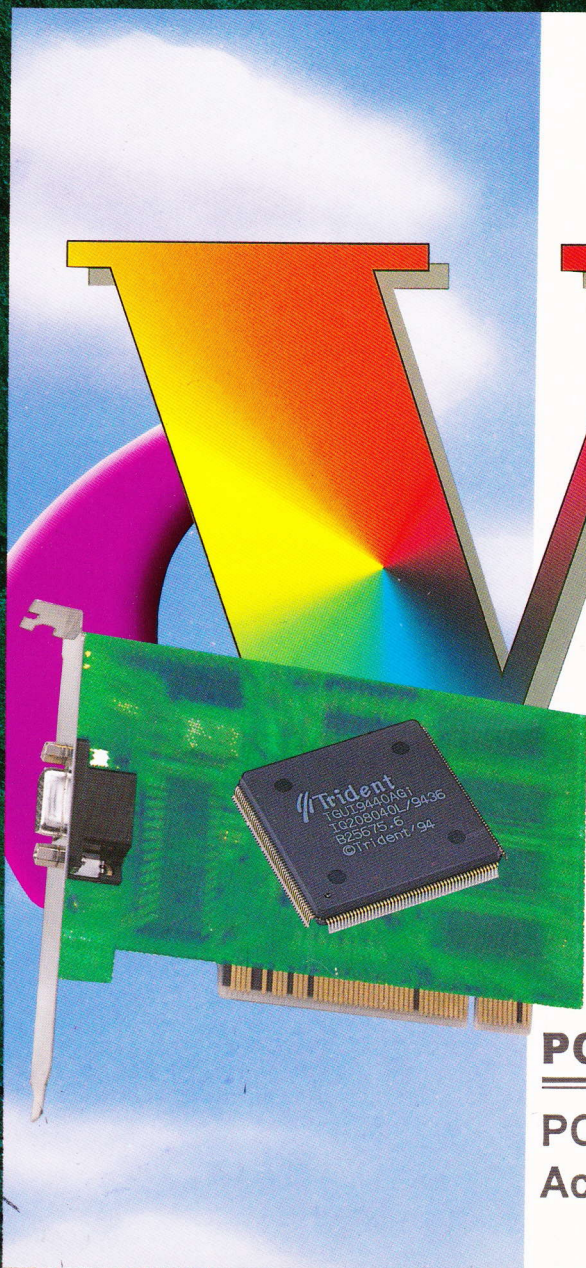


USER'S MANUAL

2922



PCI-47

**PCI-Bus VGA
Accelerator**

**VGA USER'S MANUAL
AND
INSTALLATION GUIDE**

**FOR
PCI-47**

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July, 1994

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CHAPTER 1 - HARDWARE

HARDWARE OVERVIEW

Thank you for purchasing this Graphical User Interface (GUI) accelerator adapter. The adapter works with your 486 or Pentium Peripheral Component Interconnect (PCI) Local Bus system to bring you high resolution, true color capability, high performance, and compatibility with most software and hardware.

Compatibility

- ☑ 486SX/DX and Pentium PCI systems
- ☑ Register compatible with EGA and VGA
- ☑ Non-interlaced or interlaced monitor support
- ☑ Compatible with Multi-Scanning and PS/2 monitors
- ☑ 1024x768 75Hz refresh

Resolution and Color Selection

- ☑ Supports 640x480 in 16, 256, 32K, 64K, and 16M colors
- ☑ Supports 800x600 in 16, 256, 32K, 64K, and 16M⁺⁺ colors
- ☑ Supports 1024x768 in 16, 256, 32K⁺⁺, and 64K⁺⁺ colors (interlaced and non-interlaced)
- ☑ Supports 1280x1024 in 16 and 256* colors interlaced

* These modes require 2 megabytes of display memory.

⁺ These modes require 45 nanosecond or faster display memory.

Extended Text Display

- ☑ 80 column text modes in 30, 43, and 60 rows
- ☑ 132 column text modes in 25, 30, 43 and 60 rows

Software Drivers Supported

- | | |
|---|---|
| <input checked="" type="checkbox"/> AutoCAD | <input checked="" type="checkbox"/> Autoshade |
| <input checked="" type="checkbox"/> VersaCAD | <input checked="" type="checkbox"/> GEM Desktop |
| <input checked="" type="checkbox"/> Lotus | <input checked="" type="checkbox"/> MS Windows™ |
| <input checked="" type="checkbox"/> MS Word | <input checked="" type="checkbox"/> OS/2 Presentation Manager |
| <input checked="" type="checkbox"/> Symphony | <input checked="" type="checkbox"/> Ventura |
| <input checked="" type="checkbox"/> WordPerfect | <input checked="" type="checkbox"/> SCO |
| <input checked="" type="checkbox"/> Quattro Pro | <input checked="" type="checkbox"/> VESA BIOS Extension
(for VESA standard SVGA drivers) |

Check List

In addition to this manual, you should have the following:

- ☒ GUI Accelerator Adapter Card
- ☒ Driver & Utility Software

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

Take this time to record the following information:

Dealer: _____

Date of Purchase: _____

Invoice Number: _____

Dealer's Phone: _____

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

Technical Support

In the event you have a technical problem, please reference Chapter 3, "Troubleshooting" of this manual. If you are still unable to resolve the problem, please contact your dealer for support.

CONFIGURING YOUR GUI ACCELERATOR

Jumper Settings

You can adapt the GUI accelerator for special hardware configurations using the given jumpers on the card.

TABLE 1. PCI BOARD JUMPER SETTINGS

JUMPER	OFF	ON
J4	NON-INTERLACED *	INTERLACED

Select Scan Rate: J4

J6 allows you to configure the scan rates of extended VGA modes to be compatible with your multi-scanning monitor. If your monitor can scan at 48.7 KHz or higher, remove the Jumper pin across J4. J4 in the open position will allow non-interlaced display for 1024x768 modes and higher horizontal and vertical scan rates for 800x600-16 and 800x600-256 color modes. If your monitor cannot scan at 48.7KHz or higher, leave the Jumper pin for J4 in the default position. This will give interlaced display for 1024x768 modes and reduced horizontal and vertical scan rates for the 800x600-16 and 800x600-256 color modes. Reference Table 2 page 6, and your monitor specifications for more detail on scan rates.

INSTALLATION

The installation procedure for your GUI accelerator adapter will vary slightly depending on the type of system you have (i.e., a 486/Pentium system with PCI Bus). Follow the general installation instructions in this section, and look for any special steps you will need to take for your particular system.

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. Unfasten the cover mounting screws on your system. Reference your system user manual to determine the location of the mounting screws.
3. Remove the system cover. Reference your system user manual for instructions on how to remove the system cover.
4. Select an open expansion slot. Select an appropriate PCI Bus expansion slot for the adapter. Please refer to your computer system manual for the location of the PCI Bus expansion slot. 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).
5. Install the adapter. To install the adapter in the selected PCI Bus expansion slot, place the gold-fingered edge-connector of the adapter directly above an expansion slot on the motherboard.
6. Attach the adapter. Use the screw you removed from the expansion slot in Step 4 to secure the adapter in place.
7. Replace the computer cover. Secure the cover with the mounting screws you removed in Step 2.

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 section, "Connecting the Monitor".

Connecting the Monitor

The adapter offers a 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 will require a 9-to-15 pin cable connector.

Monitor Support for Enhanced VGA Modes

Your monitor must be capable of displaying the mode you choose. Table 1 lists all available VGA display modes for the adapter, the monitors which support them, plus other information that may be useful.

Note that the color palette, (i.e., the total number of possible colors to choose from), is 16,777,216 in all modes except for monochrome modes where the color palette is 2--black and the monitor phosphor color. For example, in mode 62 (1024x768-256 colors), the total colors available for display on the monitor at one time is 256 different colors from a palette of 16,777,216. In mode 6C (640x480-16M colors), the total colors available for display on the monitor at one time is 16,777,216, i.e. 24-bit true color

CHAPTER 1 - HARDWARE

Table 2. Display Modes

RESOLUTION X * Y	COLOR DEPTH BIT	REFRESH RATE HZ	SCAN ORDER I/NI	MINIMUM DRAM MB	ACCELERATION SCHEME P/A/N
640X480	4	60	NI	1/2	P
640X480	4	75	NI	1/2	P
640X480	8	60	NI	1/2	A
640X480	8	75	NI	1/2	A
640X480	15/16	60	NI	1	A
640X480	15/16	75	NI	1	A
640X480	24	60	NI	1	N
640X480	24	75	NI	1	N
800X600	4	60	NI	1/2	P
800X600	4	75	NI	1/2	P
800X600	8	60	NI	1/2	N
800X600	8	75	NI	1/2	N
800X600	8	60	NI	1	A
800X600	8	75	NI	1	A
800X600	15/16	60	NI	1	N
800X600	15/16	75	NI	1	N
800X600	15/16	60	NI	2	A
800X600	15/16	75	NI	2	A
800X600	24	43	I	2	N
1024X768	4	60	NI	1/2	P
1024X768	4	75	NI	1/2	P
1024X768	8	60	NI	1	A
1024X768	8	75	NI	1	A
1024X768	15/16	43	I	2	A
1280X1024	4	43	I	1	P
1280X1024	4	60	NI	1	P
1280X1024	8	43	I	2	A
1280X1024	8	60	NI	2	A

1. All above modes assume use 80 ns standard DRAM, except those modes need 80 MHz memory clock will use 45 ns standard DRAM.
2. Acceleration scheme: P means accelerated by VGA graphic controller. A means accelerated by graphic engine, and N means partial acceleration.
3. You may need to adjust your multi-frequency monitor to display these modes properly. Use the horizontal and vertical size and position controls on your monitor to display without distortion.

Advanced Topics

The adapter supports a variety of video modes (standard VGA and higher solution) which are accessible through a video BIOS call from assembly language or other higher-level programming languages. Reference Appendix C for sources of programming assistance.

When you start up in DOS, the screen display defaults to the standard 80 column text or alpha-numeric mode. This is mode 33 on a color system, or mode 73 on a monochrome VGA system (see footnote references immediately following Table 2 above).

CHAPTER 2 - SOFTWARE INSTALLATION

UTILITIES INSTALLATION

Installation Procedures

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

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

The Utility installation program is run by executing the following steps:

1. Insert the display driver disk in the floppy drive.
2. Type in **README** at the floppy drive 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 10).
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 11).
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.

DRIVER/UTILITY for IVGA	Version UAG.0	7/15/94
At least 2MB of hard disk space is required for installation.		
1. Drive C:	2. Drive D:	3. Drive E:
Select a number (1, 2, 3) to continue: < ESC to Exit >		

FIGURE 10.

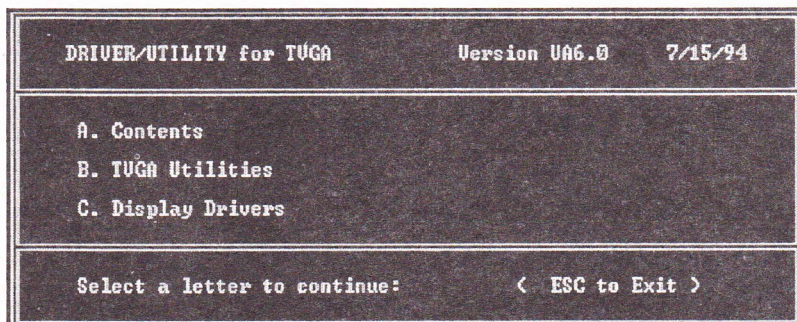


FIGURE 11.

Utilities Summary

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 Disk 2 of the Trident Utility and DOS Application drivers have been installed .
2. Type SVM to pull up the menu (see Figure 12).

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/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 12) 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**.

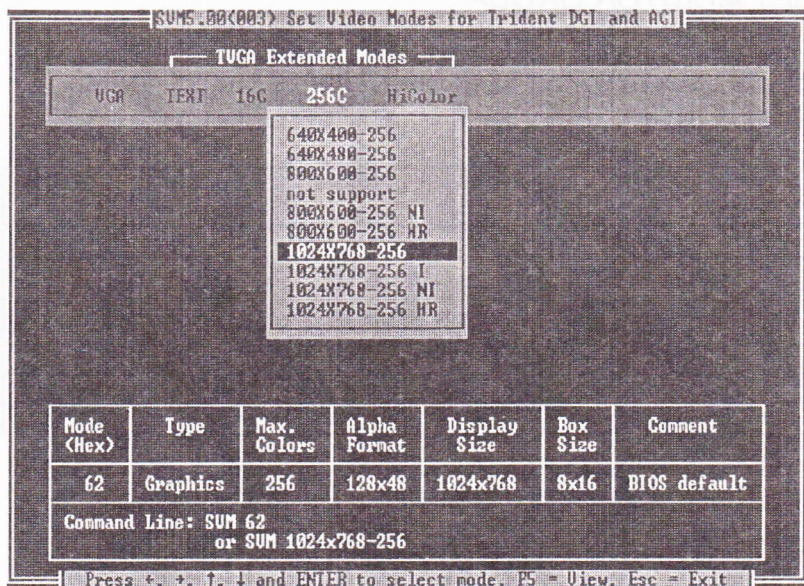


FIGURE 12.

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 Disk 2 of the Trident Utility and DOS Application drivers have been installed.
2. Type in SVM [mode number]ENTER.

For example, to run the graphics adapter in mode 62H, the command for item 2 above would be:

SVM 62 ENTER

SMONITOR

SMONITOR is designed to set the monitor group and the monitor type:

Usage: **SMONITOR <GROUP|OPTION>**

SET MONITOR GROUP

The graphics extended modes set by the graphics card's BIOS are sorted into six groups categorized by the monitor's refresh rate. The group setting as below:

GROUP	TYPE	640X480	800X600	1024X768	1280X1024
0	VGA	60	—	—	—
1	VGA_ENH	60	87i	—	—
2	SVGA	60	56	87i	—
3	SVGA_ENH	72	56	87i	—
4	SVGA_ENH_NI	72	72	60	87i
5	HIFUNC	72	72	70	87i
6	OVERHIFUNC	—	—	75	—

OPTION:

C SET COLOR MONITOR

M SET MONOCHROME MONITOR

The default group number is 4.

If you want set the monitor group, type:

SMONITOR GROUP

where GROUP is one of the group number listed above.

SET MONITOR COLOR

Switches between color and monochrome display. Some monitors (most notably Samsung monitors manufactured before 2/8/91) do not adhere to the standard IBM pinout definitions, which causes the VGA card to boot up in monochrome instead of color. This utility may be used to correct the problem.

To set the monitor as color, type:

SMONITOR C

or type:

SMONITOR M

to set monochrome monitor.

TVGACRTC

The TVGACRTC program allows the adjustment of video display parameters so that images are optimally sized and centered on the screen. Adjustable parameters include:

- ☒ Horizontal size and position.
- ☒ Vertical size and position.
- ☒ Pixel frequency.

The program is started from the DOS prompt by typing in TVGACRTC from the C:\TVGAUTIL\UTILITY directory.

The first section of the program is used to define a given name for the adjustments to be made (see Figure 14).

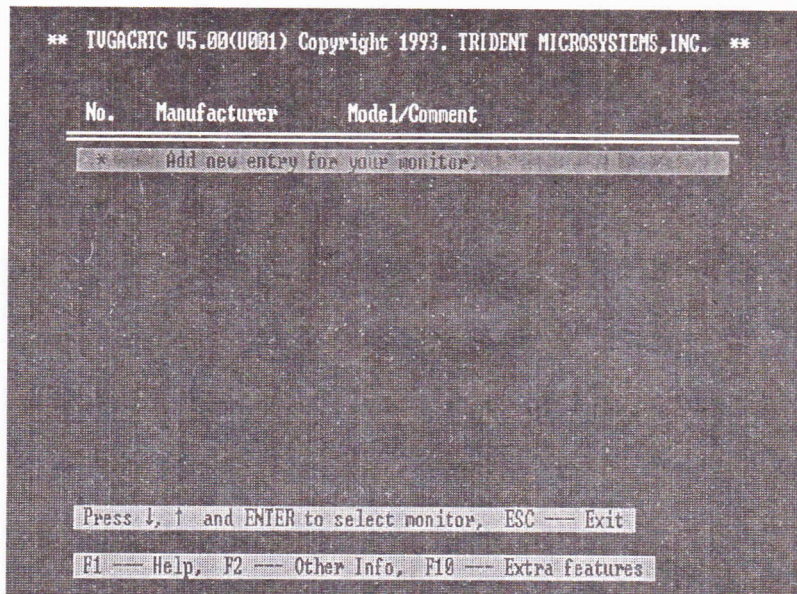


FIGURE 14.

1. Press **ENTER** to add a new monitor entry and type in the name of the manufacturer, followed by **ENTER** keystroke. The program will allow any name to be typed in.
2. Type in the associated comments for the monitor settings and press **ENTER**.

3. A mode table will be displayed, presenting all the adjustable modes as shown in Figure 15.
4. This table is traversed through the use of the up/down arrow keys. The mode highlighted is the selected mode for adjustment.
5. Select the mode to be adjusted and press **ENTER** (Figure 15 shows mode "62 non-interlaced" selected).
6. Select the desired pixel rate by scrolling the list (Figure 16) using the up/down arrow keys and press **ENTER** twice.
7. The screen alignment test pattern will then be displayed. The up/down arrow keys are used to adjust the vertical positioning of the screen. The left/right arrow keys are used for horizontal alignment of the screen. The home/end keys are used for horizontal screen sizing and the page up/down keys are used for vertical screen sizing. Once the screen position and size is adjusted, press **ENTER**, followed by the **ESC** keystroke.
8. To save the settings, type **Y** and press **ENTER**. The program will then modify the **Config.sys** file.
9. At this point press **ESC** and reboot the system to enable the parameter changes.

** TUGACRTC V5.00(U001) Copyright 1993, TRIDENT MICROSYSTEMS, INC. **

MONITOR:							
Mode	Type	Col.	Row	Resolution	Colors	Interlace	Loaded Support Adjust
5b	Graph	100	75	800x600	16	NO	YES
5e	Graph	100	37	800x600	256	NO	YES
5f	Graph	128	48	1024x768	16	YES	YES
5f	Graph	128	48	1024x768	16	NO	YES
62	Graph	128	48	1024x768	256	YES	YES
62	Graph	128	48	1024x768	256	NO	YES
63	Graph	160	64	1280x1024	16	YES	YES
63	Graph	160	64	1280x1024	16	NO	YES
6c	Graph	80	30	640x480	16M	NO	YES
70	Graph	64	30	512x480	32K	NO	YES
71	Graph	64	30	512x480	64K	NO	YES
74	Graph	80	30	640x480	32K	NO	YES
75	Graph	80	30	640x480	64K	NO	YES

Press ↓, ↑ and ENTER to select mode

ESC --- Return to previous menu, F1 --- Help

FIGURE 15.

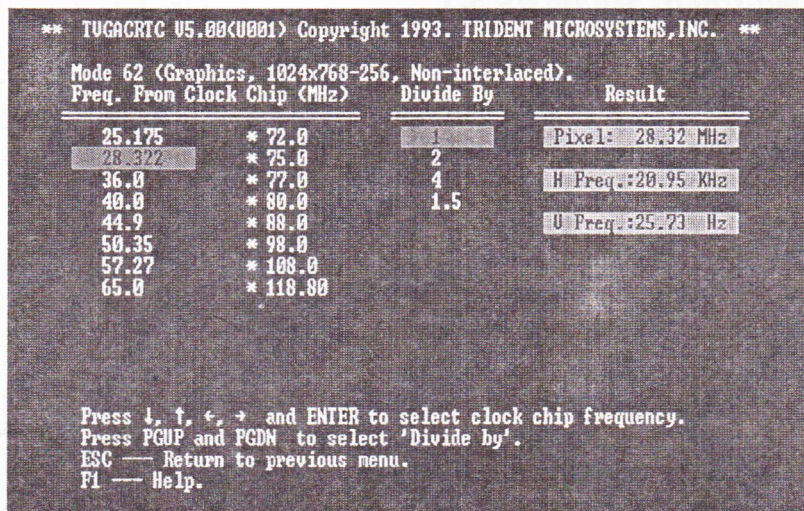


FIGURE 16.

DRIVER INSTALLATION

After selecting Drivers from the Main Menu, you will be presented with a list of possible drivers to install. Select the desired driver you wish to install. You will be presented with a version list for the given application. Choose the appropriate version of the application. Once you have selected the desired driver, the installation program will either provide you with further instructions, or guide you through the installation. The following pages give details for installing each available driver.

Microsoft Windows 3.1

INSTALLATION

The graphic installation program (TINSTALL) supports a simple 6 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 3.1 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.
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 1).

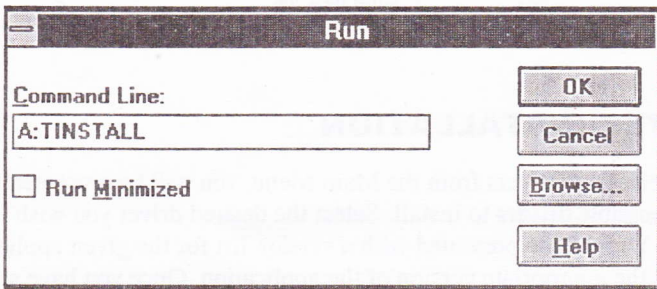


FIGURE 1.

- ☒ 6. A menu will appear, presenting a choice of Express or Custom Installation (see Figure 2).

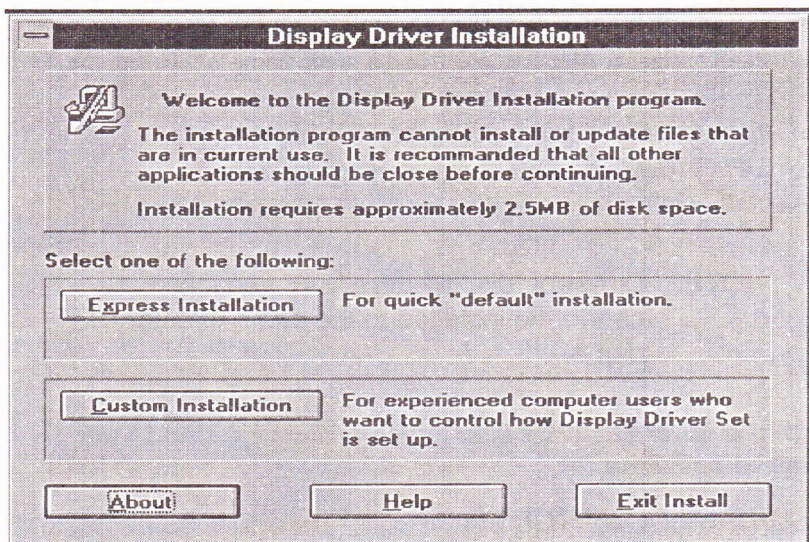


FIGURE 2.

Express Installation is quick and decision free. Display drivers will be copied into the TRIDENT.AGI 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. UA6.1) will replace the existing one.

SCREEN CONTROL

The Screen Control program provides a simplified method to set the screen resolution, color depth, and fonts. These advanced features allow customization of the virtual screen parameters and the setting of hot key values.

The main panel contains controls for setting screen resolution, color depth, and font size. Not all combinations of screen resolution, color depth, and font size are possible.

Color depths of 16, 256, 65K, 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 or 1280x1024 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.

CONFIGURING THE DISPLAY DRIVER

All selections are made by clicking on the available options (see Figure 3).

- ☒ Select the color depth first. If the current driver does not support the selected color depth, then Windows will have to be restarted.
- ☒ Select the resolution.
- ☒ Click on OK. If the current driver does not support the selected configuration, Windows will have to be restarted.

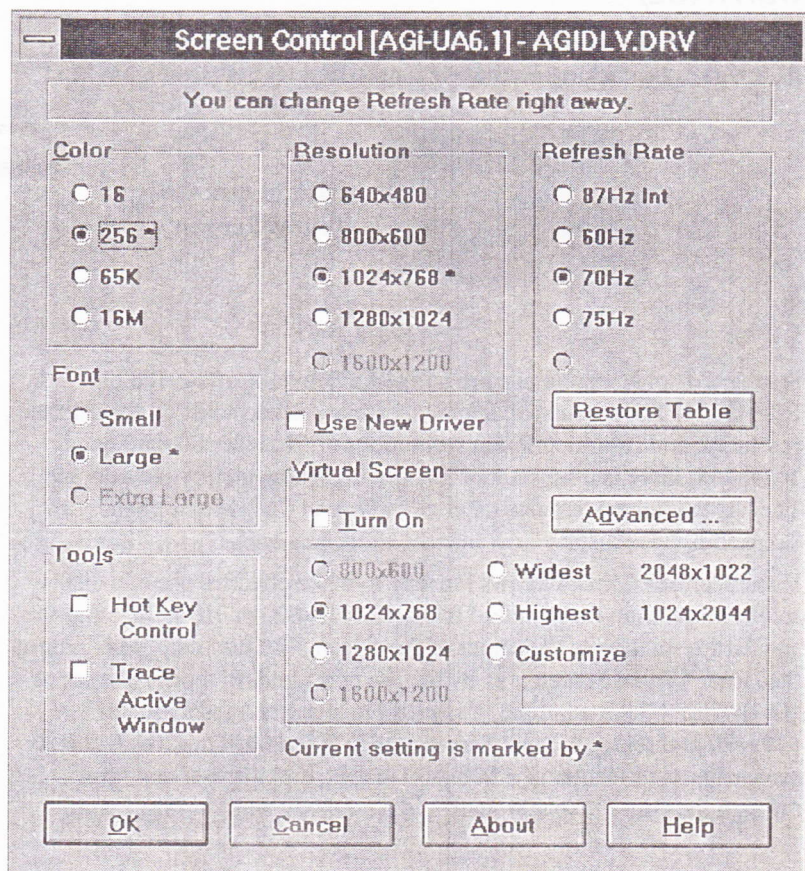


FIGURE 3.

NOTE: Hot Key Control Should be enabled before going into advanced setup. There is no virtual screen support for 16 colors. 1280x1024 is only available for 16 colors.

ADVANCED FEATURES (VIRTUAL SCREEN CONTROL)

The advanced features of the program is accessed by pressing ALT + D or by clicking on the box marked Advanced (see Figure 3).

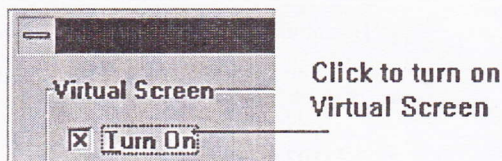
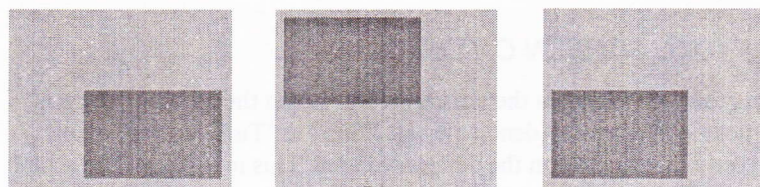


FIGURE 4.

Standard display resolutions are 640x480, 800x600, 1024x768 or 1280x1024. The amount of display memory used depends on the selected resolution and color depth. For resolutions of 640x480, 800x600 and 1024x768, there is a substantial amount of display memory left unused. The Virtual Screen features takes advantage of this unused memory by "expanding" the display area into the off-screen area.

Virtual Screen Control allows the user to make effective use of a display screen larger than the standard 640x480, 800x600 or 1024x768, and the standard resolution is the center of the screen. The user can "pan" around the larger Virtual Screen area by the use of a standard mouse or a set of "HOT KEYS." For example, it is possible to select a resolution of 640x480 and set the Virtual Screen size to 800x600. Thus, the 640x480 screen sits at the center of a 800x600 matrix, and the user can "pan" through the entire 800x600 matrix in a 640x480 window (see Figure 5).

Chapter 2 - Software Installation



Panning allows traversing a larger screen through a smaller window.

■ VIRTUAL SCREEN AREA ■ ACTUAL DISPLAY AREA

FIGURE 5.

The advanced features provide functions to customize the virtual screen, as shown in Figure 6:

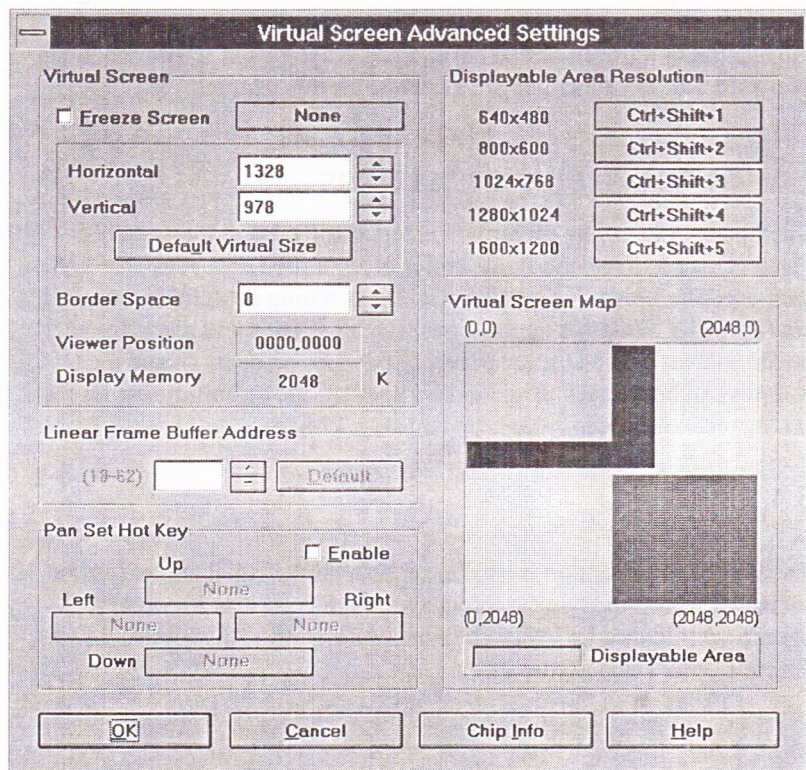


FIGURE 6. DISPLAY DRIVER ADVANCED SETTINGS

VIRTUAL SCREEN ON/OFF

This function activates the virtual screen. When the Virtual Screen is turned on (Figure 4), (denoted by an X next to "Turn on") a Virtual Screen Map appears on the designated area. This map shows the actual Displayable Area, the possible area (i.e. area that can be accessed by Virtual screen) and the invalid area (inaccessible). The virtual screen size and shape are selected by dragging the perimeters of the Displayable area. The "Default Virtual Size" function is then used to align and maximize the selection (see Figure 6).

FREEZE SCREEN

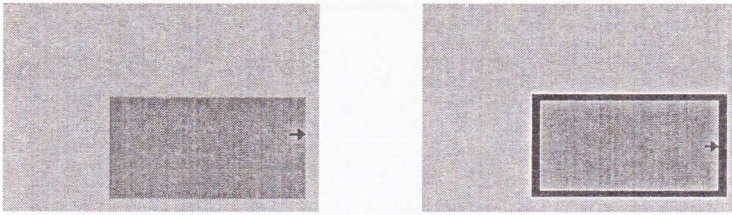
The Freeze Screen option is used to disable the panning feature, giving the illusion of a frozen screen but keeping other virtual screen functions available. Hot key functions are available for this feature.

LINEAR FRAME BUFFER ADDRESS

The Linear Addressing driver will automatically detect the system's memory size and sets the frame buffer to an unused area above the system memory. The Linear Frame Buffer Address setting is useful in avoiding conflicts with Windows applications which use the same linear frame buffer address as the Display Driver. Addresses between 18 and 62 MBytes can be selected. If there is no conflict, the default setting is highly recommended.

BORDER SPACE

The Border Space option is used to set up a border (thickness measured in pixels) within the Displayable Area, which is used as a marker for panning the screen, i.e. when the cursor hits against this border, screen panning occurs (see Figure 7).



→ mouse cursor

■ border

Border space sets up a transparent border (black area) on the display area, that is used as a threshold to start panning the virtual screen.

FIGURE 7.

PAN SET HOT KEY

Hot keys can be set up to pan the virtual screen left, right, up and down. The feature has to be enabled first by clicking on the **ENABLE** box, before hot keys can be selected.

Once all selections are made, click on **OK** or press **ALT + O** to exit the advanced setup.

DPMS (DISPLAY POWER MANAGEMENT SIGNALING)

The POWER MANAGEMENT program is designed for energy-saving monitors that conform to the VESA Display Power Management Signaling (DPMS) standard.

WARNING: The use of this program is not recommended for monitors that do not support the VESA DPMS standard.

The program offers three power-down modes:

1. Standby (minimum power savings)
2. Suspend (substantial power savings)
3. Off state (maximum power savings)

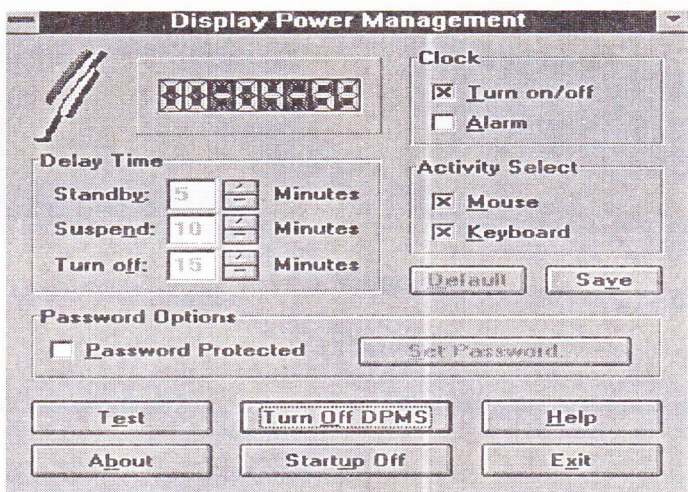


FIGURE 8.

The program monitors for mouse and/or keyboard activity. When activity is not detected for a specified delay period (controlled by the Delay Time parameter), the program signals the TGUI9440AGi to enter the selected power-down modes.

The Display Power Management program offers several options to customize the DPMS operation:

DELAY TIME

The delay time to enter each mode can be set by entering the value (in minutes) in the Delay Time parameters. Values can be entered by either clicking on the count-up or count-down button, or by clicking on the number, deleting it, and typing in the desired time in minutes (see Figure 9).

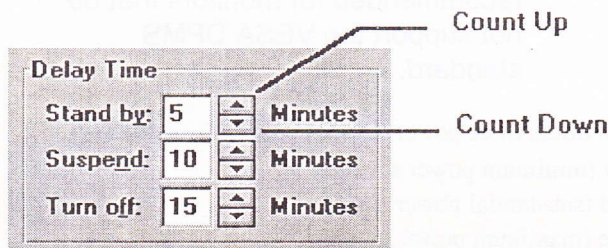


FIGURE 9. DELAY TIME

ACTIVITY SELECT

The Activity Select option selects which activity the program senses in order to restore the display to the monitor. For example, if both mouse and keyboard are selected, then either activity will re-establish the powered down signals.

PASSWORD OPTION

The Password Option sets up a password to get back onto the screen.

- ☒ A password is set up by first clicking on the box marked PASSWORD PROTECTED or by pressing ALT + P (this is confirmed by the presence of an "X" in the box).
- ☒ Press ALT + S or click on the box marked SET PASSWORD.
- ☒ Type in the selected password (twice) and select OK, or press ENTER.

CLOCK

Turning on the clock enables the digital count down display.

ALARM

If the Alarm option is enabled, then the last 5 seconds of countdown to Stand by mode is synchronized with beeps from the PC speaker.

STARTUP ON/OFF

This option installs the Display Power Management program onto the Windows Startup file, so that DPMS is active upon entering Windows.

DEFAULT

The default button sets all parameters back to the factory default values.

TEST

The test feature is used to give a demonstration of the DPMS power down function.

SAVE

This feature is used to save all the current settings.

Once all settings are selected, the program is activated by pressing ALT + O or by clicking on the box marked Turn On DPMS.

DISPLAY DRIVER UNINSTALLATION

The UNinstall program enables the user to safely delete specific display drivers or an entire display driver set.

To remove an entire Display Driver Set, complete the following steps:

1. Using the arrow keys or mouse, select the Display Driver Set that is to be removed (the set to be deleted should be high-lighted).
2. Once the desired Driver Set is selected, simply select the Delete button or press ENTER.

NOTE: The UNinstall program will not permit the deletion of a Display Driver set that is currently in use.

To remove an individual driver from a Display Driver Set, complete the following steps:

1. Using the arrow keys or mouse, select the Display Driver Set that is to be removed (the set to be deleted should be high-lighted).
2. Once the desired Driver Set is selected, click on the Enter button. This will pull up a list of available display drivers.
3. Select the display driver to be deleted by using the mouse or the up/down arrow keys to scroll through the list.
4. Click on the Delete button or press ALT + D to delete the selected display driver.

Microsoft Windows NT

MICROSOFT WINDOWS NT 3.1

INSTALLATION

1. Run the Microsoft Windows NT Setup program located in the Main group of Program Manager.
2. Select **"Change System Settings"**, from the **"Options"** pulldown menu.
3. Select **"Other"**, from the display options.
4. Microsoft Windows NT 3.1 will prompt you for the correct path where the Trident drivers are located. Enter the path **"X:\TVGAUTIL\NTDRV\NT31\"** where X is the drive where Disk 2 of the Trident Utility and DOS Application drivers have been installed .
5. A list of all Trident drivers will appear, select the resolution and color depth desired.
6. Restart Microsoft Windows NT. The desired Trident driver will then be in effect.

NOTE: If you select a color depth or resolution not supported by your card, NT will substitute 640x480, 256 color for the display.

MICROSOFT WINDOWS NT 3.5

INSTALLATION

1. Run the Microsoft Windows NT display Setup program located in the Control Panel of the Main group.
2. Select **"Change Display Type..."** button from the Display Settings options.
3. Select **"Change..."** button from the Display Type options.
4. Select **"Other..."** button from the Select Device options.
5. Microsoft Windows NT 3.1 will prompt you for the correct path where the Trident drivers are located. Enter the path **"X:\TVGAUTIL\NTDRV\NT31\"** where X is the drive where Disk 2 of the Trident Utility and DOS Application drivers have been installed.
6. A list of all Trident drivers will appear, select the resolution and color depth desired.
7. Restart Microsoft Windows NT. The desired Trident driver will then be in effect.

NOTE: If you select a color depth or resolution not supported by your card, NT will substitute 640x480, 256 color for the display.

Lotus 1-2-3, versions 2.1 and 2.2

1. Copy the Lotus 1-2-3 driver into your Lotus directory by running SET123 from the \TVGUTIL directory. For example, if the driver/utility is installed in the D: drive and Lotus 1-2-3 is installed in the C: drive with directory name \LOTUS, type:
D:\TVGAUTIL\SET123 C:\LOTUS
2. Change to the LOTUS 1-2-3 directory and type: **LOTUS** to open the main menu.
3. Select **Install** from the main menu.
4. Select **Advanced options** from the Install menu.
5. Select **Add new driver to library** from the Advanced Options menu.
6. Select **Modify current driver set** from the menu.
7. Select either **text** or **graphics** display. For the text mode, choose one of the following command lines to indicate the number of rows for your display:

TVGA 132x25 Version x.x	TVGA 80x30 Version x.x
TVGA 132x30 Version x.x	TVGA 80x43 Version x.x
TVGA 132x43 Version x.x	TVGA 80x60 Version x.x
TVGA 132x60 Version x.x	

EXAMPLE: Enter TVGA 132x25 Version 1.0 for 132 column by 25 row display. The following row values may be used: 25, 30, 43, or 60.

8. For graphics mode, select the following command line:
TVGA 640x480 for Release 2.x
9. Return to the Lotus 1-2-3 main menu and choose **Save Change** to record the changes, then exit the Lotus 1-2-3 installation program.
10. Installation is complete for Lotus 1-2-3. To reconfigure for a different resolution (i.e. 132x25 to 132x30 in text mode), follow steps 3 through 8, then run Lotus 1-2-3 as usual.

Symphony 2.x

1. Copy the Symphony driver to the \SYMPHONY directory by running the SETSYMPH utility found in the \TVGAUTIL directory. For example, if the driver/utility is installed in the D: drive and the Symphony application is installed in the C: drive with a directory name \SYMPHONY, type:

D:\TVGAUTIL\SETSYMPH C:\SYMPHONY

2. The remaining steps need to be completed inside Symphony. Note them down or reference steps 4 through 9.
3. Change to the Symphony 2.x directory and type:
SYMPHONY to open the main menu.
4. Select **Install** from the main menu.
5. Select **Advanced options** from the Install menu.
6. Select **Add New Driver To Library** from Advanced Options menu.
7. Select **Modify Current Driver Set** from the menu.
8. Select either text or graphics display. For the text mode, choose one of the following command lines to indicate the number of rows for your display:

TVGA 132x25 Version x.x	TVGA 80x30 Version x.x
TVGA 132x30 Version x.x	TVGA 80x43 Version x.x
TVGA 132x43 Version x.x	TVGA 80x60 Version x.x
TVGA 132x60 Version x.x	

EXAMPLE: Enter TVGA 132x25 Version 1.0 for 132 column by 25-row display. The following row values may be used: 25, 30, 43, or 60.

9. For graphics mode, select the following command line:
TVGA 640x480 for Release 2.x
10. Return to the Symphony main menu and choose **Save Changes** to record the changes, then exit the Symphony installation program.
11. Installation is complete for Symphony. To reconfigure for a different resolution (i.e. 132x25 to 132 30 in text mode), follow Steps 4 through 9, then run Symphony as usual.

GEM Desktop 3.xx

1. Follow the prompts to prepare a GEM/3 driver diskette. The installation program will copy driver files to the newly formatted diskette in drive A:.
2. The remaining steps need to be completed in side GEM. They are listed in a text window. Note them down or reference steps 3 through 7.
3. Insert original GEM/3 system Master Disk, and run "GEMSETUP".
4. Select in order **Change Existing Configuration, Continue, Change Your Current Setup**, and the listed graphics and card display.
5. When prompted for a new graphics card and display, select **Other Pack** and insert the newly prepared GEM/3 driver diskette in drive A.
6. Select a display driver.
7. Continue with the rest of the GEMSETUP program. Please consult your GEM manual for more information on the GEMSETUP program.

Ventura Publisher

1. Follow prompts to prepare a Ventura driver diskette. The installation program will copy driver files to the newly formatted diskette in drive A:.
2. Supply the location of the Ventura directory on the hard disk when prompted (e.g. C:\VP). Enter the path and then select OK.
3. Indicate whether or not the Ventura Publisher Professional Extension is being used.
4. Select one of the display modes listed.
5. Indicate the type of mouse being used and, if necessary, to which I/O port (i.e. COM1, COM2, etc.) the mouse is connected.
6. Confirm choices to complete the installation.

To reconfigure for a different display mode, repeat this entire installation procedure.

WordPerfect

WORDPERFECT 5.1

TO INSTALL THE TEXT MODE DRIVERS

1. Copy the driver files from \TVGAUTIL\WP51 directory on your hard disk drive into your WordPerfect 5.1 directory (e.g. C:\WP51). For example, if WordPerfect 5.1 is to be installed in drive C: and the driver\utility is installed in driver D:, type:

Copy D:\TVGAUTIL\UF51\TVGATEXT.VRS C:\WP51

The display drivers (TVGATEXT.VRS) will be copied automatically to the WordPerfect directory.

2. The remaining steps need to be completed inside WordPerfect. They are listed in a text window. Note them or reference steps 3 through 5.
3. Run WordPerfect 5.1 by typing WP at the WordPerfect 5.1 program directory.
4. Press **Shift-F1** to bring up the Setup Menu. Press **"2"** to select **Display** and then **"3"** to select **Text Screen Type**.
5. Choose one of the extended text drivers. The available drivers are 80x30, 80x43, 80x60, 132x30, 132x43, 132x60.
6. Driver installation is complete for WordPerfect. To reconfigure for a different resolution, (e.g. 132x25 to 132x30 in text mode), repeat steps 4 and 5.

TO INSTALL EXTENDED GRAPHICS MODE DRIVERS

1. Copy the driver files from \TVGAUTIL\WP51 directory on the hard disk drive into the WordPerfect 5.1 directory (e.g. C:\WP51). For example, if WordPerfect 5.1 is installed in drive C: and the driver\utility is installed in driver D:, type:

Copy D:\TVGAUTIL\WP51\TVGA16.VRS C:\WP51

2. The display drivers (TVGA16.VRS) will be automatically copied to the WordPerfect directory.
3. The remaining steps need to be completed inside WordPerfect. They are listed in a text window. Note them or reference steps 3 through 5.
4. Run WordPerfect 5.1 by typing WP at the WordPerfect 5.1 program directory.

Chapter 2 - Software Installation

5. Press the **Shift-F1** to bring up the Setup Menu. Press **"2"** to select Display and the **"2"** to select **Graphics Screen Type**.
6. Choose one of the Extended Graphic drivers. The available drivers are 800x600-16 colors, 1024x768-16 colors, and 768x1024-16 colors.
7. Driver installation is complete for WordPerfect. To reconfigure for a different resolution, (i.e. 800x600), repeat steps 4 and 5.

WORDPERFECT 6.0

TO INSTALL THE TEXT MODE DRIVERS

1. Copy the driver file from \TVGAUTIL\WP60 directory on the driver into the WordPerfect 6.0 directory (e.g.\WP6.0). For example, if WordPerfect 6.0 application is installed in drive C: and the driver\utility program is installed in drive D:, type:
Copy D: \TVGAUTIL\WP60\TVGA6TXT.VRS C: \WP60
2. To run WordPerfect 6.0 from the directory, type **WP**.
3. Make sure WordPerfect 6.0 Text Mode is selected. There should be a check mark or an asterisk in front of "Text Mode" under the **View** pull-down menu.
4. Select the "Setup" option under the **File** pull-down menu, and chose **Display**. Select "2. Text Mode Screen Type/ Colors" and then select "Screen Type". To install the Trident driver, select "Trident VGA". Select the appropriate screen resolution.

TO INSTALL EXTENDED GRAPHICS MODE DRIVERS

WordPerfect 6.0 for DOS allows selecting either Text Mode or Graphic Mode Interface. For graphic mode, install the VESA driver and select a resolution from 640x480 to 1024x768.

1. If the VGA BIOS on the card is version C3.0 or later, select the VESA driver that is included in the WordPerfect 6.0 program. If the VGA BIOS is a version earlier than C3.0, run the VESA.EXE utility program located on the VGA Driver/Utility diskette. Please see section 2.2.2 for more information on the VESA BIOS Extension utility.
2. Make sure the VESA driver from WP6.0 installation program is selected and installed. Boot-up the WordPerfect 6.0 program, and select "Graphic Mode" from the **View** pull-down menu.
3. Select "Setup" from the "File" pull-down menu. Select "Display", and choose "1" to select the different graphic mode driver. Choose "1" for Screen Type. Highlight "VESA VBE", and select the desired resolution. Follow the instructions on the screen to complete installation.

Microsoft Word for DOS

MS WORD 5.0

1. Copy the MS Word driver from the \TVGAUTIL\Word directory on the hard drive into the MS Word 5.0 directory (e.g.\Word50). For example, if MS Word 5.0 is installed in drive C: and the Driver/Utility is installed in drive D:, type:
Copy D:\TVGAUTIL\WORD\SCREEN.VID C:\WORD50

The display drivers (SCREEN.VID) will be automatically copied to **the Word directory.**

2. The remaining steps need to be completed inside MS Word. They are listed in a text window. Note them or reference steps 3 through 5.
3. Run MS Word 5.0 by typing "WORD" in the MS Word 5.0 directory.
4. Press ESC to enter a command. Press "O" to enter an Option Command.
5. Select Display Mode, then press F1 to list the display modes available. Choose one of the following lines to indicate the number of rows for the display:

- | | |
|------------------------------|---|
| (1) Text, 25 lines, 16 color | (5) Text, 25 lines, 16 color ¹ |
| (2) Text, 43 lines, 16 color | (6) Text, 30 lines, 16 color ¹ |
| (3) Text, 50 lines, 16 color | (7) Text, 43 lines, 16 color ¹ |
| (4) Text, 60 lines, 16 color | (8) Text, 60 lines, 16 color ¹ |

¹ Lines 5 through 8 are for 132 column modes. Mouse support is not available for 132 column modes.

6. Driver installation for MS Word is complete. To reconfigure for a different resolution, (i.e. 132x25), repeat steps 4 and 5.

MS WORD 5.5

1. Change the directory to \TVGAUTIL\Word55.
2. Type **SETUP** to run the setup program. Follow the instructions on the screen to complete the driver installation.

AutoCAD TurboDLD Classic Driver by Panacea

TurboDLD Classic Driver by Panacea is a combined display interface and rendering driver. It supports DOS versions of AutoCAD 10/386, 11/386 and 12. It offers the following resolutions for the drawing editor :

640x480	16 colors
800x600	16 colors
1024x768	16 colors
1280x1024	16 colors
320x400	200 colors
640x480	256 colors
800x600	256 colors
1024x768	256 colors (1MB Video RAM required)
1280x1024	256 colors (2MB Video RAM required)
512x480	32k colors
640x480	32k colors
800x600	32k colors
512x480	65k colors
640x480	65k colors
800x600	65k colors

It also offers the following resolutions for rendering:

320x200	256 colors
640x480	256 colors
800x600	256 colors
1024x768	256 colors (1MB Video RAM required)
1280x1024	256 colors (2MB Video RAM required)
512x480	32k colors
640x480	32k colors
800x600	32k colors
512x480	65k colors
640x480	65k colors
800x600	65k colors

To install the display drivers for AutoCAD 10/386, 11/386 or 12, The UG6.0 DISK # 2 and the proper AutoCAD 386 Release is required.

IMPORTANT: Ensure that AutoCAD is already installed with the IBM Standard VGA driver.

AUTOCAD/386 RELEASE 10 AND 11

1. Change the directory to C:\TVGAUTIL\ACAD. Type **INSTALL** [enter] and follow the installation steps on the screen. The TurboDLD Classic Driver and the other files will be copied to the proper ACAD working subdirectory.
2. Run DLD386's **FASTCAD.BAT**, or copy the commands from the file into the **AUTOEXEC.BAT** file before running AutoCAD. **FASTCAD.BAT** sets the environment variables including **DLDCFG**, **DSPADI**, **RDPADI** and **RCPADI**.
3. Start **AutoCAD/386** and select **Configure AutoCAD** from the Main Menu.
4. Select, in order, **Configure Video Display**.
5. Select **ADI P386 v4.0/4.1 display**. This will pull up TurboDLD's configuration menu, which should be used to select the desired graphics board, resolution.
6. Select the graphics area background color, text color (for the menu status line and command prompt areas of the screen), text background color, border color, and dialog box/button outline color. To select the default colors, press [Return] at each prompt. To select a different color, enter the desired color number at the given prompt.

AUTOCAD/386 RELEASE 12

DISPLAY DRIVER INSTALLATION PROCEDURE

Change the directory to C:\TVGAUTIL\ACAD, and type **INSTALL** [enter]. Follow the installation steps on the screen. The TurboDLD Classic Driver and the other files will be copied to the proper ACAD working subdirectory.

The display driver for the drawing editor and rendering, is installed by following these steps:

EDITOR INSTALLATION PROCEDURE

1. Run the **AutoCAD Drawing Editor** screen.
2. Select **CONFIGURE** in the File pull-down menu. AutoCAD will then switch to a text screen.
3. Select 3 to configure the video display. AutoCAD will then show the current video display.
4. Select **Y** to select a different driver.
5. Select **"Trident Microsystems© Panacea, Inc."**. This will bring out the TurboDLD's configuration menu.
6. Follow the menu to select the desired resolution.
7. Save the selection and exit from TurboDLD's configuration.
8. Enter 0 to return to the **Drawing Editor** screen.
9. Answer **Y** to save configuration changes.

RENDERING INSTALLATION PROCEDURE

1. Ensure that Rendering for AutoCAD Rel 12 is already installed.
2. Select Preferences in the Render pull-down menu from the **Drawing Editor** screen.
3. If Rendering has been previously configured, select **Reconfigure** in the **Rendering Preferences** dialog box. Otherwise, the program automatically will switch directly to a text screen.
4. Select **2** to configure the rendering driver.
5. Select "AutoCAD's configured P386 ADI combined display/rendering driver."
6. Select the desired resolution for rendering.
7. Select the desired rendering view
8. Enter **0** to return to the **Drawing Editor** screen.
9. Answer **Y** to save configuration changes.

Click **OK** to close the **Rendering Preferences** dialog box.

Quattro Pro 2.x for DOS

1. Copy the Quattro Pro driver from the \TVGAUTIL\PRO directory on the hard drive into the QPRO 2.x for DOS directory. For example, if your Quattro Pro 2.x is installed in drive C: and the Driver/Utility is installed in drive D:, type:

Copy D: \TVGAUTIL\QFRO\VIDEO.RSC C:\QPRO

The display drivers (VIDEO.RSC) will be automatically copied to the Quattro Pro directory.

2. The remaining steps need to be completed inside Quattro Pro. They are listed in a text window. Note them or reference steps 3 through 5.
3. Choose to run Q.EXE by entering "Y" in response to the prompt. The Driver/Utility Installation program will then exit to Quattro Pro.
4. Press "O" to select the **Options** menu and "D" to select Display Mode.
5. Choose an extended text mode.
6. The graphic driver installation for Quattro Pro is complete. To reconfigure for a different resolution, (i.e. 800x600), repeat steps 4 and 5.

CHAPTER 3 - TROUBLESHOOTING

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

1. Check to see if the card is firmly seated in its PCI Bus expansion slot. Be sure it is not making contact with any other cards in the system. (Note: Be sure to turn the system off before adjusting the card.)
2. Be sure your monitor is properly connected to the card. Be sure your monitor's pin definitions match those of your GUI accelerator card.
3. Turn system on, and be sure that the system's power supply is operating properly. (i.e. fan operates, system power light turns on).

COMMONLY ASKED QUESTIONS

• MONITORS

Q. *Why does the display shift or change sizes when I switch modes?*

A. Some monitors lack auto-sizing features or just do not synchronize properly to the video board output. In some cases, horizontal and vertical display adjustments may be necessary. Use the TVGACRTC program provided on your Driver Utility disk to adjust the video board output. Reference the Software User's Manual for more information on the TVGACRTC program.

Q. *What kind of monitor do I need to display 800x600 or 1024x768 resolution?*

A. To display 800x600 resolution at 56Hz refresh, your monitor must be capable of a 35.2KHz horizontal scan rate (e.g., NEC 2A, 3D). At 72Hz refresh, your monitor must be capable of a 48.0KHz scan rate (e.g., Sony HG 1304, NEC 4D, 5D, Seiko 1450).

To display 1024x768 interlaced, your monitor must be capable of a 35.5 KHz horizontal scan rate (e.g., NEC 3D, Seiko 1430 or 1440). To display 1024x768 non-interlaced (60Hz), your monitor must be capable of a 48.7KHz scan rate (e.g., Sony HG 1304, NEC 4D, 5D, Seiko 1450). To display 1024x768 non-interlaced (70Hz), your monitor must be capable of a 56.4KHz scan rate (e.g. NEC 4FG).

Q. *What kind of monitor do I need to display 1280x1024 resolution?*

A. A 19-inch or larger size monitor is recommended to display 1280x 1024 (e.g. NEC 4FG). The monitor must also be capable of a 47.5 KHz scan rate.

• SYSTEMS

Q. *Can I have two graphics boards in my system at the same time?*

A. A monochrome card may co-reside with the VGA adapter. You cannot have an EGA, CGA, or another VGA card co-resident.

Q. *I see "mouse droppings" on the screen when I move my mouse around. Is this a problem with my mouse?*

A. Could be. The version of your mouse driver may not support VGA. Another possibility is that the DRAM on your card is not seated correctly or is not the right speed. If you have added your own DRAM to the card, make sure it is the same speed or faster than the currently installed DRAM.

TROUBLESHOOTING MS-WINDOWS

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

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

Solution B: Did Windows display an error message before hang-up?

If no: Check CONFIG.SYS and AUTOEXEC.BAT files and minimize TSRs (Terminate and Stay Resident Programs) or Device Drivers, such as, DEVICE=MOUSE.SYS in CONFIG.SYS or PCTOOLS.EXE in AUTOEXEC.BAT.

If SYSTEM .INI (located in the WINDOWS\SYSTEM directory) has been edited, try replacing with a clean version from the original Windows diskettes. (Note: If this is done, any other changes you may have made to SYSTEM.INI will be lost)

Delete and reinstall the driver(s). See NOTE on page 4-X.

If yes: If Windows reports "... file corrupted", be sure you have used the Windows system or Trident Setup program to install the drivers. Copying the drivers to your Windows directory without using the Windows or Trident directory will result in a file corruption error. (the files must be expanded as well as copied). If you use the correct setup program and still have problems, delete the Trident driver files from your Windows directory and use a new set of drivers.

If installing on a network via "SETUP/N", you will need to use the "EXPAND" utility (located on original Windows diskettes) to expand the display drivers.

Problem: *Garbage on the screen or double images.*

Chapter 3 - Troubleshooting

Solution A: Use View Option (FS) in SVM program to verify the problem. See Generic Software User's Manual for more information on SVM program.

Solution B: Check jumper J4. Be sure the jumper setting is correct for your monitor.

Solution C: If the problem persists with the jumpers set correctly, the board may be defective. Contact your dealer for further support.

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 taken care of.

Problem: *Can't display certain modes.*

Solution A: Run SVM program (See Software User's Manual for more information on SVM program). If SVM fails:

Solution B: Check to see you have enough memory on the VGA card to run this mode. For example, to run display modes of 1024x768x25 6 or 32,000 or more colors, 1 megabyte of memory is required.

Solution C: Run TVGACRTC program to adjust video parameters (See Software User's Manual for more information on TVGACRTC program).

Solution D: If steps a, b, or c do not resolve this problem, it may be a hardware problem. Check specifications and capability of the monitor.

Chapter 3 - Troubleshooting

Problem: *Windows screen size is too tall or too narrow.*

Solution A: Run SVM to verify the problem.

Solution B: Use TVGACRTC to adjust screen size.

Solution C: Some monitors have limited bandwidth and the Windows screen size problem may not be corrected completely.

Problem: *Icons and characters are too small in 1024x768 and 1280x1024 modes.*

Solution: It is normal for icons and characters to become smaller in higher resolutions. A 19-inch or larger monitor is recommended for these higher modes.

Problem: *Mouse doesn't function properly.*

Solution A: Check mouse connection and re-boot the system.

Solution B: Contact mouse vendor for latest version of the mouse driver.

Problem: *When changing resolutions by running SETUP, the SETUP menu displays more than one selection for the same resolution mode.*

Solution: When upgrading to a new set of Windows drivers, you need to delete the old OEM?.INF (e.g. OEMO.INF) file in the WINDOWS\SYSTEM subdirectory. The SETUP menu will then display only one selection for each resolution mode.

Problem: *When installing a high resolution Trident display Driver for foreign language Windows 3.1 (i.e. German or French version of Windows 3.1), the SETUP program prompts to insert an incorrect Microsoft Windows 3.1 diskette.*

Solution: Since Microsoft uses a different diskette arrangement for their foreign language Windows 3.1 fonts, the OEMSETUP.INF in the Driver/Utility Disk will prompt for a diskette number that is not correct for the foreign language Windows 3.1. In order to remedy this problem, a Universal Windows 3.1 driver that includes all the Windows 3.1 fonts has been created. This Universal Windows 3.1 driver does not require any fonts from the Windows 3.1 program diskettes. Contact your dealer to obtain a Trident Universal Windows 3.1 display driver diskette.

APPENDICES

Appendix A - Pinout and Sync Frequencies

Analog Color Display Pinouts

Table 2 shows the GUI accelerator analog color display pinouts.

TABLE 2. 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	MONITOR ID ²
13	HORIZONTAL SYNC
14	VERTICAL SYNC
15	NOT USED

Footnotes:

- 1 Analog monochrome type monitors use green video for all video input and ignore red video and blue video.
- 2 Monochrome monitors connect Pin 12 to ground. Color monitors leave Pin 12 open. The adapter uses Pin 12 to detect the monitor type.

Conversion Table: 9-to-15 Pin

If you will be using a 9-to-15-pin adapter cable to link your 9-pin monitor connector to the 15-pin connector, check Table 3 carefully before you install the cable. 9-to-15 pin adapter cables are available from a variety of sources, but they need to match the specifications in Table 3 in order to work properly with your new adapter.

The adapter requires a D-shaped 9-pin female connector and a D-shaped 15-pin male connector.

TABLE 3. 9-to-15 Pin Conversion Table

9-PIN CONNECTOR SIGNAL	PIN	15-PIN CONNECTOR SIGNAL	PIN
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

Video Signals

ANALOG: BLACK LEVEL = 0V

FULL INTENSITY LEVEL = +0.7V

APPENDIX B - DRAM UPGRADES

Your GUI accelerator adapter may be a 1MB DRAM board or an upgradeable 2MB DRAM board. Please check to see if you have empty memory sockets to determine which board you have.

Once you have identified your board, you may purchase the same type of DRAM as is already installed on your VGA addapter. This DRAM may be purchased from your dealer, a local electronics store, or a mail order house (which advertise in publications such as Computer Shopper, PC Magazine, PC World, and BYTE). If you need help, please contact your vendor.

2MB DRAM Board Upgrade

If your board is identified as an Upgradeable 2MB, it can be upgraded from 1MB to 2MB DRAM. Upgrading to 2MB will allow 1280x 1024-256 color resolution.

To add DRAM to your board, complete the following steps:

1. Turn system off before removing board.
2. Place the adapter face up on a firm, flat non-static surface (avoid wool materials). The gold edge connector should be facing you.
3. Insert the DRAM chips into the available sockets on the center of the board. Be sure pin one on the chip matches with pin one on the socket. If you install the memory backwards, it will be damaged. When inserting the chip, be careful not to bend the pins. The DRAM chip should be seated snugly into the socket.

Upgrade Verification

To check if the DRAM has been installed properly, install the board in your system and turn the system ON. At the initial boot-up, the copyright and the amount of video DRAM detected will appear in the upper left-hand corner of the screen. If the amount of DRAM detected is the same as the amount installed (2MB), the DRAM has been installed successfully.

If the amount of DRAM detected does not match the amount of DRAM installed, turn your system off and remove the board from your system. Check to see that all the pins fit snugly into their respective sockets (i.e. no pins have been bent underneath the DRAM chip or are sticking out). Be sure pin one is orientated properly.

Appendix C - Additional Sources for Programming Assistance

The information in this manual is intended for quick reference only. If you intend to seriously program VGA software, you should refer to one of the following publications on VGA:

- IBM Personal System/2 Display Adapter Technical Reference, April 1987. (IBM part number 68X2251 S68X-2251-0.)
- IBM Personal System/2 and Personal Computer BIOS Interface Technical Reference, April 1987. (IBM part number 68x2260 S68X-260-00.)
- Programmer's Guide to the EGA and VGA Cards, by Richard F. Ferraro. Second Edition, copyright 1990, Addison-Wesley Publishing Company.
- Advanced Programmer's Guide to the EGA, VGA, by George Suttty and Steve Blair. Copyright 1988, Brady-Book, a division of Simon and Schuster, Inc.

Appendix D - 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 prepared by the Federal Communications Commission helpful: "How to Identify and Resolve Radio-TV Interference Problems." This booklet is available from the U.S. Government Printing Office, Washington, D.C. 20402, Stock No. 004-000-00345-4.

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.

Appendix E - Software Updates

Trident is continuously working to improve software driver performance, and to add drivers for new versions of supported application software. These software updates are available at no charge.

You can connect to the Bulletin Board Service (BBS) at (408) 263-8529, to learn about new driver software.

