

**ABLE VGA IV
GRAPHICS
CARD**

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**ABLE VGA IV Graphics Adapter
User's Manual**

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TABLE OF CONTENTS

SECTION 1: Introduction	1
1.1 Features of the ABLE VGA IV Graphics Adapter	1
1.2 Check List	3
SECTION 2: Configuring The ABLE VGA IV Graphics Adapter Graphics Adapter	4
2.1 Hardware Configuration	4
2.2 DIP Switch Settings	6
2.2.1 Selecting The Monitor Type	6
2.2.2 Selecting Fast And Slow Address Decode	7
2.2.3 Selecting An 8- Or 16-Bit Data Path	7
2.3 Jumper Settings	8
2.3.1 VGA, CGA, and MDA Monitors: Jumper J1	8
2.3.2 Automatic Bus Size Detection on the 16-Bit ABLE VGA IVA Card: Jumper J2	9
2.3.3 IRQ9 Interrupt Control for the 8 and 16-Bit ABLE VGA IV Cards: Jumper J3	10
Section 3:Installing The ABLE VGA IV Card	11
3.1 Installation Procedures	11
3.2 Connecting The Monitor	13
3.2.1 Choosing the Right Connector for Your Monitor	13
3.2.2 Cabling Your Monitor	14
3.2.3 Monitor Support for Enhanced VGA Modes	14
3.2.4 Monitor Support for Other Graphics Modes	16

Section 4:Software	17
4.1 TVGA Utilities	17
4.2 Switching Video Modes With SVM.EXE	18
4.2.1 How SVM Works	18
4.2.2 How To Use SVM	18
4.2.3 Example:Switching to EGA Mode With SVM	20
4.3 Installing the VGA Drivers for Your Software Program	21
4.3.1 Configuring AutoCAD for High-Resolution Graphics Modes	21
4.3.2 Configuring Autosshade for High-Resolution Graphics Mode	23
4.3.3 Configuring Lotus 1-2-3 for VGA Graphics and Extended Text Mode	24
4.3.4 Configuring Lotus 1-2-3 for VGA Graphics and Extended Text Mode	26
4.3.5 Configuring Framework II and III for Extended Graphics and Text Modes	27
4.3.6 Configuring GEM for High-Resolution Graphics Modes	29
4.3.7 Configuring Ventura Publisher for Extended Graphics Modes	31
4.3.8 Configuring WordStar Release 3 for Extended Text Modes	32
4.3.9 Configuring WordStar Release 4 or 5 for Extended Text Modes	33
4.3.10 Configuring WordPerfect for Extended Text Display	35
4.3.11 Configuring MS Windows for High-Resolution Graphics Display	37

4.4	Optional Software: TVGA RAM BIOS and the TANSI (ANSI) Driver	38
4.4.1	How to Install TVGA RAM BIOS In Your CONFIG.SYS File	38
4.4.2	How to Install TVGA RAM BIOS In Your AUTOEXEC/BATFile	40
4.4.3	How to Install TANSI.SYS	41
Section 5: Advanced Topics		42
5.1	Standard VGA Modes	42
5.2	Extended VGA Modes	44
5.2.1	Additional Sources for Programming Assistance	45
Appendix A: Pin Out and Sync Frequencies		46
A1.1	Analog Color Display Pinouts	46
A1.2	Multisync-TTL Monochrome Display Pinouts	47
A1.3	Conversion Table:9-to-15 Pin	47
A1.4	Multisync-TTL Color Display Pinouts	48
A1.5	Video Signals	48
A1.6	Sync Signals for PS/2 Monitors	49
Appendix B: Checking Your ROM BIOS: The BIC.EXE Program		50
Appendix C: FCC Compliance Statement		55

Section 1

Introduction

1.1 Features of the ABLE VGA IV Graphics Adapter

Congratulations on your purchase of the ABLE VGA IV Graphics Adapter. The ABLE VGA IV Graphics Adapter works with your IBM PC/XT, PC/AT or compatible system and high-resolution color monitor to bring you sharp resolution, splendid color, and functions and features far beyond the VGA standard.

The ABLE VGA IV Cord fully supports:

- All IBM VGA modes to the register level
- IBM EGA, CGA, and MDA modes to the register level
- Hercules mode monochrome display
- Mutisync monitors (analog or TTL)
- PS/2 monitors
- EGA, CGA, MDA, and Hercules monitors

Note: See Section 4 for details about properly configuring the ABLE VGA IV Graphics Adapter for EGA, CGA, MDA or Hercules display on Multisync or PS/2 monitors.

High-Resolution Graphics Display

Resolution	Colors
640×400	256 out of 256K
640×480	256 out of 256K*
800×600	16 out of 256K
1024×768	16 colors out of 256K*

* Requires 5 12K of DRAM

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:

- AutoCAD
- Autoshade
- Lotus 1-2-3
- Symphony
- Framework
- GEM Desktop
- Ventura Publisher
- WordPerfect
- WordStar
- MS Windows

1.2 Check List

Unpack your ABLE VGA IV Graphics Adapter Kit carefully from its carton. Besides this manual, you should have received the following:

- The ABLE VGA IV Adapter
- Two TVGA Utility Diskettes

Section 2

Configuring The ABLE VGA IV Graphics Adapter

This section explains how to configure the ABLE VGA IV Graphics Adapter for use with your particular system.

Incorrect setting or use of the ABLE VGA IV Graphics Adapter may result in damage to the computer system, monitor, or the ABLE VGA IV Graphics Adapter itself. Carefully read through this manual before you install your ABLE VGA IV Graphics Adapter into your system. Step-by-step instructions in the section "In-stalling The TVGA Graphics" will guide you through the installing process.

2.1 Hardware Configuration

The ABLE VGA IV Graphics Adapter is a video adapter with either an 8-bit or 16-bit bus connector for IBM PCs, XTs, ATs, and compatible systems, Figures 1 and 2 are diagrams for the 8-bit and 16-bit ABLE VGA IV Graphics Adapters.

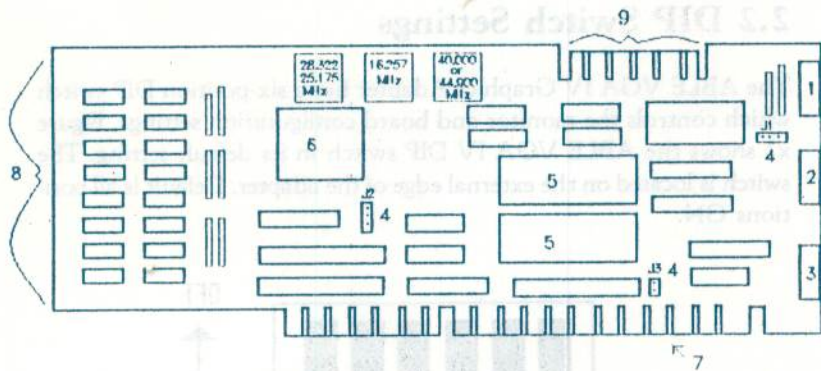


Figure 1 The ABLE VGA IV Graphics Adapter (8-bit)

Features in Figure 1 are as follows:

1. DIP Switches: Monitor selection., Fastmode, 8 or 16-bit data path.
2. DB-15 connector: For analog monitors.
3. DB-9 connector: For TTL monitors.
4. Jumpers J1, J2, J3
5. Video BIOS: Basic Input/Output System.
6. TVGA 8800CS Chip: TRIDENT VGA Graphics chip.
7. Edge connector: For IBM PC/XT, PC/AT and compatible systems.
8. Video DRAM: 256K or 512K
9. Feature connector: For special applications.

2.2 DIP Switch Settings

The ABLE VGA IV Graphics Adapter has a six-position DIP switch which controls the monitor and board configuration settings. Figure x2 shows the ABLE VGA IV DIP switch in its default setting. The switch is located on the external edge of the adapter. Default is all positions ON.

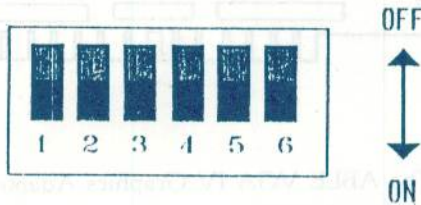


Figure 2 DIP Switch on the ABLE VGA IV Graphics Adapter

2.2.1 Selecting The Monitor Type

TRIDENT has developed a BIOS that supports EGA, CGA, and MDA monitors as well as VGA/Multisync monitors. You can access these features by setting the DIP switches on card as shown below. In addition, the BIOS has been adjusted to support the NEC 2A, 3D, XL, and II monitors.

TABLE 1a Selecting the Monitor Type

Switch Settings	1	2	3	4
VGA mode	ON	ON	ON	ON
EGA mode	OFF	ON	ON	ON
CGA mode	ON	OFF	ON	ON
MDA/Hercules mode	OFF	OFF	ON	ON

2.2.2 Selecting Fast And Slow Address Decode

Switch 5 provides fast address decode when set to OFF, and slow address decode when set to ON. If you have a high-speed motherboard bus and have trouble booting, set switch 5 to OFF, (Note: this may conflict with software which addresses the video or BIOS memory space.). See Table 1b.

TABLE 1b Selecting Fast And Slow Address Decode

Switch Settings	5
Slow address decode	OFF
Fast address decode	OFF

2.2.3 Selecting An 8- Or 16-Bit Data Path

The ABLE VGA IV card is shipped with all switches on the six-position DIP switch set to ON. Certain personal computers are not fully compatible with the IBM AT Bus standard, and cannot run the ABLE VGA IV Graphics Adapter in 16-bit mode. Therefore, if you install the 16-bit TVGA card in a 16-bit slot and encounter any problems booting or operating your system with these settings, please reset switch 6 to OFF (see Table 1c).

TABLE 1c Selecting 8- Or 16-Bit Data Path

Switch Settings	6
16-bit data path:	ON
8-bit data path	OFF







2.3 Jumper Settings

You can adapt the ABLE VGA IV Graphics Adapter for special hardware configurations using the three-pin jumpers J1 and J2 and the two-pin jumper J3 on the adapter card.

2.3.1 VGA, EGA, CGA, and MDA Monitors: Jumper J1

You need to set Jumper J1 on the ABLE VGA IV Graphics Adapter for the type of monitor you are using. You will find J1 located next to the TTL connector on the card. Table 2 shows how to set J1 on the 8-bit or 16-bit ABLE VGA IV card for use with a VGA, EGA, CGA, or MDA monitor.

TABLE 2 J1 Settings for 8-Bit and 16-Bit TVGA Cards

VGA or EGA (Default)	CGA/MDA
3 	3 
2 	2 
1 	1 

NOTE: For the standard ABLE VGA IV card, leave J1 jumpered on the default position for VGA.

2.3.2 Automatic Bus Size Detection on the 16-Bit ABLE VGA IV CARD: Jumper J2

Jumper J2, located next to the TVGA 8800 controller on the 16-bit ABLE VGA IV card, controls automatic bus size detection. With automatic bus size detection on, the ABLE VGA IV card will sense whether it is in an 8-bit or 16-bit slot, and will configure the card accordingly. You can either set automatic bus size detection to ON, or set the card for 8-bit BIOS interface. Table 3 illustrates the available settings for J2 on the 16-bit ABLE VGA IV card.

NOTE: Certain motherboards may deviate from the IBM AT bus standard, and could affect the 16-bit operation of the 16-bit TVGA card. If you have problems booting your system, set Jumper J2 to its 8-bit setting as shown in Table 3, or place the TRIDENT TVGA card in an 8-bit slot.

TABLE 3 J2 Settings for the 16-bit ABLE VGA IV Card

Autodetect (Default)		Autodetect (Compaq, Micronics)		8-Bit BIOS Interface	
J2	3	J2	3	J2	3
	2		2		2
			1		1

2.3.3 IRQ9 Interrupt Control for the 8 and 16-Bit ABLE VGA IV Cards: Jumper J3

Jumper J3 on the ABLE VGA IV card controls the use of IRQ9. The default Position is OFF. This allows LAN network cards (ie. Novell) to run in your system without an interrupt conflict. If you encounter some software that requires the use of IRQ9, set jumper J3 to ON. To set the jumper on, place a jumper over both pins on J3. Table 4 illustrates the available settings for J3.

TABLE 4 J3 Settings for IRQ9

IRQ9 Disabled: J3 OFF (DEFAULT)			IRQ9 Enabled: J3 ON		
J3	2	●	J3	2	●
	1	●		1	●

Section 3

Installing the ABLE VGA IV

The installation procedure for your ABLE VGA IV Graphics Adapter will vary slightly depending the type of system you have: IBM PC/XT/ATs or compatible system. Just follow the general installation instructions in this section, and look for any special steps you will need to take for your particular system. If you hae an older-model PC. PC/XT. or compatible, please read Appendix B before you install the ABLE VGA IV Graphics Adapter.

3.1 Installation Procedures

To install the ABLE VGA IV Graphics Adapter into your system, follow these steps:

1. Turn OFF all power to your system, including any peripherals (printer, external drives, modem).
2. **Unfasten the cover mounting screws on your system.** For older IBM PCs, there are two cover mounting screws. However, the newer IBM XTs and compatibles use four screws, and newer ATs use five mounting screws. All cover mounting screws are located on the back of the computer.
3. **Remove the system cover.** After all cover mounting screws are off, carefully slide the system unit cover forward. When the cover will not go any further, tilt it up as shown in Figure 4 and lift it away.

4. **Select an open expansion slot.** If you have an 8-bit ABLE VGA IV Graphics Adapter, use any free slot in your IBM PC/XT/AT or compatible to install the adapter. If you have the 16-bit expansion slot on your IBM/AT or compatible system. Select an appropriate expansion slot for the ABLE VGA IV Graphics Adapter and 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 ABLE VGA IV VGA Graphics Adapter).
5. **Install the adapter.** To install the ABLE VGA IV in the selected expansion slot, place the gold-fingered edge-connector of the ABLE VGA IV Graphics Adapter directly above the expansion slot on the motherboard. Gently push the ABLE VGA IV Graphics Adapter down until it snaps into place. Make sure the graphics adapter is fully seated in the expansion slot.
6. **Secure the adapter.** Use the screw you removed from the expansion slot in Step 5 to secure the ABLE VGA IV Graphics Adapter in place.
7. **Replace the computer's cover.** Secure it with the mounting screws you removed in Step 2.

You have now completed the installation of the ABLE VGA IV Graphics Adapter on your system. However, before you use the ABLE VGA IV Graphics Adapter, please go on to Section 3.2, "Connecting the Monitor."

3.2 Connecting The Monitor

The ABLE VGA IV VGA Graphics Adapter provides two connectors; choose the one which matches your monitor type:

- Analog connector (15-pin)
- TTL digital connector (9-pin).

Use the ABLE VGA IV analog (15-pin) connector with the IBM PS/2 85XX, Multisync. or compatible monitors. Use the TTL (9-pin) connector with NEC, Nanao, SONY and other variable-frequency monitors with TTL operations. The TTL connector may also be used for EGA, CGA, MDA or Hercules monitors.

3.2.1 Choosing the Right Connector for Your Monitor

Table 6 lists monitor types and the connector they will need to use on the ABLE VGA IV VGA Graphics Adapter.

Table 5 Monitor and Connector Types

Monitor Type	Connector Type
8514	15-pin
8513	15-pin
8512	15-pin
8503	15-pin
Multisync Analog	15-pin
Multisync TTL	9-pin
EGA, CGA, MDA, Hercules	9-pin

3.2.2 Cabling Your Monitor

When you connect your monitor to the ABLE VGA IV Graphics Adapter, be sure you have the right cable and connector for your monitor type. Fixed-frequency analog monitors such as the IBM 85XX or compatibles come equipped with a 15-pin connector standard. For variable frequency analog or analog/digital monitors, you will need either a 9-to-15-pin cable connector for analog display, or a 9-pin cable connector for digital display.

Once you've selected the proper cable and connectors, make sure you also set your monitor for the appropriate mode of operation (analog or digital display) before you power up your system and monitor. See your monitor's user manual for directions on how to select analog or digital operation.

3.2.3 Monitor Support for Enhanced VGA Modes

Your monitor must be capable of displaying the resolution and text mode you choose. Table 6 lists all VGA display modes available with the ABLE VGA IV Graphics Adapter and the monitors which support them.

Table 6 Display Modes and Supporting Monitors

Mode (hex)	Type Formal	Alpha Size	Screen	8514*	8513*	8512*	8503*	Multi- sync**
0,1	text	40x25	320x200	Yes	Yes	Yes	Yes	Yes
2,3	text	80x25	640x200	Yes	Yes	Yes	Yes	Yes
0 ¹ ,1 ¹	text	40x25	320x350	Yes	Yes	Yes	Yes	Yes
2 ¹ ,3 ¹	text	80x25	640x350	Yes	Yes	Yes	Yes	Yes
0 ² ,1 ²	text	40x25	360x400	Yes	Yes	Yes	Yes	Yes
2 ² ,3 ²	text	80x25	720x400	Yes	Yes	Yes	Yes	Yes
4,5	graph	40x25	320x200	Yes	Yes	Yes	Yes	Yes
6	graph	80x25	640x200	Yes	Yes	Yes	Yes	Yes
7	text	80x25	720x350	Yes	Yes	Yes	Yes	Yes
7	text	80x25	720x400	Yes	Yes	Yes	Yes	Yes
D	graph	40x25	320x200	Yes	Yes	Yes	Yes	Yes
E	graph	80x25	640x200	Yes	Yes	Yes	Yes	Yes
F	graph	80x25	640x350	Yes	Yes	Yes	Yes	Yes
10	graph	80x25	640x350	Yes	Yes	Yes	Yes	Yes
11	graph	80x30	640x480	Yes	Yes	Yes	Yes	Yes
12	graph	80x30	640x480	Yes	Yes	Yes	Yes	Yes
13	graph	40x25	320x200	Yes	Yes	Yes	Yes	Yes
50	text	80x30	640x480	Yes	Yes	Yes	Yes	Yes
51	text	80x43	640x473	Yes	Yes	Yes	Yes	Yes
52	text	80x60	640x480	Yes	Yes	Yes	Yes	Yes
53	text	132x25	1056x350	Yes	Yes	Yes	Yes	Yes
54	text	132x30	1056x480	Yes	Yes	Yes	Yes	Yes
55	text	132x43	1056x473	Yes	Yes	Yes	Yes	Yes
56	text	132x60	1056x480	Yes	Yes	Yes	Yes	Yes
57	text	132x25	1188x350	Yes ³	No	No	No	Yes
58	text	132x30	1188x480	Yes ³	No	No	No	Yes
59	text	132x43	1188x473	Yes ³	No	No	No	Yes
5A	text	132x60	1188x480	Yes ³	No	No	No	Yes
5B	graph	100x75	800x600	No	No	No	No	Yes
5C	graph	80x25	640x400	Yes ³	No	No	No	Yes
5D	graph	80x30	640x480	Yes ³	No	No	No	Yes
5f	ggraph	128x48	1024x768	Yes ³	No	No	No	Yes

Table Notes:

- * 8514, 8513, 8512, 8503 are IBM PS/2 monitors.
- ** Multisync monitors support both Analog and TTL operations (ie. NEC Multisync II or compatible)
- ¹ EGA text modes with 8x 14 and 9x 14 character sizes and 350 lines vertical resolution.
- ² VGA text modes with 9x16 character size and 400 lines vertical resolution.
- ³ Will support if 44.9 Mhz crystal present on board.

Note: 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.

3.2.4 Monitor Support for Other Graphics Modes

The ABLE VGA IV Card has downward compatibility with EGA, CGA, MDA and Hercules modes on ABLE VGA IV-Card monitors. The ABLE VGA IV Card is also capable of using PS/2 or Multisync monitors for most display modes. (See Section 4.2.). In addition, the ABLE VGA IV Card may be used with EGA, CGA, MDA, or Hercules monitors.

Section 4 Software

4.1 TVGA Utilities

This section explains how to use the utility software on the TVGA Utility Diskettes. The Utility Diskettes provide the following programs:

- SVM.EXE (Select Video Mode)
- High-resolution drivers for Microsoft Windows, GEM, Lotus 1-2-3 and other popular software programs.
- TVGA RAM BIOS (may be used to improve display speed)
- TANSI.SYS (may be used to replace ANSI.SYS to support extended text display (more than 25 rows).
- BIC.EXE (reports PC System BIOS information). This utility is covered in Appendix B.
- Monitor Test-tests your monitor for the ability to run 800x600 and 1024x768 modes

NOTE: We are continuing to update existing drivers and develop new drivers for popular software applications. Your TVGA Utility Diskettes may have drivers not listed in the manual. The README file on TVGA Utility Diskette #1 contains a full listing of current drivers and detailed installation procedures, so make sure you check the README file prior to driver installation.

4.2 Switching Video Modes With SVM.EXE

4.2.1 How SVM Works

SVM is a menu-driven program designed to help you select the right video mode for special applications or game programs which can't run in standard VGA mode. For example, the PINBALL game can only run in CGA mode: you will need to choose CGA mode with SVM before starting PINBALL.

SVM will let you emulate EGA, CGA, Hercules (MDA) modes on a VGA monitor. You may also use SVM to select the standard VGA text mode (i.e. 80x25) and extended VGA text modes (i.e. 132x60). Some game programs require that you boot up in CGA mode. For these programs, SVM will lock in CGA mode, and will remain in CGA mode even if you warm-boot (press [Ctrl]-[Alt]-[Del]). For all other modes (EGA, Hercules, and so on), SVM will reset to VGA after you warm-boot. Since most programs can run in VGA mode, don't forget to switch back to VGA mode whenever your special program is over.

PLEASE NOTE: With one exception, the SVM utility can only be used with a VGA monitor. The exception follows:

If you wish to run AutoCAD or ET on a Hercules monitor, you may do so by typing SVM HERC2 from the Command line.

4.2.2 How To Use SVM

You can run SVM 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. This section covers both methods.

How To Use the SVM Menu

1. Insert TVGA Utility Diskette #1 into your floppy disk drive (Drive A).
2. Type:
SVM [Enter]
3. The SVM menu will appear, displaying the available modes for your selection.

How to Use SVM Through Command Lines

If you already know what mode you want to select, and you don't want to use the SVM menu, you can type:

SVM [Mt Mode] [Enter]

Table 7 shows the values you can enter in the command line, depending on the mode you want to select.

NOTE: If you need more information about selecting modes with SVM, you can ask for a help message by typing:

SVM? [Enter]

Table 7 SVM Command Lines

Desired Mode/Feature	Command Line You Would Type
Help message	SVM?
Switch back to regular VGA 80x25	SVM VGA
Switch to EGA mode	SVM EGA
CGA for game programs that run under DOS	SVM CGA
CGA for stand-alone game programs (those which have to boot from their own diskettes)	SVM CGA -B
Hercules monochrome	SVM HERC
80 columns by 30 rows text mode	SVM 80 x 30
80 columns by 43 rows text mode	SVM 80x43
80 columns by 60 rows text mode	SVM 80x60
132 columns by 25 rows text mode	SVM 132x25
132 columns by 30 rows text mode	SVM 132x30
132 columns by 43 rows text mode	SVM 132x43
132 columns by 60 rows text mode	SVM 132x60

4.2.3 Example: Switching to EGA Mode With SVM

1. Insert TVGA Utility Diskette #1 into your floppy disk drive (Drive A) and type:

SVM

[Enter]

2. Use the right arrow key on your keyboard's numeric keypad to select EGA, and press the [Enter] key to confirm your choice.

You can also switch to EGA mode directly: at the DOS prompt, just type:

SVM EGA

[Enter]

3. To return to VGA mode from EGA mode, type:

SVM VGA

[Enter]

4.3 Installing the VGA Drivers for Your Software Program

This section explains how to install the TVGA drivers for a number of popular software applications. Just find the section that covers your particular software and follow the directions or put TVGA Utility Diskette #1 in Drive A and type README to start.

4.3.1 Configuring AutoCAD for High-Resolution Graphics Modes

TVGA Utility Diskette #1 contains menu-driven procedures that automatically install the drivers for AutoCAD Version 2.xx, Release 9, and Release 10.

To install the ADI driver:

1. Insert TVGA Utility Diskette #1 in Drive A and type README.A menu will appear outlining available utilities.
2. Choose to install both AutoCAD and AutoShade, or just AutoCAD. If you choose to install both AutoCAD and AutoShade, please refer to section 4.3.2 after completing the installation procedures in section 4.3.1.
3. Select the version of AutoCAD you have installed. When you select a version of AutoCAD, the system will prompt you for the directory where you want to load the directory you plan to use if it is different from the default directory.

Table 8 ADI Drivers on the TVGA Utility Diskettes

ADI Version No.	Resolution	Colors	Monitor Options
ADI V2.x	649x480	16	N/A
ADI V2.x	800x600	16	N/A
ADI V2.x	1024X768	16	N/A
ADI V2.x	1024X768	4	N/A
ADI V2.x	800X600	16	single/dual
ADI V2.x	1024x768	16	single/dual
ADI V2.x	640x480	256	single/dual
ADI V2.x	800x600	16	single/dual
ADI V2.x	1024x768	16	single/dual
ADI V2.x	640x480	256	single/dual

4. Select a display driver from the menu. When you select a driver, the correct files will load automatically in your AutoCAD directory.
5. Enter the ADI interrupt vector you wish to use. The default value is 7A. If you are using a system with a LAN network card installed (ie. Novell) you may need to select an interrupt value other than the default value. If so, be sure to use the same interrupt value for all AutoDesk programs (AutoCAD, AutoShade, Autosketch).
6. Select Normal or Black background. For details on dual-screen or single-screen modes, please reference **Special Option for Releases 9 and 10** on the next page.
7. Select Dual Screen or Single Screen mode (Y-Dual Screen mode, N-Single Screen mode). For details on background color, please reference **Special Option for Releases 9 and 10** on the next page.
8. Start AutoCAD and bring up the configure AutoCAD menu. Reconfigure the video display by selecting "ADI display Vx.x"
9. To load the driver; exit AutoCAD, reboot your system, and enter DSVGA the command line. When you start AutoCAD, the graphics display will be in the resolution you selected.

NOTE: Please consult your AutoCAD Users Guide for additional information on driver installation.

Special Options for Releases 9 and 10

Dual Monitor Support

The drivers for Releases 9 and 10 have special options. From your AutoCAD manual, you will notice that AutoCAD offers support for both single and dual monitors.

For the dual monitor feature, use a monochrome card and monitor in combination with your ABLE VGA IV card and graphics monitor. In this mode, AutoCAD displays text menu information on the monochrome monitor and the drawing on the graphics monitor. In the standard configuration you use a function key to flip between the text and graphics screens.

Background color

The AutoCAD drivers will support both white and black backgrounds on the graphics screen. Entering DSVGA initializes the background selected during the installation procedure.

4.3.2 Configuring Autoshade for High-Resolution Graphics Mode

The Autoshade Driver is installed along with your AutoCAD Driver. You will, however, need to configure the Autoshade program for the newly installed Autoshade Driver. This may be accomplished as follows:

1. From DOS, enter the directory where Autoshade is stored (ie. C:\SHADE). Type:

SHADE ;if you are configuring Autoshade for the first time, or

SHADE-R ;if you have previously configured Autoshade.

2. Configure Autoshade. Be sure to select Option 1 (Autodesk Interface Display Driver) for the Interactive Display Device, and Option 1 (Autodesk Interface Rendering Driver) for the Rendering Display Device.

NOTE: Please consult your Autoshade Installation and Performance Guide for additional information.

4.3.3 Configuring Lotus 1-2-3 for VGA Graphics and Extended Text Mode

To install the new extended display drivers for Lotus 1-2-3, you'll need TVGA Utility Diskette #1 and Lotus 1-2-3 Release 2.

How to Install the Lotus TVGA Drivers

1. You will need to copy the new display drivers from TVGA Utility Diskette #1 to your Lotus 1-2-3 program diskette, or to the directory on your hard disk drive where you have installed Lotus 1-2-3.

For a system with two floppy drives and no hard drive:

To copy the files to your Lotus 1-2-3 diskette, put TVGA Utility Diskette #1 in Drive A. From Drive A, type:

```
SET 123 A:\LOTUS [Enter]
```

For a system with a hard drive and a floppy drive;

To copy the files to your LOTUS directory on your hard disk drive, insert TVGA Utility Diskette #1 into Drive A. From Drive A, type:

```
SET 123 C:\LOTUS [Enter]
```


2. Enter your 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 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 132x30 Version x.x

TVGA 132x43 Version x.x

TVGA 132x60 Version x.x

(Example: enter "TVGA 132x25 Version 1.0" for 132-column by 25-row display. You can enter any of the following values for rows: 25, 30, 43, or 60.)

For graphics mode, select the following command line:

TVGA 640x 480 for Release 2.x

8. Return to the Lotus 1-2-3 main menu and choose "Save Changes" to record the changes you have made, then exit the Lotus 1-2-3 installation program.
9. You have completed driver installation for Lotus 1-2-3. If you need to reconfigure for a different resolution. (i.e. 132x25 to 132x30 in text mode), just follow steps 4 to 10, then run Lotus 1-2-3 as usual.

4.3.4 Configuring Symphony for VGA Graphics and Extended Text Mode

To install the new extended display drivers for Symphone, you'll need TVGA Utility Diskette #1 and Symphony Release 2.

How to Install the Symphony TVGA Drivers

1. You will need to copy the new display drivers from TVGA Utility Diskette #1 to the directory on your hard disk drive where you have installed Symphony.

To copy the files to your SYMPH directory on your hard disk drive, insert TVGA Utility Diskette #1 into Drive A. From Drive A, type:

```
SETSYPH C:\SYMPHONY [Enter]
```

2. Enter your Symphony directory and type "Symphony" 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 line to indicate the number of rows for your display:

```
TVGA 132x25 Version x.x
```

```
TVGA 132x30 Version x.x
```

```
TVGA 132x43 Version x.x
```

```
TVGA 132x60 Version x.x
```

(Example: enter "TVGA 132x25 Version 1.0" for 132-column by 25-row display. You can enter any of the following values for rows: 25, 30, 43, or 60.)

For graphics mode, select the following command line:

TVGA 640x 480 for Release 2.x

8. Return to the Symphony main menu and choose "Save Changes" to record the changes you have made, then exit the Symphony installation program.
9. You have completed driver installation for Symphony. If you need to reconfigure for a different resolution, (i.e. 132x25 to 132x30 in text mode), just follow Steps 2 to 8, then run Symphony as usual.

4.3.5 Configuring Framework II and III for Extended Graphics and Text Modes

To install the TVGA high-resolution drivers for Framework II or III, you will need TVGA Utility Diskette #1 and the Framework II or III program release 1.1 Throughout this section, "Framework" refers to Framework II or III.

How to Install the Framework Drivers

1. Place framework "SETUP" disk in Drive A or go to your Framework directory (if you have installed Framework on the hard disk), and type:

```
SETUP      [Enter]  ;for Framework II, or  
SETUPFW   [Enter]  ;for Framework III
```

2. From the SETUP menu choose option 2, "ALL OTHER USES OF THE SETUP PROGRAM."
3. Select an appropriate location for the FWSTUP file from the choices outlined on the screen.

4. Select the CONFIGURATION option.
5. From the CONFIGURATION Menu, choose the PRIMARY HARDWARE option.
6. Select in order, "Screen Driver", and "I want to enter my own driver file name," Then enter the name of the driver you want to use. Tables 9a and 9b lists the available driver names:

Table 9a Framework II Drivers

Driver Name	Zoom Screen Format	Screen Format
FW250.SC	640H×480V	132C×25R text
FW300.SC	640H×480V	132C×30R text
FW430.SC	640H×480V	132C×43R text
FW600.SC	640H×480V	132C×60R text
FW251.SC	800H×600V	132C×25R text
FW301.SC	800H×600V	132C×30R text
FW431.SC	800H×600V	132C×43R text
FW601.SC	800H×600V	132C×60R text
FWG1.SC	640H×480V	640H×480V Graphics
FWG2.SC	800H×600V	800H×600V Graphics

Table 9b Framework III Drivers

Driver Name	Zoom Screen Format	Screen Format
FW380x43.SC	800×600	80×30 text
FW380x60.SC	800×600	80×30 text
FW132x25.SC	800×600	132×25 text
FW132x30.SC	800×600	132×30 text
FW132x43.SC	800H×600	132×43 text
FW132x60	800H×600	132×60 text
FWG12.SC	800H×600	800×600 graphics (12 scan lines)
FWG14.SC	800H×600	800×600 graphics (14 scan lines)
FWG16.SC	800H×600	800×600 graphics (16 scan lines)

7. When you have entered the driver name, type "M" to return to the main menu.
8. From the Main Menu, type "7" to save all your settings.
9. You will be prompted to insert the "SETUP Disk" into Drive A. Do not insert the SETUP Disk; instead, please insert TVGA Utility Diskette #1, since your new drivers are located on the TVGA Utility Diskette. Press the space bar when you have TVGA Utility Diskette #1 in the floppy drive.
10. The "SETUP" program will ask you where you want to store the FWSETUP configuration file. Choose option "2" if you are using a hard disk drive. Strike any key to exit to DOS once you have made your choice.
11. Your high-resolution drivers for Framework are now ready to use. Just run Framework II or III as usual; unless you want to configure a different resolution for Framework, you will not need to repeat this installation procedure.

Example: Configuring for 132x60-column Display

To choose the driver for 132x60-column display for the screen format and 800x600 for the "zoom" function, type:

FW601.SC

[Enter]

4.3.6 Configuring GEM for High-Resolution Graphics Modes

To install extended-display drivers for GEM, you'll need GEM Desktop release 2.x or 3.x and the TVGA Utility Diskettes. Before you can install the extended-display drivers for the ABLE VGA IV Graphics Adapter, make sure you have already installed GEM on your hard disk drive.

How to Install the GEM Drivers

GEM 2.x

1. Enter the GEM environment (enter your GEM directory and type **GEM**).
2. Insert TVGA Utilities Diskette #1 in Drive A.
3. Go to Drive A by double-clicking on the A floppy drive icon.
4. Double-click on the GEMSETUP.APP icon in the A floppy drive window to start GEM's Setup procedure
5. Follow the instructions in Part 4 of the GEM Desktop manual:
 - a. Select the new graphics display field from the "Available Graphics Cards" window and drag the field to the "Chosen Graphics Cards" window.
 - b. Select "Screen Fonts" under the "Categories" menu.
 - c. Select the TVGA supplied fonts listed in the "Available Screen Fonts" window and drag them individually or in a group to the "Chosen Screen Fonts" window.
6. Save the changes you have made in GEM Setup.

GEM 3.x

1. Insert your original GEM SYSTEM Master Diskette in Drive A and type:

GEMSETUP

[Enter]

2. Select in order: "CHANGE EXISTING CONFIGURATION" "CONTINUE", "CHANGE YOUR CURRENT SETUP" and the listed graphics and card display.

3. When you are prompted to choose a new graphics card and display, select "OTHER PACK." and insert TVGA Utility Diskette #2 in Drive A.
4. Select a TVGA display driver.
5. Continue with the rest of the "GEMSETUP" program.

Please consult your GEM manual for more information on the "GEM-SETUP" program.

4.3.7 Configuring Ventura Publisher for Extended Graphics Modes

To install extended-display drivers for Xerox Ventura Publisher, you will need Ventura Publisher release 1.1 or 2.0 already installed on your hard disk drive. You will also need TVGA Utility Diskette #1.

How to Install the TVGA Drivers for Ventura Publisher

1. Insert TVGA Utility Diskette #1 into Drive A and type:

README

[Enter]

2. Indicate which drive your Ventura program is stored on.
3. Indicate whether or not you are using the Ventura Publisher Professional Extension.
4. **SELECT** one of the display modes listed.

Indicate the type of mouse you are using, and to which I/O port (ie. COM1, COM2, etc) the mouse is connected.

5. Confirm your choices to complete the installation.

If you want to reconfigure for a different display mode, you will need to repeat this entire installation procedure.

4.3.8 Configuring WordStar Release 3 for Extended Text Modes

To configure WordStar Release 3 for extended display, you'll need TVGA Utility Diskette #1 and WordStar Release 3.

How to Install the WordStar Release 3 Driver

1. Copy the file called "DEBUG.COM" or "DEBUG.EXE" from your DOS system disk to the WS Release 3 diskette or to the WordStar directory on your hard disk drive. If you're working with a hard disk drive, for example, type:

```
COPY C:\DOS\DEBUG.COM C:\WS [Enter]
```

2. Make a copy of the WS.COM file from your WordStar diskette or the WordStar directory on your hard drive, and give the new file the name WS 132.COM. Either insert your WordStar diskette into Drive A, or enter your WordStar directory on your hard disk drive and type:

```
COPY WS.COM WS 132.COM [Enter]
```

3. Insert TVGA Utility Diskette #1 into Drive A and copy the file MAKE.BAT and the driver files (25, 30, 43, and 60, for 132x25, 132x30, 132x43, and 132x60 modes, respectively) to your WordStar diskette or subdirectory. To copy the files to your WordStar (WS) directory, type:

```
COPY A:\MAKE.BAT C:\WS [Enter]
```

```
COPY A:\25 C:\WS [Enter]
```

```
COPY A:\30 C:\WS [Enter]
```

```
COPY A:\43 C:\WS [Enter]
```

```
COPY A:\60 C:\WS [Enter]
```

4. If you aren't already in your WordStar directory, enter that directory. Modify WordStar to work with 132-column mode, by typing:

MAKE 25 WS132.COM

[Enter]

5. Run SVM.EXE to select the video mode you want to display.
6. Go to your WordStar directory and run WordStar Release 3 by typing:

WS132

[Enter]

Follow these steps every time you run WordStar:

- a. Type "SVM" and select the display mode, or select the mode directly by typing the appropriate SVM command line. (See Section 4.2).
- b. Type "**WS132**" to run WordStar.
- c. When you exit WordStar, type "SVM VGA" to return to the standard VGA display mode.

4.3.9 Configuring WordStar Release 4 or 5 for Extended Text Modes

To configure WordStar Release 4 or 5 for extended text display, you'll need TVGA Utility Diskette #1 and WordStar Release 4.

How to Install the WordStar Drivers

1. Go to your WordStar Professional directory and start WordStar's installation program by typing: **WSCHANGE**
2. Type "**WS.EXE**" as the filename of your WS program file, and type "**WS.EXE**" as the filename for new changes.
3. Select option A for "Console options."
4. Select option A for "Monitor options."
5. Choose option C for "Screen Sizing"

6. Choose option A for "Height" at the Screen Sizing Menu. then enter the desire value for the screen format (ie. 25, 30, 43, or 60).
7. Choose option B for "width" at the Screen Sizing Menu and enter the value 132 or 80 for the screen size.
8. Once you have selected the screen format, return to the Main Installation Menu by typing a series of X's.
9. Run SVM.EXE to select the extended video mode (make sure the values you select are the same as those you selected previously in the WordStar configuration).
10. Start WordStar by typing:

WS132

[Enter]

NOTE: When you exit Wordstar remember to return to the standard 80 x 25 text display mode by typing: SVM VGA.

Every time you start up Wordstar in extended text mode, follow these steps:

- a. Run SVM.EXE to set the mode. (See Section 4.2)
- b. Type **WS** to start WordStar.
- c. Return on standard mode when you are done, by typing:

SVM VGA

[Enter]

You won't need to repeat this installation procedure unless you want to configure WordStar for a different display mode.

4.3.10 Configuring WordPerfect for Extended Text Display

To configure WordPerfect for extended text display, you'll need TVGA Utility Diskette #1 and WordPerfect version 4.2 or 5.0.

WordPerfect 4.2

To install the drivers:

1. Run the SVM.EXE program to select the extended text mode you want to use (i.e. 132 or 80 columns by 25, 30, 43, or 60 rows).
2. Enter the WordPerfect Setup menu. To do so, go to the directory where you have stored WordPerfect (or insert the WordPerfect program diskette into Drive A if you are using a floppy system). Type:

WP/S

[Enter]

3. Select option 3, "Screen and Beep options."
4. Enter the values for **column** and row to match the values you selected with the SVM.EXE program.
5. Choose option 0 to accept the new configuration and enter WordPerfect.

WordPerfect 5.0

To install the drivers:

1. Run the SVM.EXE program to select the extended text mode you want to use (i.e. 132 or 80 columns by 25, 30, 43, or 60 rows).
2. To implement an 80 column mode, simply enter WordPerfect from the directory containing the WordPerfect program (ie. C:WP). Type:

WP

[Enter]

3. To implement a 132 column mode, you may use the WordPerfect program to either adjust the paper size or change the font size. Instructions for each of these procedures follow:

Adjusting paper size:

- a. Enter the WordPerfect program by typing:

WP

[Enter]

- b. Press Shift-F1 to bring up the SETUP menu. Press "5" to select Initial Settings and then "4" to select Initial Code.
- c. Press Shift-F8 to bring up the SETUP menu. Press "2" to select Page format and then "8" to select Paper Size..
- d. Configure the paper size to 11 x 14 inches and select standard paper type..
- e. Return to the Word Processing mode. Once you have adjusted the page size. You need not repeat this procedure unless you want to change to a different display mode.

Changing font size:

- a. Enter the WordPerfect program by typing:

WP

[Enter]

- b. Press SHIFT-F8 to select the Format Menu.
- c. Press "3" select the Document Format Menu.
- d. Select option 3 "Initial Font" from the Document Format Menu
- e. Choose a font of 16.5 pitch or greater from those available(available fonts depend on the printer you have selected).

- f. Return to the Word Processing mode. The Initial Font selection you have made will be saved with your document.

NOTE: Remember, when you exit from WordPerfect, type the command line "SVM VGA [Enter]" to return to standard 80 x 25 VGA text display.

4.3.11 Configuring MS Windows for High-Resolution Graphics Display

To install high-resolution drivers for MS Windows, you'll need the TVGA Utility Diskettes and MS Windows 286/386.

How to Install the MS Windows Drivers

1. Place the MS Windows' "SETUP" diskette into Drive A and type:

SETUP **[Enter]**

2. Follow the instructions on the screen for the SETUP program. When you are prompted to choose the display adapter, select the option "**Other**" to use the supplied driver for TVGA, and insert the appropriate TVGA Utility Diskette in Drive A (diskette #1 for Windows 286 or diskette #2 for Windows 386).
3. Select one of the TVGA high-resolution graphics modes listed.
4. Select the system font of "Medium System Font (VGA)".
5. Select the terminal font of "Large Terminal Font (USA/Europe-VGA)".
6. Continue with the rest of the MS Windows' "SETUP" program.

You have completed the MS Windows high-resolution driver installation. If you need to reconfigure for a different display mode, you need to repeat the above installation procedure.

4.4 Optional Software: TVGA RAM BIOS and the TANSI (ANSI) Driver

Your TVGA Utility Diskette includes additional, optional programs to help you make the most of your ABLE VGA IV Graphics Adapter.

- TVGA RAM BIOS enables you to keep the TVGA BIOS in your system's active memory for faster display response. It requires approximately 32K of memory. If your system includes enough memory, you may want to try using the TVGA RAM BIOS. You can install the TVGA RAM BIOS in either two ways: in your CONFIG.SYS file, or in your AUTOEXEC.BAT file. For the CONFIG.SYS file, use the TVGABIO.SYS file use the TVGABIO.EXE file. On an 8-bit system, TVGA RAM BIOS will make your display run faster; on a 16-bit system, increased speed will depend on your system's hardware limitations.
- TANSI.SYS provides an enhanced ANSI driver for your standard output device. This driver allows you to display more than 25 rows of text on your standard screen. If you already have an ANSI driver installed and are unable to display more than 25 rows of text. you might want to replace your ANSI driver with TANSI.SYS.

4.4.1 How to Install TVGA RAM BIOS In Your CONFIG.SYS File

1. Insert the TVGA Utility Diskette into your floppy disk drive (Drive A).
2. Type the following line to copy the TVGABIO.SYS file onto your hard disk drive:

```
COPY A:TVGABIO.SYS C: [Enter]
```

- Using your line editor, insert the following line as the first line of your CONFIG.SYS file:

DEVICE = TVGABIO.SYS

If you do not have a text editor, type the following line to view your CONFIG.SYS file:

TYPE CONFIG.SYS [Enter]

Take a pencil, carefully copy the contents of your CONFIG.SYS file, and then type the line:

COPY CON CONFIG.SYS [Enter]

Enter the following line, followed by the contents of your CONFIG.SYS file exactly as you copied them down:

DEVICE = TVGABIO.SYS

Then press [Ctrl]-[Z] to save your changes and exit the file.

- Reboot your system to activate TVGA RAM BIOS.

4.4.2 How to Install TVGA RAM BIOS In Your AUTOEXEC.BAT File

1. Insert the TVGA Utility Diskette into your floppy disk drive (Drive A).
2. Type the following line to copy the TVGABIO.COM file onto your hard disk drive:

```
COPY A:TVGABIO.EXE C: [Enter]
```

3. Using your line editor, insert the following line as the first line of your AUTOEXEC.BAT file:

```
TVGABIO
```

If You do not have a text editor, type the following line to view your CONFIG.SYS file:

```
TYPE AUTOEXEC.BAT [Enter]
```

Take a pencil, carefully copy the contents of your AUTOEXEC.BAT file, and then type the line:

```
COPY CON AUTOEXEC.BAT [Enter]
```

Then type the following line, followed by the contents of your AUTOEXEC.BAT file exactly as you copied them down:

```
TVGABIO
```

Then press [Ctrl]-[Z] to save your changes and exit the file.

4. Reboot your system to activate TVGA RAM BIOS.

4.4.3 How to Install TANSI.SYS

1. Insert TVGA Utility Diskette #1 into your floppy disk drive (Drive A).
2. Type the following line to copy the TANSI.SYS file onto your hard disk drive:

COPY A:TANSI.SYS C: [Enter]

3. Using your line editor, delete the line **DEVICE = ANSI.SYS** from you CONFIG.SYS file and insert the following line:

DEVICE = TANSI.SYS

If you do not have a text editor, type the following line to view your CONFIG.SYS file:

TYPE CONFIG.SYS [Enter]

Take a pencil, carefully copy the contents of your CONFIG.SYS file, and then type the line:

COPY CON CONFIG.SYS [Enter]

Then type in the contents of your CONFIG.SYS file exactly as you copied them down, but make sure you leave out the line **DEVICE = ANSI.SYS**. At the end of the file, add in the following line:

DEVICE = TANSI.SYS

Then press [Ctrl]-[Z] to save your changes and exit the file.

4. Reboot your system to activate TANSI.SYS.

Section 5 Advanced Topics

This section covers information intended for users familiar with assembly language programming. The VGA standard supports a variety of video modes, accessible through a video BIOS call from assembly language or other higher-level programming languages. This section will help you, the programmer, maximize the performance of your ABLE VGA IV Graphics Adapter accessing its enhanced display modes.

When you start up in DOS, the screen display defaults to the standard 80 column text or "alpha-numeric" mode. This will be mode 3+ on a color system, or mode 7+ on a monochrome system which is attached to an analog monitor.

5.1 Standard VGA Modes

Table 10 on the following page lists the standard VGA video modes available with your VGA card.

Table 10 Standard VGA modes

Mode (hex)	Type	Colors	Alpha Format	Buffer Start	Char Size	Screen Size
0	text	16/256K	40x25	B8000	8x8	320x200
0*	text	16/256K	40x25	B8000	8x14	320x350
0+	text	16/256K	40x25	B8000	9x16	360x400
1	text	16/256K	40x25	B8000	8x8	320x200
1	text	16/256K	40x25	B8000	8x14	320x350
1	text	16/256K	40x25	B8000	9x16	360x400
2	text	16/256K	80x25	B8000	8x8	640x200
2+	text	16/256K	80x25	B8000	8x14	640x350
2	text	16/256K	80x25	B8000	9x16	720x400
3	text	16/256K	80x25	B8000	8x8	640x200
3+	text	16/256K	80x25	B8000	8x14	640x350
3	text	16/256K	80x25	B8000	9x16	720x400
4	graphic	4	40x25	B8000	8x8	320x200
5	graphic	4	40x25	B8000	8x8	320x200
6	graphic	2/256K	80x25	B8000	8x8	640x200
7	text	mono	80x25	B8000	9x14	720x350
7+	text	mono	80x25	B8000	9x16	720x400
D	graphic	16/256K	40x25	A0000	8x8	320x200
E	graphic	16/256K	80x25	A0000	8x8	640x200
F	graphic	mono	80x25	A0000	8x14	640x350
10	graphic	16/256K	80x25	A0000	8x14	640x350
11	graphic	2/256K	80x30	A0000	8x16	640x480
12	graphic	16/256K	80x30	A0000	8x16	640x480
13	graphic	256/256K	40x25	A0000	8x8	320x200

* EGA text modes with 8x14 and 9x14 character sizes and 350 lines vertical resolution.

+ VGA text modes with 9x16 character size and 400 lines vertical resolution.

NOTE: Default display modes are 3+ for color system and 7+ for mono systems with analog monitors.

5.2 Extended VGA Modes

The ABLE VGA IV Graphics Adapter supports sixteen enhanced modes, in addition to the standard VGA modes. Table 11 summarizes the sixteen new display modes.

Table 11 Extended VGA Modes

Mode (hex)	Type	Colors	Alpha Format	Buffer Start	Char Size	Screen Size
50	text	16/256K	80x30	B8000	8x16	640x480
51	text	16/256K	80x43	B8000	8x11	640x473
52	text	16/256K	80x60	B8000	8x8	640x480
53	text	16/256K	132x25	B8000	8x14	1056x350
54	text	16/256K	132x30	B8000	8x16	1056x480
55	text	16/256K	132x43	B8000	8x11	1056x473
56	text	16/256K	132x60	B8000	8x8	1056x480
57	text	16/256K	132x25	B8000	9x14	1188x350
58	text	16/256K	132x30	B8000	9x16	1188x480
59	text	16/256K	132x43	B8000	9x11	1188x473
5A	text	16/256K	132x60	B8000	9x8	1188x480
5B	graphic	16/256K	100x75	A0000	8x8	800x600
5C	graphic	256/256K	80x25	A0000	8x16	640x400
5D†	graphic	256/256K	80x30	A0000	8x16	640x480
5F†	graphic	16/256K	128x48	A0000	8x16	1024x768
61†	graphic	16/256K	96x64	A0000	8x16	768x1024

†5D, 5F and 61 need 512K DRAM

5.2.1 Additional Sources for Programming Assistance

The information in this section is intended for your edification 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 68X 2251 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. Copyright 1988, Addison-Wesley Publishing Company.

NOTE: Analog monochrome type monitors use Green Video for all video input and ignore Red Video and Blue Video.

Appendix A

Pin Out and Sync Frequencies

A1.1 Analog Color Display Pinouts

Table 12 shows the ABLE VGA IV Graphics Adapter analog color display pinouts.

Table 12 Analog Color Display Pinouts

PIN	Function
1	Red Video
2	Green Video
3	Blue Video
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	Not Used
12	Not Used
13	Horizontal Sync
14	Vertical Sync
15	Not Used

NOTE: Analog monochrome type monitors use Green Video for all video input and ignore Red Video and Blue Video.

A1.2 Multisync-TTL Monochrome Display Pinouts

Table 13 Multisync-TTL Monochrome Display Pinouts

PIN	Function
1	Ground
2	Ground
3	N/A
4	N/A
5	N/A
6	Intensity
7	Video
8	Horizontal Sync (+)
9	Vertical Sync (-)

A1.3 Conversion Table: 9-to-15 Pin

If you will be using a 9-to-15 adapter cable to link your 9-pin video connector to the 15-pin ABLE VGA IV connector, check Table 14 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 14 in order to work properly with the ABLE VGA IV Graphics Adapter.

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

Table 14 9-to-15 Pin Conversion Table

9-Pin Connector		15-Pin Connector	
Signal	Pin	Signal	Pin
Red	1	Red	1
Green	2	Green	2
Blue	3	Blue	3
Horiz. sync	4	Horiz. 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

A1.4 Multisync-TTL Color Display Pinouts

Table 15 Multisync-TTL Color Display Pinouts

PIN	Function
1	Ground
2	Least Significant Red
3	Most Significant Red
4	Most Significant Green
5	Most Significant Blue
6	Least Significant Green
7	Least Significant Blue
8	Horizontal Sync (+)
9	Vertical Sync (-)

A1.5 Video Signals

(1) Analog:

Black level = 0V

Full intensity level = +0.7V

A1.6 Sync Signals for PS/2 Monitors

Table 16 Sync Signals for PS/2 Monitors

Vert. Res.	Hori. Freq.	Polarity	Vert. Sync Freq.	Polarity
350 lines	31.47 KHz	+	70.08 Hz	-
400 lines	31.47 KHz	-	70.08 Hz	+
480 lines	31.47 KHz	-	59.94 Hz	-

Appendix B

Checking Your ROM BIOS: The BIC.EXE Program

You will need to read this appendix only if you have an early-model PC, PC/XT, or compatible. If this is the case, you will need to run the BIC.EXE program on your TVGA utility diskette to check the ROM BIOS version of your computer before you install the ABLE VGA IV Graphics Adapter. The BIC.EXE program will tell you the version date for your system's ROM BIOS.

BIC.EXE provides the date and version number of your video BIOS for reference. To run BIC.EXE:

1. Boot up your system.
2. Insert the TVGA Utility Diskette into your floppy disk drive.
3. At the A:/prompt, type:

BIC

[Enter]

4. The BIC.EXE program will display the following information:

The System BIOS date is:

XX/XX/XX

The Video BIOS information:

Date:XX/XX/XX

Version : XXXX

OEM Code : X

If your ROM BIOS shows a date later than October 27, 1982, you will not need to replace your system ROM BIOS to work with the ABLE VGA IV Graphics Adapter. However, earlier versions of the ROM BIOS for computers manufactured in 1981 or 1982 does not support EGA or VGA graphic modes.

If you want to install the ABLE VGA IV Graphics Adapter on a system with a ROM BIOS manufactured in 1981 or 1982, you will need to upgrade your system ROM BIOS to a new version from IBM's authorized dealer network.



FCC Warning

This equipment generates and uses radio frequency energy and may interfere with radio communications if it is not properly installed and used according to the instructions. If it does not meet the FCC requirements, the manufacturer's warranty does not apply. The user is responsible for any interference caused by this equipment.

If the equipment does not meet the FCC requirements, the user is responsible for any interference caused by this equipment. The user is encouraged to contact the manufacturer for more information.

If the equipment does not meet the FCC requirements, the user is responsible for any interference caused by this equipment. The user is encouraged to contact the manufacturer for more information.

Appendix C

FCC Compliance Statement

Trident VGA

FCC ID: HNG2 YPTVGA 16X159 A

Certified to comply with the limits for a Class B computing device according to Subpart j or Part 15 of FCC rules. See instructions if interference to radio reception is suspected.

FCC Warning

This equipment generates and uses radio frequency energy and if not installed and used correctly, that is, in strict accordance with the manufacturer's correctly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio and television reception.

It has been tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of the FCC Rules, which are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause interference with radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient the receiving antenna.
- Relocate the computer with respect to the receiver.
- Plug the computer into a different outlet so that the computer and receiver are on different branch circuits.
- Ensure that card slot covers are installed in all unused slots.

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions.

The user may find the following booklet prepared by the Federal Communications Commission helpful: "How to Identify And Resolve Radio-TV Interference Problems" (available from the U.S. Government Printing Office, Washington, D.C. 20402, Stock No. 004-000-00345-4). Only equipment (computer input/output devices, printers, etc.) certified to comply with the Class B limits may be attached to this product. In addition, the user must use shielded interface cables in order to maintain the product within FCC compliance.