TVGA - 8900C
User's Manual

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1. INTRODUCTION

1.1. Features

Thank you for purchasing our VGA graphics board. The adaptor works with your 8bit/16bit (or compatible) to bring you super-high resolution, 256-color capability, fast screen redraw, compatibility with most software and hardware.

Compatibility

- 486,386,286 and PC compatibles.
- Register compatible with Hercules, MDA, CGA, EGA and VGA.
- Non-interlaced or interlaced monitor support.
- Compatible with Multi-Sync and PS/2 monitors.
- 72Hz VESA standard (800x600 resolution).

Resolution and color selection

MEMORY	256K DRAM	512K DRAM	1MB DRAM
640 x 400	---	256-NI*	256-NI
640 x 480	16-NI	16-NI,256-NI	16-NI,256-NI
768 x 1024	---	16-I**	16-I
800 x 600	16-NI	16-NI,256-I	16-NI,256-NI
1024 x 768	4-I	4-I,16-I/NI	4-I,16-I/NI,256-I/NI

"*" NI = Non-Interlaced   "**" I = Interlaced

Extended test 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
- CADKEY
- Framework
- GEM Desktop
- Lotus
- MS Windows
- MS Word
- OS/2 Presentation Manager
- P-CAD
- Quattro Pro
- Symphony
- Ventura
- VersaCAD
- VESA BIOS Extension
- WordPerfect
- WordStar

1.2 Check List

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

- VGA Graphics Adapter
- Two Driver & Utility Diskettes

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

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

2. CONFIGURING YOUR VGA ADAPTER

This section explains how to configure the adapter for use with your computer system.

WARNING: Incorrect setting or use of the adapter may result in damage to the computer system, monitor, or the graphics adapter itself. Carefully read through this manual before installing the adapter in your system. Step-by-step instructions in the "Installation" section will guide you through the installation process.

TVGA 8900C SOJ Graphics Layout

SOJ VIDEO RAM

SOJ VIDEO RAM

SW4   SW3

JP6

RAMDAC

Trident
TVGA8900C

VIDEO BIOS

VGA
CONNECTOR

JP1
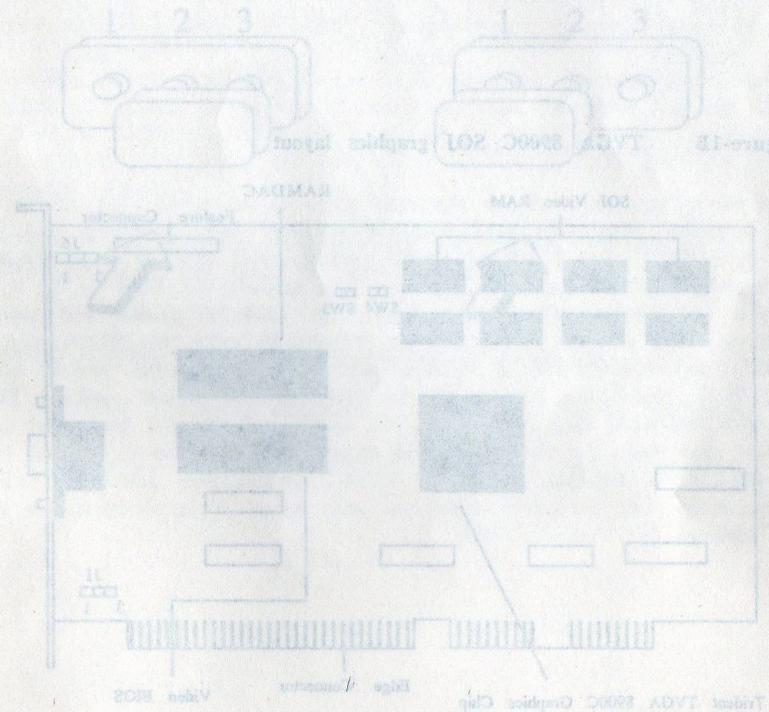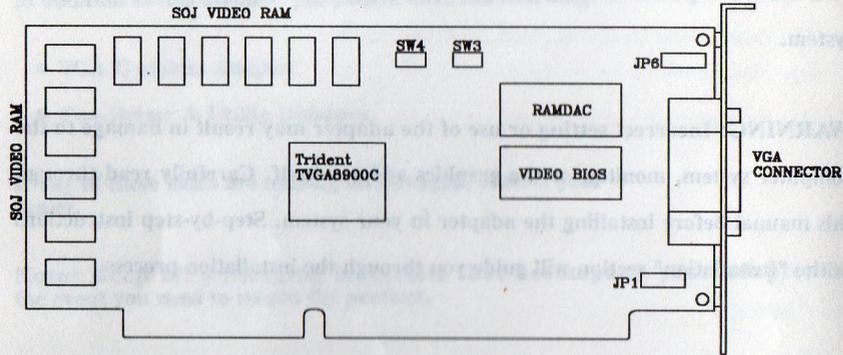
Figure-1B   TVGA 8900C SOJ graphics layout

SOJ Video RAM

RAMDAC

Feature   Connector

J6
3   1

SW4 SW3

J1
3   1

Trident TVGA 8900C Graphics Chip

Edge Connector

Video BIOS
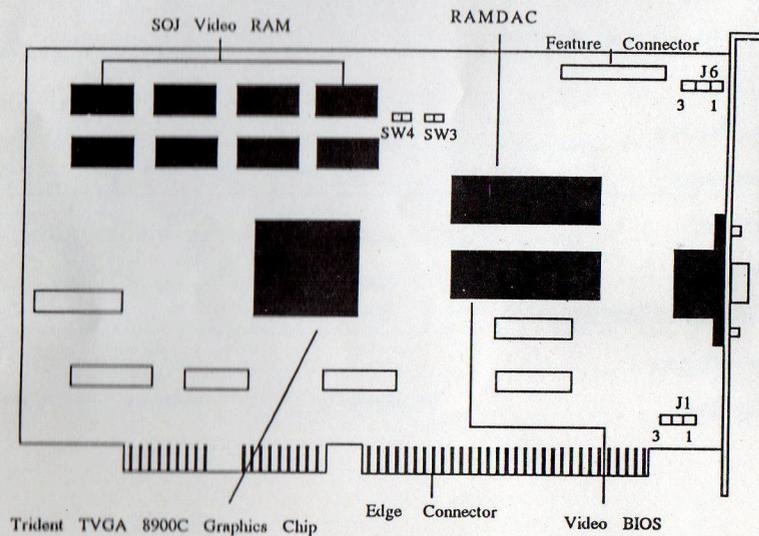
2.2.   Jumper Settings

You can adapt the VGA adapter for special hardware configurations using the given jumpers on the card.

2.2.1.   IRQ9 Interrupt Control : Jumper J1

Jumper J1 controls the use of IRQ9. The default position is 2-3 short. This allows LAN network cards (e.g. Novell) to run in your system without an interrupt conflict. If you encounter software that requires the use of IRQ9, move Jumper J1 to cover pins 1 and 2. Figure-2 illustrates the two settings for Jumper J1.

Figure-2   J1 Settings for IRQ9

IRQ9 Disabled : Default;
(Pins 2 and 3 connected)

IRQ9 Enabled;
(Pins 1 and 2 connected)

1   2   3

1   2   3
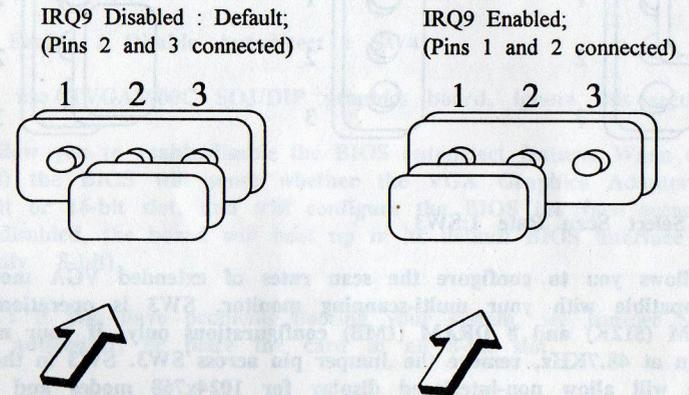
2.2.2. Monitor Detection Control : Jumper J6 (Optional)

Jumper J6 is for monitors that do not adhere to the PC monitor pinout (e.g. Samsung or Goldstar). If your VGA color monitor boots up in monochrome mode, remove the Jumper completely. If your VGA monochrome monitor does not display correctly, move the jumper to pins 2 and 3. Figure-3 illustrates the setting for Jumper J6.

Figure-3   J6 Settings For Monitor Detection Control

J6 : Default   J6 : Non-Standard Color   J6 : Non-Standard Monochrome
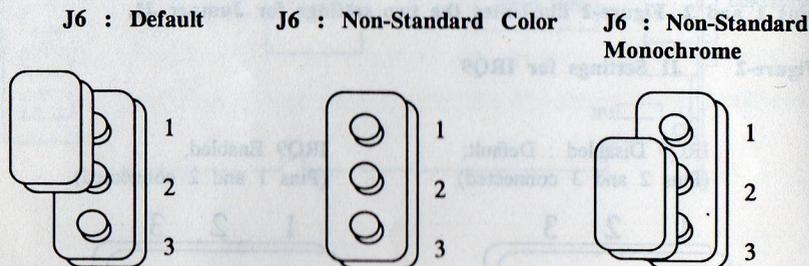
2.2.3. Select Scan Rate 1:SW3

SW3 allows you to configure the scan rates of extended VGA modes to be compatible with your multi-scanning monitor. SW3 is operational for 4 DRAM (512K) and 8 DRAM (1MB) configurations only. If your monitor can scan at 48.7KHz, remove the Jumper pin across SW3. SW3 in the open position will allow non-interlaced display for 1024x768 modes and higher horizontal and vertical scan rates for 800x600-16 color (4 DRAM and 8 DRAM) and 800x600-256 (8 DRAM only). If your monitor cannot scan at 48.7KHz, leave the Jumper pin for SW3 in the default position. This will give interlaced display for 1024x768 modes and reduced horizontal and vertical scan rates for the 800x600-16 color (4 DRAM and 8 DRAM) and 800x600-256 (8 DRAM). Reference Table-1 (Installation 3-4) and Table-7 (Appendix 6-4) for more detail on scan rates. Figure-4 illustrates the two settings for Jumper SW3.

Figure-4   SW3 Setting For Selecting Scan Rate

SW3 : 48.7KHz Scan Rate   SW3 : Default Scan Rate
(Pins 1 and 2 open)   (Pins 1 and 2 connected)
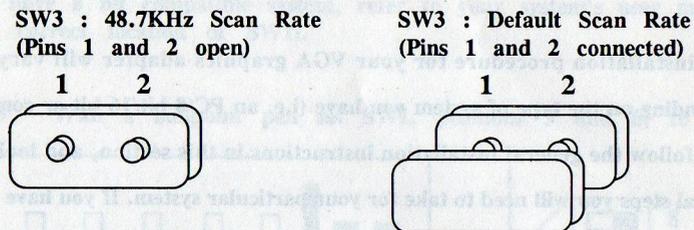
WARNING : Be sure to check your multi-scanning monitor's specifications before selecting the scan rate. Selecting a scan rate higher than the monitor can handle may damage the monitor.

2.2.4. Enable / Disable Autodetect : SW4

If you use TVGA8900C SOJ/DIP graphics board, ignore this section.

SW4 allow you to enable/disable the BIOS autodetect feature. When enabled (default) the BIOS will sense whether the VGA Graphics Adaptor is in an 8-bit or 16-bit slot, and will configure the BIOS interface accordingly. When disabled, the board will boot up in its default BIOS interface setting (generally 8-bit).

NOTE : If you have problems booting your system, set Jumper SW4 to disable autodetect, or place the card in an 8-bit slot.

Figure-5   SW4 settings to enabled/disabled autodetect

SW4 : Disable Autodetect   SW4 : Enable Autodetect : Default

(Pins 1 and 2 connected)   (Pins 1 and 2 open)
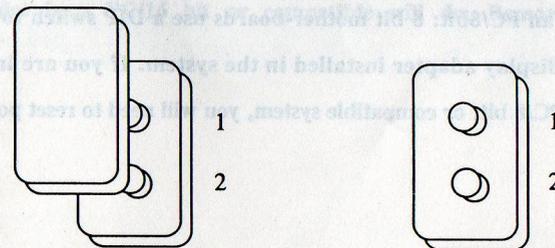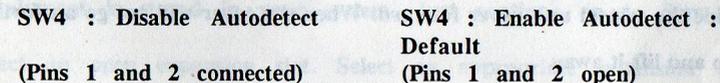
3. INSTALLATION

The installation procedure for your VGA graphics adapter will vary slightly depending on the type of system you have (i.e. an PC/8 bit/16 bit or compatible). 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 have an older-model PC, 8 bit, or compatible, please read Section 6.2. before you install your graphics adapter.

3.1. Installation Procedures

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

1. Turn OFF all power to your system, including any peripherals (printer, external drives, modem, etc.).

2. Unfasten the cover mounting screws on your system. For older- 8bit PCs, there are two cover mounting screws. However, the newer 8 bit PC and compatibles use four screws, and newer 16 bit 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 an further, tilt it up and lift it away.

4. If you have an PC/8bit: 8 bit mother-boards use a DIP switch to identify the type of video display adapter installed in the system. If you are installing the adapter in an PC/8 bit, or compatible system, you will need to reset positions 5 and 6 of

DIP switch block SW1 on your computer's motherboard. Use Figure-6 to locate switch SW1. Reset positions 5 and 6 of SW1 to the ON position. (If you have 8 bit compatible system, refer to your system's user manual for the correct location of SW1).

Figure-6   With a ballpoint pen set SW1, positions 5 and 6, to ON
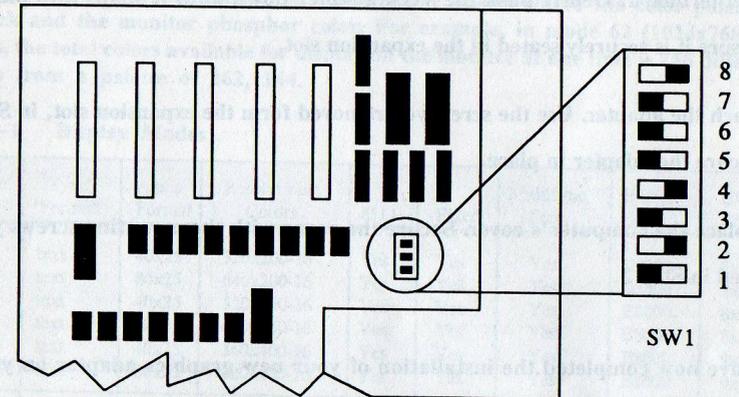
If SW1 is a slide switch, you will need to use a pen or a paper clip to push positions 5 and 6 into the ON position. If SW1 is a rocker switch, use the pen or paper clip to push the rockers at positions 5 and 6 down for the ON position.

If you have an 16 bit or compatible system : You don't need to reset any DIP switches in your system, since 16 bit computers and compatible systems use the SETUP file instead of DIP switches to tell the computer what equipment is stored in your system. Just continue on to Step 5.

5.   Select an open expansion slot. Select an appropriate expansion slot for the adapter. Any available 8-bit slot in a PC/8 bit or compatible, or 16-bit slot in a PC/16 bit or compatible will do. Remove the retaining

screw that holds the slot cover in place. Slide the slot cover out and put the screw aside (you will need it to secure the adapter).

6. Install the adapter. To install the adapter in the selected expansion slot, place the gold-fingered edge-connector of the adapter directly above an expansion slot on the motherboard. Gently push the VGA adapter down until it snaps into place. Make sure it is securely seated in the expansion slot.

7. Attach the adapter. Use the screw you removed form the expansion slot, in Step 5 to secure the adapter in place.

8. Replace the computer's cover. Secure the cover with the mounting screws you removed in Step 2.

You have now completed the installation of your new graphics adapter on your system. Before you use the system, however, please refer to Section 3.2.

3.2. Connecting the Monitor

The adapter offers a 15-pin analog connector. When you connect your monitor to the adapter, be sure you have the right cable and cable connector. Fixed-frequency analog monitors come equipped with a 15-pin connector. Variable frequency analog or analog/digital monitors will require a 9-to-15-pin cable connector.

3.2.1. Monitor Support for Enhanced VGA Modes

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

Note that the color palette, i.e.; the total number of possible colors to choose from, is 262, 144 in all modes except for monochrome modes where the color palette is 2-black and the monitor phosphor color. For example, in mode 62 (1024x768-256 color), the total colors available for display on the monitor at one time is 256 different colors from a palette of 262, 144.

Table-1   Display Modes

Mode (hex)	Type Format	Alpha Format	Resolution/ Colors	8514[1]	Fixed	Multisyne Freq.[2]	Buffer Start	Char Size
0,1	text	40x25	320x200-16	Yes	Yes	Yes	B8000	8x8
2,3	text	80x25	640x200-16	Yes	Yes	Yes	B8000	8x8
0[3],1[3]	text	40x25	320x350-16	Yes	Yes	Yes	B8000	8x14
2[3],3[3]	text	80x25	640x350-16	Yes	Yes	Yes	B8000	8x14
0[4],1[4]	text	40x25	360x400-16	Yes	Yes	Yes	B8000	9x16
2[4],3[4]	text	80x25	720x400-16	Yes	Yes	Yes	B8000	9x16
4,5	graphics	40x25	320x200-4	Yes	Yes	Yes	B8000	8x8
7	graphics	80x25	640x200-2	Yes	Yes	Yes	B8000	8x8
7[3]	text	80x25	720x350-mono	Yes	Yes	Yes	B8000	9x14
7[4]	text	80x25	720x400-mono	Yes	Yes	Yes	B8000	9x16
D	graphics	40x25	320x200-16	Yes	Yes	Yes	A0000	8x8
E	graphics	80x25	640x200-16	Yes	Yes	Yes	A0000	8x8
F	graphics	80x25	640x350-mono	Yes	Yes	Yes	A0000	8x14
10	graphics	80x25	640x350-16	Yes	Yes	Yes	A0000	8x14
11	graphics	80x30	640x480-2	Yes	Yes	Yes	A0000	8x16
12	graphics	80x30	640x480-16	Yes	Yes	Yes	A0000	8x16
13	graphics	40x25	320x200-256	Yes	Yes	Yes	A0000	8x8
50	text	80x30	640x480-16	Yes	Yes	Yes	B8000	8x16
51	text	80x43	640x473-16	Yes	Yes	Yes	B8000	8x11
52	text	80x60	640x480-16	Yes	Yes	Yes	B8000	8x8
53	text	132x25	1056x350-16	Yes	Yes	Yes	B8000	8x14
54	text	132x30	1056x480-16	Yes	Yes	Yes	B8000	8x16
55	text	132x43	1056x473-16	Yes	Yes	Yes	B8000	8x11

Table continue,

Mode (hex)	Type Format	Alpha Format	Resolution/ Colors	8514[1]	Fixed	Multisync[2] Freq.	Buffer Start	Char Size
56	text	132x60	1056x480-16	Yes	Yes	Yes	B8000	8x8
57	text	132x25	1188x350-16	Yes	No	Yes	B8000	9x14
58	text	132x30	1188x480-16	Yes	No	Yes	B8000	9x16
59	text	132x43	1188x473-16	Yes	No	Yes	B8000	9x11
5A	text	132x60	1188x480-16	Yes	No	Yes	B8000	9x8
5B [8]	graphics	100x75	800x600-16	Yes	No	Yes	A0000	8x8
5B [7]	graphics	100x75	800x600-16	No	No	Yes [5]	A0000	8x8
5C [7]	graphics	80x25	640x400-256	Yes	Yes	Yes	A0000	8x16
5D [7]	graphics	80x30	640x480-256	Yes	Yes	Yes	A0000	8x16
5E [11]	graphics	100x75	800x600-256	No	No	Yes [11]	A0000	8x8
5E [8,10]	graphics	100x75	800x600-256	Yes	No	Yes	A0000	8x8
5E [8,10]	graphics	100x75	800x600-256	No	No	Yes [5]	A0000	8x8
5F [7,9]	graphics	128x48	1024x768-16	Yes	No	Yes	A0000	8x16
5F [7,10]	graphics	128x48	1024x768-16	No	No	Yes [5]	A0000	8x16
60 [9]	graphics	128x48	1024x768-4	Yes	No	Yes	A0000	8x16
61 [6,7]	graphics	96x64	768x1024-16	No	No	No	A0000	8x16
62 [8,9]	graphics	128x48	1024x768-256	Yes	No	Yes	A0000	8x16
62 [8,10]	graphics	128x48	1024x768-256	No	No	Yes [5]	A0000	8X16

Table Notes :

1   8514 is an PS/2 monitor.

2   Multisync monitors support both Analog and TTL operations (e.g. NEC Multisync 3D)

3   EGA text modes with 8x14 and 9x14 character sizes and 350 lines vertica resolution.

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

5   Check to see if your multisync monitor supports the interlaced or non-interlaced versions of these modes (monitor must   support horizontal scan rate of 48.7KHz or 56.4KHz for non-interlaced display).

6   A portrait monitor is required to run this mode (e.g. Magics-15PF).

7   Supported by 4 and 8 DRAM configurations only.

8   Supported by 8 DRAM configuration only.

9   Interlaced mode.

10   Non-interlaced mode.

11   Supported by 4 DRAM configuration only.

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.

3.3 Advanced Topics

This section covers information intended for users familiar with assembly language programming. The VGA standard supports a variety of video modes that are accessible through a video BIOS call form assembly language or other higher-level programmming languages.

When you start up in DOS, the screen display defaults to the standard 80 column text or alpha-numeric mode. This is mode 3[4] on a color system, or mode 7[4] on a monochrom VGA system (see footnote references in Table Notes section above).

4. TROUBLESHOOTING TIPS

4.1. Hardware Troubleshooting

The following are some recommended steps to take if the VGA Graphics Adapter will not boot or operate properly in your system:

1. Check to see if the card is firmly seated in its bus expansion slot. Be sure it is not making contact with any other cards in the system.

2. Be sure your monitor is porperly connected to the card. Be sure your monitor's pin definitions match those of your VGA card.

3. Be sure your system's power supply is operating properly (i.e. fan operates, system power light comes on).

4. If you are using an PC/8bit or compatible, be sure switches 5 and 6 of Switch Block SW1 on your motherboard are set to ON.

5. If you are using an PC/8bit or compatible, check to see your system BIOS is dated October 27, 1982 or later. System BIOS versions prior to this date will bot support the adapter card.

Special configuration requirements for EMS cards, LAN cards and SCSI, EDSI, or RLL controllers

1. EMS card: be sure the EMS pages do not conflict with the video RAM space (A0000-DFFFF). If you cannot move the EMS pages out of the A0000-DFFFF area, move Jumper SW4 to the Disable Autodetect position.

2. LAN card: be sure Jumper J1 is set to disable IRQ9. If you still encounter problems, move Jumper SW4 to the Disable Autodetect position.

3. SCSI,ESDI, or RLL controller: if you encounter problems, move Jumper SW4 to the Disable Autodetect position.

4.2. Commonly Asked Questions

4.2.1. Monitors

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

A. Some monitors lack auto-sizing features or just do not synchronize properly to the video board output. In some cases, horizontal and vertical display adjustments may be necessary.

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

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

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

4.2.2. Systems

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

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

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

A. Could be. The version of your mouse driver may not support VGA. Another possibility is that the DRAM on your card is not seated correctly or is not the right speed. If you have added your own DRAM to the card, make sure it is 100 nano-second Fast Page Mode DRAM.

4.2.3. Software Application

Q. When I run a system utilities programs (PC Tools, Norton Utilities, etc.) it tells me I only have 256K of video memory, even though 512K or 1MB is on the board.What's wrong?

A. Nothing is wrong. System utility programs ard designed to detect only the VGA Standard amount of video mamory (256K).

Q. I'm having trouble getting the Windows 3.0 drivers to work properly. What should I do?

A. Windows 3.0 can be configuration sensitive. Here are some tips:

1. Install the standard VGA driver (comes with the Windows program) first. Make sure everything is working correctly before you try and install a high resolution driver.

2. Minimize the number of TSRs in your system.

3. Add the following commands to the Enchanced mode portion of the Windows SYSTEM.INI file:

        Virtual HDIRQ=OFF
        EMMexclude-A000-DFFF

4. Do not use SHARE or APPEND commands in your CONFIG. SYS or AUTOEXEC.BAT files.

Q. My display is not correct when I run VPIC or RIX. What's wrong?

A. The first thing to check is the software version. VPIC must be version 2.3 or later. RIX must be version 1.3 or later. If you are using VPIC, you will also need to run the MAMODE.EXE utility. This utility allows you to change the momery addressing scheme from the default 64K scheme to a 128K scheme. To run the utility just place Driver & Utility Disk #1 in drive A and type MAMODE. The utility will tell you which memory address scheme the graphics adapter is currently using. To change the current scheme, just press [Enter].

Q. I am trying to run some old CGA and EGA software and I am having display problems. What should I do?

A. Some older versions of software require video interrupt IRQ9 (e.g., CGA Pinball, Fantasyland, PC Labs Benchmark Series Interrupt Test). Set Jumper J1 to enable IRQ9.

4.3. If You Need Technical Assistance

To help us answer your questions, please have the following information handy when you call:

1. Serial number of your adapter.

2. System information. What PC are using? What peripherals do you have in your system? What kind of monitor are you using? How much RAM is your system configured for?

3. What version operating system(s) are you running?

4. What version software package are you using?

5. What are your jumper and switch settings on the adapter? What is the BIOS version? What version of Driver & Utility Disks?

6. What is the problem? What seems to cause the problem to occur?

5. SOFTWARE

5.1. TVGA Utilities

This section explains how to use the utility software on the Driver & Utilities Diskettes. The diskettes provide the following programs:

- SVM89.EXE (Switch Video Mode).
- TVGA RAM BIOS (may be used to improve display speed).
- TANSI.SYS (used to replace ANSI.SYS to support extended text display, i.e. more than 25 rows).
- BIC.EXE (reports PC System BIOS information). This utility is covered in
- MODETEST checks monitor's ability to run any display mode.
- MAMODE.EXE (select 128K or 64K memory addressing scheme for high resolution programs - e.g. VPIC 2.3 or earlier.
- PMFIX (circumvents display problem when using standard VGA driver and switching to between full screen OS/2 and PM)
- RIXFIX (allows RIX programs - e.g. ColorRIX, Present, Rixinfo, Res_Test, Q - prior to version 1.38 to operate correctly with product based on the Trident TVGA8900C chip)
- SMONITOR.EXE (for monitors which do not adhere to the PC monitor pinout standard and thus boot up in VGA monochrome - e.g.Samsung,Goldstar).

- TVGACRTC (allows users to adjust video display specifically for their monitor. Can be sued to remedy screen size changes,screen shifts and sync problems, when switching between modes, TVGACRTC may also be used to select 70Hz refresh for 1024x768 non-interlaced modes).

IMPORTANT NOTE: Because we are continuously updating existing drivers and developing new drivers for popular software applications, your Driver & Utility Diskettes may have drivers not listed in the manual. The README file on Driver & Utility Disk #1 contains a full listing of currect drivers and detailed installation procedures.

5.2. Switching Video Modes with SVM89.EXE

5.2.1. How SVM89 Works

SVM89 is a menu-driven program designed to help you select the right video mode for special applications or for game programs which cannont run in standard VGA mode. For example, the game "PINBALL" can only run in CGA mode; you will need to choose CGA mode with SVM89 before starting PINBALL.

SVM89 allows you to emulate EGA, CGA, and Hercules (MDA) modes on a VGA monitor. You may also use SVM89 to select the standard VGA text mode (i.e.80x25) and extended VGA text modes (i.e.132x60). Some game programs require you boot up in CGA mode. For these programs, SVM89 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, etc.),

SVM89 will reset to VGA after you warm-boot. Since most programs can run in VGA mode, do not forget to switch back to VGA mode when you are finished with the program requiring the special mode.

5.2.2. How to Use SVM89

You can run SVM89 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 SVM89 menu

1. Insert Driver & Utility Disk #1 into your floppy driver (drive A).

2. Type:

SVM89   < Enter >

3. The SVM89 menu will display the available modes.

How to use SVM89 through command lines

If you already know what mode you want to select, and you do not want to use the SVM89 menu, you can type:

SVM89 [My Model]

Table-2 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 SVM89, you can ask for a help message by typing.

SVM89?   < Enter >

Table-2   SVM89 command lines

DESIRED MODE / FEATURE	COMMAND LINE
Help message	SVM89?
Switch back to regular VGA 80x25	SVM89 VGA
Switch to EGA mode	SVM89 EGA
CGA for game programs that run under DOS	SVM89 CGA
CGA for stand-alone game programs (those which have to boot from their own diskettes)	SVM89 CGA - B
Hercules monochrome	SVM89 HERC
80 columns by 30 rows text mode	SVM89 80x30
80 columns by 43 rows text mode	SVM89 80x43
80 columns by 60 rows text mode	SVM89 80x60
132 columns by 25 rows text mode	SVM89 132x25
132 columns by 30 rows text mode	SVM89 132x30
132 columns by 43 rows text mode	SVM89 132x43
132 columns by 60 rows text mode	SVM89 132x60

5.2.3.   Example : Switching to EGA Mode with SVM89

1.   Insert Driver & Utility Disk#1 into your floppy drive (drive A), type :

SVM89   < Enter >

2. Use the < Right Arrow > Key on your keyboards 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, type:

SVM89 EGA   < Enter >

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

SVM89 VGA   < Enter >

5.3. Installing the VGA drivers for your software program

This section explains how to install drivers for a number of popular software applications. Before you begin, make sure to delete any previous TVGA drivers currently installed for your given program. Otherwise, the newly installed driver may conflict with the driver(s) currently installed. Once this is done, find the section that covers your particular software and follow the directions, or put Driver & Utility Disk #1 in drive A and type README to start.

5.3.1. AutoCAD

The VGA Driver & Utility Disk #1 contains menu-driven procedures that automatically install the drivers for AutoCAD Release 9 and Release 10.

1. Insert Driver & Utility Disk #1 in drive A and type README. Select "C" for a list of display drivers.

2. Choose to install drivers for both AutoCAD and AutoShade, or just AutoCAD. If you choose to install both AutoCAD and AutoShade, please refer to Section 5.3.2. after completing the installation procedures in Section 5.3.1.

3. Select the version of AutoCAD you have installed. When you select a version of AutoCAD, the system will prompt you for the directory to which you want to load the drivers. C:\ACAD is the default directory. Enter the directory you plan to use if it is different from the default directory.

Table-3 ADI drivers on the Driver & Utility Diskettes

ADI VERSION[1]	RESOLUTION/ COLORS	MONITOR OPTIONS	DRAM REQUIRED
ADI V3.x/V4.x	800x600-16	Single/dual	256K
ADI V3.x/V4.x	1024x768-16	Single/dual	512K
ADI V3.x/V4.x	640x480-256	Single/dual	512K
ADI V3.x/V4.x	800x600-256	Single/dual	512K
ADI V3.x/V4.x	1024x768-256	Single/dual	1MB

[1] Same driver used for ADI V3.X and ADI V4.X

4. Select a display driver from the menu. When you select a driver. the correct files will load automatically into you AutoCAD directory. If you are not installing an Autoshade driver, please skip to step 6.

5. If you have chosen to install AutoCAD and Autoshade, you will be prompted to select a Rendering Device Driver for Autoshade. Your options are 640x480-256 colors, 800x600-256 colors (512K DRAM required) or 1024x768-256 colors (1MB DRAM required). When you select a driver, the correct files will automatically load into your Autoshade directory.

6. 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 (e.g. Novell), you may need to select an interrupt value other than the default value (i.e. 7B,7C,7D). If so, be sure to use the same interrupt value for all AutoDest programs (AutoCAD, Auto-Shade, Auto-sketch).

7. Select Normal or Black background. For details on background color, please reference Special Options for Releases 9 and 10 on the next page.

8. Select Dual Screen or Single Screen mode (Y-Dual Screen mode, N-Single Screen mode). For details on dual-screen or single-screen modes, please reference Special Options for Releases 9 and 10.

9. Start AutoCAD and bring up the configure AutoCAD menu. Re-configure the video display by selecting ADI display Vx.x.

10. To load the driver: exit AutoCAD, reboot your system, and enter DSVGA on 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 offer special options. In your Auto-CAD 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 card and graphics monitor. In this mode, AutoCAD displays text menu information on the monochrome monitor and the drawing on the graphics moni-

tor. In the standard configuration, 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.

5.3.2. Autoshade 1.1

The Autoshade driver is installed along with an AutoCAD ADI driver. You will, however, need to configure the Autoshade program for the newly installed Auto-shade Driver. This may be accomplished as follows:

1. From DOS, enter the directory where Autoshade is stored (i.e. 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 as follows:

   a. Select Option 1 (Autodesk Interface Display Driver) for the Interactive Display Device, and Option 1 (Autodesk Interface Rendering Driver) for the Rendering Display Device.

   b. Enter "Y" for "Do the display and rendering devices share a single screen?" and "Does the FLIPSCREEN require a redraw?"

3. To use the Autoshade driver along with AutoCAD/386 protected mode drivers, type DSVGAR - F before entering Autoshade. This switch will install only the Autoshade rendering driver and not the AutoCAD ADI driver.

5.3.3. AutoCAD/386 (release 10 and 11), AutoShade 2.0,& 3D Studio

To install the extended display drivers for AutoCAD/386 you will need Driver & Utility Disk #1 and AutoCAD/386.

1. Copy the display driver from the a:/ACAD386 directory on Driver & Utility Disk #1 to your AutoCAD/386 directory (e.g. C:/ACAD386). From drive A, type:

COPY A:/ACAD386/RCPTVGA.EXP C:/ACAD386

RCPTVGA.EXP is a combined display interface and rendering driver. All extended resolutions are available (640x480-256, 800x600-16/256, and 1024x768-16/256).

2. Enter the following SET command at the DOS prompt, or add it to you AUTOEXEC.BAT file:

SET DSPADI = RCPTVGA

3. Start AutoCAD/386. Select Configure AutoCAD from the main menu.

4. Select in order, Configure Video Display and ADI P386 display.

5. If you have an MDA/Hercules card in your system, you will be prompted as to whether or not you would like to use a dual monitor configuration. Reference (Software 5-7) for a discussion of dual monitor support.

6. A number of prompts follow which allow you to select the graphics area background color, text color (for the menu, status line, and command prompt areas of the screen), text background color, border color, and dialogue box/button outline color. To select the default color, press <Return> at each prompt. To select a diferent color, enter the appropriate color number at the given prompt.

NOTE: For 16-color modes, you can only select black or white for a graphics background color.

Refer to the Video Graphics Array Video Display Option in the Installation and Performance Guide for more detailed information on the color select prompts for 16 color and 256 color modes.

IMPORTANT: The AutoCAD/386 drivers may also be used with Autoshade 2.0 and 3D Studio. For Autoshade 2.0 use the following set commands in your AUTOEXEC.BAT file:

SET DSPADI = RCPTVGA
SET RDPADI = RCPTVGA

For 3D Studio use the following set command in your AUTOEXEC.BAT:

SET RCPADI = (location of 3D Studio on hard drive)\RCPTVGA

Consult you Autoshade 2.0 and 3D Studio manuals for additional information on how to configure these programs for high resolution drivers.

5.3.4. CADKEY

To install CADKEY you will need Driver & Driver & Utility Disk #1 and CADKEY version 3.5.

1. You will need to copy the display drivers and installation program from the A:/CADKEY directory on Driver & Utility Disk #1 to the \CKGR subdirectory on your hard disk where you have installed CADKEY (e.g. C:\CADKEY\CKGR). From drive A, type:

COPY A:\CADKEY\TR16.EXE C:\CADKEY\CKGR
COPY A:\CADKEY\TR256.EXE C:\CADKEY\CKGR
COPY A:\CADKEY\INS.EXE C:\CADKEY\CKGR

TR16.EXE denotes the 16 color graphics screen driver. This driver includes 640x350,640x480,800x600 and 1024x768 resolutions.

TR256.EXE denotes the 256 color graphics screen driver. This driver includes 640x480, 800x600, and 1024x768 resolutions.

2. Run INS.EXE to install the graphics drivers into CADKEY's GRDEV.DAT file.

3. Run CONFIG.EXE. Select the following in order:

   a. Set Graphics Option

   b. Select Graphics Device

   c. A TVGA graphics driver (e.g. 16 color or 256 color)

   d. A graphics mode (e.g. 800x600 or 1024x768)

4. Continue with the rest of the CONFIG.EXE program.

5. To complete drive installation: Run TR16.EXE if you have selected a 16 color driver. Run TR256 if you have selected a 256 color driver. When you start CADKEY, the graphics will now be in the selected resolution.

5.3.5. VersaCAD

To install extended display drivers for VersaCAD you will beed Driver & Utility Disk #1 and VersaCAD/286 or VersaCAD/386

Versa CAD/286

1. You will need to copy the display drivers from the A:\VCAD directory on Driver & Utility Disk #1 to the VersaCAD directory on your hard disk (e.g. C:\VCAD). From drive A, type:

COPY A:\VCAD\TV16.COM C:\VCAD54
COPY A:\VCAD\TV256.COM C:\VCAD54
COPY A:\VCAD\TVGA.CFG C:\VCAD54

TV16.COM denotes the 16 color graphics screen driver. This driver includes 800x600 and 1024x768 resolutions. TV256.EXE denotes the 256 color graphics screen driver. This driver includes 640x480, 800x600, and 1024x768 resolutions.

2. Enter your VersaCAD/286 directory.

3. Run TV16.COM if you want to select a 16-color driver. Run TV256.COM if you want to select a 256 color driver.

4. Enter your hard disk root directory (e.g. C:\) and start VersaCAD.

5. Enter the Environment configuration program by pressing "E".

6. Press, in order, "N" to select Environment Menu3 and "S" to select Screen Configuration.

7. Select a display driver.

8. Continue with the rest of VersaCAD'S Environment Configuration Program.

NOTE: When changing from a 16 color driver to a 256 color driver, or visa versa, complete steps 5 through 8; then exit VersaCAD and reboot your system. Run the appropriate COM.EXEfile and then start VersaCAD.

VersaCAD/386

1. You will need to copy the display drivers from the A:\VCADP directory on Driver & Utility Disk #1 to the VersaCAD/386 directory on your hard disk (e.g. C:\VCAD386). From drive A, type as follows:

COPY A:\VCADP\TV16P.COM C:\VCAD386
COPY A:\VCADP\TV256P.COM C:\VCAD386
COPY A:\VCADP\TVGAP.CFG C:\VCAD386

TV16P.COM denotes the 16 color graphics screen driver. Thisdriver includes 800x600 and 1024x768 resolutions.

TV256p. EXE denotes the 256 color graphics screen driver. This driver includes 640x480, 800x600, and 1024x768 resolutions.

2. Enter your VersaCAD/386 directory.

3. Run TV16P.COM to select a 16 color driver. Run TV256P.COM to select a 256 color driver.

4. Perform steps 4 through 8 of the VersaCAD/286 driver installation procedures listed above. If you are changing from a 16 color diver to a 256 color driver, or visa versa, reference the note on the previous page.

5.3.6. P-CAD

To install the extended display drivers for P-CAD you will need Driver & Utility Disk #1 and P-CAD version 4.01 later.

1. You will need to copy the display drivers from the A:\PCADdirectory on Driver & Utility Disk #1 to the DRV subdirectory on your hard disk where you installed P-CAD (i.e. C:\PCAD\DRV). From drive A, type:

```
COPY A:\PCAD\T800.DRV C:\PCAD\DRV   <Enter>
COPY A:\PCAD\T1024.DRV C:\PCAD\DRV   <Enter>
```

T800.DRV denotes an 800x600-16 color driver. T1024.DRV denotes a 1024x768-16 color driver.

2. Modify the PCADDRV.SYS File as follows:

   a. Use your test editor to change the line:

      display\pcad\drv\dibmvga.drv

   to :

      display\pcad\drv\(new driver name, i.e. t800.drv)

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

```
TYPE PCADDRV.SYS        <Enter>
```

With a pen or pencil, carefully copy the contents of your PCADDRV.SYS file, and then type the line:

```
COPY CON PCADDRV.SYS        <Enter>
```

Enter the contents of your PCADDRV.SYS exactly as you copied them down, with the exception of the line:

display\pcad\drv\dibmvga.drv

For this liner, enter:

display \pcad\drv\(new driver name, i.e. t800.drv)

Press <Ctr> - <Z> to save your changes and exit the file.

5.3.7. Lotus 1-2-3

To install the new extended display drivers for Lotus 1-2-3, you will need Driver & Utility Disk #2 and Lotus 1-2-3 Release 2.x.

1. You will need to copy the display drivers from Driver & Utility Disk #2 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.

Choose one of the graphics drivers.

For a system with two floppy drives and <u>no hard drive:</u>

To cope the files to your Lotus 1-2-3 diskette, put Driver& Utility Disk #2 in Drive A. From drive A, type:

```
SET123 A:\LOTUS        <Enter>
```

For a system <u>with a hard drive</u> and a floppy drive:

To cope the files to your\LOTUS directory on your hard diskdrive, insert Driver & Utility Disk #2 into Drive A. From drive A, type:

```
SET123 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 Install menu.

6. Select Modify current driver set from the menu.

7. Select either text or graphics display. For the text mode,choose one of the following command lines to indicate the number of rows for your display:

TVGA 132x25 Verson x.x	TVGA80x30 Version x.x
TVGA 132x30 Verson x.x	TVGA80x43 Version x.x
TVGA 132x43 Verson x.x	TVGA80x60 Version x.x
TVGA 132x60 Verson x.x	

(Example: enter TVGA 132x25 Verson 1.0 for 132-colume 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 640x480 for Release 2.x

8. Return to the Lotus 1-2-3 Main menu and choose Save change to record the changes you have made, then exit the Lotus1-2-3 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 through 10, then run Lotus 1-2-3 as usual.

5.3.8. Symphony

To install the new extended display drivers for Symphony,you'll need Driver & Utility Disk #2 and Symphony Release 2.

1. You will need to copy the new display drivers from Driver Utility Disk #2 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 Driver & Utility Disk #2 into drive A. From drive A, type:

SETSYMPH 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 lines to indicate the number of rows for your display:

TVGA 132x25 Version x.x	TVGA80x30 Version x.x
TVGA 132x30 Version x.x	TVGA80x43 Version x.x
TVGA 132x43 Version x.x	TVGA80x60 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 row: 25,30,43, or 60).

For graphics mode, select the following command line:

TVGA 640x480 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 Symophony. If you need to recon-figure for a different resolution, (i.e. 132x25 to 132x30 in text mode), just follow Steps 2 through 8, then run Symphony as usual.

5.3.9. Framework II and III

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

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

```
SETUP        <Enter> ; for Framework II, or
SETUP        <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 FWSETUP file from the choices outlined on the screen.

4. Select the configuration option.

5. At 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 4a and 4b list the available driver names:

Table 4a Framework II Drivers.

DRIVE NAME	ZOOM SCREEN FORMAT	SCREEN FORMAT
FW250.SC	640H x 480V	132C x 25R text
FW300.SC	640H x 480V	132C x 30R text
FW430.SC	640H x 480V	132C x 43R text
FW600.SC	640H x 480V	132C x 60R text
FW251.SC	800H x 600V	132C x 25R text
FW301.SC	800H x 600V	132C x 30R text
FW431.SC	800H x 600V	132C x 43R text
FW601.SC	800H x 600V	132C x 60R text
FWG1.SC	640H x 480V	640H x 480V graphics
FWG2.SC	800H x 600V	800H x 600V graphics

Table 4b Framework III Drivers

DRIVE NAME	ZOOM SCREEN FORMAT	SCREEN FORMAT
FW380x30.SC	800H x 600V	80C x 30R text
FW380x43.SC	800H x 600V	80C x 43R text
FW380x60.SC	800H x 600V	80C x 60R text
F3132x25.SC	800H x 600V	132C x 25R text
F3132x30.SC	800H x 600V	132C x 30R text
F3132x43.SC	800H x 600V	132C x 43R text
F3132x60.SC	800H x 600V	132C x 60R text
F3G12.SC	800H x 600V	800H x 600V graphics[1]
F3G14.SC	800H x 600V	800H x 600V graphics[2]
F3G16.SC	800H x 600V	800H x 600V graphics[3]

[1]12 scan lines.   [2]14 scan lines.   [3]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, insert Driver & Utility Disk #1, since your new driv-ers are located on the Driver & Utility Disk. Press the space bar when the Driver & Utility Disk #1 is in the floppy drive.

10. The SETUP program will ask you where you want to store the FWSETUP configuration file. Choose Option 1 if you are running Framework from your floppy drive, or 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 for 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.

5.3.10 GEM DESKTOP

To install extended-display drivers for GEM, you will need GEM Desktop release 3.x and Driver & Utility Disk #2. Before you can install the extended-display drivers for the graphics adapter, make sure you have already installed GEM on your hard disk drive.

GEM 3.x

1. Insert your original GEM System Master Diskette in drive A, 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 Driver & Utility Disk #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 into on the GEMSETUP program.

5.3.11 Ventura Publisher

To install extended-display drivers for Xerox Ventura Publisher, you should have Ventura Publisher release 2.0 already installed on your hard disk drive. You will also need Driver & Utility Disk #2.

1. Insert Driver & Utility Disk #2 into drive A and type:

VPDRV2_0   < 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.

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

6. 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.

5.3.12. WordStar Release 3

To configure WordStar Release 3 for extended display, you will need Driver & Utility Disk #1 and WordStar Release 3.

1. Copy the file called DEBUG.COM or DEBUG.EXE from your DOS system disk to the WS Release 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 Word-Star directory on your hard drive, and give the new file the name WS132.COM. Either insert your WordStar diskette into Drive A, or enter your WordStar disk-ette into Drive A, or enter your WordStar directory on your hard disk drive and type:

COPY WS.COM WS132.COM   < Enter >

3. Insert Driver & Utility Disk #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:\WS\MAKE.BAT C:\WS        < Enter >
COPY A:\WS\25 C:\WS              < Enter >
COPY A:\WS\30 C:\WS              < Enter >
COPY A:\WS\43 C:\WS              < Enter >
COPY A:\WS\60 C:\WS              < Enter >
```

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

MAKE "driver file name (i.e. 25)" WS132COM   < Enter >

5. Run SVM89.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:

1. Type SVM89 and select the display mode, or select the mode directly by typing the appropriate SVM89 command line. (See Section 5.2)

2. Type WS132 to run WordStar.

3. When you exit WordStar, type SVM89 VGA to return to the standard VGA display mode.

5.3.13. WordStar Release 4 or 5

To configure WordStar Release 4 or 5 for extended text display, you will need Driver & Utility Disk #1 and WordStar Release 4 or 5.

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:

WS132.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 desired value for the screen format (i.e. 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 SVM89.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 80x25 text display mode by typing: SVM89 VGA. When using WordStar in an extended text mode, follow these steps:

1. Run SVM89.EXE to set the mode (See Section 5.2).

2. Type WS132 to start WordStar.

3. Return to standard VGA display mode when done, by typing:

   SVM89 VGA   < Enter >

You will not need to repeat this installation procedure unless you want to configure WordStar for a different display mode.

5.3.14 WordPerfect

To configure WordPerfect for extended display, you will need Driver & Utility Disk #1 and WordPerfect for a different display mode.

WordPerfect 4.2

To install extended <u>text mode</u> drivers

1. Enter the WordPerfect Setup menu. To do this, go to the directory where you have stored WordPerfect (or insert the WordPerect program diskette into drive A if you are using a floppy system). Type:

   WP/S   < Enter >

2. Select option 3, Set Screen and Beep options.

3. Enter the values for column and row to match a column/row value available in SVM89.EXE.

4. Choose option 0 to accept the new configuration and enter WordPerfect.

5. Run the SVM89.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).

WordPerfect 5.0

To install extended <u>text mode</u> drivers

1. Run the SVM89.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, enter WordPerfect from the directory containing the WordPerfect program (i.e., C:\WP). Type:

   WP   < Enter >

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

Adjusting font size

a. Enter the WordPerfect program by typing:

   WP   < Enter >

b. Press < shift > - < F8 > to select the Format Menu.

c. Press "3" to 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 Inital Font selection you have made will be saved with your document.

Note: Remember, when exiting from WordPerfect, type the command line SVM89 VGA < Enter > to return to standard 80 x 25 VGA text display.

Changing paper size

a. Enter the WordPerfect program by typing:

   WP   < Enter >

b. Press < shift > - < F1 > to bring up the Setup menu. Select Initial Settings. Then select Initial Code.

c. Press <Shift> - <F8> to bring up the Format Menu. Select Page Format. Then select Paper size.

d. Configure the paper size to 14" x 11". Press "0" to select Other and then enter the paper size.

e. Return to the Word processing mode. Once you have adjusted the page size, you need not repeat this procedure unless you will need to adjust the font size to use 132-column mode.

NOTE: Not all printers will support 14" x 11" paper size (e.g., HP LaserJet). If your will not support this paper size, you will need to adjust the font size to use 132-column mode.

To install extended __graphics mode__ drivers

1. Insert Driver & Utility Disk #1 in Drive A.

2. COPY the extended drivers from Utility Diskette #1 to your WordPerfect directory (e.g. C:\WP50) by typing:

    COPY A:\WP5\T*.WPD C:\WP50   <Enter>

3. Enter the WordPerfect program by typing:

    WP   <Enter>

4. Press <Shift> - <F1> to bring up the Setup Menu. Press "3" to select Display and then "5" to select Graphics Screen Type.

5. Choose one of the extended graphics drivers. The available drivers are 800x600-16 colors, and 768x1024-16 colors.

WordPerfect 5.1

To install the __text mode__ drivers

1. Insert Driver & Utility Disk #1 in drive A.

2. Copy the extended text driver from Driver & Utility Disk #1 to your WordPerfect directory (e.g. c:\WP51) by typing:

    COPY A:\WP51\TVGATEXT.VRS C:\WP51   <Enter>

3. Enter the WordPerfect program by tying:

    WP   <Enter>

4. Press <Shift> - <F1> to bring up the Setup Menu. Press "2" to select Display and then "3" to select Text Screen Type.

5. Choose one of the extended text drivers. The available drivers are 80x30, 80x43, 80x60, 132x30, 132x43, 132x60.

To install extended __graphics mode__ drivers

1. Insert Driver & Utility Disk #1 in Drive A.

2. Copy the extended drivers from Driver & Utility Disk #1 to your WordPerfect directory (e.g. c:\WP51) by typing:

    COPY A:\WP51\TVGA16.VRS C:\WP51   <Enter>

3. Enter the WordPerfect program by typing:

    WP   <Enter>

4. Press <Shift> - <F1> to bring up the Setup Menu. Press "2" to select display and then "2" to select Text Screen Type.

5. Choose one of the extended text drivers. The available drivers are 800x600-16 colors, 1024x768-16 colors, and 768x1024-16 colors.

5.3.15 Microsoft Word 5.0

To install the new extended display drivers for Microsoft Word 5.0, you will need Driver & Utility Disk #1 and Word 5.0.

1. Copy the new display drivers from Driver & Utility Disk #1 to the directory on your hard drive where you have installed MS word.

To copy the file to your\WORD50 directory on your hard disk drive, insert Driver & Utility Disk #2 into drive A. From drive A, type:

COPY A:\WORD\SCREEN.VID C:\WORD50

2. Enter the MS Word program by typing:

WORD

3. Press <Esc> to enter a command. Press "O" to enter an Option Command.

4. Select Display Mode, then press <F1> to list the display modes available. Choose one of the following lines to indicate the number of rows for your display:

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

[1]Lines 5 through 8 are 132 column modes. Mouse support is available for 132 column modes.

5.3.16 MS Windows 386 (Optional)

To install high-resolution drivers for MS Windows 386, you will need the Driver & Utility Disk #3 (optional) and MS Windows 386.

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 prompted to choose the display adapter, select the option "Other" to use the supplied driver for TVGA, and insert Driver & Utility Disk #3 in drive A.

3. Select one of the high-resolution graphics modes listed.

4. Select Medium System Font(VGA).

5. Continue with the rest of the MS Windows' SETUP program. You have completed the MS Windows high-resolution driver installation. If you will need to repeat the above installation procedure.

5.3.17 Microsoft Windows 3.0

To install high-resolution drivers for Microsoft Windows 3.0, you will need Driver & Utility Disk #2 and Microsoft Windows 3.0.

1. First install MS Windows 3.0 using the standard IBM VGA driver.

2. Make sure Windows 3.0 is working properly.

3. Change to Windows 3.0 directory (e.g. C:\win30), run SETUP.EXE.

4. Insert Driver & Utility Disk #2, change display driver to "Other...". Select path as A:\WIN30.

5. Select a suitable driver.

6. Follow instructions to finish SETUP.

5.3.18 OS/2 Presentation Manager

To install the extended display drivers for OS/2 Presentation Manager, you will need Driver & Utility Disk #2 and Presentation Manager 1.2x or 1.3.

1. Install Presentation Manager for a standard IBM VGA card and verify Presentation Manager runs correctly.

2. Enter OS/2s installation subdirectory (the default name is C:\OS2\INSTALL).

3. Type DDINSTAL to execute device driver installation. The program will ask you to insert your extended driver diskette in drive A (in this case, Driver & Utility Disk #2). It will then copy the Presentation Manager Driver from your drive A

root directory. To complete the driver installation, you may be asked to insert the OS/2 Installation Diskette into drive A.

4. Reboot your system. Remember to leave the OS/2 Installation Diskette in drive A unit prompted to remove the diskette.

5.3.19. Quattro Pro

To install the new extended display drivers for Quattro Pro, you will need Driver & Utility Disk #1 and Quattro Pro 2.x.

1. Copy the new display drivers from Driver & Utility Disk #1 to the directory on your hard drive where your have installed Quattro Pro.

To copy the files to your \QPRO directory on your hard disk drive, insert Driver & Utility Disk #2 into drive A. From drive A, type:

COPY A:\QPRO\VIDEO.RSC C:\QPRO   < Enter >

2. Enter the Quattro Pro program by typing: Q

3. Press "/O" to select the Option menu and "D" to select Display mode.

4. Choose Trident VGA and select an extended text mode.

5.3.20 VESA BIOS Extension

To install the VESA Extension you will need Driver & Utility Disk #1.

1. Copy the VESA BIOS to your hard disk drive. Insert Driver & Utility Disk #1 into Drive A and type:

COPY A:\TVGAUTIL\VESA.EXE C:\   < Enter >

2. To run the BIOS extension just type VESA.EXE from the root directory on your hard drive. The program will stay resident unit you reboot the system.

3. You may now configure your VESA supported applications (e.g. Generic CAD 5.0, Generic CAD Level III, Cadkey 4.0, Deluxe Paint II Enhanced, etc) for a VESA Driver.

5.4 TVGA RAM BIOS and the TANSI (ANSI) Driver

5.4.1. How to Install RAM BIOS in CONFIG.SYS

1. Insert Driver & Utility Disk #1 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 >

3. Using your line editor, insert the following line as the first line of your CONFIG.SYS File:

DEVICE = TVGABIO.SYS.   < Enter >

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 content of your CONFIG.SYS file, and then Type the line:

Copy CON CONFIG.SYS   < Enter >

Then type 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.

4. Reboot your system to activate TVGA RAM BIOS.

5.4.2. How to Install Ram BIOS in AUTOEXEC.BAT

1. Insert Driver & Utility Disk #1 into your floppy disk (drive A).

2. Type the following line to copy the TVGABIO.COM file onto your hard disk drive:

COPY A:TVGAUTIL\TVGABIO.EXE C: <Enter>

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

TVGABIO   <Enter>

If you do not have a text editor, type the following line to view your AUTOEXE.BAT 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   <Enter>

Then press <Ctrl> - <Z> to save your changes and exit the file.

4. Reboot your system to activate TVGA RAM BIOS.

5.4.3. How to Install TANSI.SYS

1. Insert Driver & Utility Disk #1 into your floppy disk drive (driveA).

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 text editor, insert the following line to view your CONFIG.SYS

DEVICE = TANSI.SYS   <Enter>

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 files 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 line DEVICE = TANSI.SYS.

Press <Ctrl> - <Z> to save your changes and exit the file.

4. Reboot your system to activate TANSI.SYS.

6. Appendix

6.1. Pinout and Sync Frequencies

6.1.1. Analog Color Display Pinouts

Table-5 shows the VGA Graphics Adapter analog color display pinouts.

Table-5 Analog Color Display Pinouts

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

[1] Analog monochrome-type monitors use green video for all video input and ignore red video and blue video.

[2] Monochrome monitors connect Pin 12 to ground. Color monitor leave Pin 12 open. The adapter uses Pin 12 to detect the monitor type.

6.1.2. Conversion Table: 9-to-15 pin

If you will be using a 9-to-15 pin adapter cable to link your 9-pin monitor connector to the 15-pin connector, check Table-6 carefully before you install the cable. 9-to-15 pin adapter cables are availible from a variety of sources, but they need to match the specifications in Table-6 in order to work properly with your new adapter.

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

Table-6 9-to-15 Pin Conversion Table

9-PIN CONNECTOR SIGNAL	PIN	15 PIN CONNECTOR SIGNAL	PIN
Red	1	Red	1
Green	2	Green	2
Blue	3	Blue	3
Horz Sync	4	Horz Sync	13
Vert Sync	5	Vert Sync	14
Red Ground	6	Return Red	6
Green Ground	7	Return Green	7
Blue Ground	8	Return Blue	8
Sync Ground	9	Digital Ground	10
		Ground	5

6.1.3. Video Signals

Analog:

Black Level = 0V

Full Intensity Level = +0.7V

6.1.4. Sync and Polarity Specifications

Table-7 lists the horizontal sync, vertical sync, and polarity for all available VGA modes. If you are not sure if your monitor will support a particular mode, check your monitor's specification for horizontal sync, vertical sync, and polarity against these tables.

Table-7   Sync and Polarity Specifications

MODE (h)	CLOCK (MHz)	HORZ. SYNC (KHz)	VERT SYNC (Hz)	POLARITY (H,V)
0,1	25.175	31.4	70	+, -
2,3	25.175	31.4	70	+, -
0[1],1[1]	25.175	31.4	70	-, +
2[1],3[1]	25.175	31.4	70	-, +
0[2],1[2]	28.322	31.5	70	+, -
2[2],3[2]	28.322	31.5	70	+, -
4,5	25.175	31.4	70	+, -
6	25.175	31.4	70	+, -
7	28.322	31.5	70	+, +
7 +	28.322	31.5	70	+, +
D	25.175	31.4	70	+, -
E	25.175	31.4	70	+, -
F	25.175	31.4	70	-, +
10	25.175	31.4	70	-, +
11	25.175	31.4	60	-, -
12	25.175	31.4	60	-, -
13	25.175	31.4	70	+, -
50	25.175	31.5	60	-, -
51	25.175	31.5	60	-, -
52	25.175	31.5	60	-, -
53	40.000	31.2	70	-, +
54	40.000	31.2	60	-, -
55	40.000	31.2	60	-, -
56	40.000	31.2	60	-, -
57	44.900	31.2	70	-, +
58	44.900	31.2	60	-, -
59	44.900	31.2	60	-, -
5A	44.900	31.2	60	-, -
5B[8]	36.000	35.2	56	-, -
5B[3,9,10]	50.350	48.0	72	+, +
5C[3]	50.350	31.5	70	-, +
5C[4]	25.175	31.5	70	-, +
5D[3]	50.350	31.5	60	-, -
5D[4]	25.175	31.5	60	-, -
5E[5,7]	57.272	29.5	90	+, +
5E[6,7,9]	72.000	35.2	56	+, +
5E[4,8]	36.000	35.2	56	-, -
5E[4,6,9]	40.350	48.0	72	+, +
5F[4,5,8,12]	44.900	35.5	86	+, +
5F[4,6,9,10,12]	65.000	48.7	60	+, +
5F[4,6,9,13,14]	75.000	56.4	70	+, +
60[5]	44.900	35.5	86	+, +
61[11]	44.900	37.9	70	+, +
62[4,5,8,12]	44.900	35.5	86	+, +
62[4,6,9,10,12]	65.000	48.7	60	+, +
62[4,6,9,13,14]	75.000	56.4	70	+, +

Table Notes

[1] EGA text modes with 8x14 and 9x14 character sizes and 350 lines.

[2] VGA text modes with 9x16 character size and 400 lines vertical resolution.

[3] Supported by 4 and 8 DRAM configurations only.

[4] Supported by 8 DRAM configuration only.

[5] Interlaced mode.

[6] Non-interlaced mode.

[7] Supported by 4 DRAM configuration only.

[8] Jumper SW3 connected.

[9] Jumper SW3 open.

[10] High refresh monitor required with horizontal frequency greater than 48KHz.

[11] Portrait monitor.

[12] Jumper SW4 connected.

[13] Jumper SW4 open.

[14] High refresh monitor required with horizontal frequency greater than 56KHz.

6.2. 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 Driver & Utility Diskette to check the ROM BIOS version of your computer before you install the 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 Driver & Utility Disk #1 into your floppy disk drive.

3. Go to directory A:\TVGAUTIL, type:

BIC   <Enter>

The BIC.EXE program will display the following information:

The system BIOS date is:

XX/XX/XX

The Video BIOS date is:

The Video BIOS information:

Date: XX/XX/XX

Version: XX/XX/XX

OEM Code: X

If your ROM BIOS show a date earlier than October 27, 1982, you will need to replace your system ROM BIOS to work with the adapter. Earlier versions of the ROM BIOS for computers manufactured in 1981 or 1982 do not support EGA or VGA graphics modes.

6.3. DRAM Upgrades

The VGA adapter can be configured with two, four or eight pieces of 256Kx4 (100 nanosecond) Fast Page Mode DRAM. We recommend to use 100 nanosecond DRAM in Table-8.

Table-8 DRAM list

MANUFACTURES	PART NUMBER
TI	TMS44C256-10
TOSHIBA	TC514256AP-10
MITSUBISHI	M5M44256BP-10
SAMSUNG	KM44C256AP-10
MOTOROLA	MCM514256AP-10
HYUHDAI	51C4256S-10
MICRON	MT4C4256-10

Upgrading from two to four DRAM allows you to display up to 1024x768-16colors. Upgrading from four to eight DRAM allows you to display up to 1024x768-256 colors. It also speeds performance a bit. To purchase DRAM, contant your dealer, a local electronics store, or a mail order house (which advertise in publications such as Computer Shopper, PC Magazine, PC World, and BYTE). Order 256Kx4 Fast Page Mode DRAM (sometimes called one megabit DRAM). DRAM speed should be 100 nanoseconds.

Upgrading From 256K DRAM to 512K or 1MB

1. Place the adapter component side up on a firm, flat, non-static surface (avoid wool materials). The gold edge connector should be facing you.

2. Insert the DRAM (two pieces if upgrading to 512K and 6 pieces if upgrading to 1MB) into the sockets provided on the lower left-hand corner of the board. DRAM should be added in columns from right to left. The notched side of the DRAM should be facing down. Be sure each DRAM is seated snugly.

3. To check that the DRAM has been installed properly, place the board in your system and turn the system ON. A copyright and the amount of video DRAM

detected will appear in the upper left-hand corner of the initial boot screen. If the amount of DRAM detected is 256K, remove the adapter from your system. Check to see that all pins fit snugly into their respective socket holdes (i.e., no pins bent underneath the DRAM chip or sticking out). Be sure the notches for each DRAM are facing the same way (down).

6.4. FCC Compliance Statement

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 instructions, it 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 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 ODD and ON, the user is encouraged to try to correct the interference by once 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 brand circuits.
- Ensure that card slot covers are installed in all unused computer slots.

6.5. SUPPLEMENT

All the TVGA Utility programs are compressed into a TVGA.EXE file in the diskette. When you decompress this file, please follow the next steps:

1. Insert the diskette into your 1.2MB floppy drive.

2. Run INSTALL.BAT from the diskette.

3MB Hard Disk free space is needed to decompress the TVGA.EXE file.

After decompression, TVGA1 and TVGA2 sub-directories are created automatically in the Hard Disk:

    C:\TVGA1: It contain TVGA Utility Programs Disk One.

    C:\TVGA2: It contain TVGA Utility Programs Disk Two.

If you would like to keep the Utility Programs in Diskettes, you can use XCOPY to copy the directories into two diskettes:

1. Insert a 5.25" 1.2MB diskette as TVGA Utility Programs Disk 1.

2. Copy Utility Programs Disk One files under A: prompt by typing

    XCOPY C:\TVGA1 /S /V

3. Label this diskette as TVGA Utility Programs Disk 1.

4. Insert another 5.25" 1.2MB diskette in your Floppy Drive.

5. Copy utility Programs Disk Two files under A: prompt by typing

    XCOPY C:\TVGA2 /S /V

6. Label this diskette as TVGA Utility Programs Disk 2.