. SELECT "Apply" to active the selected mode.

1. Introduction

Thank you for purchasing this 3DImàge985 3D/2D Graphical User Interface (GUI) accelerator adapter that supports 133MHz AGP with sidebands and pipelining. This adapter works with Accelerated Graphics Port (AGP) bus of your system to bring you high resolution, true color capability, high performance, and compatibility with most software and hardware.

1.1 Compatibility

☑ This 3D/2D Graphical User Interface (GUI) accelerator adapter is IBM VGA compatible on BIOS, register, and hardware. This adapter works only with a Accelerated Graphics Port (AGP) bus slot.

1.2 Check List

The package you have purchased should contain the following:

☑ Trident 3DImàge985 AGP 3D/2D GUI Accelerator Adapter Card

☑ 3D Games sampler CD

☑ One Windows 3.x Driver Diskette

☑ One Driver Diskette with Windows 95 driver.

☑ One Driver Diskette with Windows NT 3.5/4.0 driver

☑ One Driver Diskette with DOS applications driver

☑ One Live-Video Capture AVI Driver Diskette (Optional)

☑ One Display Drivers and Utilities CD (Optional and replaces the above five diskettes)

☑ One Software MPEG Player Diskette (Optional)

☑ One OS/2 Warp Driver Diskette (Optional)

☑ S-Video television output cable (Optional)

☑ 3DImàge985 *User's Guide*

If any of these items are missing or damaged, contact your dealer.

Important: Keep all packaging materials that accompany your adapter in the event you need to return the product.

1.3 Features

- ☑ Supports up to 133MHz AGP with sidebands and pipelining.
- ☑ Supports PCI 2.1 specification including 66MHz operations.
- ☑ Supports extensive high-performance 3D functionality.
- ☑ Accelerates the most frequently used 2D GUI/video operations
- ☑ Supports up to 1600x1200x64k Hi-colors mode using 4MB of SGRAM on board. Supports up to 1024x768x64k Hi-colors mode using 2MB of video memory.
- ☑ Supports VESA Display Power management Signaling (DPMS) and VESA DDC 2b standards available on most of the VGA, SVGA and multisync monitor.
- ☑ Software MPEG playback or live video capture capable.
- ☑ Optional connection to NTSC or PAL standard television through a standard composite video jack or S-video jack.
- ☑ Supports the standard IBM Feature Connector (FC) and Video Module Interface (VMI) Host Connector for sending graphics data to an add-on video controller
- ☑ Contains drivers for the most popular operating systems and software available today

1.3.1 RESOLUTION AND COLOR SELECTION

- ☑ Supports up to 1024x768 in 16, 256, 32K, 64K and 16M colors non-interlaced
- ☑ Supports 1280x1024 in 16, 256, 32K and 64K colors non-interlaced
- ☑ Supports 1600x1200 in 16, 256, 32K and 64K colors non-interlaced
- ☑ 80 column text modes in 30, 43 and 60 rows
- ☑ 132 column text modes in 25, 30, 43 and 60 rows

1.3.2 3D AND 2D GUI ACCELERATOR

Accelerates the most frequently used 2D functions in today's graphics-intensive environments plus complete 3D GUI acceleration:

- ☑ Complete 3D primitive support
- ☑ Texture mapping
- ☑ Gouraud Shading for smooth shading
- ☑ Alpha blending for transparency effects
- ☑ Fog
- ☑ Z-buffering at 16/32 bit-per-pixel
- ☑ Page flipping for double and triple buffering for smooth animation effects

1.3.3 VESA DPMS AND VESA DDC2B SUPPORTED

Supports VESA Display Power management Signaling (DPMS) which decreases energy consumption when used with a monitor that meets the VESA standards for power management. Supports VESA DDC 2b standards for automatically selecting the correct display setup on a monitor that meets the VESA DDC standard.

1.3.4 SOFTWARE MPEG VIDEO PLAYBACK

Full-motion software MPEG video playback through 3DImàge985's fast video accelerator is available with the installation of a software MPEG player.

1.3.5 VIRTUAL SCREEN

The Virtual Screen features takes advantage of un-used display memory by expanding the display area into the off-screen area; this feature allows the user to make effective use of a display screen larger than the standard 640x480, 800x600 or 1024x768 resolutions.

1.3.6 DCI AND DIRECTDRAW SUPPORTED

Supports DCI for Windows 3.1x and DirectDraw for Windows 95 for enhancement of display quality and playback performance during software MPEG video playback. Both DCI for Windows 3.1x and DirectDraw for Windows 95 are memory manger for video memory. Using such memory manager for video manger, a program can manipulate video memory with ease, taking full advantage of the blitting and color decompressing capabilities of 3DImàge985's video hardware.

1.3.7 LIVE VIDEO CAPTURE

Live video capture is the process of accepting video data from an outside source and writing it to the frame buffer from where it can be displayed or stored. This process is supported by 3DImàge985 through the Feature Connector and the Video Module Interface(VMI) Host Connector.

1.3.8 TV OUT (OPTIONAL)

The 3DImàge985 is capable of displaying all standard and some extended VGA video modes on an NTSC or PAL TV. Resolutions up to 720x480 can be displayed on NTSC TV's; resolutions up to 800x600 can be displayed on PAL TV's. Extra features are built-in to reduce line flickering and to vertically scale the image for TV display.

2. Adapter Installation

2.1 Adapter Layout

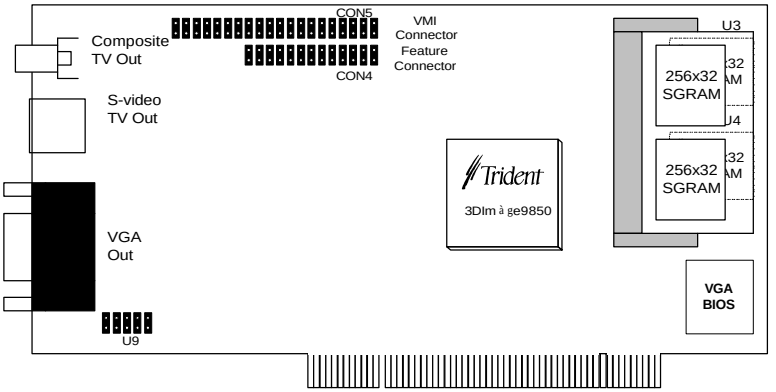


Figure 2-1. 3DImàge985 AGP card with Output to TV

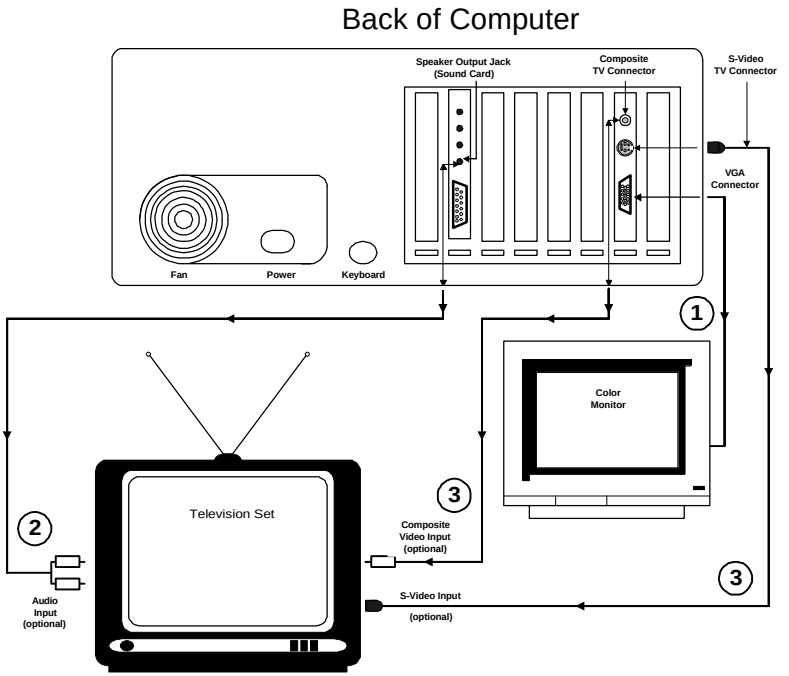
2.2 Installation Procedures

To install the adapter into your system, follow these steps:

1. Turn OFF all power to your system, including any peripherals (printer, external drives, modem, etc.).
2. Disconnect the power cord and the monitor cable from the back of the computer.
3. Unfasten the cover mounting screws on your system and remove the system cover. Refer to your system user manual for instructions and to determine the location of the mounting screws.
4. Remove any graphics adapter that already exists on your motherboard. Start by removing the screw that holds the adapter retaining bracket in place (keep this screw, you will need it later). Then, gently pull straight up on the adapter card itself, and remove it from the motherboard.
5. If appropriate, you can use the expansion slot left vacant by the existing graphics adapter you just removed. Otherwise, select an appropriate AGP bus expansion slot for the new adapter. Refer to your computer system manual for the location of the AGP bus expansion slots. Remove the retaining screw that holds the slot cover in place. Slide the slot cover out and put the screw aside (you will need it to secure the adapter).
   If you just removed an existing graphics adapter and are not going to use that expansion slot, you can install the slot cover you just removed from the unused expansion slot to cover the open hole.
6. Install the adapter. To install the adapter in the selected expansion slot, carefully line up the gold-fingered edge connector on the adapter directly above the expansion slot connector on the motherboard. Then press the adapter into place, completely, using only as much pressure as is safely necessary. DO NOT USE excessive force. Use the (remaining) screw you removed to secure the adapter retaining bracket in place.
7. Replace the computer cover. Secure the cover with the mounting screws you removed in Step 3.

You have now completed the installation of your new graphics adapter on your system. Before you use the system, however, please refer to the following sections, “Connecting the Display”.

2.3 Connecting the Display and Optional TV



1. The adapter offers a standard VGA 15-pin analog connector. When you connect your monitor to the adapter, be sure you have the right cable and cable connector. Fixed-frequency analog monitors come equipped with a 15-pin connector. Variable frequency analog or analog/digital monitors may require a 9-to-15 pin cable connector.
2. If your system is equipped with a sound board, you can also connect a Y-cable for speaker (single male mini stereo phono jack to double male RCA jack) from the Speaker-Out jack of the sound board to the Audio-In jack on your television set.
3. For optional TV connection, please check the back of your TV or VCR for the presence of a S-Video connector. If such a connector is present, you will need a S-Video cable to connect S-Video TV-Out on the adapter to S-Video In on the TV or VCR. If such a connector is not available, a RCA video cable is needed to connect Composite TV-Out on the adapter to Composite Video In on the TV or VCR. S-Video connection is recommended since it provides a higher quality display.

3. Utilities and Drivers Installation

3.1 Microsoft Windows

3.1.1 Microsoft Windows 95 Driver Installation from CD

1. ENSURE that MS Windows 95 is up and running properly using the Trident SVGA driver that it has detected.

2. Insert the Trident Display Driver CD into your CD-ROM drive.

3. SELECT your CD-ROM drive or TYPE in X:\SETUP (X is the letter of your CD-ROM drive) under Start..Run of the task bar for the Trident Display Driver CD Setup menu.

4. SELECT the "Installation" selection bar to install Windows 95 Display Driver.

5. Follow the on-screen instructions to finish Trident display driver installation.

6. Restart Windows 95 to complete installation.

3.1.2 Microsoft Windows 95 Driver Installation from Diskette

1. ENSURE that MS Windows 95 is up and running properly using the Trident SVGA driver that it has detected.

2. OPEN the “My Computer” program group and SELECT the “Control Panel” icon as shown in Figure 3-1.

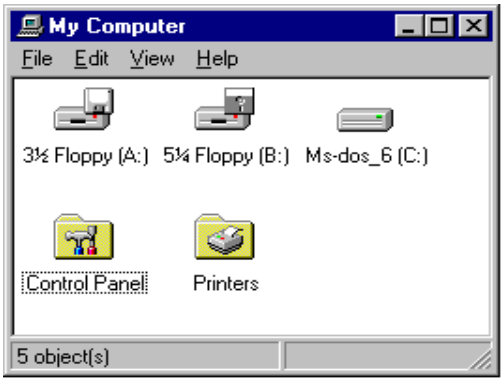
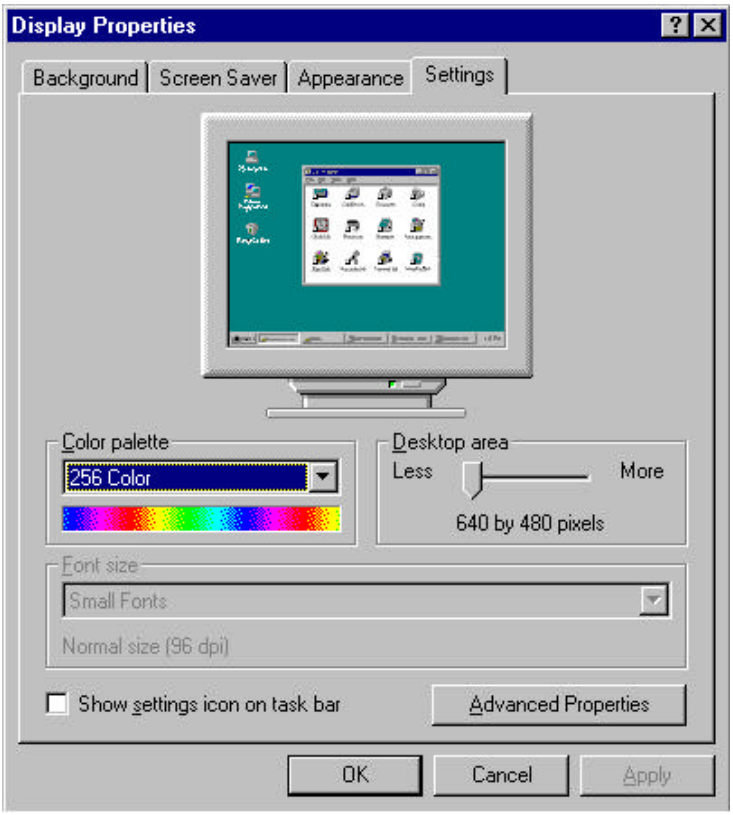


Figure 3-1.

3. SELECT the “Display” icon and then SELECT the “Settings”



page (refer to Figure 3-2).

Figure 3-2.

4. SELECT either the “Change Display Type” or the “Advanced Properties” selection bar, and then SELECT the “Change” button next to Adapter Type (refer to Figure 3-3).

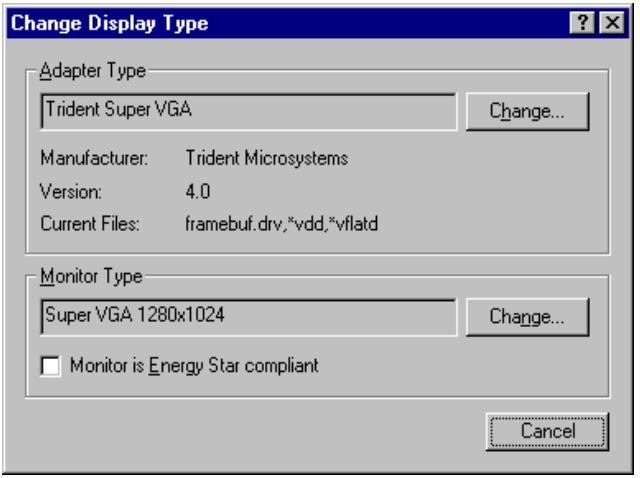


Figure 3-3.

5. On the “Select Device” page, SELECT the “Have Disk” button to install the Trident display driver from Disk 2 of the Drivers and Utilities diskette (refer to Figure 3-4).

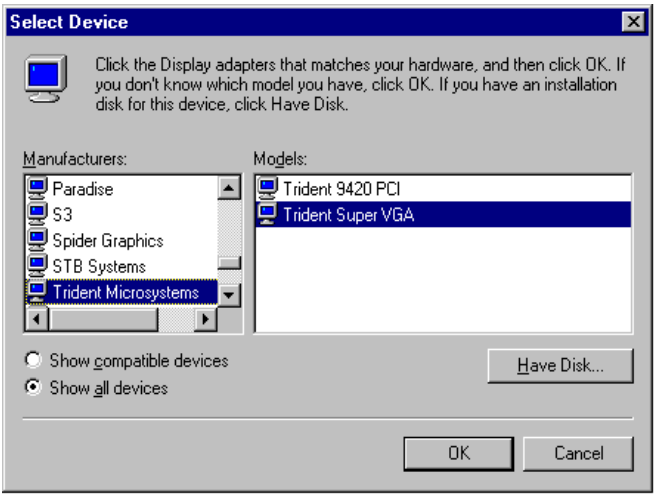


Figure 3-4.

6. After the “Have Disk” button is selected, an “Install From Disk” window will appear. SELECT the “Browse” button to browse the directory “X:\WIN95” of your diskette drive where X: stands for the drive letter of your diskette drive in your system (refer to Figure 3-5).

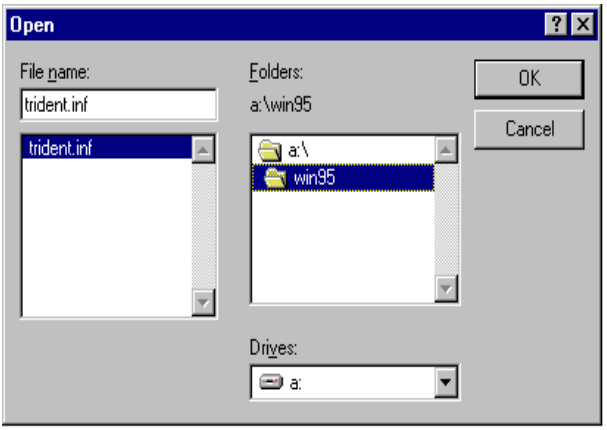


Figure 3-5.

7. Once in this directory, the file TRIDENT.INF will appear under file name list. SELECT “OK” to return to the “Install From Disk” window (see Figure 3-6). Under the statement “Copy manufacturer’s files from”, the line X:\WIN95 should appear. SELECT “OK” to start installing the driver files from the diskette drive.

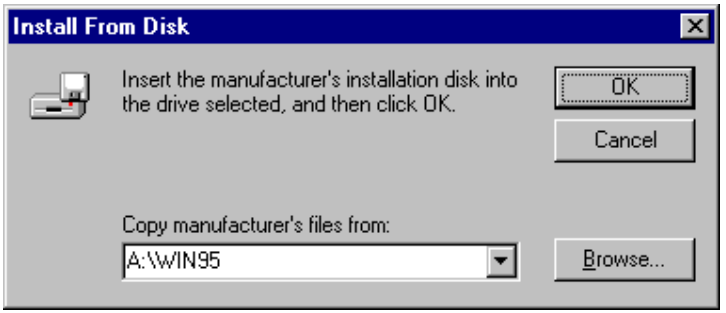


Figure 3-6.

8. After the files have been copied from the diskette drive to the hard drive, a “Select device” window will appear as shown in Figure 3-7. Under Models, the line “Trident Imàge 985 (AGP v21xx)” will now be listed.

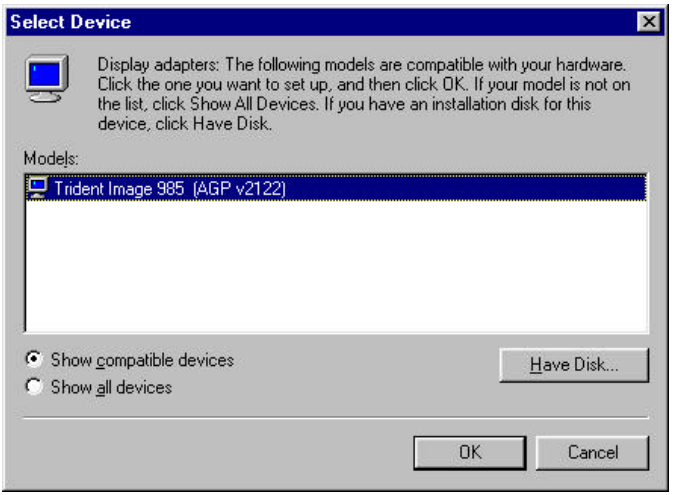
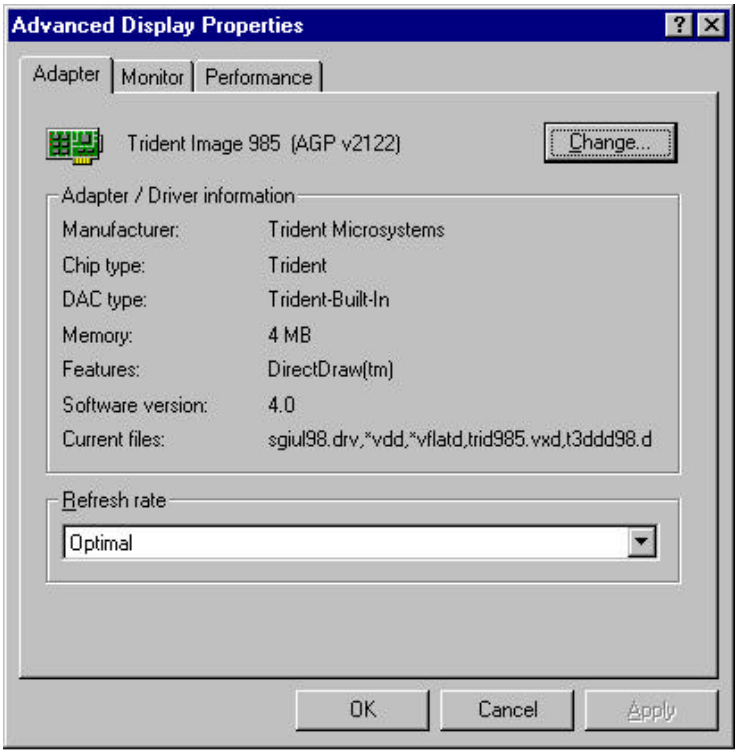


Figure 3-7.

9. SELECT the “OK” button to close the “Select Device” window and to select the “Color Palette”, “Desktop Area”, and “Refresh Rate” of your choice under the Trident



accelerated driver (refer to Figure 3-8).

Figure 3-8.

Once the desired color palette (the number of colors), desktop area (resolution) and refresh rate have been chosen, the Windows 95 system will be re-started using the Trident accelerated driver.

3.1.3 MICROSOFT WINDOWS NT 4.0 DRIVER INSTALLATION

1. SELECT the “Display” icon in control panel and then SELECT the “Settings” page.
2. SELECT “Display Type...” button in the “Settings” page.
3. SELECT “Change...” button from the Adapter type section.
4. SELECT “Have Disk...” button from the Change Display page.
5. Microsoft Windows NT 4.0 will prompt you for the correct path where the Trident drivers are located. ENTER the path “X:\NT40” where X: is the drive where Disk 3 of the 3DImàge985 Drivers & Utilities diskette has been inserted.
6. If the driver “Trident Video Accelerator” is listed under the Display list, SELECT the “OK” button to continue.
7. Once the driver files are copied, RESTART Microsoft Windows NT 4.0 for the changes to take effect.
8. SELECT the desired color palette (the number of colors), desktop area (resolution), and refresh frequency in the settings page of Display Properties and then SELECT the “Test” button in the same page to determine whether your selection works properly. SELECT “Apply” to active the selected mode.

3.1.4 MICROSOFT WINDOWS 3.1X DRIVER INSTALLATION

The graphic installation program (TINSTALL) supports a simple six-step installation procedure for the display driver setup program, the power management program and the UNinstall program.
To use TINSTALL, follow the 6 steps below:

☑ 1. ENSURE that MS Windows 3.1x is up and running properly, using the standard VGA driver.

☑ 2. SELECT the MAIN group in Program Manager.

☑ 3. CLICK on FILE or press ALT + F (see Figure 3-9)

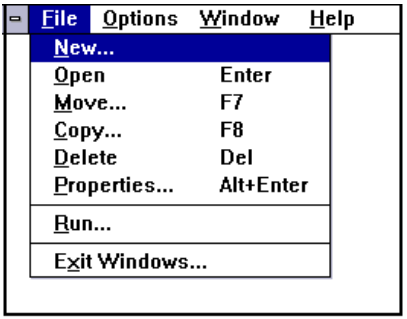


Figure 3-9.

☑ 4. CLICK on RUN or PRESS R to select command line.

☑ 5. TYPE in "A:TINSTALL" (if the display driver disk is in the B drive then TYPE in "B:TINSTALL") and then PRESS ENTER (see Figure 3-10).

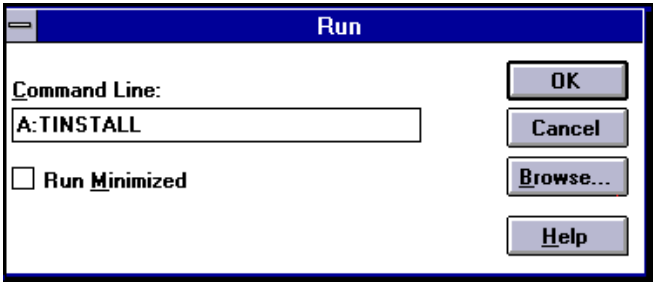


Figure 3-10.

☑ 6. A menu will appear, presenting a choice of Express or Custom Installation.

Express installation is quick and decision free. Display drivers will be copied into the TRIDENT.SGI directory and Utility files will be copied into the TRIDENT.UTL directory. Once all files are copied, a program group called DISPLAY DRIVER AND UTILITIES will be created.

Custom installation allows control over file storage and in what program group the icons are placed. The first dialog box that appears shows the default directory to which the display drivers will be copied. To change the directory name select the default name, delete it and then enter the desired directory name. Once the desired directory name is selected, continue the installation procedure by selecting CONTINUE, or by pressing ENTER. The next dialog box displays a summary of where files are stored. Select CONTINUE to copy the drivers and utilities files. When all files are copied, the program will present a choice of program groups where the icons will be created. Create a new group to place the utility icons or select from pre-existing groups (e.g. main, applications, accessories etc.).

When all necessary files are copied and a group name is selected, the TINSTALL program will create three icons:

- ☑ a. Screen Control (Used to configure display drivers).
- ☑ b. DPMS (Used for power management configurations).
- ☑ c. UNinstall (Used to delete the installed TRIDENT drivers).

NOTE: Different "display driver set" versions cannot be installed to the same directory name.

"Display driver sets" of the same version number (e.g. US6.x) will replace the existing one.

3.1.4.1 SCREEN CONTROL

The Screen Control panel contains controls for setting screen resolution, color depth, font size, refresh rates. Not all combinations of screen resolution, color depth, font size and refresh rate are attainable.
Color depths of 16, 256, 64K, or 16.7M colors can be selected by clicking next to the desired option. Color depth determines the number of colors that may be simultaneously displayed on the screen. The selected color depth determines the possible resolutions.
Screen resolutions of 640x480, 800x600, 1024x768, 1280x1024 or 1600x1200 can be selected by clicking next to the available options. The virtual screen size is automatically adjusted to be at least as large as the selected screen resolution.
Available refresh rates are dependent on the selected color depth and resolution. The "Back to Default" option is used to reset the refresh rate to the factory default value in case your monitor does not support a high refresh rate.

3.1.4.1.1 Configuring the Display Driver

- ☑ Select the color depth first.
- ☑ Select the resolution.
- ☑ Select the font size (if available as an option).
- ☑ Select the refresh rate.
- ☑ Click on OK. If the current driver does not support the selected configuration, Windows will have to be restarted.

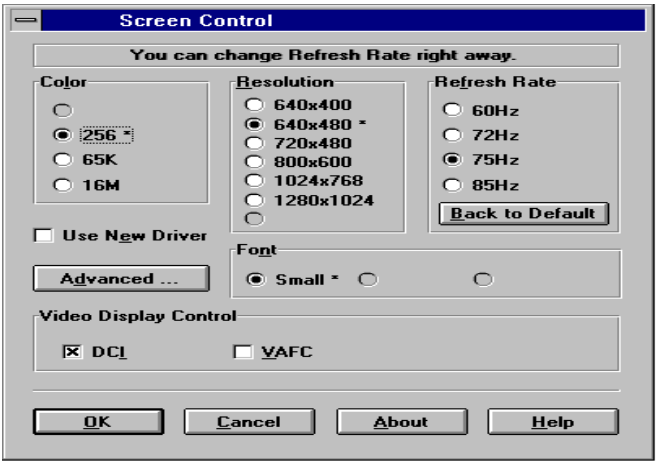


Figure 3-11.

3.1.4.1.2 DDC Monitor Auto Detection

If your monitor is a "PLUG & PLAY" monitor and is in compliance with VESA DDC2 Standard, the display driver will automatically detect the information provided by the DDC2 complaint monitor. If the display driver is not able to correctly detect the information provided by the monitor, a message will be displayed that allows you to:
Accept it: The display driver will save the information from the DDC2 monitor that it was able to detect.
Ignore DDC: The display driver will not save the information from the DDC2 monitor and this monitor will not be treated as a DDC2 complaint monitor.
Try Again: The display driver will attempt again to detect the information provided by the DDC2 monitor.

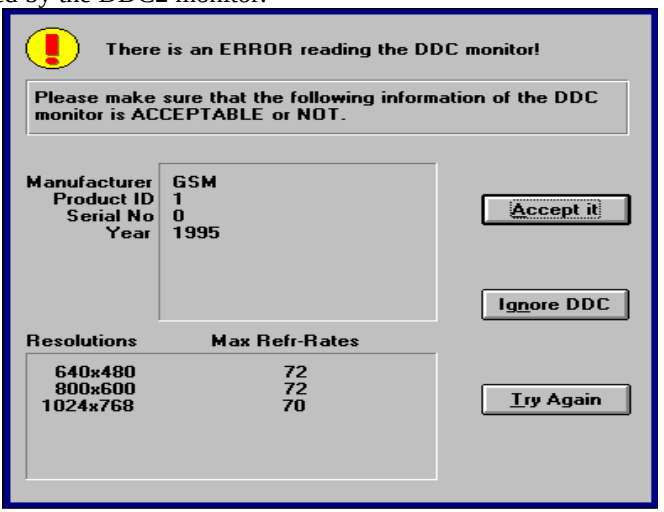


Figure 3-12.

If the display driver is able to detect the monitor successfully, the correct information will be shown once the button “DDC Monitor” in the Advanced page of the Screen Control panel is selected.

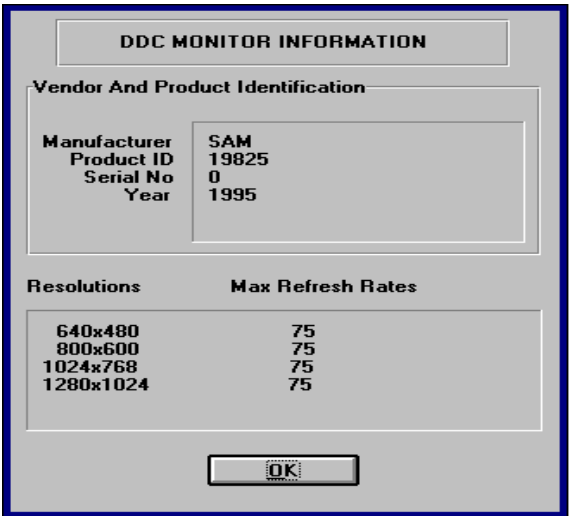


Figure 3-13.

3.2 Live Video Capture Driver

Video Capture is the process of accepting video data from an outside source, such as TV tuner, VCR, Laser Disc Player or a Camcorder and writing it to the frame buffer. The data stored in the frame buffer can then be displayed on the monitor or stored in the hard disk drive. The 3DImàge985 is capable of video capture through the Feature Connector and the Video Module Interface (VMI) Host Connector.

The ability to capture video data is supported by the 3DImàge985 chip set; however, additional adapter or hardware may be required to activate this feature. Please check with your dealer to find out if this optional feature is available on your video adapter card.

Before installation of 3DImàge985 AVI drivers, both 3DImàge985display driver and Microsoft Video for Windows 1.1e Runtime have to be installed. Installation procedures for 3DImàge985 display driver is in section 3.1.4 of this guide and installation procedures as well as installation software for Microsoft Video for Windows 1.1e can be found in the Microsoft Video for Windows 1.1e software package which may be purchased separately.

While installing Microsoft Video for Windows 1.1e, both Video Playback and Video Tools programs have to be installed to be able to use the Video Capture tools. Once Video for Windows 1.1e has been installed successfully, the Video for Windows program group will display the programs as shown in Figure 3-14.

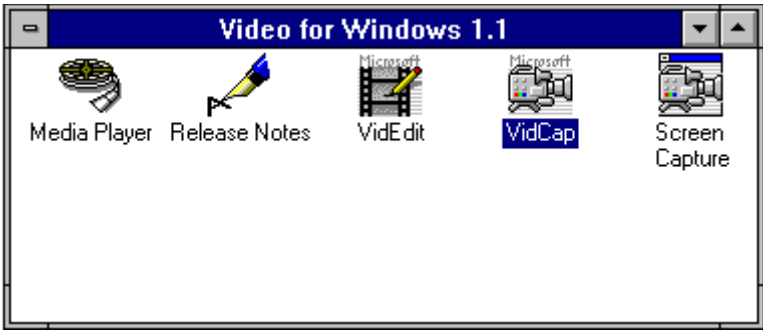


Figure 3-14.

The 3DImàge985 AVI drivers can be installed by following these steps below:

1. SELECT the MAIN group in Program Manager.
2. CLICK on FILE or PRESS ALT + F
3. CLICK on RUN or PRESS R to select command line.
4. TYPE in “A:\AVISETUP.EXE” (change the drive letter if the 3DImàge985 AVI driver diskette is in drive B:) and then PRESS ENTER.

5. The Trident AVI Drivers Setup screen will appear. PRESS "Continue" to start installation (See Figure 3-15).

Figure 3-15.

6. The next screen will place Trident AVI Drivers in the directory “C:\WINDOWS\AVIDRV”. Change the path only if another directory is desired (see Figure 3-16). Click on “Continue” to complete the installation process of Trident AVI Drivers.

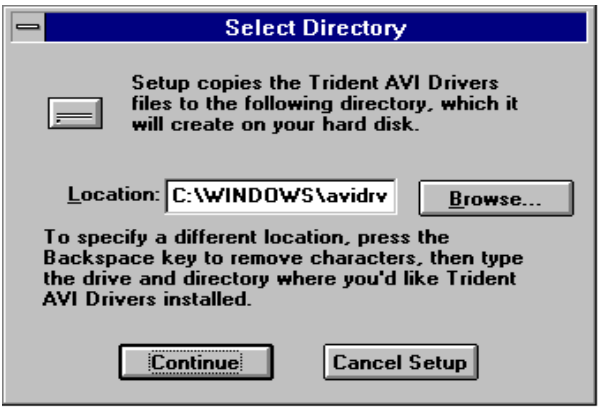


Figure 3-16.

3.2.1.1 Video capture driver usage

1. OPEN the "VidCap" program in the Video for Windows 1.1e program group.

2. TURN ON the video device that's currently connected to the video-in port of the video capture board and PUSH the "Play" button on the video device to start sending video signals to the video capture board.

3. In the VidCap program window, CLICK on "Overlay Video" under Options (See Figure 3-17).

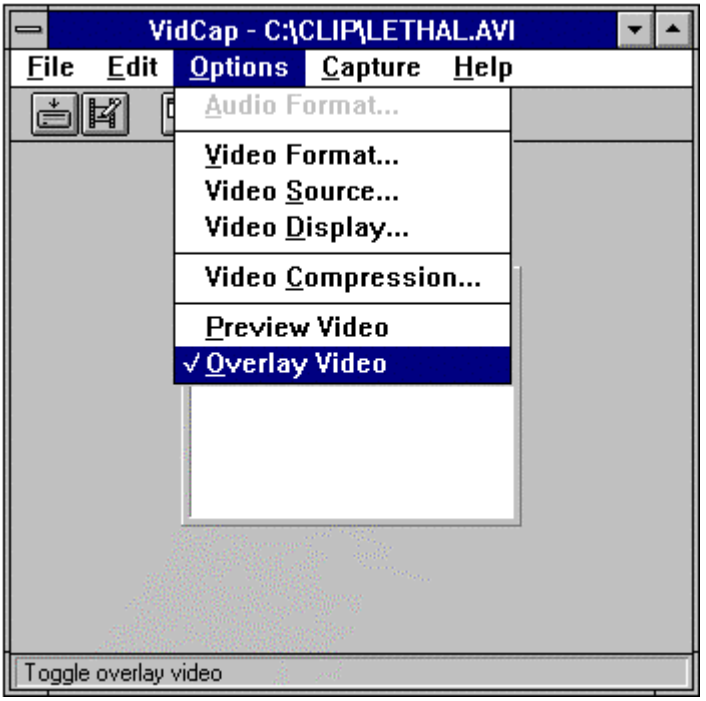


Figure 3-17.

4. CLICK on Video Source to set the source of the video signal (see Figure 3-18).

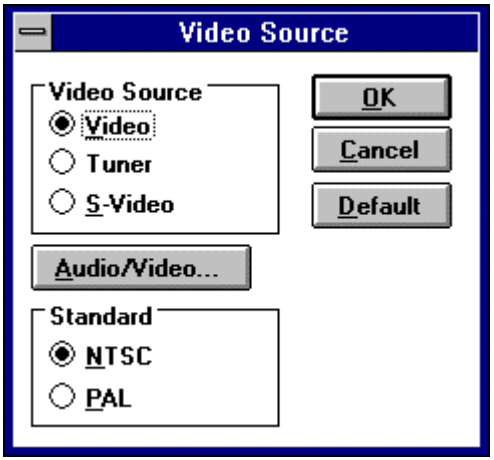


Figure 3-18.

5. SET video source to ”Video” to begin displaying video in the overlay window.

3.2.1.2 Video Overlay adjustments

1. In the VidCap program window, CLICK on " Video Format" under Options to set screen size (see Figure 3-19).

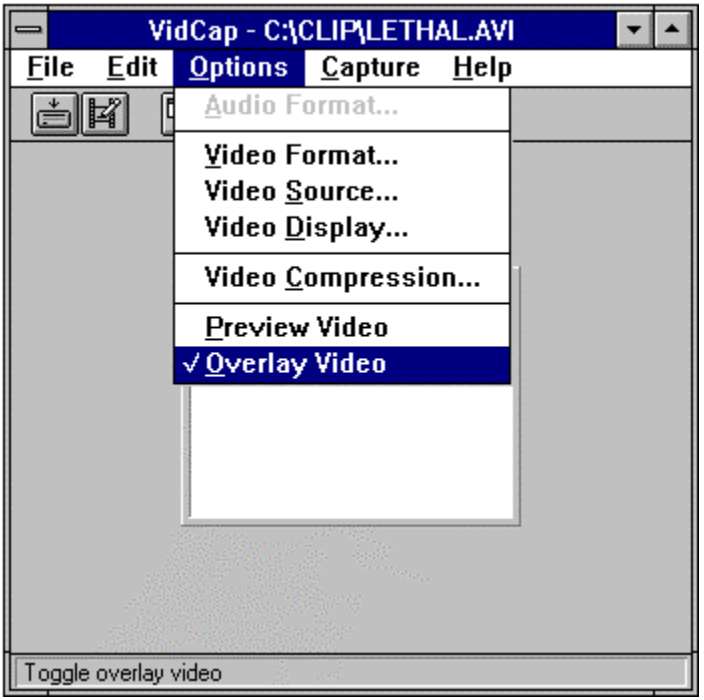


Figure 3-19.

2. SELECT different Image Formats by clicking on one of choices under Image format selections (see Figure 3-20). While all five formats allow image dimensions of up to full screen size, only “Video Conference YUV 422” image format allows full screen size of 704x576.

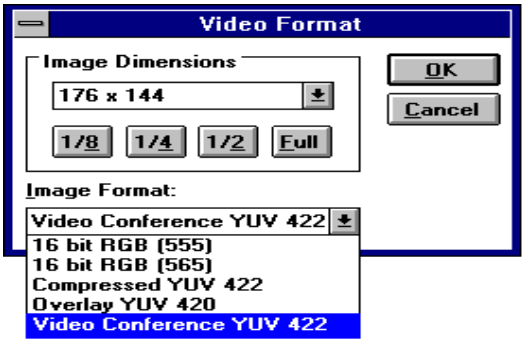


Figure 3-20.

3. To configure video or adjust colors, CLICK on “ Video Display” under Options (see Figure 3-21).

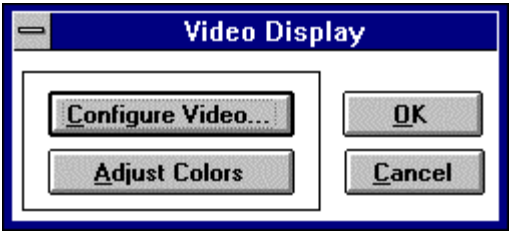


Figure 3-21.

4. CLICK on the “Adjust Colors” button to make adjustments of brightness, contrast, saturation and hue. CLICK on “Configure Video” button to make adjustments on Overlay Key Control, Display X/Y Offset, and Capture X/Y Offset (see Figure 3-22).

Figure 3-22.

5. CLICK on "Overlay Key Control" to set VGA Color Key to a color key value other than the default. CLICK on "Display X/Y Offset" to adjust the video window within the overlay window. When the video window is centered, it will completely cover the overlay window (see Figure 3-23).

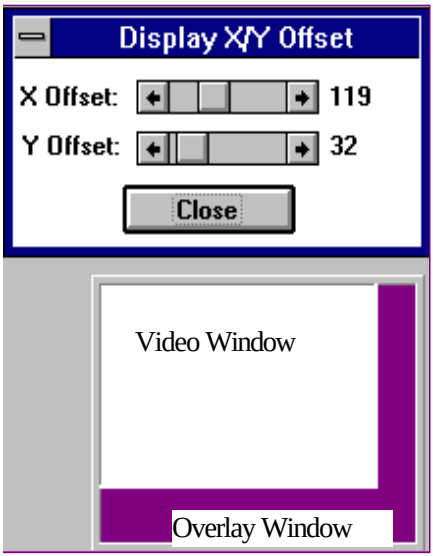


Figure 3-23.

6. SELECT 'Capture X/Y Offset" to adjust the color within the video window if the color does not appear correct (see Figure 3-24).

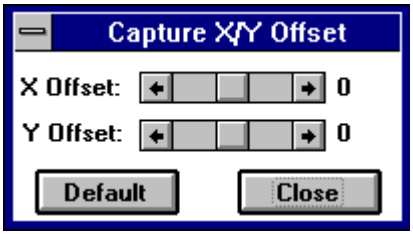


Figure 3-24.

3.3 OS/2 Driver Installation

Before installing Trident display driver for the first time, the current display type has to be VGA mode. The instructions to return to VGA mode are in the "Recovering from an incorrect display type selection" section of your OS/2 user's manual.
Trident's OS/2 display driver is installed by following these simple steps.

☑ 1. PLACE the Trident OS/2 driver diskette into diskette drive A: or diskette drive B:.

☑ 2. OPEN an OS/2 full-screen or OS/2 Window session under "Command Prompt" of the System folder.

☑ 3. PRESS 'ALT+F1' after OS/2 shows up in the upper left hand corner, and then SELECT 'V'.

☑ 3. SWITCH the current drive to the diskette drive where the Trident OS/2 driver diskette was inserted.

☑ 4. At the drive prompt, TYPE the following command: "INSTALL".

The Trident LOGO will now appear and a screen that reads "Trident Display Drivers Setting" will appear after that.

3.3.1 DISPLAYING OR CHANGING SCREEN RESOLUTION

This Trident OS/2 Display Drivers utility supports the following resolutions with OS/2. The required memory is shown in parentheses.

640x480x256	800x600x65K
800x600x256	1024x768x65K (2M)
1024x768x256	640x480x16.7M
1280x1024x256 (2M)	800x600x16.7M (2M)
640x480x65K	

The first page of the Trident Display Drivers Settings window is labeled Screen Resolution selection page.

- ☑ SELECT the resolution and color depth
- ☑ ENABLE/DISABLE virtual screen

The second page is the Monitor Model selection page.

- ☑ CLICK on Monitor tab to go to this page.
- ☑ POINT to and CLICK on the down arrow button to show a list of monitor models.
- ☑ SELECT the monitor model. If you can not find your monitor's model, SELECT "Default".

The third page is the Refresh Rate selection page.

- ☑ CLICK on Refresh tab to go to this page.
- ☑ The refresh rates displayed are those supported at each resolution by the monitor specified in the Monitor Model selection page.
- ☑ You can change the refresh rates by CLICKING on down arrow button and then CLICKING on the desired refresh rate.
- ☑ After the selections, CLICK on the Install button to complete the installation.
- ☑ REBOOT OS/2 to have this installation take effect.

3.3.2 SCREEN RESOLUTION CONFIGURATION PROCEDURE

☑ 1. DOUBLE-CLICK on the Video configuration folder, and then DOUBLE-CLICK on the “Display Setting“ object.

☑ 2. To change resolution and/or color depth

a) CLICK on “Screen“ tab.

b) SELECT the resolution and color depth.

c) CLICK on “Set“ button.

☑ 3. To enable virtual screen

a) POINT to and CLICK “Virtual Screen” on the button

☑ 4. To change refresh rate

a) CLICK on Refresh tab.

b) POINT to and CLICK on the down arrow button.

c) SELECT the refresh rate.

d) CLICK on the “Set“ button to take effect.

e) If you don't want the selected refresh rate, CLICK the Undo button or PRESS the 'U' key to return to previous refresh rate.

3.3.2.1 Virtual Screen

Virtual screen allows the monitor to display the information of a larger screen within the physical borders of the monitor. On some monitors the display fonts at higher resolutions, such as 1024x768, may be too small to read. If virtual screen is enabled for 1024x768 resolution, the display font will be larger in 640x480 resolution or 800x600 resolution; however, the information displayed will be that of 1024x768 resolution.
To enable virtual screen:

☑ 1. SET UP the Trident display at a higher resolution, such as 1024x768.

☑ 2. SHUTDOWN the system and then re-start the system.

☑ 3. GO into the Video configuration folder and CLICK on the "Display Setting" object to select the screen resolution page.

☑ 4. CHOOSE a smaller resolution such as 640x480 and CHECK the line that says "Virtual Screen On".

☑ 5. CLICK on the 'Set' button and the screen will automatically be set to physical screen size of 640x480 with virtual screen size of 1024x768.

To return to base mode from virtual screen:

☑ 1. SELECT base mode screen resolution.

☑ 2. SELECT 'Set'.

Notes:

1. To activate virtual screen, color depth has to be the same for both the physical screen and virtual screen.
2. Virtual screen size has to be larger than physical screen size.
3. If you change the resolution, you must reboot OS/2 to have the changes take effect.
4. If you decide to change your hardware system configuration, such as upgrading video memory or system memory, you should

   a) Change the resolution to VGA.
   b) Change the hardware configuration.
   c) Re-install the Trident OS/2 Display Drivers.

3.4 DOS Utilities

The Utility Installation program is used to install and retrieve instructions on:

a) Utility programs
b) Non-Windows applications display drivers.

Run the Utility Installation Program by executing the following steps:

☑ 1. INSERT the Drivers and Utilities Disk #2 in the floppy drive.

☑ 2. TYPE in "README" at the DOS prompt.

☑ 3. A numbered list of available destination drives will be displayed on the screen. SELECT the destination drive by TYPING in the corresponding number; e.g., to select drive C, type in "1" (see Figure 3-25).

Figure 3-25.

4. Files and subdirectories will be expanded into the newly created directory TVGAUTIL. A new menu will then be displayed on the screen, showing a list of on-line instructions (see Figure 3-26).

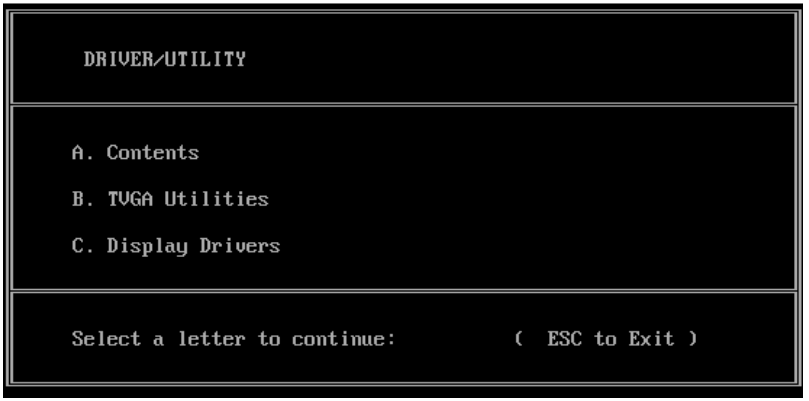


Figure 3-26.

☑ 5. Selecting A will display the contents of all drivers in the list.

☑ 6. Selecting B will display instructions on the available utility programs.

☑ 7. Selecting C will display instructions on how to install display drivers for non-Windows applications.

3.4.1.1 SVM.EXE

SVM is a menu-driven program designed to select and test all video modes available to the adapter.

HOW TO USE SVM

The SVM program can be executed in either of two ways: by calling up the menu and selecting from the menu choices, or by entering the desired mode directly with a specific command line.

HOW TO USE SVM FROM THE MENU

☑ 1. SWITCH directory to "X:\TVGAUTIL\UTILITY" where X: is the drive where the Trident Utility and DOS Application driver files have been copied.

☑ 2. TYPE SVM to call up the menu (see Figure 3-27).

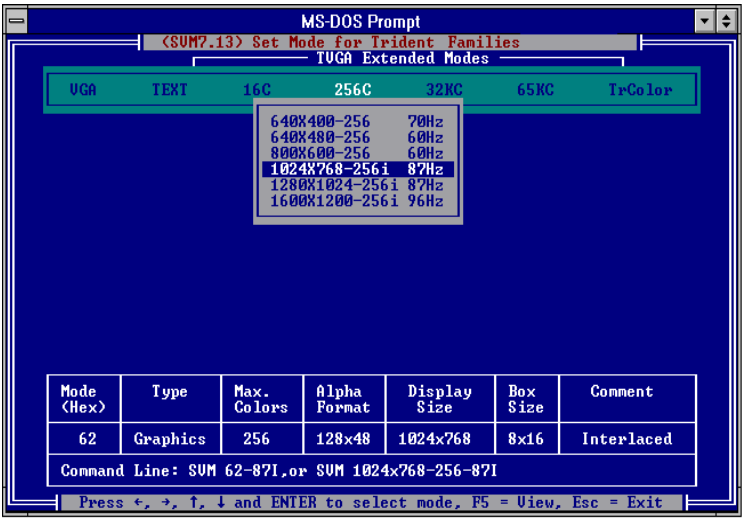


Figure 3-27.

The top bar shows the available color depths. This is traversed through by use of the right/left arrow keys.

The program provides all the different resolutions supported by the chip under each color depth. These resolutions are traversed by the up or down arrow keys. The graphics adapter can be tested for each resolution/ mode by first high-lighting the selection (e.g. 1024x768-256 colors as shown in Figure 3-27) by use of the arrow keys, then pressing the F5 key.

The graphics adapter can be run at a selected mode by first selecting the mode and then pressing ENTER.

HOW TO USE SVM FROM THE COMMAND LINE

The SVM program may be used to select a mode directly from the command line following two simple steps:

☑ 1. SWITCH directory to "X:\TVGAUTIL\UTILITY" where X: is the drive where the Trident Utility and DOS Application driver files have been copied.

☑ 2. TYPE in SVM [mode number] and PRESS ENTER.

For example, to run the graphics adapter in mode 62H, the command line would be:

SVM 62 <ENTER>

3.5 Optional TV Out

In Windows 95, use 'Television' control page and 'Display Device' control page to select television only features in display properties once the display driver for Windows 95 has been installed. The 'Television' control page allows the user to select 'Underscan' or 'Overscan', to select 'Interlaced' or 'Non-interlaced', to adjust the 'Screen Shift' of the television display horizontally and to select the degree of flicker reduction under Advance control button. The 'Display Device' control page allows the user to switch from color monitor to TV as the default display device and vice versa.

In Windows 3.x, use the Display Control program in Display Driver and Utility Program Group to access TV display features and to switch from color monitor to TV as the default display device and vice versa. The Display Control program allows the user to select Underscan or Overscan, to select interlaced or non-interlaced, to select degree of flicker reduction and to adjust screen shift both horizontally and vertically.

In DOS, a TSR program "TVDISP" is available in the directory of "X:\TVGAUTIL\UTILITY" (where X is the letter of your hard disk drive). This program allows the user to select 'Underscan' or 'Overscan', to select 'Interlaced' or 'Non-interlaced', to switch from color monitor to TV as the default display device and vice versa, to adjust the 'Screen Shift' of the television display both horizontally and vertically, and to contract or expand the size of screen both horizontally and vertically. More information about the TVDISP program is available in the REAME.TXT file of this directory.

Conventional broadcast TV or VCR content provides an "Overscaned" viewing area in order to ensure that the entire visible screen is used. The result is that portions of the image along the border are beyond the physical screen. The actual visual area lost is dependent on the individual TV model. On the other hand, a PC system display content should be within the boundaries of the physically viewable screen. This is called underscan. When the TV is used as the display device in a PC, display hardware needs to control the image generation circuitry to drive the underscan timing to the TV.

Besides generating interlaced timing, hardware may have the option to drive non-interlaced timing to the TV. A non-interlaced display will remove much of the flicker effect but reduce the detail of the image.

The interlaced timing of a TV causes a flickering effect on the screen. Depending on the TV standard and tube phosphor material, the severity of flicker differs from one brand and model of TV to another. Since TV content is almost always full-motion video or animation, flicker is not as noticeable as it is when the screen content is stationary. Flickers are caused by a television's low frame rate as well as the interlacing of adjacent scans. This flicker is most obvious when a particular scan contrasts highly with the scans directly above and below, such as a black horizontal line on a white background. This type of flicker can be greatly reduced by 3DImàge985's built-in flicker reduction filter.

4. Frequently Asked Questions (FAQ)

Q1 What is AGP and what does it mean?

Answer
The Accelerated Graphics Port (AGP or A.G.P) is a high performance, component level interconnect targeted at 3D graphical display applications and is based on a set of performance extensions or enhancements to Peripheral Component Interconnect (PCI). A typical 3D application requires tremendous amount of memory to render 3D scenes. AGP provides a cost-effective way of shifting some of 3D rendering data structures into system memory from frame buffer of 3D graphics accelerator. The 3DImàge985 supports the higher performance 2X or execute mode of AGP which allows data structures to be executed in system memory space without being copied into the frame buffer of 3D graphics accelerator prior to use by the accelerator.

Q2 Why do we need 3D graphics capability in our PC?

Answer
3D technology is becoming increasingly important (and common) not only in games, but also in other applications such as VRML, which allows 3D scene descriptions in Web applications. 3D technology is used for image editing, modeling, and an increasing number of in home and business applications. In games, as well as other applications, 3D acceleration not only allows better visual qualities and more realistic scenery attributes than software alone, but it also allows a higher frame rate, which translates into a more interactive experience for the end users.

Q3 What does "Rendering Engine" mean?

Answer
"Rendering Engine" generically applies to the part of the graphics engine that draws 3D primitives, usually triangles. In most implementations, the rendering engine is responsible for interpolation of edges and "filling in" the triangle.

Q4 What does the set-up engine do in a graphics controller?

Answer
A set-up engine allows drivers to pass triangles in the form of raw

vertex information; whereas, most common designs force triangles to be pre-processed for the rendering engine in terms of delta values for edges, color, and texture.

Q5 Why does a 3D graphics chip need to have both a rendering engine and a setup engine?

Answer
Any "3D application", a game, VRML, or modeling package, can benefit from 3D rendering. This is especially true of applications that use texturing extensively; because texturing and texture filtering are very intensive operations at the pixel level in terms of CPU operations and demands for memory bandwidth. Without a set-up engine in a graphics controller, the CPU has to calculate the delta values for edges, color, and textures; the drivers need to handle ten (10) times more extensive data. This results in slower 3D pipeline operations between the CPU and the graphics controller.

Q6 If we use powerful CPUs, such as a Pentium™200, can a standard 2D graphics card achieve 3D performance?

Answer
Yes and no. Software rendering can take advantage of "tricks" learned by force of necessity through years of trial and error. With such stratagems, the speed of software rendering for simple scenes can approach that of low-level hardware 3D rendering. On the other hand, as scenes become more complex, there are conflicts between using the CPU for high-level game logic, geometry, lighting, and rendering, all of which increase their demands. No current CPU or system can perform advanced quality-enhancements (bilinear filtering and alpha blending) in real time. Even general case texture mapping with RGB lighting is too much for the current CPU generation.

Q7 What does "software 3D" mean ?

Answer
Software 3D is generally used to mean using non-specific (2D) hardware in conjunction with the CPU to render for 3D applications. Some of these techniques allow usable 3D applications when high-powered and/or MMX™equipped CPU's are employed along with special-case software optimization techniques. As stated above, SW 3D can achieve credible results with today's applications, but the rising popularity of good 3D hardware at the consumer price level is

inexorably compelling the public to expect hardware level scene enhancements and frame rates.

Q8 What is “SGRAM”?

Answer
Synchronous Graphics Random Access memory (SGRAM) is a new and improved type of memory, custom-designed for graphics use.

Q9 What is the advantage of SGRAM as compared to ordinary DRAM?

Answer
SGRAM is now capable of running at much higher speeds than fast page or EDO DRAM. Also, SGRAM is able to execute a small number of frequently executed operations, such as buffer clears, specific to graphics applications, independently of the controller.

Q10 What is 3DImàge985?

Answer
The 3DImàge985 is one of the first of the "second generation" 3D controllers which will catapult 3D applications of all types into the PC mainstream by providing the feature set and performance necessary for compelling 3D applications. It does this by combining proven VGA, video, and graphics acceleration with an advanced 3D rendering core including a set-up engine and a full 3D feature set.

Q11 Why should the customer choose Trident 3DImàge985 over other alternatives?

Answer
As stated above, the 3DImàge985 is second generation. This means that it combines the full feature sets often seen in first generation designs with the essential elements that were missing in those designs:

- High performance 3D achieved by innovative design
- Careful attention to system level integration
- Aggressive use of existing and recently developed technology, such as single-cycle SGRAM memory interfaces

The 3DImàge985 represents an overall competency in all areas, with excellence in some important ones, such as 3D and video, that make it the best choice on the market today for both consumer and commercial applications.

5. Troubleshooting

The following are some recommended steps to take if the GUI accelerator adapter will not boot or operate properly in your system:

1. Ensure that the monitor or TV brightness and contrast controls are properly adjusted.
2. Check to see if your monitor or TV is properly connected to the card. Be sure your monitor's pin definitions match those of your GUI accelerator card (See Appendix B). For TV out, ensure that the composite signal is connected to a "Video Input" RCA jack on the TV (or check the S-video connection). Read the TV owner's manual to select the proper signal jack for the display.
3. Turn the system on and confirm that the power supply is operating properly; i.e., that the fan operates and the system power light turns on.
4. Check to see if the card is firmly seated in its AGP bus expansion slot. It should not be making contact with any other cards in the system.

Note: Turn the system off before adjusting the card.

Problem: ***Windows hangs up during or after installing a driver.***

Solution A: Reread installation procedures to be sure you have installed the drivers correctly.

Problem: ***Windows color palette does not look right or colors changing.***

Solution: Most likely a defective RAMDAC, memory chip, clock chip, or crystal. Contact your dealer to have the problem repaired.

Problem: ***Can't display certain modes.***

Solution A: Run the SVM program (See the User's Guide for more information on the SVM program). If the SVM program fails, go to Solutions B, and C.

Solution B: Check to see that there is enough memory on the GUI accelerator to run this mode. For example, to run display mode 79H (1024x768-64K colors, refer to the tables in Section 2), 2 MB of display memory is required.

Solution C: If Solutions A, or B do not resolve this problem, it may be hardware related. Check the specifications of the monitor.

6. Appendix A: Video Mode Table

The adapter's video modes include all of the following:

TABLE 6-1: STANDARD VGA MODE SUPPORT

Mode #	Resolution -Colors	Horz KHz	Vert Hz	Mem Req	Text Res	Mode Type	TV Out
0h,1h	320x200-16	31.4	70	2M	40x25	Text	N,P
2h,3h	640x400-16	31.4	70	2M	80x25	Text	N,P
4h,5h	320x200-4	31.4	70	2M	40x25	Graph	N,P
6h	640x200-2	31.4	70	2M	80x25	Graph	N,P
7h	720x350-Mono	31.5	70	2M	80x25	Text	N,P
Dh	320x200-16	31.4	70	2M	40x25	Graph	N,P
Eh	640x200-16	31.4	70	2M	80x25	Graph	N,P
Fh	640x350-2	31.4	70	2M	80x25	Graph	N,P
10h	640x350-16	31.4	70	2M	80x25	Graph	N,P
11h	640x480-2	31.4	60	2M	80x30	Graph	N,P
12h	640x480-16	31.4	60	2M	80x30	Graph	N,P
13h	320x200-256	31.4	70	2M	40x25	Graph	N,P

TABLE 6-2: EXTENDED VGA MODE SUPPORT

Mode #	Resolution -Colors	Horz KHz	Vert Hz	Mem Req	Text Res	Mode Type	TV Out
20/1h_2	864x480-32K/64K	37.3	75	2M	108x30	Graph	
20/1h_1	864x480-32K/64K	31.5	60	2M	108x30	Graph	
22h_2	864x480-256	37.3	75	2M	108x30	Graph	
22h_1	864x480-256	31.5	60	2M	108x30	Graph	
23h_2	864x480-16M	37.3	75	2M	108x30	Graph	
23h_1	864x480-16M	31.5	60	2M	108x30	Graph	
24/5h	1024x600-32K/64K	38.0	60	2M	128x37	Graph	
26h	1024x600-256	38.0	60	2M	128x37	Graph	
27h	1024x600-16M	38.0	60	4M	128x37	Graph	
2Ch	320x200-256	31.6	70	2M	40x12	Graph	
2Dh_4	320x240-256	43.3	85	2M	40x15	Graph	
2Dh_3	320x240-256	37.5	75	2M	40x15	Graph	
2Dh_2	320x240-256	37.8	72	2M	40x15	Graph	
2Dh_1	320x240-256	31.4	60	2M	40x15	Graph	
2Eh_3	400x300-256	53.7	85	2M	50x18	Graph	
2Eh_2	400x300-256	46.8	75	2M	50x18	Graph	
2Eh_1	400x300-256	37.8	60	2M	50x18	Graph	
32h_5	512x384-256	68.7	85	2M	64x24	Graph	
32h_4	512x384-256	60.0	75	2M	64x24	Graph	
32h_3	512x384-256	56.4	70	2M	64x24	Graph	
32h_2	512x384-256	48.3	60	2M	64x24	Graph	
32h_1	512x384-256	35.5	87i	2M	64x24	Graph	
3Bh	320x200-16M	31.6	70	2M	40x12	Graph	
3Ch_4	320x240-16M	43.2	85	2M	40x15	Graph	
3Ch_3	320x240-16M	37.5	75	2M	40x15	Graph	
3Ch_2	320x240-16M	37.8	72	2M	40x15	Graph	
3Ch_0	320x240-16M	31.4	60	2M	40x15	Graph	
3Dh_3	400x300-16M	53.7	85	2M	50x18	Graph	
3Dh_2	400x300-16M	46.8	75	2M	50x18	Graph	
3Dh_1	400x300-16M	37.8	60	2M	50x18	Graph	
3Eh_4	512x384-16M	60.0	75	2M	64x24	Graph	
3Eh_3	512x384-16M	56.4	70	2M	64x24	Graph	
3Eh_2	512x384-16M	48.3	60	2M	64x24	Graph	
3Eh_1	512x384-16M	35.5	87i	2M	64x24	Graph	
42/3h	320x200-32K/64K	31.6	70	2M	40x12	Graph	
44/5h_4	320x240-32K/64K	43.2	85	2M	40x15	Graph	
44/5h_3	320x240-32K/64K	37.5	75	2M	40x15	Graph	
44/5h_2	320x240-32K/64K	37.8	72	2M	40x15	Graph	

Mode #	Resolution -Colors	Horz KHz	Vert Hz	Mem Req	Text Res	Mode Type	TV Out
44/5h_1	320x240-32K/64K	31.4	60	2M	40x15	Graph	
46/7h_4	400x300-32K/64K	53.7	85	2M	50x18	Graph	
46/7h_3	400x300-32K/64K	46.8	75	2M	50x18	Graph	
46/7h_2	400x300-32K/64K	37.8	60	2M	50x18	Graph	
48/9h_5	512x384-32K/64K	68.7	85	2M	64x24	Graph	
48/9h_4	512x384-32K/64K	60.0	75	2M	64x24	Graph	
48/9h_3	512x384-32K/64K	56.4	70	2M	64x24	Graph	
48/9h_2	512x384-32K/64K	48.3	60	2M	64x24	Graph	
48/9h_1	512x384-32K/64K	35.5	87i	2M	64x24	Graph	
50h	640x480-16	31.5	60	2M	80x43	Text	
51h	640x473-16	31.5	60	2M	80x43	Text	
52h	640x480-16	31.5	60	2M	80x60	Text	
53h	1056x350-16	31.3	70	2M	132x25	Text	
54h	1056x480-16	31.3	60	2M	132x30	Text	
55h	1056x473-16	31.3	60	2M	132x43	Text	
56h	1056x480-16	31.3	60	2M	132x60	Text	
57h	1188x350-16	31.3	70	2M	132x25	Text	
58h	1188x480-16	31.3	60	2M	132x30	Text	
59h	1188x473-16	31.3	60	2M	132x43	Text	
5Ah	1188x480-16	31.3	60	2M	132x60	Text	
5Bh_1	800x600-16	37.8	60	2M	100x75	Graph	
5Ch	640x400-256	31.6	70	2M	80x25	Graph	N,P
5Dh_4	640x480-256	43.2	85	2M	80x30	Graph	
5Dh_3	640x480-256	37.5	75	2M	80x30	Graph	
5Dh_2	640x480-256	37.8	72	2M	80x30	Graph	
5Dh_1	640x480-256	31.4	60	2M	80x30	Graph	N,P
5Eh_3	800x600-256	53.7	85	2M	100x37	Graph	
5Eh_2	800x600-256	46.8	75	2M	100x37	Graph	
5Eh_1	800x600-256	37.8	60	2M	100x37	Graph	P
5Fh_5	1024x768-16	68.7	85	2M	128x48	Graph	
5Fh_4	1024x768-16	60.4	75	2M	128x48	Graph	
5Fh_3	1024x768-16	56.4	70	2M	128x48	Graph	
5Fh_2	1024x768-16	48.5	60	2M	128x48	Graph	
5Fh_1	1024x768-16	35.5	87i	2M	128x48	Graph	
60h	720x480-256	31.4	60	2M	90x30	Graph	
61h	720x480-16M	31.4	60	2M	90x30	Graph	
62h_5	1024x768-256	68.7	85	2M	128x48	Graph	
62h_4	1024x768-256	60.0	75	2M	128x48	Graph	
62h_3	1024x768-256	56.4	70	2M	128x48	Graph	

Mode #	Resolution -Colors	Horz KHz	Vert Hz	Mem Req	Text Res	Mode Type	TV Out
62h_2	1024x768-256	48.3	60	2M	128x48	Graph	
62h_1	1024x768-256	35.5	87i	2M	128x48	Graph	
63h_4	1280x1024-16	91.1	85	2M	160x64	Graph	
63h_3	1280x1024-16	80.0	75	2M	160x64	Graph	
63h_2	1280x1024-16	63.9	60	2M	160x64	Graph	
63h_1	1280x1024-16	46.4	87i	2M	160x64	Graph	
64h_4	1280x1024-256	91.1	85	2M	160x64	Graph	
64h_3	1280x1024-256	75.0	75	2M	160x64	Graph	
64h_2	1280x1024-256	64.0	60	2M	160x64	Graph	
64h_1	1280x1024-256	46.4	87i	2M	160x64	Graph	
65h_2	1600x1200-16	75	60	2M	200x75	Graph	
65h_1	1600x1200-16	62.5	96i	2M	200x75	Graph	
66h_2	1600x1200-256	75	60	2M	200x75	Graph	
66h_1	1600x1200-256	62.5	96i	2M	200x75	Graph	
6Ah_1[1]	800x600-16	37.8	60	2M	100x75	Graph	
6Bh	640x400-16M	31.6	70	2M	80x25	Graph	
6Ch_4	640x480-16M	43.2	85	2M	80x30	Graph	
6Ch_3	640x480-16M	37.5	75	2M	160x60	Graph	
6Ch_2	640x480-16M	37.8	72	2M	160x60	Graph	
6Ch_1	640x480-16M	31.4	60	2M	160x60	Graph	N,P
6Ch_0	640x480-16M	31.4	60	2M	240x30	Graph	
6Dh_2	800x600-16M	53.7	85	2M	200x74	Graph	
6Dh_1	800x600-16M	46.8	75	2M	200x74	Graph	
6Dh_0	800x600-16M	37.8	60	2M	200x74	Graph	P
6Eh_1	1024x768-16M	68.7	85	4M	128x92	Graph	
6Eh_0	1024x768-16M	35.5	87i	4M	128x92	Graph	
74/5h_4	640x480-32K/64K	43.2	85	2M	160x30	Graph	
74/5h_3	640x480-32K/64K	37.5	75	2M	160x30	Graph	
74/5h_2	640x480-32K/64K	37.8	72	2M	160x30	Graph	
74/5h_1	640x480-32K/64K	31.4	60	2M	160x30	Graph	N,P
76/7h _4	800x600-32K/64K	53.7	85	2M	200x37	Graph	
76/7h_3	800x600-32K/64K	46.8	75	2M	200x37	Graph	
76/7h_2	800x600-32K/64K	37.8	60	2M	200x37	Graph	P
78/9h_5	1024x768-32K/64K	68.7	85	2M	128x96	Graph	
78/9h_4	1024x768-32K/64K	60.0	75	2M	128x96	Graph	
78/9h_3	1024x768-32K/64K	56.4	70	2M	128x96	Graph	
78/9h_2	1024x768-32K/64K	48.3	60	2M	128x96	Graph	
78/9h_1	1024x768-32K/64K	35.5	87i	2M	128x96	Graph	
7A/Bh_1	1280x1024-32K/64K	91.1	85	4M	160x128	Graph	

Mode #	Resolution -Colors	Horz KHz	Vert Hz	Mem Req	Text Res	Mode Type	TV Out
7A/Bh_0	1280x1024-32K/64K	46.4	87i	4M	160x128	Graph	

NOTES:

1. VESA mode. Same as 5Bh_1.
2. The "i" in the vertical frequency column denotes "interlaced". The "N" and "P" in the TV Out column denote "NTSC" and "PAL", respectively.

7. Appendix B: Pinout and Sync Frequencies

7.1 Analog Color Display Pinouts

Table 7-1 lists the GUI accelerator analog color display pinouts.

TABLE 7-1. ANALOG COLOR DISPLAY PINOUTS

PIN	FUNCTION
1	Red Video[1]
2	Green Video[1]
3	Blue Video[1]
4	Not Used
5	Ground
6	Red Return (ground)
7	Green Return (ground)
8	Blue Return (ground)
9	Key (no pin)
10	Sync Return (ground)
11	Monitor ID (not used)
12	SDA (DDC support)
13	Horizontal Sync
14	Vertical Sync
15	SCL (DDC support)

Note 1: Analog monochrome type monitors use green video for all video input and ignore red and blue video.

7.2 Conversion Table: Pin Adapters

If you will be using a 9-to-15 pin adapter cable to link your 9 pin monitor connector to the 15 pin accelerator card connector, check Table 7-2 carefully before you install the cable. The 9-to-15 pin adapter cables are available from a variety of sources, but they need to match the specifications in Table 7-2 to work properly with your new card.
The adapter cable requires a D-shaped 9 pin female connector and a D-shaped 15 pin male connector.

TABLE 7-2. 9-TO-15 PIN CONVERSION TABLE

9 PIN SIGNALS	PIN NO.	15 PIN SIGNALS	PIN NO.
Red	1	Red	1
Green	2	Green	2
Blue	3	Blue	3
Horz Sync	4	Horz Sync	13
Vert Sync	5	Vert Sync	14
Red Ground	6	Return Red	6
Green Ground	7	Return Green	7
Blue Ground	8	Return Blue	8
Sync Ground	9	Digital Ground	10
		Ground	5

7.3 Analog Video Signals

Black Level = 0 V
Full Intensity (White) Level = +0.7 V

8. Appendix C: FCC Compliance Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesirable operation.
This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and if not installed and used properly, in strict accordance with the manufacturer's instructions, 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, the user is encouraged to try and correct the interference by one of more of the following measures:

- ☑ Reorient or relocate the receiving antenna.
- ☑ Increase the separation between the equipment and receiver.
- ☑ Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- ☑ Consult an experienced radio/TV technician for help and additional suggestions.

The user may find the following booklet prepared by the Federal Communications Commission helpful: “How to Identify and Resolve Radio-TV Interference Problems.” It is available from the U.S. Government Printing Office, Washington, D.C. 20402, Stock No. 004-000-00345-4.

8.1 FCC Warning

The user is cautioned that changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.
NOTE: In order for an installation of this product to maintain compliance with the limits for a class B device, shielded cables and power cord must be used.