Hercules Graphics Station Card

TIGA 2.0 Documentation Supplement

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Introduction

This documentation supplement covers the use of the Hercules Graphics Station Card (HGSC) with the TIGA 2.0 software and its associated Windows 3.0 drivers. This supplement expands the information contained in the Hercules Graphics Station Card Owner's Manual and replaces the Software Chapter 2 of that manual for the coverage of TIGA 2.0. Additional information is contained in the README file of the Hercules Graphics Station Card Utilities Diskette TIGA 2.0 Version. Be sure to review this file following the directions on page 3 of the Owner's Manual.

If you received this supplement with an update diskette, all of the additional information you need is contained in this document. If you received this supplement with the purchase of a new Graphics Station Card, you will need to refer to Chapter 1 Getting Started in the Hercules Graphics Station Card Owner's Manual for information about how to install the card in your system.

Before installation, record the serial number of your Graphics Station Card. You will need the serial number if you contact Hercules for technical support. You should also return the registration card so that Hercules can inform you of important future software updates.

Serial # _____

Hercules Technical Support
Telephone: 415 540-0749

TIGA

After you have installed the Hercules Graphics Station Card following the steps in the Owner's Manual, and after you have successfully executed the TEST program, your Graphics Station Card will run in standard VGA modes without any further software installation. To access the high performance features of the Hercules Graphics Station Card you must install the TIGA software and application drivers.

TIGA stands for Texas Instruments Graphics Architecture and is important software for the Graphics Station Card. TIGA enables the use of the Texas Instruments 34010 graphics processor which is responsible for the higher speed, higher resolution, and greater number of colors available on the Hercules Graphics Station Card. In addition to providing the TI 34010 graphics routines, TIGA manages the communication between the host CPU (the 80286, 80386, or 80486) and the 34010 graphics processor. The TIGA software must be installed before Windows, AutoCAD or other TIGA compatible applications can be used in non-VGA modes.

Hercules provides two version of TIGA - TIGA 1.1 and TIGA 2.0. You only need to be concerned with TIGA version 1.1 if you are using TIGA compatible applications that have not been updated for TIGA 2.0. TIGA 2.0 provides a significant enhancement of support for protected mode operation. Also, TIGA 2.0 does not require .ALM files that were needed with TIGA 1.1. The Hercules supplied drivers for Windows 3.0 and AutoCAD are designed for use with TIGA 2.0. If these are the only TIGA programs that you require then you do not need TIGA 1.1. The Hercules Graphics Station Card Utilities Diskette for TIGA 2.0 is labeled TIGA 2.0 Version. Those

users who do require TIGA 1.1 should consult Appendix B - Maintaining TIGA 1.1 and TIGA 2.0 Files on the Same System before proceeding.

TIGA 2.0 video modes supported on the Hercules Graphics Station Card are listed in the following table:

Mode Number	Resolution	Bits per Pixel	# of Colors
0	640x480	8	256
1	640x480	16	32,768
2	800x600	8	256
3	1024x768	8	256
4	512x480	32	16.7 Million
5	640x480 (2 page)	8	256

Note: TIGA mode #3 can operate with two sets of frequencies for either interlaced or non-interlaced monitors. The STATION program allows the user to specify monitor type indicating which 1024x768 format (interlaced or non-interlaced) is desired.

The Two Versions of the Hercules Graphics Station Card

The Hercules Graphics Station Card is available in two versions - models GB1024 and GB1024+2. It is important to understand how the differences between the two versions of the card affects your use of software.

The GB1024 is the base model of the Graphics Station Card. The GB1024 has one megabyte of video RAM (VRAM) and no dynamic RAM (DRAM). The GB1024+2 is the full memory model of the Graphics Station Card featuring one megabyte of VRAM and two megabytes of DRAM. Both cards support the same display formats from 16- and 24-bit true color to high-resolution 1024x768 256 color modes.

The difference between the two models of the Hercules Graphics Station Card is that the GB1024+2 version has additional memory for storing program code such as TIGA. The GB1024 stores program code in unused portions of video memory. Both cards feature built-in VGA which also uses the VRAM for its display. On the GB1024, the VGA display buffer, the 34010 display buffer and 34010 code all use the same memory and this affects both current and future software.

Windows 3.0 Compatibility Notes

The Windows 3.0 driver supplied with the Graphics Station Card supports the display of 256 colors at up to 1024x768 resolution. This driver can be used on either the GB1024 or the GB1024+2 versions of the card. Future Windows drivers from Hercules will support both 16- and 24-bit color on the GB1024+2 version of the Graphics Station Card. The GB1024 version of the card will be limited to 256 colors

under Windows because there is not enough memory on the base model of the Graphics Station Card for both the true-color display memory and the TIGA code.

Another consideration unique to the GB1024 version of the card is a result of sharing VRAM between VGA operation and TIGA program storage. When a full-screen DOS program (non-Windows application) is launched from the Windows desktop, the TIGA code in memory is overwritten by the VGA. In order to preserve the state of TIGA, a memory image is written out to disk before switching to text mode and reloaded back from disk before re-enabling Windows. This additional overhead is not imposed on the GB1024+2 version of the card which stores TIGA code in DRAM.

AutoCAD ADI Compatibility Notes

The structure of the Hercules ADI driver provides optimum performance on the GB1024+2 model of the Hercules Graphics Station Card.

The supplied real mode driver for AutoCAD Release 10 supports both the GB1024 and the GB1024+2 models.

The protected mode driver supports AutoCAD 386 Release 10 on the GB1024 and the GB1024+2 models. AutoCAD 386 Release 11 is supported on the GB1024+2 model only.

The memory requirements for 24-bit rendering (via the Hercules ADI driver) demand the additional DRAM available on the GB1024+2. Autodesk 3D Studio and AutoShade 2.0 (available Q1 '91) are supported only on the GB1024+2 card.

The following table summarizes the software driver support for the two models of the Hercules Graphics Station Card.

Software	GB1024	GB1024+2
Windows 3.0 8-bit driver	X	X
Windows 3.0 16/24-bit drivers (future)		X
AutoCAD Release 10 (real mode)	X	X
AutoCAD 386 Release 10 (protected mode)	X	X
AutoCAD 386 Release 11		X
Autodesk 3D Studio		X
AutoShade 2.0 (Q1 '91)		X

Note for Users of the GB1024 Model Hercules Graphics Station Card

Some GB1024 cards (but not GB1024+2) require modification in order to work with TIGA 2.0. The modification requires replacing the socketed memory-mapper chips NMM0 and NMM1, illustrated in Appendix One of the Graphics Station Owner's Manual, with new chips labeled NMM0-B and NMM1-B. Cards in need of this modification were manufactured between the first week of January and the third week June, 1990 and can be identified by their serial numbers. The format of the Graphics Station Card's serial number is as follows: GS0MONWxxxxx, where MON is the month of manufacture and W is the week of manufacture (A, B, C, or D). Thus, cards needing modification have serial numbers between GS0JANAxxxxx and GS0JUNCxxxxx. If you have a Graphics Station Card in this serial- number range, and did not receive the replacement PALs with your copy of TIGA 2.0, please contact Hercules for the replacement chips. Users outside of North America should contact their supplier for the new PALs.

Hercules Software Updates

By purchasing a Hercules Graphics Station Card you have made an investment in the future. With enough power for high performance at high resolution and enough color for photo-realistic image display, the Hercules Graphics Station Card will be an appropriate platform for several generations of software to come.

PC graphics software is evolving rapidly and new versions of sophisticated programs can be expected periodically. In order to keep users abreast of these software changes Hercules will offer software updates and upgrades as follows:

Bug Fixes to the distribution software will be available to registered users. This software may be available on the Hercules BBS or can be sent to users via US Mail for a nominal handling fee.

This software will be provided by request on an as-needed basis.

New or Enhanced Drivers - From time to time Hercules will issue new software that will be available to registered users at an additional cost. Price will vary according to the nature of the enhancements.

Please be sure to register your Graphics Station Card in order to qualify for these software updates.

Organization of the Hercules Graphics Station Card Utilities Diskette TIGA 2.0 Version

\Root <DIR>

STATION.EXE	HGSC software installation and TIGA configuration utility
STATION.MNU	Menu text required by STATION.EXE
README.COM	Hercules README text file viewing utility
README	Text file containing update information
TEST.EXE	HGSC Diagnostic program
CHKTIGA.EXE	TIGA information utility
HBOOT.SYS	Utility for dual monitor configurations. See Appendix 2 of the Owner's Manual
RAMVGA.COM	Video BIOS relocation utility - Documented in Appendix A of this supplement

\TIGA <DIR>

TIGACD.EXE	TIGA 2.0 Communications Driver
TIGAGM.OUT	TIGA 2.0 Graphics Manager
TIGALNK.EXE	TIGA 2.0 Link Utility
WIN30.RLM	Load module required by the TIGA Windows 3.0 driver
HGSADI.RLM	Load module required by the TIGA ADI driver
EXTPRIMS.RLM	Generic TIGA 2.0 load module

TOVGA.BAT	Batch file used to return the HGSC to VGA mode
SETVGA.EXE	Executable file used by TOVGA.BAT to return the HGSC to VGA mode

\MODES <DIR>

*.CL	Primary configuration information files
*.CFG	Secondary configuration information files

\WIN30 <DIR>

TIGA48.DRV	Windows 3.0 TIGA driver for resolutions of 800x600 or higher
TIGA48LO.DRV	Windows 3.0 TIGA driver for 640x480
TIGA.GR3	Windows "grabber" for TIGA
VDDTIGA.386	'386 enhanced mode support for TIGA
OEMSETUP.INF	Information file for Windows 3.0 SETUP
TIGAOEM	File needed for Windows 3.0 setup

\ACAD <DIR>

HGSADI.EXE	ADI v4.0 real mode driver for TIGA 2.0 and AutoCAD/DOS Release 10.
HGSADI.EXP	PADI v4.0 /4.1 combined rendering and display driver for TIGA 2.0 and AutoCAD 386 Release 10/11 and AutoShade 2.0.
HGS3DS.EXP	PADI v4.1 combined rendering and display driver for TIGA 2.0 and 3D Studio.

Installing TIGA 2.0 Software

Use the STATION program on the Hercules Graphics Station Card Utilities Diskette TIGA 2.0 Version to install the TIGA 2.0 files to your hard disk. If you need to maintain an existing TIGA installation for a TIGA 1.1 application, please read Appendix B - Maintaining TIGA 1.1 and TIGA 2.0 Files on the Same System before proceeding.

If you are updating an existing TIGA installation we recommend that you edit your AUTOEXEC.BAT file to eliminate any reference to TIGA. Eliminate the SET TIGA command as well as the reference to the TIGA directory from the DOS PATH command. Also remove the \TIGA directory from your hard disk if one exists, then reboot the system.

To install the new software follow these steps:

1. Place the Hercules Graphics Station Card Utilities Diskette TIGA 2.0 Version in a high density floppy disk drive and log onto this drive (e.g. type `A: [Enter]`). Type `STATION [Enter]` to execute the program.

2. Select item 1 to copy the Hercules supplied TIGA files to your system.

3. Press `[Enter]` to accept the default Destination Path (the drive and subdirectory where STATION will copy the TIGA files). If you wish to have STATION copy the files to a different drive or directory, use the backspace key to erase the default path and enter the desired destination path.

4. Press `[Enter]` to verify that the Source Path (the location of the Graphics Station Card Utilities Diskette) is correct. If it is not, use the backspace key to erase the indicated drive and enter the desired drive disignation.

5. STATION will present two monitor options: "Non-Interlaced 1024" and "Interlaced 1024." (If STATION presents an empty box, see Appendix A - Troubleshooting.) These two monitor options differ only in how they handle operation at a resolution of 1024x768. If your monitor supports non-interlaced operation at 1024x768 select "Non-Interlaced 1024." If your monitor supports interlaced operation at this resolution, or if your monitor doesn't support this resolution (e.g., you are using a standard VGA monitor at 640x480 or an enhanced VGA monitor at 800x600) then select "Interlaced 1024."

6. Select the screen resolution in which you wish to operate your TIGA applications. If you choose 800x600 or 1024x768 your monitor must be capable of achieving these resolutions. DO NOT select the 640x480x16 format, neither the AutoCAD driver nor the Windows 3.0 driver require this option.

   If you want to change the TIGA resolution at a later time, you can do this by running STATION from your hard disk and selecting the new resolution.

7. STATION asks whether all of the options are correct. If they are, press "`Y`" and continue. If they are not, press "`N`" and you will be given the opportunity to specify the correct information.

8. STATION prompts you to enter the default TIGA directory. This should be the same Destination Path that was specified in step #3 above. Press `[Enter]` if the TIGA directory is correct or use the backspace key to erase the suggested directory and enter the desired directory.

9. Verify that the TIGA resolution specified is correct. Press "`Y`" to proceed with the

installation or "N" if you selected an inappropriate display format. If you selected an inappropriate display format, do not let STATION modify your AUTOEXE.BAT file in the next step and start again with option #1 from STATION's main menu.

10. STATION prompts you to allow it to modify your AUTOEXEC.BAT file. Press "Y" to let STATION make the necessary changes and go to step 11.

    If you are updating your AUTOEXEC.BAT file yourself (you have elected not to have STATION update the AUTOEXEC.BAT file) be sure that the TIGA 2.0 directory is in the DOS Path, and that the command:

    SET TIGA=-mc:\tiga2 -lc:\tiga2

    is included in the AUTOEXEC.BAT file. This example SET command assumes that the TIGA 2.0 files are stored in a directory of drive C: called \TIGA2. (The second TIGA parameter "-l" is a lowercase "L" not a numeral one).

    Be sure to install the TIGA files, update the AUTOEXEC.BAT file and reboot your computer BEFORE attempting to install Windows 3.0.

11. Exit STATION, by selecting option #4.

12. Remove the Hercules Utilities Diskette from drive A: and reboot your computer. Note that you must reboot your system before running TIGA applications whenever you change the monitor configuration or the screen resolution.

Now that STATION and the TIGA files are copied to your hard disk you can change the TIGA monitor configuration or screen resolution at any time by running STATION from the hard disk and making the appropriate selections.

The CHKTIGA.EXE Utility

Once TIGA is installed and you have rebooted, use the CHKTIGA.EXE program to verify that the TIGA environment variables are set and that the TIGA communications driver (TIGACD) is loaded.

To use CHKTIGA.EXE, log onto the root directory of your hard disk and type:

```
CHKTIGA [Enter]
```

If you get the error response "Bad command or file name" your DOS path does not include the TIGA directory. You should update your path to include this information.

The CHKTIGA program makes standard TIGA calls to load the graphics manager, set graphics mode, and read the current TIGA configuration. If TIGA is installed correctly you will see a message confirming this. Press the ESC key to return to DOS or press "C" to see detailed configuration information.

The Graphics Station Card and '386 Memory Management Software

If you are using a VCPI (Virtual Control Program Interface) compatible '386 memory manager such as QEMM386 from Quarterdeck you can customize the TIGA installation for optimum performance. QEMM386 v5.1 is compatible with TIGA 2.0, Windows 3.0, and AutoCAD 386. To inform QEMM386 of the characteristics of the Graphics Station Card for proper operation, here is an example of the load command in the CONFIG.SYS file:

```
device=qemm386.sys rom=C000-C6FF

aram=C700-C7FF i=C800-DFFF ram
```

This tells QEMM386 that the VGA ROM is located from C000-C6FF, that there is non-relocatable adapter RAM at C700-C7FF and to include C800-DFFF in the memory map (this may be inappropriate in your system depending on what other devices you have installed) and finally the "ram" command instructs QEMM386 to occupy unused areas of memory between 640K and 1024K.

If you have enough unused high memory, you can use Quarterdeck's LOADHI command in your AUTOEXEC.BAT file to load TIGACD into the memory above DOS's workspace. For example, the line in your AUTOEXEC.BAT file that loads TIGACD might read:

```
\qemm\loadhi /r:1 \tiga\tigacd
```

assuming that LOADHI is in the \QEMM directory and TIGACD is in the \TIGA directory.

Microsoft Windows 3.0 Installation

The Hercules Graphics Station Card Windows 3.0 driver will display 256 colors at the TIGA supported resolutions of 640x480, 800x600, and 1024x768.

Note: The following instructions assume that Windows 3.0 has been installed in your system already and is currently set up to operate in standard VGA mode. These instructions also assume that you have completed the process of installing the general-purpose TIGA files on your system, that you have rebooted your system to establish the TIGA environment variables and that CHKTIGA confirms that TIGA is properly installed.

The Windows 3.0 Setup program does not allow 3rd party drivers to be installed from the Windows Desktop. It is necessary to run the Setup program from DOS. This operation is covered in Appendix A of the Windows Users Guide: *Installing a Device Driver Not Supplied with Windows*. You will need a set of Windows 3.0 distribution disks to complete the procedure.

For the purpose of these instructions we will assume that you have Windows 3.0 installed in the C:\WINDOWS directory of your hard disk and that the high-density floppy disk drive on your system is drive A:. If these designations do not match your setup, substitute the appropriate drive and path statements for your configuration. So that you can easily restore your system to VGA mode, we recommend that you copy your current SYSTEM.INI file in the Windows 3.0 directory to VGA.INI (e.g. `copy c:\windows\system.ini c:\windows\vga.ini[Enter]`)

To install the Windows 3.0 drivers:

1. Log onto the \WINDOWS directory of your hard disk. For example:

   CD\WINDOWS

2. Type: SETUP [Enter]

3. When the Windows SETUP program shows you the current configuration, move the cursor bar to VGA on the "Display:" line and press [Enter].

4. SETUP will present a list of display options. Press the down arrow key to scroll to the bottom of the list and press [Enter] to select "Other".

5. SETUP instructs you to insert the display driver disk provided by the hardware manufacturer. Place the Hercules Graphics Station Card Utilities Diskette TIGA 2.0 version in drive A:. Specify the path A:\WIN30 for the SETUP program and press [Enter].

6. SETUP will read the Hercules Utilities Diskette and present two options: TIGA Color Hires (800 x 600 or greater) and TIGA Color Medium Res. (640 x 480). If you will be using Windows at 800 x 600 or 1024 x 768 choose TIGA Color Hires. If you will be using Windows at 640 x 480 choose TIGA Color Medium Res. This selection is required so that SETUP can install the appropriate screen fonts for the resolution you will be using.

7. SETUP now prompts for the Hercules TIGA 2.0 Utilities Diskette. Use the backspace key to delete the default path and type in the correct path A:\WIN30. Press [Enter].

8. If you have selected TIGA Color Medium Res. please skip to step 11. If you selected TIGA Color Hires, SETUP will prompt for the Windows 3.0 Disk #1 so that it can copy the correct system font. Put the Microsoft disk in drive A:, backspace over the "\WIN30" path specification to erase it and press [Enter].

9. SETUP next prompts for the Hercules TIGA 2.0 Utilities Diskette. Replace this diskette in drive A:, type the path A:\WIN30 and press [Enter].

10. SETUP will need more font files and prompts for another Windows diskette. Backspace over the "\WIN30" path to erase it, place the specified disk in drive A: and press [Enter].

11. The new configuration specified by SETUP should be correct. Press [Enter] to accept the configuration.

12. CAUTION: SETUP indicates that the new display driver requires changes to your CONFIG.SYS file. This is an error in the SETUP program, no change is required. Select Option #3 so that SETUP does not make a change to your CONFIG.SYS file. If you do allow SETUP to modify your CONFIG.SYS file at this point, it will place the line "device=c:\windows\ega.sys" in your CONFIG.SYS file. You will have to delete this line from your CONFIG.SYS file before trying to start Windows.

13. Users of Windows on 80386 and 80486 machines must use an ASCII editor (such as EDLIN supplied with DOS) to add the following line to

the \WINDOWS\SYSTEM.INI file after the section header [386Enh]:

EMMEXCLUDE=C700-C7FF

Windows will not work properly in enhanced mode unless this line has been added to the SYSTEM.INI file.

14. You may now start a Windows session in the normal way.

AutoCAD ADI Drivers for Real Mode and Protected Mode

Three files are distributed on the Hercules TIGA 2.0 Utilities diskette in the \ACAD directory:

HGSADI.EXE	ADI v4.0 real mode driver for TIGA 2.0 and AutoCAD/DOS Release 10.
HGSADI.EXP	PADI v4.0/4.1 combined rendering and display driver for TIGA 2.0 and AutoCAD 386 Release 10/11 and AutoShade 2.0.
HGS3DS.EXP	PADI v4.1 combined rendering and display driver for TIGA 2.0 and 3D Studio.

Another file, HGSADI.RLM, (the TIGA 2.0 relocatable load module for use with the ADI drivers) will have been copied into the TIGA directory by the STATION program. TIGA 2.0 does not require that you create an .ALM file as was necessary under TIGA 1.1.

Real Mode

(Users of AutoCAD 386 or AutoCAD Release 11 see the section below entitled Protected Mode.)

HGSADI.EXE is the real-mode driver for AutoCAD release 10. To use it, copy the HGSADI.EXE file from the \ACAD directory of the Hercules TIGA 2.0 Utilities diskette to the AutoCAD directory of your hard disk. Make sure to erase an old HGSADI.RLM from that directory if one is left over from TIGA 1.1.

HGSADI.EXE Command Line Switches

The real mode ADI driver uses expanded memory, as well as the program memory on the GB1024, to store the display list. The driver's minimum requirement for expanded memory is 64K, and the upper limit is 4 Megabytes. By default, HGSADI allocates all available expanded memory for its own use, leaving none for AutoCAD or other programs that use the ADI. The -p command line option should be used to specify how much expanded memory, in kilobytes, to allocate. For example, if you want the driver to use 1 megabyte of expanded memory for display list processing, load the driver as follows:

```
HGSADI <other options> -p1024 <other
    options>  [Enter]
```

Note that the value you enter will be rounded down to a 16K boundary. The rest of the expanded memory, if any, will be used by AutoCAD.

To change the amount of expanded memory that the driver uses, you must first remove the ADI driver from memory with the -r option (see below), then run HGSADI again with the new value.

A display list maintained by the ADI driver enables the driver to REDRAW, ZOOM, and PAN locally without requesting "fresh" vectors from AutoCAD. As a result, these operations are speeded up considerably. However, the expanded memory used by the driver will no longer be accessible to AutoCAD, and thus may slow down AutoCAD in some other areas, such as the initial loading of a drawing and REGEN. It is therefore important to achieve a balanced usage of expanded memory between AutoCAD and the ADI driver. AutoCAD can also make use of EXTENDED memory, so if your system has extended memory as well, you may be able to dedicate all expanded memory to the ADI driver without hindering AutoCAD's performance. See the AutoCAD Installation and Performance Guide for more details.

The best way to determine how much expanded memory to allocate for the ADI driver is through experimentation. The general rule is that the bigger the drawing, the more display list memory it consumes. A new AutoCAD command, HDMEM, allows you to query the driver's usage of the expanded memory. After running AutoCAD and loading your drawing, type HDMEM at AutoCAD's command prompt, and the amount of expanded memory the driver has allocated, the amount that is currently in use and its percentage will be displayed. You may then use this information to determine how much expanded memory to allocate for the driver the next time you run AutoCAD with this drawing.

Interrupt Vector Switch

To choose an interrupt vector for the ADI driver other than the default 0x7A, type:

HGSADI <other options> -Vnn <other options>[Enter]

where "nn" is a two digit hexadecimal number representing the new interrupt vector. For example, to use interrupt vector 0x7B, type:

```
HGSADI <other options> -V7B <other
options>[Enter]
```

Make sure the vector you use to configure the AutoCAD ADI Display driver is the same as the one you specify here. If you do not specify a vector when loading the driver, the default of 0x7A will be used.

Inverse Switch

To choose a white background for the AutoCAD drawing board, use the -i option (for inverse background) as follows:

```
HGSADI <other options> -i <other
options>[Enter]
```

If you do not use the -i option, a black background will be selected. Regardless of whether you select the inverse option when loading the driver, you may change the background color within AutoCAD by typing "INVERSE" at the AutoCAD command prompt.

Dual Screen Mode

The HGSADI driver supports AutoCAD's dual-screen mode. This mode is available if you have a monochrome card such as a Hercules Text

Card, or a Hercules Graphics Card Plus in your system along with your Graphics Station Card. To activate the dual-screen mode, use the -2 options:

```
HGSADI <other options> -2 <other
options>[Enter]
```

If you select this option you must invoke AutoCAD from the secondary monitor in order for dual screen operation to be in effect.

Remove Switch

Finally, the HGSADI driver can be removed from memory after it has been loaded by using the -r option:

```
HGSADI -r [Enter]
```

If the driver has been loaded at an interrupt vector other than the default (0x7A), you will need to specify the location on the command line. For example, if the driver was loaded with the following parameter:

```
HGSADI -v7b[Enter]
```

It would be removed with:

```
HGSADI -r -v7b[Enter]
```

Protected Mode

HGSADI.EXP is the protected mode ADI v4.0/4.1 driver for AutoCAD 386 Release 10 and Release 11. AutoCAD Release 10 is supported on both the GB1024 and the GB1024+2 models of the Hercules Graphics Station Card. AutoCAD Release 11 and AutoShade v2.0 are supported only on the GB1024+2 card.

There is no need to set up EMS memory as with the real-mode driver. The protected-mode driver will allocate display-list memory out of extended memory, or if necessary, from your hard disk. This is all part of the Virtual Memory provided by 386 | DOS-extender and 386 | VMM built inside AutoCAD. Be sure to consult the AutoCAD Installation and Performance Guide for information about memory managers and system configuration. AutoCAD is quite sensitive to the environment it runs in. For example, the HIMEM.SYS memory manager required by Windows 3.0 is incompatible with AutoCAD 386. If you want to use both Windows 3.0 and AutoCAD 386, you will either have to us an alternate VCPI memory manager for Windows such as QEMM386 or you will have to maintain batch files to manage the two environments so that both programs can run.

There are several ways to set up the driver for use with AutoCAD. One method is described below. Consult the AutoCAD Installation and Performance Guide for other alternatives.

1. Copy HGSADI.EXP from the \ACAD directory of the Hercules TIGA 2.0 Utilities Diskette to the AutoCAD 386 directory of your hard disk.

2. Rename HGSADI.EXP to ADIDISP.EXP, which is the "magic name" AutoCAD looks for in search of a display driver. (If ADIDISP.EXP already exists for another display driver, you should save it under a different name so it can be restored later.)

3. Start AutoCAD and choose #5. Configure AutoCAD on the main menu.

4. If AutoCAD had already been configured for another type of display, then the current configuration will be shown. If this is the case, press [Enter] to go to the next menu. From the Configuration menu choose #3. Configure video display.

5. If a video display had been configured before, AutoCAD will ask whether you wish to choose a different one. Answer "Y" and press [Enter]. On the next menu select 1. ADI P386 display.

6. The next two questions come from the driver and correspond to the options -i, -2 available in the HGSADI real-mode driver.

   Do you want dark vectors on a light background field? "N"

   Press [Enter] to accept the default black background. Press Y [Enter] to choose a light grey background. No matter what you select here, you can change the background color within AutoCAD by entering "INVERSE" at the AutoCAD command prompt.

   Do you want to enable dual-screen mode? "N"

   Press [Enter] to accept the default single-screen output mode. Otherwise, press Y [Enter] to select dual-screen mode.

(NOTE! If you choose dual-screen mode, you must start AutoCAD from your monochrome monitor. If you have not started the current AutoCAD session from the monochrome monitor, finish the configuration process, then exit AutoCAD and restart again from the monochrome monitor.)

There will be a few more questions from AutoCAD. Answer them appropriately.

7. When the Configuration menu reappears, press `[Enter]` twice to accept the defaults and return to the main menu, from which you may start your normal AutoCAD session.

   The driver has to be configured only once the first time you install it, or when you want to change the driver parameters.

AutoDesk 3D Studio Driver

HGS3DS.EXP is an external ADI driver written specifically for AutoDesk 3D Studio. It is a combined rendering/display driver that outputs to a single monitor. In display mode, it offers resolutions from 640 x 480 up to 1024 x 768 in 256 colors (as determined by the current TIGA configuration). In rendering (frame buffer) mode, it offers the same resolutions and color as in display mode, or it may be configured to operate in 512 x 480 24-bit color mode. The driver is compatible with the GB1024+2 model of the Graphics Station Card. The driver requires the 2 Mb. DRAM and will not operate on the GB1024 Graphics Station Card. Use CHKTIGA to be sure that TIGA is installed and operative before trying to install and use 3D Studio.

Driver Setup
(These directions assume that you have installed 3D Studio on your hard disk according to AutoDesk's installation instructions.

Follow the instructions below to set up the driver for 3D Studio:

1. Copy HGS3DS.EXP from your distribution disk into your 3D Studio "drivers" directory. Also make sure you have the HGSADI.RLM file in your TIGA directory.

2. Append the option -i0x60 to your TIGA environment variable in your AUTOEXEC.BAT file. For example, a typical setup might look like this:

   SET TIGA=-mc:\tiga -lc:\tiga -i0x60

This option redirects the host interrupt vector used by the TIGA communication driver to hex 60, the

default is hex 7F. This is necessary because 3D Studio is running under PharLap's 386| DOS-EXTENDER which, to avoid hardware interrupt conflict, redirects the IRQO - IRQ7 lines through interrupt 78h - 7Fh.

Windows 3.0 and other TIGA applications will have no trouble with TIGA configured to this interrupt.

3. Add the following line to your AUTOEXEC.BAT or 3D Studio start-up batch file:

   SET RCPADI=c:\3ds\drivers\hgs3ds.exp

   Substitute the appropriate path if your 3D Studio files reside in a different drive or directory.

4. Edit the following 3DS.SET configuration file parameters to make 3D Studio load and use the ADI driver.

   DEFAULT-DISPLAY="RCPADI"

   MAIN-DISPLAY=RCPADI

   Comment out the MATERIAL-DISPLAY parameter. 3D Studio v1.0 will always use the VGA's 320 x 200 256-color mode for the Materials Editor.

5. Restart your system so the changes that were made to your AUTOEXEC.BAT file can take effect.

Using 3D Studio

Now you may start 3D Studio. The opening screen will come on in the default TIGA resolution. The first time you render a scene in 3D Studio, the ADI driver will return to text mode and ask you the following questions:

Do you want 24-bit rendering <yes> ?

If you answer yes, the rendering will be done in 512 x 480 true color mode; otherwise, it will be in 256 colors at the same resolution as the display mode. 24-bit rendering is the default and is preferred over the 8-bit modes, because in general, true color improves image quality more than higher resolution, and the rendering will be accomplished faster.

Would you like to correct the rendering screen aspect ratio <no> ?

If you are planning to render with 256 colors accept the default "No" answer since the aspect ratio of the rendering screen is 1/1. The 512 x 480 24-bit per pixel resolution does not yield square pixels so an image will appear stretched in the horizontal direction unless you adjust the aspect ratio. If you plan to render in 24-bit per pixel mode answer "Y" to this question and give the values "123" for the Pixel Width and "100" for the Pixel Height in response to the following two prompts:

Pixel Width, 1 to 32766 <1>:

Pixel Height, 1 to 32766 <1>:

After the configuration is completed, 3D Studio will go on to render the image. The rendering will take a considerable time to begin (maybe as long as several minutes). Don't be impatient and reboot. See the

second of the special notes below so that you will know what happens if you ever do reboot during a rendering session.

Note that the configuration information is stored in a file called 3DADI.CFG in your 3D Studio directory. If later on you decide to change the configuration, you may delete 3DADI.CFG and the process will repeat.

Special Notes:

1. Version 1.0 of 3D Studio loads a new copy of the rendering/display driver every time the user initiates a rendering. This condition results in multiple copies of the driver stacking up in memory during a session involving several display to renderer toggles. Be aware of this when using 3D Studio and save your work if you sense more hard disk activity than is normal. At such a time it is advisable to quit the program and start over so that the multiple copies are eliminated.

2. During rendering, the 24-bit rendering driver changes the TIGA.CFG file in your system's \TIGA directory to TIGA mode #4. When the display driver is re-enabled after a rendering is complete, the default 8-bit TIGA mode is reset. If you reboot your system while rendering in 24-bit mode you must run STATION to reset the default 8-bit TIGA resolution before attempting to enter 3D Studio (or other TIGA application such as AutoCAD or Windows 3.0).

Appendix A - Troubleshooting

Potential Memory Conflicts

The Graphics Station Card uses several memory locations in the C000 page for communication between the CPU and the card's on-board 34010 graphics processor (see page 39 of the manual for a detailed list of memory usage). EMS Managers, video BIOS caching systems, and video BIOS shadowing systems present potential conflicts with this area of memory. Symptoms of memory conflicts of this type are memory errors in the TEST program, and STATION exiting with the message "Graphics Station Card not detected." The following is a description of each potential conflict, and a solution:

EMS MANAGERS such as QEMM386 and EMM386 must often be instructed to exclude the C700-C7FF area from their table of usable memory. Consult your memory management program's manual for instructions. Users of QEMM386 and EMM386 may accomplish this by adding the line:

X=C700-C7FF or aram=C700-C7FF

to the appropriate command in their CONFIG.SYS file. For example, the CONFIG.SYS line:

DEVICE=C:\QEMM386.SYS

would become:

DEVICE=C:\QEMM386.SYS aram=C700-C7FF

Similarly, an EMM386 user might change their CONFIG.SYS from:

DEVICE=c:\emm386.sys

to read:

DEVICE=c:\emm386.sys x=C700-C7FF

Video Caching and Video Shadowing

Many computers have options in their setup menu for video caching and video shadowing. These options can enhance the performance of VGA cards. Video caching copies the video BIOS and/or video display memory to a separate area of static RAM, and diverts all video memory reads or writes by the CPU to this cache. Video shadowing is a simpler technique which copies the video BIOS area (C000-C6FF) to low memory, and redirects all BIOS calls to the "shadow" video BIOS routines.

Video caching often causes interaction problems with the Graphics Station Card, because the cache prevents writes to the 34010 registers from getting to the Graphics Station Card. Some shadow RAM implementations are incompatible with the Graphics Station Card as well.

If your computer's video optimization routines appear to cause a conflict with Graphics Station memory (again, the symptoms include TEST reporting memory errors and STATION printing "Graphics Station Card not detected"), try disabling these options. Most computers have a "setup" menu from which these options may be toggled on or off.

RAMVGA.COM

The RAMVGA.COM program is an alternative to built-in video enhancement routines: RAMVGA.COM copies ("shadows") the VGA ROM BIOS from the Graphics Station Card into your

system's memory. This causes the BIOS video services to execute faster, and in some cases will speed up screen operations in application programs.

To copy the VGA BIOS into RAM, make sure RAMVGA.COM is in your current drive and directory, or in your DOS path, and type:

```
RAMVGA  [Enter]
```

If you want to suppress the program's sign-on message, as, for example, when starting RAMVGA from a batch file, type:

```
RAMVGA /q [Enter]
```

Notes: The Graphics Station Card's VGA BIOS will occupy approximately 26k bytes of system memory, which will not be available for use by application programs.

Whether you notice any speedup in a particular application will depend on the speed of your system RAM and the extent to which the application uses BIOS and DOS services to manipulate the display. RAMVGA has no effect on programs that run under TIGA.

What to do if STATION Doesn't Execute Properly

MS DOS version 4.01 behaves inconsistently, sometimes preventing STATION from properly installing the TIGA files. A symptom of this condition is the box for the monitor selection coming up empty when the program is run from the floppy disk. If this occurs on your system, here are instructions for you to follow in copying the TIGA files to your hard disk without the aid of STATION. You DO NOT need to perform these steps unless STATION has been unable to execute properly (as detailed above).

1. Make a directory on your hard disk for the TIGA 2.0 files, for example MKDIR \TIGA2.

2. Copy all of the files from the root directory of the Hercules supplied distribution diskette into the newly created TIGA 2.0 directory of your hard disk drive.

3. Copy all of the files from the \TIGA directory of the Hercules supplied distribution diskette into the newly created TIGA 2.0 directory of your hard disk drive.

4. Make a subdirectory of the TIGA 2.0 directory of your hard disk called \MODES, for example MKDIR \TIGA2\MODES.

5. Copy all of the files from the \MODES directory of the Hercules supplied distribution diskette into the \TIGA2\MODES directory of your hard disk drive.

6. Execute STATION from your hard disk drive and select monitor type and screen resolution from STATION's main menu.

7. Update your AUTOEXEC.BAT file as detailed in step 10 of the previous section entitled *Installing TIGA 2.0* software and then reboot your computer.

Appendix B - Maintaining TIGA 1.1 and TIGA 2.0 Files on the Same System

In some circumstances, it may be necessary to keep both TIGA 1.1 (the previous version) and TIGA 2.0 (the new version) installed on your system. This would be the case if you are using TIGA 1.1 applications that have not been updated for TIGA 2.0. If you only use Windows 3.0 or AutoCAD, you will not need to retain your TIGA 1.1 files. You should therefore delete these files and any TIGA 1.1 drivers you have previously installed and repeat the installation process using STATION.EXE.

In order to keep both versions of TIGA on your system without conflict, you must keep the files from the two different TIGA versions in separate, differently named directories on your hard disk. For example, if you have the TIGA 1.1 files installed in C:\TIGA, when you run STATION.EXE to install TIGA 2.0 you should instruct the program to install the files in a different directory, e.g., C:\TIGA2.

Maintaining two separate TIGA versions also requires having two different AUTOEXEC.BAT files, because the AUTOEXEC.BAT includes the PATH statement indicating where the TIGA files are kept and the TIGA environment variable. Following the example above, the AUTOEXEC.BAT file for TIGA 1.1 would include the PATH statement "PATH=C:\TIGA" and the variable "SET TIGA=-mC:\TIGA -lC:\TIGA," and the AUTOEXEC.BAT file for TIGA 2.0 would include the PATH statement "PATH=C:\TIGA2" and the variable "SET TIGA=-mC:\TIGA2 -lC:\TIGA2." Of course, it is not possible to have two files with the same name in the same directory, so you must give your two AUTOEXEC.BAT files different names, e.g., AUTOEXEC.T1 and AUTOEXEC.T2. Before running a TIGA application, you would copy the appropriate file to your AUTOEXEC.BAT file, e.g., COPY AUTOEXEC.T1 AUTOEXEC.BAT, then reboot your system.

Appendix C - TIGA Options

TIGA Environment Variable

TIGA uses the environment variable "TIGA" for information about the location of TIGA system files, relocatable load modules, and the desired interrupt level. Set the TIGA environment variable using the following syntax:

SET TIGA=<flag><string> <flag><string> [flag] [string]

TIGA recognizes three flags:

Flag	Description
-m	Specifies the path for TIGA system files
-l	Specifies the path for TIGA relocatable load modules (.RLM files)
-i	Specifies the host interrupt level used by the TIGA communication driver (TIGACD)

The -m and -l flags are essential for TIGA to operate. The -i flag is only necessary if the default interrupt level (0x7F) needs to be changed.

When TIGA is initially installed, all TIGA system files and Hercules supplied .RLM files are placed in the C:\TIGA directory or in an alternate directory specified by the user to the STATION program. Either STATION or the user specifies this path using the -m flag in the TIGA environment variable. Any .RLM files required by a TIGA application must be located in either the current directory from which the TIGA application is invoked or the path specified by the -l flag in the TIGA environment variable.

The TIGA communication driver (TIGACD) defaults to interrupt level 0x7F for its communication with an application. To change the default interrupt level use the -i flag followed by the desired interrupt level (in hex) in the TIGA environment variable.

In the following example all TIGA system files are located in C:\TIGA, .RLM files are in C:\RLM, and the desired interrupt level for TIGACD is 0x78. The TIGA environment variable would be:

SET TIGA=-mc:\tiga -lc:\rlm -i0x78

TIGACD Command Line Option

There are two command line options that affect the TIGA communications driver: Syntax TIGACD [option].

Option	Description
-i	Forces a new copy of TIGACD to be loaded into memory. This supersedes any previously loaded TIGACD and forces a reloading of the TIGA graphics manager.
-u	Uninstalls TIGACD from memory thereby disabling TIGA.

Appendix D - Hercules Bulletin Board System

Hercules maintains a 24-hour bulletin board system (BBS) for technical support and information exchange. The BBS is a good place to request information from Hercules, get updates and utilities as well as third-party drivers and programs. In addition, the BBS features a library of GIF and true-color Targa image files.

The Hercules BBS can be reached at:

415 540-0621 or

415 540-6719

Both lines operate at 300, 1200 and 2400 baud with no parity, 8 data bits, 1 stop bit.

If you experience random characters, or "garbage", on your screen after connecting with the BBS, send one or more BREAK characters until the login message appears, and then type "bbs" at the prompt.

Users of Procomm Plus should press Alt-B to send a BREAK character, and users of the original Procomm should press ALT-F7. If you are using another communication package, please check your program's documentation.

The Hercules BBS is very popular, busy signals for extended portions of the day are not uncommon. It is easiest to connect between the hours of 3:00 and 6:00 PM Pacific Time, and between midnight and 8:00 AM.

Hercules

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