

VGA

VGA 1024

Graphics Display Adapter

MULTI-COLOR

MULTI-SHADE



Enhanced Video Adapter

Qtec
VGA 1024

Installation Manual
Version 1.00

04/20/89

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QUICK INSTALLATION GUIDE

Analog Operation

If an analog monitor (eg. IBM VGA or NEC Multisync monitor) is connected to the Qtec VGA1024 board through 15 analog connector, Please do the followings:

- a. Set all 4 switches of the dip-switch to OFF position (OFF OFF OFF OFF). This should have been pre-set from the factory.
- b. Set Jumper 1 (JP1) to connect the two lower pins and Jumper 2 (JP2) to connect the top 2 pins. This should have been pre-set from the factory.
- c. Switch off your PC and plug the Qtec VGA1024 board into any of your 8-bit or 16-bit slot.

This is all you need to do to run any VGA software.

Digital Operation

When only the digital monitor is used with the Qtec VGA1024 board (the 15-pin analog connector is not connected), please consult dip-switch and jumper settings section of this manual.

Remark:

1. Analog sensing

When your PC power is turned-on, your Qtec VGA1024 board will sense if its 15-pin analog connector is active (connected). If yes, the Qtec VGA1024 board will set itself to VGA mode regardless of its dip-switch setting.

To run 800x600 and 1024x768, please make sure that all 4 switches of the dip-switch is set to OFF position.

2. Software Mode Switching

For software mode switching, please use DMODE utility program to switch modes (VGA, EGA, CGA, MDA or Hercules). Please note that the adapter's current mode will not be re-set by warm-booting (Ctrl-Alt-Del) the PC. This is a planned function for users' convenience. To switch modes, please use DMODE utility or turn-off the PC.

INSTALLATION

INTRODUCTION

Congratulations on the purchase of your Enhanced Video Adapter, the Qtec VGA1024 board! We would like to take a moment to familiarize you with some of your new board's special features.

1. *Software Compatibility*

The Qtec VGA1024 board is based on Tseng Labs' ET3000 VGA chip which provides you register-level compatibility with the IBM VGA, EGA, CGA, MDA and Hercules standards to protect your software investment.

2. *Monitor Compatibility*

The Qtec VGA1024 board is compatible with the IBM 85XX analog VGA monitor, Multifrequency monitors, EGA, CGA and MDA monitors.

3. *VGA-Sync, One-Adapter-One-Monitor Solution*

The Qtec VGA1024 boards provides more than Hercules, CGA, EGA and MDA register-level compatibility. The VGA-Sync converts various video frequencies of the pre-VGA standards to VGA frequency without involving BIOS, interrupt or any software. VGA-Sync is the first and perhaps the only solution for running all pre-VGA software standards on a 31.5KHz VGA monitor.

Please see Software Mode Switching section for details.

4. *Extended Graphics Modes*

The Qtec VGA1024 provides the following graphics mode which are not available from the IBM VGA:

640x480, 256 colors out of 256K colors
800x600, 16/256 colors out of 256K colors
1024x768, 16 colors out of 256K colors (interlaced)
1024x768, 16 colors out of 256K colors (non-interlaced)

5. *Hardware Window, Hardware Zoom & Smooth Panning*

Qtec VGA1024 provides realtime (instant) hardware window, hardware zoom and pan features which are previously only available on an expensive high-end graphics hardware. Hardware zoom is significantly faster than software zoom and is required for efficient graphics editing. Extensive software support including sample source code is available.

6. *132-column Text Display*

Qtec VGA1024 provides 132-column x 25/28/44 lines text display for Lotus 1-2-3, Lotus Symphony, Word Perfect, etc. on variable-frequency monitors and IBM 5154 or functional equivalent monitors which is not available from the IBM VGA. 132-column modes are not supported on the IBM 85xx analog monitors.

Qtec VGA1024's 132-column feature also lets your microcomputer using popular emulator products to emulate the display characteristics of widely used terminals such as the DEC VT100 and the IBM 3278, which require 132 columns of text.

7. *Multiple soft fonts*

The Font Loader and Font Editor software included in your Qtec VGA1024 Utility Diskette let you design and use custom character fonts ideal for scientific and foreign language applications.

We built the Qtec VGA1024 board for the future with powerful features. Software developers are working to integrate these features into their products to make your Qtec VGA1024 board more valuable. The Qtec VGA1024 represents the latest in state-of-the-art video display adapter.

Thank you for choosing Qtec VGA1024 board.

Now let's get your Qtec VGA1024 board installed.

INSTALLATION REQUIREMENTS

IBM Personal Computer

IBM Personal Computers manufactured prior to April 1983 must have a new ROM module installed on the system board before you install the Qtec VGA1024.

If you are not certain which ROM module is installed on your system board, run the following BASIC program.

The program displays the date code of the ROM module installed on your system board. Enter the program exactly as shown. If the date displayed is earlier than 10/27/82, a new ROM module is required. The ROM is contained in the BIOS Upgrade Kit available from your IBM dealer. The IBM part number is 1501005.

```
10 DEF SEG=&HF000
20 FOR A=&HFFF5 TO &HFFFF
30 PRINT CHR$(PEEK(A));
40 NEXT
RUN
```

Additional information on BASIC programs is available in your BASIC manual.

IBM Personal Computer XT, XT 286, AT, and PS/2 Model 30

The Qtec VGA1024 board is compatible for use in these systems.

Compatible Personal Computers

Check with the dealer or manufacturer of your computer. The Qtec VGA1024 board is compatible with the IBM VGA Adapter, IBM Enhanced Graphics Adapter (EGA), IBM Color Graphics Adapter (CGA) and Hercules standards. Most compatible systems support these standards. If your computer supports one of these standards, then the Qtec VGA1024 board will work in your system.

Tools Required

Medium-size, flat-blade screwdriver

Optional:

Medium screwstarter

3/16-inch nutdriver

1/4-inch nutdriver

Inventory checklist

Check your Qtec VGA1024 carton to ensure that it contains the following items:

1. The Qtec VGA1024 board
2. The Qtec VGA1024 Utility & Driver Diskette
3. The Qtec VGA1024 Demo Diskette
4. The Qtec VGA1024 User's Manual

Consult your dealer if either item is missing.

QTEC VGA1024 INSTALLATION INSTRUCTION

IMPORTANT

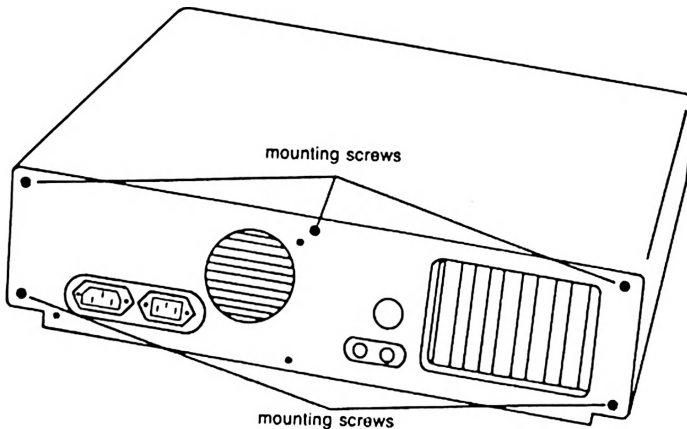
If necessary, consult the user manuals for your computer and any other devices you may have attached to it as you perform the following steps.

1. Power OFF any devices (printer, display, modem, etc.) you may have attached to your computer.
2. Power OFF your computer system.

BEFORE YOU DO THE NEXT STEP

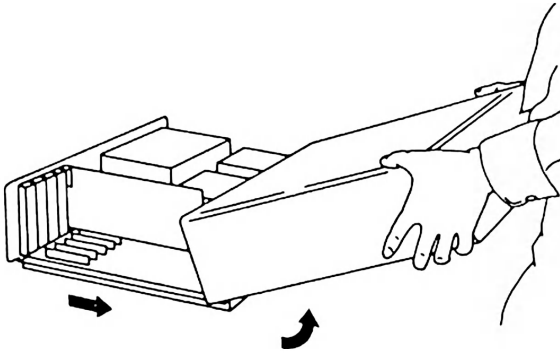
If you are not sure you'll remember which cables go in which connectors, label the cables and connectors before disconnecting them.

3. Disconnect all cables from the rear of your computer.
4. Turn your computer so that its back is facing you.
5. Using the flat-blade screwdriver or 1/4-inch nutdriver, remove the five cover mounting screws. Save the screws for reinstallation of the cover.



6. Now turn the computer so that its front is facing you.

7. Carefully slide the computer cover towards you. When the cover will not go any further, tilt it upward and gently lift it away from the computer.



8. Look at the Qtec VGA1024 board and locate the switch block.
9. To set the switches on your Qtec VGA1024 board, refer to the Guide to Switch Settings on the following pages.

You need to set the switches to indicate:

- * The type of display monitor attached to your Qtec VGA1024 board.
- * The mode of operation desired on system power-up (i.e., VGA, EGA, CGA, MDA).
- * Which display the computer should use, if more than one display is attached, when the power is turned on.

The Qtec VGA1024 provides two video connectors, the 15-pin (DB15) analog connector and 9-pin (DB9) TTL (digital) connector. The 15-pin (DB15) connector is for interfacing Qtec VGA1024 with analog monitors such as IBM PS/2 monitor (IBM 85xx) or variable-frequency monitor (analog mode). The 9-pin (DB9) connector is for interfacing with TTL (digital) monitors only.

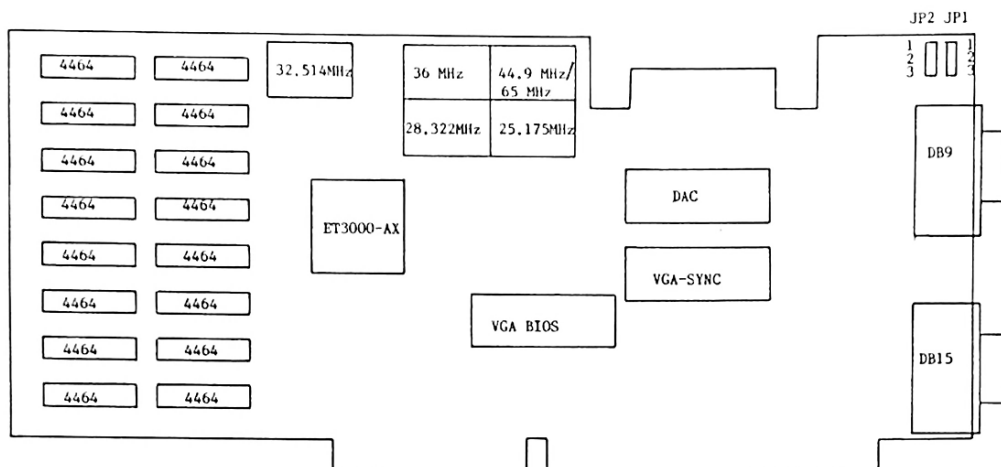
The following chart shows the display monitors that may be attached to the Qtec VGA1024 board and maximum displayable resolution capabilities.

DISPLAY MODEL	MAXIMUM RESOLUTION/COLOR	TYPE
NEC MultiSync XL	1024x768 / 16 colors	Analog, Color
IBM 8514	1024x768 / 16 colors	Analog, Color
Variable frequency (multiSync type)	800x600 / 16/256 colors	Analog, Color
IBM 8513	640x480 / 16/256 colors	Analog, Color
IBM 8512	640x480 / 16/256 colors	Analog, Color
IBM 8503	640x480 / 16/64 shades	Analog, Monochrome
Variable frequenc (multiSync type)	640x480 / 16 colors	TTL, Color
IBM 5154	640x350 / 16 colors	TTL, Color
IBM 5153	640x200 / 16 colors	TTL, Color
IBM 5151	720x348 / 2 colors	TTL, Monochrome

NOTE

1. Compatible analog/TTL variable-frequency monitors include the Mitsubishi Diamond Scan, NEC MultiSync, Sony Multiscan, Thomson Autoscans, and others.
2. Display monitors compatible with the above displays can be used with the Qtec VGA1024 board. Check with your dealer to ensure the compatibility of any particular display. The 1024x768 mode requires an analog monitor such as the NEC MultiSync XL or IBM 8514 display monitor or functional equivalents. Digital (TTL) variable-frequency monitors can display up to 640x480-pixel resolution; fixed-frequency TTL monitors, such as IBM 5154 Enhanced Color Display and compatibles can display up to 640x350-pixel resolution.

CONNECTOR, DIP SWITCH AND JUMPER LOCATOR



Qtec VGA1024 board

JUMPER SETTINGS

Position	JP1	JP2
	Display attached to Qtec	IRQ2 Line Status
1&2	TTL Monochrome operation	IRQ2 Disabled (default)
2&3	Color operation (default)	IRQ2 Enabled

CONNECTOR INFORMATION

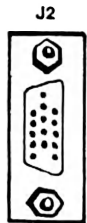
Direct Drive Video Display Connector (DB9-S)		
J1	SIGNAL NAME - DESCRIPTION	PIN
Direct Drive Video Display	Ground	1
	Secondary Red	2
	Primary Red	3
	Primary Green	4
	Primary Blue	5
	Secondary Green/Intensity	6
	Secondary Blue/Mono Video	7
	Horizontal Sync	8
	Vertical Sync	9



IMPORTANT

The Qttec VGA1024 uses the same 15-pin (DB15) cable available from monitor manufacturers to interface with the IBM PS/2 computers. The 9-pin connector on the Qttec VGA1024 is for interfacing TTL (digital) monitors only. If using monitor which can operate in both digital and analog mode, be sure the monitor is switched appropriately for analog or digital operation before connecting to your Qttec VGA1024. Maximum performance is provided by analog variable-frequency monitors.

Direct Drive Video Display Connector (DB15-S)		
J2	SIGNAL NAME - DESCRIPTION	PIN
Direct Drive Video Display	Red	1
	Green	2
	Blue	3
	Monitor ID bit 2	4
	Not used	5
	Ground	6
	Ground	7
	Ground	8
	Not used	9
	Ground	10
	Monitor ID bit 0	11
	Monitor ID bit 1	12
	Horizontal Sync	13
	Vertical Sync	14
	Not used	15



GUIDE TO SWITCH SETTINGS

The following tables will guide you in selecting the right Qtec VGA1024 switch settings for your system configuration. The Hints on Setting the Qtec VGA1024 Switches section will answer common Qtec VGA1024-related questions about your computer's configuration, while the Setting the Qtec VGA1024 Switches section will point you to the correct table for the display adapters you have installed, where you can read off the switch setting for your exact setup. Before you proceed to the Setting the Qtec VGA1024 Switches section, we suggest that you read the following to familiarize yourself with the rules governing the installation boards, you may just want to skip the following, but do look at it. If you have problems or get stuck while installing your Qtec VGA1024 board, come back to this section and reread it carefully - chances are good that the information you need is here.

Hints on Setting the Qtec VGA1024 Switches

HOW MANY QTEC VGA1024 BOARDS CAN I INSTALL IN MY SYSTEM?

No more than one Qtec VGA1024 board is allowed in a system.

WHAT DISPLAY ADAPTERS CAN I INSTALL WITH MY QTEC VGA1024 BOARD?

The Qtec VGA1024 board can be configured for color or monochrome operation. If the Qtec VGA1024 is configured for color operation, it can coexist in the same system with the IBM Monochrome Adapter or functional equivalent. If the Qtec VGA1024 board is configured for monochrome operation, it can coexist in the same system with IBM Color/Graphics Adapter or functional equivalent. Your computer may contain no more than one color board and one monochrome board.

IF I HAVE MORE THAN ONE DISPLAY ADAPTER INSTALLED, HOW DO I KNOW WHICH ONE TEXT WILL COME UP ON WHEN I START MY COMPUTER?

The system configuration tables shown on following pages cover all valid combinations of the Qtec VGA1024 board and other display adapters, and the switch settings required in each configuration.

"Primary Display" refers to the display that is active when the computer is started up, while "Secondary Display" refers to a second display that is installed but is not the primary display. Note that no display actually has to be attached to the secondary adapter; a display must always be attached to the primary display so you can read the screen when you start your computer. Therefore you should set the Qtec VGA1024 switches so that the display you want to use when you start the computer is the Primary Display. Once your computer is started, you can use the DOS MODE command to switch the display from one screen to the other.

WHAT DISPLAYS CAN I USE WITH MY QTEC VGA1024 BOARD?

The Qtec VGA1024 board can actually drive several distinct types of display monitors. The Qtec VGA1024 board can drive an analog variable frequency color display, and the IBM 8512, 8513 and 8514 analog color display (Please note that Qtec VGA1024 does not support 132-column display on the IBM 85XX monitors). It can also drive TTL (digital) monochrome and color displays.

We strongly recommend that you use a variable-frequency color display (MultiSync-type monitor) with your Qtec VGA1024 board. The variable-frequency color displays take full advantage of the Qtec VGA1024 board's advanced feature, allowing a maximum resolution of 1024x768 with 16 colors available from a palette of 256,000 colors and supporting all text modes. You must, of course, set the Qtec VGA1024 board's switches correctly for whatever display you have attached, as shown in the tables on following pages.

SETTING THE QTEC VGA1024 SWITCHES

The Qtec VGA1024 board can be used with either an analog display monitor via 15-pin connector or digital (TTL) monitor via 9-pin connector depending on the device attached, the jumper settings and switch settings. The switch settings on tables A-F are provided for you to set your Qtec VGA1024 to the appropriate configuration for your equipment.

When your PC is turned on, the Qtec VGA1024 checks its analog connector and hardware switch to set its mode. IF Qtec VGA1024 IS CONNECTED TO AN ANALOG MONITOR THROUGH ITS 15-PIN CONNECTOR, IT SELECTS THE VGA MODE REGARDLESS OF ITS HARDWARE SWITCH SETTING (We program Qtec VGA1024 BIOS this way for users' convenience since over 90% of the time Qtec VGA1024 would be used in VGA mode). IF Qtec VGA1024 IS NOT CONNECTED TO AN ANALOG MONITOR THROUGH ITS 15-PIN CONNECTOR, IT THEN READS ITS HARDWARE SWITCH SETTING AND SETS ITS MODE ACCORDINGLY.

TABLE A VGA CONFIGURATION

Qtec VGA1024 as Primary Display Adapter

Use this table if you want VGA mode as an automatic default mode when you power-on your system. In this configuration, Qtec VGA1024 is a primary video adapter attached to an analog monitor via 15-pin video connector (DB15). The Qtec VGA1024 may drive either an IBM 85XX monitor or Variable-frequency monitor (analog mode).

Switch Settings				Type of Display attached and Initial Mode Selection	
SW1	SW2	SW3	SW4	Primary Display (Attached to Qtec VGA1024 board)	Secondary Display (Attached to Monochrome Adapter)
on	off	off	off	IBM 85xx	Monochrome (IBM 5151) or None
off	off	off	off	Multisyncing, variable-frequency analog monitor	Monochrome (IBM 5151) or None

* Multisyncing, Variable-frequency monitors include the NEC MultiSync, Sony Multiscan, Mitsubishi Diamond Scan, Thomson Autoscan, and other compatible devices.

TABLE B EGA CONFIGURATION

Qtec VGA1024 as Primary Display Adapter

Use this table if you want EGA mode as an automatic default mode when you power-on your system. In this configuration, Qtec VGA1024 is a primary video adapter attached to a digital (TTL) display via 9-pin video connector (DB9). The initial display will come up on the screen attached to the Qtec VGA1024 board.

Switch Settings				Type of Display attached and Initial Mode Selection	
SW1	SW2	SW3	SW4	Primary Display (Attached to Qtec VGA1024 board)	Secondary Display (Attached to Monochrome Adpater
on	on	on	off	Enhanced color monitor (IBM 5154 or compatible	Monochrome (IBM 5151) or None
off	on	on	off	Enhanced color or multisyncing displays (IBM 5154/compatible, or multisyncing monitors *)	Monochrome (IBM 5151) or None

- * Multisyncing, Variable-frequency monitors include the NEC MultiSync, Sony Multiscan, Mitsubishi Diamond Scan, IDEK Multiflat and other compatible devices.

IMPORTANT NOTE

If you would like to have an analog monitor connecting to DB15 and EGA/MultiSync monitor connecting to the DB9 at the same time and want register-level EGA compatibility on EGA monitor, please connect the EGA monitor to DB9 first, set switch to EGA configuration, re-set your computer, then connect the analog monitor to DB15. Qtec VGA1024 is initialized (when computer is power-on or re-set) to VGA mode when an analog monitor is attached to the 15-pin connector regardless of its switch setting.

TABLE C
CGA CONFIGURATION

Qtec VGA1024 as Primary Display Adapter

Use this table if you want CGA mode as an automatic default mode when you power-on your system. In this configuration, Qtec VGA1024 is a primary video adapter attached to a digital (TTL) color monitor via 9-pin video connector (DB9). The initial display will come up on the screen attached to the Qtec VGA1024 board.

Switch Settings				Type of Display attached and Initial Mode Selection	
SW1	SW2	SW3	SW4	Primary Display (Attached to Qtec VGA1024 board)	Secondary Display (Attached to Monochrome Adapter)
on	off	off	on	Color 40x25 (IBM 5153)	Monochrome (IBM 5151) or None
off	off	off	on	Color 80x25 (IBM 5153)	Monochrome (IBM 5151) or None

TABLE D
CGA CONFIGURATION

Qtec VGA1024 as Secondary Display Adapter

Use this table if the Qtec VGA1024 board and the IBM Color/Graphics Adapter are BOTH installed in your system and the Qtec VGA1024 board is a secondary video adapter attached to a digital (TTL) monochrome monitor via 9-pin video connector (DB-9). The initial display will come up on the color screen.

Switch Settings				Type of Display attached and Initial Mode Selection	
SW1	SW2	SW3	SW4	Primary Display (Attached to Color Graphics Adapter)	Secondary Display (Attached to Qtec VGA1024)
on	on	off	on	Color 40x25 (IBM 5153)	Monochrome (IBM 5151) or None
off	on	off	on	Color 80x25 (IBM 5153)	Monochrome (IBM 5151) or None

TABLE E
MONOCHROME CONFIGURATION

Qtec VGA1024 as Primary Display Adapter

Use this table if the Qtec VGA1024 board is a primary video adapter configure for monochrome display. Qtec VGA1024 board is attached to a digital (TTL) monochrome monitor via 9-pin video connector (DB9). The initial display will come up on the screen attached to the Qtec VGA1024 board.

Switch Settings				Type of Display attached and Initial Mode Selection	
SW1	SW2	SW3	SW4	Primary Display (Attached to Qtec VGA1024 board)	Secondary Display (Attached to Color Graphics Adapter)
off	off	on	off	Monochrome (IBM 5151)	Color 80x25 (IBM 5153) or None
on	off	on	off	Monochrome (IBM 5151)	Color 40x25 (IBM 5153) or None

TABLE F MONOCHROME CONFIGURATION

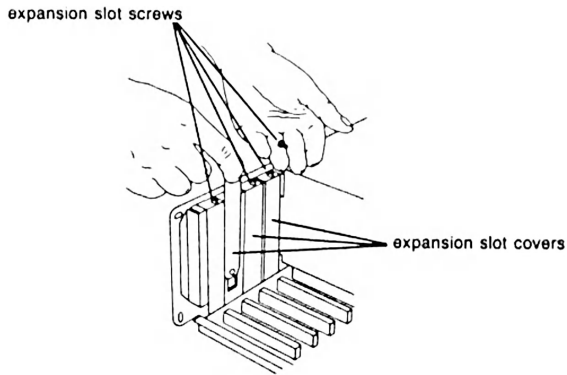
Qtec VGA1024 as Secondary Display Adapter

Use this table if the Qtec VGA1024 board and the IBM Monochrome Display Adapter are BOTH installed in your system and the Qtec VGA1024 board is a secondary video adapter. The Qtec VGA1024 may drive either a digital (TTL) monitor via 9-pin video connector (DB9) or an analog monitor (IBM 85XX monitor or Variable-frequency monitor) via 15-pin video connector (DB15).

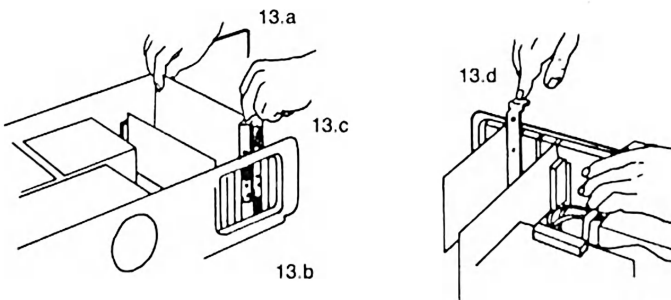
Switch Settings				Type of Display attached and Initial Mode Selection	
SW1	SW2	SW3	SW4	Primary Display (Attached to Monochrome Adapter)	Secondary Display (Attached to Qtec VGA1024)
on	on	on	on	Monochrome (IBM 5151)	Color 40x25 (IBM 5153)
off	on	on	on	Monochrome (IBM 5151)	Color 80x25 (IBM 5153)
on	off	on	on	Monochrome (IBM 5151)	Enhanced color (IBM 5154)
off	off	on	on	Monochrome (IBM 5151)	Enhanced color (IBM 5154) or Multisyncing, Variable-frequency TTL monitors *
on	on	off	off	Monochrome (IBM 5151)	Color 80x25 (IBM 85xx)
off	on	off	off	Monochrome (IBM 5151)	Color 80x25 (Multisyncing, Variable-frequency analog monitors *)

* MultiSync, Variable-frequency monitors include the NEC MultiSync, Sony Multiscan, Mitsubishi Diamond Scan, Thomson Autoscans, IDEK Multiflat and other compatible devices.

10. The Qtec VGA1024 is intended for analog output for maximum performance. If your display monitor is not capable of accepting analog input then it must be interfaced with the TTL 9-pin connector on the Qtec VGA1024. TTL monitors are capable of delivering no more than 640x480 graphics resolution with 16 colors. Please avoid interfacing monitors with the adapter incorrectly.
11. Your Qtec VGA1024 board can go into any unused slot on the motherboard. Choose the slot you want to hold the Qtec VGA1024 board.
12. Remove the screw which holds the chosen expansion slot rear panel cover. Remove the cover and set the screw and cover aside.



13. At this point, you are ready to install your Qtec VGA1024 board into the system. The Qtec VGA1024 board may be installed in any empty expansion slot on the IBM motherboard. Refer to the following picture as you do steps 13.a through 13.d.



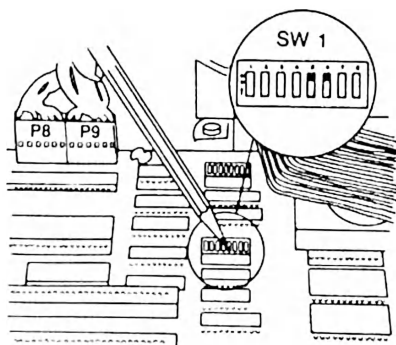
- a. Hold the Qtec VGA1024 board by its top corners and slide it into your computer.
 - b. Firmly press the Qtec VGA1024 board expansion slot connector into the expansion slot you've chosen, making sure the board edge connector is seated in the slot.
 - c. Line up the hole on the top of the retaining bracket on the board with the threaded hole on the lip of the computer rear panel.
 - d. Insert the screw that was removed with the expansion slot rear panel cover (reverse of Step 12), and tighten it firmly.
14. Refer to the following figure to locate switch block 1 on the IBM motherboard. Switch block 1 is the set closest to the expansion slots; it is marked as SW1.

NOTE

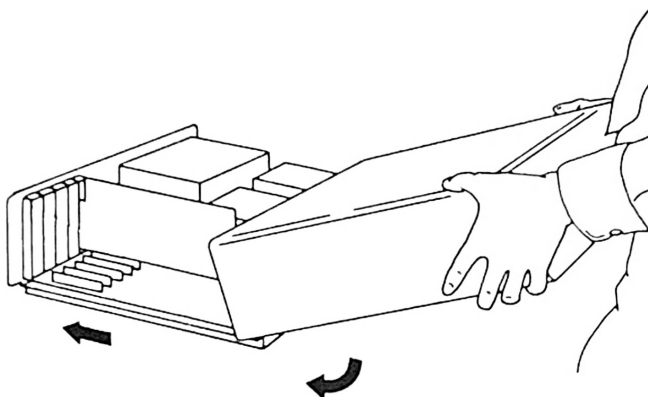
The switch settings and descriptions which follow are correct for the IBM Personal Computer. If you have a compatible computer system, the motherboard switch configuration may not be the same. If so, consult the documentation provided with your system. After setting the switches or jumper(s) as required continue with step 17.

NOTE

If you have an IBM PC/AT continue with step 17. the IBM PC/AT does not require setting switches.



15. Now, identify levers 5 and 6 on switch block 1. Identify them by the numbers imprinted along one edge of the switch.
16. Using the tip of a ballpoint pen or similar object, set levers 5 and 6 on switch block 1 to the ON position. The ON and OFF positions are usually marked along the side of the switch.
17. Hold the computer cover as shown in the figure below, with its front facing you, tilting down in the back. Slip the upper rear edge of the cover over the top of the computer front panel.



18. Lower the cover and carefully slide it back over the computer. Be sure that the lips along the bottom of the cover slide along the rails on each side of the computer chassis.
19. Install the five mounting screws (reverse of Step 5) that hold the cover to the computer.
20. You are now ready to reconnect all cables (reverse of Step 3) to the rear of the computer. If necessary, refer to the instructions supplied with your display monitor, printer or other equipment.
21. After you reconnect all the cables, refer to the documentation provided with the computer to learn how to turn on and use your computer.

NOTE

- If you have an IBM PC or IBM PC/XT refer to the section titled "Setup" or "Introduction/Installation" in your Guide to Operations manual. Insert this manual in your Guide to Operations manual in the section titled "Option" or "Options Installation".
- If you have an IBM PC/AT refer to the Installation and Setup manual for your computer for additional information. Before your IBM PC/AT can be used for the first time, it must be told what options are installed. The Setup Program found on the IBM Diagnostics diskette included with your computer is used for this purpose. Insert this manual into your Installation and Setup manual in "Section 8, Additional Options".
- If you have an IBM compatible computer refer to the section titled "Setup" or "Introduction/Installation" in your User's Guide. Insert this manual in the section titled "Option" or "Options Installation".

SOFTWARE UTILITIES

SOFTWARE ON YOUR QTEC VGA1024 UTILITY DISKETTE

A program diskette comes with your Qtec VGA1024 board. It includes several routines similar to some utilities found on your DOS diskette. Following are descriptions of these Qtec VGA1024 utilities, drivers and other files.

- DMODE.EXE Used to switch the Qtec VGA1024 display modes.
- FASTBIOS.SYS Speeds up video BIOS operations when used in 80286- and 80386-based systems. It must be installed as the FIRST device in the CONFIG.SYS file.
- EANSI.SYS Replaces the ANSI.SYS device driver supplied on your DOS system disk. EANSI.SYS is compatible with the standard ANSI.SYS, and additionally supports the extended screen modes provided by Qtec VGA1024.
- FONT.DOC Contains the latest information on the Font Editor and Font Loader, describing new fonts and features. Print this file and read it before using the font software.
- FEDIT.COM The font editor, used to create new fonts and/or modify existing fonts. User's .FNT font files also included on your Qtec VGA1024 diskette.
- FLOAD.COM The font loader, used to load a selected font into video memory from disk.
- README.BAT Contains additional information which was not available at the time this manual was printed.
- HOTKEY, HOTZOOM A RAM resident zoom utility. Detail informations are on following pages.
- VDIAG.COM A diagnostic file that tests all functions of the Qtec VGA1024.

Also included in Qtec VGA1024 Utility diskette are software drivers for high resolution graphics for certain popular software packages and 132-column text driver for Lotus 1-2-3 and Symphony. Please see instructions explain how to install these drivers on the following pages.

DMODE.EXE FOR SOFTWARE MODE SWITCHING

Qttec VGA1024 is designed to provide compatibility with following modes: IBM's VGA, EGA, CGA, MDA and Hercules mode.

DMODE.EXE is the utility program which is used to switch display modes after the PC is turned-on. Because Qttec VGA1024 supports various types of monitors, various display standards (VGA, EGA, CGA, MDA, Hercules) and various display formats (132-column text, high resolution graphics, etc.), the user has to properly set the Qttec VGA1024 into the specific mode desired via DMODE.EXE otherwise one may experience incompatibility difficulties with software being used.

DMODE is an easy-to-use, menu-driven program. By executing DMODE.EXE at DOS prompt, the following screen will appear.

ADVANCED DISPLAY MODE SETUP (DMODE)

MONITOR	ADAPTER MODE	FORMAT (TEXT)
1. MDA	1. MDA	1. 40 X 25
2. CGA	2. CGA	2. 80 X 25
3. EGA	3. EGA	3. 80 X 60
4. VGA	4. VGA	4. 132 X 25
5. DIGITAL MULTISYNC	5. GRAYSCALE ON/OFF	5. 132 X 28
6. ANALOG MULTISYNC	6. VGA-SYNC ON/OFF	6. 132 X 44
7. ADJUST SCREEN	7. (RESERVED)	7. EXTENDED FORMAT

ACTION:
Please move cursor to select functions.

MESSAGE: (Press X to return to DOS)
Active monitor or modes are in Golden color.

User simply move cursor to select the monitor being used, the desire display mode, text format and press RETURN key.

An easy to understand on-screen operation instruction is included and will guide you through all steps.

The ADJUST SCREEN function (item No. 7 on DMODE menu) allows user to adjust the active display location on the screen. Many monitors have different display characteristics resulting in the display area on the monitor being too left, right, low or high under various modes. The ADJUST SCREEN allows user to customize the Qtec VGA1024 card to fit the monitor.

The ADJUST SCREEN remains active in the computer until the computer is re-booted. User may save or load the adjusted specifications.

IMPORTANT

- a. The DMODE will not allow you to switch to a mode which is not supported by the monitor specified.
- b. "Soft-boot" your PC (by pressing Ctrl, Alt, Del keys) does not change the mode of Qtec VGA1024; this is also a conscious decision for operational convenience. In most case when the PC is "soft-booted", the user wish to operate in the previous video mode.

DMODE.EXE FOR SELECTING TEXT DISPLAY FORMAT

In addition to the standard 80-column x 25-line text display format, the Qtec VGA1024 provides you with the capability to utilize extended column modes with text applications. This means that your Qtec VGA1024, when interfaced with appropriate color displays, can produce 132x44, 132x28, 132x25, and 80x60 modes in addition to the standard 80x25 and 40x25 modes. To use one of these formats simply enter DMODE select text display format desire for the menu.

Please note that the Qtec VGA1024 requires a variable frequency monitor to utilize the 132-column and 80x60 text display formats. 132-column and 80x60 text display are not supported on the IBM 8512, 8513 and 8514 analog monitors.

With the appropriate software, the 132-column display capability allows emulation of terminals that require 132 columns of text. Following is the list of terminal emulation packages that supports 132-column text.

Terminal Emulation Software for DEC

- General Micro PC102, PC202
- FTG Data Systems EMU.TEK
- Diversified Computer EM220
- Persoft SMARTTERM 125, 200, 240
- KEA Systems Ltd. ZSTEMpc-VT220 .
- Microplot PC Plot III
- Walker, Richer & Quinn Reflection 1 & 2
- Coefficient Systems Crosstalk 4.0

Terminal Emulation Software for IBM 3270

- Attachmate Attachmate
- CXI PCOX/ONE Rel 2.1
- IDEAssociates Ideacom 3 in 1
- DCA IRMA w/E78, IRMA 2

INSTALLING THE FASTBIOS.SYS DEVICE DRIVER

The FASTBIOS.SYS device driver is a file located on the Utility Diskette that is used to transfer the contents of the video ROM BIOS to PC system memory. This utility enhances video BIOS operation speed considerable when used in 80286- and 80386-based systems.

FASTBIOS.SYS is installed in the system CONFIG.SYS file with the following line

```
DEVICE=FASTBIOS.SYS
```

and must be the FIRST such device driver listed within the CONFIG.SYS file. If this is not done, the following message may result upon loading:

```
FASTBIOS NOT INSTALLED -- another (earlier installed)
device driver has taken over the video interrupt; make
sure the line DEVICE=FASTBIOS.SYS occurs first in your
CONFIG.SYS file.
```

Should an attempt be made to install FASTBIOS.SYS in anything other than an 80286- or 80386-based system, the following message will result:

```
FASTBIOS requires an 80286 or 80386 machine
```

When FASTBIOS.SYS is successfully installed the following message appears:

```
FASTBIOS Installed
```

FASTBIOS.SYS, residing within CONFIG.SYS, can only be installed during system boot-up. Please remember to reboot your system after adding FASTBIOS to your CONFIG.SYS file, and ensure that FASTBIOS.SYS resides on the same directory as CONFIG.SYS.

USING THE REPLACEMENT ANSI STANDARD CONSOLE DRIVER

Format: DEVICE=EANSI.SYS

This command must appear in the configuration file (CONFIG.SYS) to install EANSI.SYS, just as the command to install the ANSI.SYS device driver that comes on the DOS diskette would appear. EANSI.SYS is compatible with the standard ANSI.SYS, and additionally supports the extended screen modes provided by Qtec VGA1024. Once installed with the above command, EANSI.SYS provides all the screen control and keyboard remapping features of ANSI.SYS (see your DOS Technical Reference manual). EANSI.SYS is a replacement for ANSI.SYS, and the two should not be in use at the same time.

EANSI.SYS may be used to select the extended Qtec VGA1024 screen modes. This is accomplished by issuing an escape sequence with the "set mode" command, just as any standard mode would be selected with the normal ANSI.SYS. For example, screen mode 22 hex would be selected by sending the escape sequence:

(Esc)[=34h

to the screen. (Note that 34 is the decimal equivalent of 22 hexadecimal). To select other modes, simply replace 34 with the number of the mode you wish to select.

The available extended screen modes using an enhanced color display are as follows:

Mode	Columns	Rows
34 dec (22 hex)	132	44
35 dec (23 hex)	132	25
36 dec (24 hex)	132	28
42 dec (2A hex)	100	40
38 dec (26 hex)	80	60
2 dec (02 hex)	80	25

For example, to place the screen in 132-column by 44-row mode, do the following. Place the DEVICE command:

DEVICE=EANSI.SYS

in the CONFIG.SYS file on a bootable disk, and place EANSI.SYS and BASICA.COM on that disk. Boot the system, and in response to the DOS prompt, type BASICA, then press ENTER and type the following BASIC commands:

```
OPEN "0",1,"TEMP.DAT"  
PRINT #1, CHR$(27);"[=34h";  
CLOSE  
SYSTEM
```

This creates the file TEMP.DAT, containing the escape sequence to select mode 22 hex, 132-column mode. In response to the DOS prompt, type

TYPE TEMP.DAT then press ENTER

which sends the escape sequence to the screen. The screen is immediately set to 132-column mode. Note that the escape sequence is not displayed; it is interpreted as a command rather than displayable text.

USING THE CUSTOM FONT LOADER AND FONT EDITOR

The Custom Font Loader and Font Editor included on the Qtec VGA1024 Utility Diskette let you instantly change the set of characters (character font) displayed on the screen. For example, the letter "A" could be displayed as ∇ or α , or could even be changed to a different character entirely. This is very useful for scientific and foreign language application, as well as for simply customizing the look of your screen.

Normally, fonts must be changed from within a program, but the Font Loader lets you change the displayed font with a single DOS command. You can load one of the several ready-made fonts provided on the Qtec VGA1024 Diskette, or you can use the font editor to customize your own fonts.

The font software consists of:

- FONT.DOC - the latest information about the font software, describing new fonts and features. Print this file and read it before using the software.
- FEDIT.COM - the font editor, used to create new fonts and/or modify existing fonts. Start the Font Editor by typing the command "FEDIT" at the DOS prompt. Select the Help option in FEDIT's main menu for more information.
- FLOAD.COM - the font loader, used to load a selected font into video memory from disk. Up to four fonts may be stored in video memory at once, with any one of the fonts selected for display. Type the command FLOAD, with no parameters, for more information on the use of this program.
- Assorted fonts- fonts packaged on your Qtec VGA1024 diskette include the two standard Qtec VGA1024 fonts, font designed for the APL language, and a thin, single-dot font. You may modify any of these fonts as you wish with the font editor. Other fonts will be added in the future; check the README.DOC file on your diskette for the latest information. Any file on the Qtec VGA1024 diskette with the extension .FNT contains a font.

Notes on the Custom Font Loader and Font Editor

- . Please remember to back up your Qtec VGA1024 Utility Diskette before using it.
- . See the FONT.DOC file on the Qtec VGA1024 Utility & Driver Diskette for information on using the Font Editor.
- . Fonts may be loaded in text mode only. When a font is selected to be displayed, every character on the screen is immediately displayed in that new font.

USING THE ZOOM UTILITY

The ZOOM utility consists of two RAM resident programs that allow graphics program running on the Qtec VGA1024 board to perform hardware zooming, panning and scrolling at the touch of a key. The programs HOTKEY and HOTZOOM are included on your Utility Diskette.

The ZOOM utility works by using the BIOS keyboard interrupt to check for the ZOOM utility programs. Programs such as AutoCAD permit the use of this keyboard interrupt. Some graphics programs bypass the keyboard interrupt and may not allow ZOOM to function.

ZOOM is useful when working with interactive programs which allow editing of the graphics display screen.

The following graphics modes are supported:

<u>RESOLUTION</u>	<u>MODE</u>	<u>DISPLAY</u>
640x200	E	16 colors
640x350	F	Monochrome
640x350	10	16 colors
640x480	11	2 colors
640x480	12	16 colors
320x200	13	256 colors
800x600	29	16 colors

Once the programs are installed, you may bring up the ZOOM at any time within a graphics application by pressing the pre-defined hotkey. You may specify any key on the keyboard as the hot key.

Before you enter your graphics application, you must load the ZOOM utility programs into memory. Note that you should only do this once after booting your PC.

1. Insert the Qtec VGA1024 Utility Diskette into drive A.
2. Type:
A:HOTKEY
A:HOTZOOM
3. Once you have entered a graphics application you may press the F10 (function) key to invoke the ZOOM program.

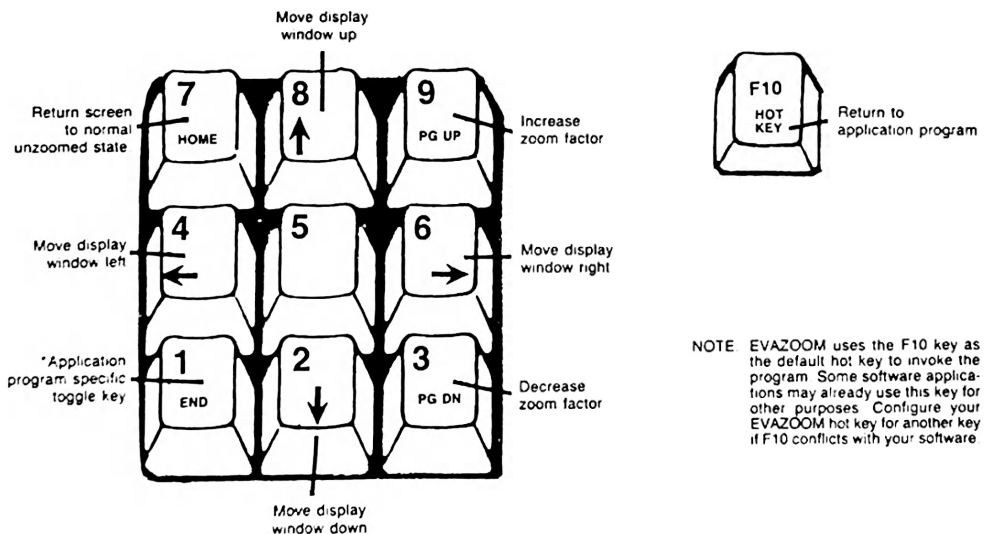
NOTE: ZOOM uses the F10 key as the default hotkey to invoke the program. Some software applications may already use this key for other purposes. Configure your ZOOM hot key for another key if F10 conflicts with your software.

Zooming the Display

Once you have pressed the hotkey and entered the ZOOM program, you will see a 3 x 3 character box in the upper left hand corner of the display. This box is a reminder that you are now in the zoom program and can use some of the keypad keys to perform various functions. We call this specify mode since the user is able to specify the zoom factor and the area of the display currently being viewed. You can return to your application program by re-hitting the hot key.

<u>Key</u>	<u>Meaning</u>
Home	Return screen to normal unzoomed state
Up Arrow	Move display window up
Pg Up	Increase zoom factor
Left Arrow	Move display window left
Right Arrow	Move display window right
End	Application program specific toggle key *
Down Arrow	Move display window down
Pg Dn	Decrease zoom factor
Hot Key	Return to application program

- * For example in AutoCAD using the DSVGA 640x480 driver, the END key is defined as a toggle that allows or inhibits the AutoCAD input device (keyboard, mouse, etc.) from panning the display window during cursor movement.



NOTE EVAZOOM uses the F10 key as the default hot key to invoke the program. Some software applications may already use this key for other purposes. Configure your EVAZOOM hot key for another key if F10 conflicts with your software.

Conflicts with other RAM resident programs and Changing Hot key

Since the ZOOM programs are RAM resident utilities, and many users now load other RAM resident routines in their systems, conflicts may result when one program uses the same interrupt number as another RAM resident program. If you suspect there exists a conflict in your system you may wish to load the HOTKEY program at a different interrupt location or perhaps change the hot key that wakes HOTZOOM up. If you have previously loaded the ZOOM programs, re-boot your computer and perform the following steps:

1. Insert the Qttec VGA1024 Utility Diskette into drive A.
2. Type: A:HOTKEY 1
A:HOTZOOM
3. Answer the questions concerning your hot key choice and the new interrupt number used by HOTKEY. To select the defaults simply hit the return after each question.

The HOTKEY program replaces the BIOS keyboard interrupt so that it may intercept keys and determine when the user specified hot key has been hit. HOTZOOM also installes itself as a RAM resident program, therefore, the ZOOM programs use two adjacent interrupt locations specified during the initialization sequence. The default locations are 60H and 61H and the default hot key is F10 (function key 10).

Note that interrupt numbers 60H-67H are usually reserved for user application programs, like ZOOM. Other interrupt numbers may have operating system or hardware specific functions.

4. Make sure you load the HOTKEY and HOTZOOM programs before you run an application program.

USING DIAGNOSTIC TEST PROGRAM

Included in the Qtec VGA1024 Utility Diskette is a test program called VDIAG.COM which can help you further verify that your Qtec VGA1024 board and attached display monitor are working properly.

1. At the DOS prompt, type VDIAG then press ENTER.
2. The test will start and prompt you with further instructions.

SOFTWARE DRIVERS

132-COLUMN TEXT DRIVER INSTALLATION FOR LOTUS 1-2-3 AND SYMPHONY

Important

Please note that 132-column text modes require monochrome (TTL) monitor, EGA (TTL) monitors, variable-frequency (TTL or analog) or functional equivalent monitors. 132-COLUMN TEXT MODES ARE NOT SUPPORTED ON IBM PS/2 85XX ANALOG MONITORS.

Introduction

Six drivers for Lotus 1-2-3 Release 2 or later and Symphony Release 1.1 or later are provided on your Qtec VGA1024 Utility Diskette under subdirectory name Lotus. These drivers support all the text modes of the Qtec VGA1024 board: 80x25, 132x25, 132x28, 132x44 and 80x60. There is one driver dedicated to each of these five modes; each of these drivers, when selected as the active text display for a Lotus product, will automatically cause individual Lotus programs and utilities (1-2-3, Translate, Symphony, Printgraph, etc.) to display in the selected format. For example, if the 132x28 driver has been selected in the installation procedure, as described below, then when 1-2-3 is run, the spreadsheet will display 132 columns by 28 rows of text.

There is also the 'All Color text Modes' driver which supports all five text display modes of the Qtec VGA1024 board. When this driver is selected, each time you enter an individual Lotus program or utility, you are offered the choice of any of the five display modes. This allows you to switch between 80-column and 132-column displays without exiting to DOS.

We have provided six drivers to give you complete flexibility in configuring Lotus products to meet your needs. If you always want a 132x28 display, install the 132x28 driver and you will automatically get that display every time you start a program from the Lotus or Access menu. If you want the 80x25 display most of the time for speed and reading ease, but want to be able to switch to the 132x44 display quickly to get an overall view of your spreadsheets, install the 'All Modes' driver and select the desired display each time you start 1-2-3 or Symphony. We've left you the freedom to pick the drivers that are right for you.

ONE NOTE: when you are using the 'All Color Text Modes' driver, whenever you enter the Translate utility from the Lotus or Access menu, you should have 80x25 mode selected. The Translate utility operates differently from the other programs and utilities, and often does not show 132-column displays properly from the 'All Modes' driver. Also, the Install utility always comes up in 80-column mode, no matter what driver is used.

Installation Instructions

Before installing the text drivers, be sure that you have read GETTING STARTED in the Lotus 1-2-3 or the Lotus Symphony documentation. This documentation assumes that you are familiar with the Install program and procedures outlined in the Lotus documentation. The Lotus Install program permits new drivers to be added to the driver library via the Add New Drivers to Library option of the Advanced Options Menu. Once the text drivers are added to the library you may select them via the Modify Current Driver Set option of the Advanced Options Menu.

Please note that the following instruction assumes that you have a Hard Disk system.

1. Insert the Qtec VGA1024 Utility Diskette into drive A. Text drivers are in the Qtec VGA1024 Utility Diskette under LOTUS subdirectory.
2. Copy all text drivers from Qtec VGA1024 Utility Diskette into the hard disk that has Lotus program files.

COPY A:\LOTUS*.DRV

3. Perform the First-Time Installation of your Lotus product. Refer to the Lotus GETTING STARTED documentation for instructions on running the Install program. Select the First-Time Installation option from the main menu. The Install program will guide you through the procedure of selecting the drivers you want. Remember that Qtec VGA1024 supports the IBM Enhanced Graphics format, so you should select the EGA card for the initial text and graphics screen display device.

When you have completed the driver selection, press F10 function key to display the current driver selections. Please note that the Text Display and Graph Display selections must match the samples below in order to use the text drivers. You may want to create several driver sets, and experiment to see which suits your needs.

When you have completed your selections, the Install program saves the drivers you select in a file, or driver set, called 123.SET for Lotus 1-2-3 or LOTUS.SET for Lotus Symphony. When prompted, respond that you do not want to leave the Install program at this time. Continue with step 5; you are now ready to install the text drivers.

When installing Lotus 1-2-3 your selections should look like:

<u>Text Display</u>	<u>IBM Enhanced Graphics</u>
<u>Graph Display</u>	<u>IBM Enhanced Graphics</u>
Keyboard	IBM Keyboard
Printer Int.	IBM Printer Interface
File Trans.	IBM PC or compatible
Collating	Numbers first or other choice
Math Unit	Coprocessor Floating Point Driver
	Software Floating Point Driver
Text Printer	None or the printer you selected
Graph Printer	None or the printer you selected

When installing Lotus Symphony your selections should look like:

<u>Text Display</u>	<u>Universal Text Display - Separate</u>
<u>Graph Display</u>	<u>IBM Enhanced Graphics - Separate</u>
Keyboard	IBM Keyboard
Printer Int.	IBM Printer Interface
Comm Port	None or the comm port you selected
Modem	None or the modem you selected
Comm Protocol	None or the protocol you selected
File Trans.	IBM PC or compatible
Collating	Numbers first or other choice
Math Unit	Coprocessor Floating Point Driver
	Software Floating Point Driver
Text Printer	None or the printer you selected
Graph Printer	None or the printer you selected

5. You should be in the Main Menu of the Install program at this point. Select Advanced Options from the Install Main Menu and press RETURN.
6. The Advanced Options Menu will appear on your screen. Select Add New Drivers to Library and press RETURN. Note that this step only needs to be performed once.
7. The Install program will ask you to press RETURN. This step creates a file named SINGLE.LBR which contains the drivers we are adding. (Step 3 above copied the drivers from the Utility Diskette to your hard disk, so you are all set to go).

8. The Advanced Options Menu will appear on your screen. Select Modify Current Driver Set and press RETURN.
9. The current drivers selected will appear on your screen. Select Text Display and press RETURN.
10. The text display drivers will appear on your screen. Select the VGA Adapter driver you want to use and press RETURN. As discussed earlier, the available drivers are:

- VGA Adapter (All Color Text Modes)
- VGA Adapter (80x25 Color Text Only)
- VGA Adapter (132x25 Color Text Only)
- VGA Adapter (132x28 Color Text Only)
- VGA Adapter (132x44 Color Text Only)
- VGA Adapter (80x60 Color Text Only)

11. The currently selected drivers will appear on your screen. Verify that the driver you selected appears in the Text Display field. Select Return to menu and press RETURN.
12. The Advanced Options Menu will appear on your screen. Select Save Changes and press RETURN.
13. At this time the Install program prompts you for the name of your driver set. Lotus 1-2-3 and Lotus Symphony permit selection of the driver set to use when you start the program. If you want to name the driver set, type the name and then press RETURN. For example, if you selected the VGA Display (132x28) driver you may wish to name it VGA28. To save the current driver set using the default name of 123 for Lotus 1-2-3 or LOTUS for Lotus Symphony simply press RETURN. These default driver sets will be used automatically if you don't explicitly select another driver set when you run Lotus or Access.
14. The Install program will inform you that the driver set has been saved. Press RETURN. The Exit Menu will appear on your screen. You can create additional driver sets at any time by selecting the Advanced Options Menu, Modify Current Driver Set, and Save Changes procedures of the Install program (step 8 through 13 above). If you want to create additional driver sets now, press RETURN to go to the Main Menu. Don't forget to use a different name for each driver you save. When you are finished select Yes and press RETURN to exit the Install program.

15. Refer to the Starting and Ending chapter of the Lotus Getting Started documentation to learn how to start Lotus 1-2-3 or Lotus Symphony. Below are some examples of how to select a different driver set when starting the program.

If you are starting Lotus 1-2-3:

Type LOTUS and press RETURN to use the default driver set named 123.

Type LOTUS VGA28 and press RETURN, where VGA28 is the name of the driver set you created used for 132 column by 28 row display on your Qtec VGA1024 board.

Type LOTUS VGA44 and press RETURN, where VGA44 is the name of the driver set you created used for 132 column by 44 row display on your Qtec VGA1024 board.

etc.

If you are starting Lotus Symphony:

Type ACCESS and press RETURN to use the default driver set named LOTUS.

Type ACCESS VGA28 and press RETURN, where VGA28 is the name of the driver set you created used for 132 column by 28 row display on your Qtec VGA1024 board.

Type ACCESS VGA44 and press RETURN, where VGA44 is the name of the driver set you created used for 132 column by 44 row display on your Qtec VGA1024 board.

etc.

Using 'All Color Text Modes' text display for Lotus 1-2-3 and Symphony

If you select 'All Color Text Modes' text driver, after entering 1-2-3, a pop-up menu is activated by issuing a Ctrl-A key input sequence, at which time the Qtec VGA1024 text display mode selection menu appears. After selecting the desired mode, the RETURN or ENTER key is depressed causing a beep to emit from the system. This indicates that the desired mode has been set. You must then EXIT to the Lotus Access menu if the program was entered through the LOTUS command, or back to DOS if the program was entered with the 1-2-3 command, in order to invoke the desired mode selection.

DRIVER INSTALLATION FOR AUTODESK'S AUTOCAD 2.5

The instructions which follow are applicable to users of Autodesk's Inc. AutoCAD Version 2.5 and Qtec VGA1024 board. Please note that to use the 800x600 or 1024x768 mode of the Qtec VGA1024, an ANALOG variable-frequency or functional equivalent monitor is required. Choosing a higher resolution than your monitor is capable of displaying will bring unsatisfactory results.

The Qtec VGA1024 Utility Diskette contains the AutoCAD ADI driver program named DSVGA.EXE which makes full use of the high resolution graphics capabilities of the Qtec VGA1024 board.

Instructions:

1. Copy the driver program DSVGA.EXE contained on the Qtec VGA1024 Utility Diskette to the disk which has the AutoCAD program files.
2. The Qtec VGA1024 driver program DSVGA.EXE needs to be loaded before you can use the 1024x768, 800x600 and 640x480 modes with AutoCAD. Once loaded, the driver remains memory resident until you power off or restart your system. Remember that you need to load the driver only once each time you power on or restart the system.

To load the driver program via one line of entry type

DSVGA -r{123456} -v{nn} -z{yn}

where -r selects the desired resolution listed below.

- 1 = 640x480 (8x8 Font, 16 color)
- 2 = 1024x768 (8x16 Font, 16 color)
- 3 = 640x480 (8x16 Font, 2 color)
- 4 = 800x600 (8x16 Font, 16 color)
- 5 = 640x480 (8x16 Font, 16 color)

where -v selects the interrupt vector for driver used
(7A is the default interrupt used by both AutoCAD and this driver).

where -z selects whether the menu should be zoomed or not,
enter Y for yes or N for no.

Example: DSVGA -r2-v7D-zY

selects 1024x768 resolution, using interrupt 7D, and utilizing the zoom feature.

Note: DSVGA, and attached parameters may be invoked via a batch file.

DSVGA may also be invoked using the following method, however the menu zoom option is not presented if invoked in this manner, type

DSVGA

The driver program will display the following:

```
--- AutoCAD ADI Driver V2.23 ---  
VGA Adapter AutoCAD Driver
```

If you are changing resolutions please respond with original INT number

Enter ADI INT number in HEX (Default = 7A) ==>

Please Enter Resolution

- 1 = 640x480 (8x8 Font, 16 color)
- 2 = 1024x768 (8x16 Font, 16 color)
- 3 = 640x480 (8x16 Font, 2 color)
- 4 = 800x600 (8x16 Font, 16 color)
- 5 = 640x480 (8x16 Font, 16 color)

Choice ==>

NOTE: Be sure your monitor is capable of displaying the resolution you select.

The driver is now all set to be used at the resolution you selected. If later you wish to change the driver resolution just type DSVGA again.

3. Using the AutoCAD documentation configure AutoCAD. Simplified instructions are included below.

- . Type ACAD
- . Select Main Menu item 5 (Configure AutoCAD)
- . Select Configuration Menu item 3 (Configure video display)

- . Select ADI display
- . Select the hexadecimal interrupt, this must match your -v parameter selection when loading DSVGA. The default is 7A.
- . Continue through the configuration menu

After you complete the configuration you can begin using AutoCAD.

DRIVER INSTALLATION FOR AUTODESK'S AUTOCAD RELEASE 9/10 AND AUTOSHADE

The following instructions are applicable to users of Autodesk Inc's AutoCAD Release 9/10, AutoShade and the Qtec VGA1024 adapter. Please note that, to use the 800x600 or 1024x768 mode, an ANALOG variable-frequency or functional equivalent monitor is required. Please be sure that your monitor is capable of displaying these resolution in order to utilize this driver. Choosing a higher resolution than your monitor is capable of displaying will bring unsatisfactory results.

The enclosed ADI Driver contains an AutoCAD driver program called VADIR9.COM, which in turn is configured by a file called VINST.COM. The VADIR9.COM program makes full use of the 640x480, 800x600 and 1024x768 graphics mode of the Qtec VGA1024 Adapter. In addition, the VADIR9.COM supports 640x480 and 800x600 in 256 colors in AutoShade.

To configure VADIR9.COM you must first run the VINST.COM program. In running this, you must answer several questions dealing with Resolution, Configuration, and Screen Colors by entering a new value or pressing RETURN to accept the default value displayed by each question.

After all questions are answered in VINST.COM, the program will display a message declaring the AutoCAD ADI driver successfully modified.

Note that there is an extensive list for determining the colors of the various entities comprising the graphic screen. The setting of these colors requires entering a color code number. The following is a listing of color code numbers.

- 0 Background
- 1 Red
- 2 Yellow
- 3 Green
- 4 Cyan
- 5 Blue
- 6 Magenta
- 7 White
- 8-15 intensified versions of codes 0-7

After setting colors for all of the screen elements, your ADI driver configuration is complete.

At this time, you should run VADIR9.COM to load the configured driver, before loading AutoCAD. If you wish to change any of the screen element attributes, simply run VINST.COM again to make changes and run VADIR9.COM again before loading AutoCAD. VADIR9.COM should always be run before loading AutoCAD in order to display in the resolution, and with the screen attributes of your choice.

Running AutoCAD

After the ADI driver has been configured to your requirements and VADIR9.COM has been run, AutoCAD can then be loaded.

Using the AutoCAD documentation configure AutoCAD. Simplified instructions are included below.

- . Type ACAD
- . Select Main Menu item 5 (Configure AutoCAD)
- . Select Configuration Menu item 3 (Configure video display)
- . Select ADI display
- . Select the hexadecimal interrupt, the default is 7A.
- . Continue through the configuration menu

After you complete the configuration you can begin using AutoCAD.

DRIVER INSTALLATION FOR MICROSOFT WINDOWS VERSION 2

The instructions which follow are applicable to users of Microsoft Windows version 2 and Qtec VGA1024 board. Please note that, to use the 800x600 or 1024x768, an ANALOG variable-frequency or functional equivalent monitor is required. Please be sure that your monitor is capable of displaying these resolution in order to utilize this driver. Choosing a higher resolution than your monitor is capable of displaying will bring unsatisfactory results.

The Qtec VGA1024 Utility Diskette contains new driver files under WINDOWS2 sub-directory. These drivers will replace the driver files contained on the Windows Screen Driver Diskette.

Instructions:

1. Run the Windows SETUP program as usual, when the choose the display adapter menu is displayed, select "Other Display Driver Supplied by Manufacturer" option.
2. When prompted by Windows program "Insert disk for your display driver in the following drive", insert the Qtec VGA1024 Utility Diskette into drive "A:" and type A:\WINDOWS2 and press RETURN
3. Windows will locate the supplied drivers and display:
VGA Adapter 800x600 16 colors
VGA Adapter 1024x768 16 colors
4. Select the option you wish to use.
5. When prompted by Windows, select "VGA Fonts".
6. Continue with the rest of the Windows setup process.

After you complete the above steps you can begin using Windows.

DRIVERS INSTALLATION FOR VENTURA PUBLISHER VERSION 1.1-2.0

The following instructions are applicable to users of Ventura Publisher Version 1.1 - 2.0 and the Qtec VGA1024 Adapter.

The enclosed Ventura 800x600 and 1024x768 driver files are installed AFTER Ventura Publisher has been installed on your system. Please be sure that your monitor is capable of displaying these resolutions in order to utilize the drivers. Choosing a higher resolution than your monitor is capable of displaying will bring unsatisfactory results.

To install your VGA driver, perform the following steps:

1. Follow the Ventura installation instructions.
2. When you are asked to select a video adapter, choose
 - E IBM Personal System/2 (640x480) two colors (Version 1.1) or
 - E IBM VGA or Compatible (640x480) 2 colors (Version 2.0)
3. Complete Ventura Publisher installation and see that it is working properly using the installed IBM driver.
4. Exit Ventura Publisher and insert the Qtec VGA1024 Driver Diskette in your A: drive.
5. Log on to your A: drive, for example

```
C:>A: [ENTER]
A:>
```

and type `VPDRV2_0 [ENTER]`
6. The program will ask you some questions about your Ventura configuration. Answer them appropriately.
7. When the program asks you what display device and resolution you want to install for, make a selection,
 - VGA Adapter (800x600) 16 colors or greys or
 - VGA Adapter (1024x768) 16 colors or greys

Whichever is appropriate or desirable for your hardware configuration.

8. The program then asks for the type of mouse you have. Respond as you did during your initial installation.
9. Finally, the program displays the choices you have made and provides you the opportunity to change. If no change is necessary, press [ENTER] or "Y" (the default response is "Y") and the driver will be installed.
10. If you desire a change, press "N" [ENTER] and make your changes.

The driver will then be installed and you can log back on to the hard disk drive and begin using Ventura.

DRIVERS INSTALLATION FOR GEM 2.2-3.1

IMPORTANT

The GEM drivers on your Qtec VGA1024 driver diskette are used for GEM versions 2.2 and 3.0-3.1. The drivers whose file extensions end in .VGA are for GEM Versions 3.0-3.1, while those ending in .SYS are for GEM Version 2.2. This is transparent to the individual GEM programs as they will seek out the appropriate driver files during loading.

Please note that the Qtec VGA1024 Driver Diskette supplied to you is created specifically for the drivers contained therein. The original has a volume label called GEM DRIVRPK that GEM must see in order to load the drivers. If you need additional back up copy of your driver diskette, it must be indentially copied using the DOS DISKCOPY command in order to preserve the integrity of the order and content of the original.

Driver Installation for GEM 2.2

The following instructions are applicable to users of GEM Version 2.2 and the Qtec VGA1024 Adapter.

Please be sure that your monitor is capable of displaying these resolutions in order the utilize the drivers. Choosing a higher resolution than your monitor is capable of displaying will bring unsatisfactory results.

The enclosed GEM driver files require a new GEMSETUP.TXT file to be installed in place of that which is on GEM Device Driver Diskette #1. The driver makes full use of the 800x600 and 1024x768 graphics mode of the Qtec VGA1024 adapter.

Before installing GEM, perform the following steps:

1. Make a DISKCOPY of GEM Device Driver Disk #1. This copy will be used in place of the original during installation.
2. Copy GEMSETUP.V22 from your Qtec VGA1024 Driver Diskette to the newly-created copy of the GEM Device Driver Disk #1, as GEMSETUP.TXT.

Example: C:>COPY A:GEMSETUP.V22 B:GEMSETUP.TXT

Please note that you are copying the GEMSETUP.V22 file from your Qtec VGA1024 Driver Diskette to your GEM Device Driver Disk #1 diskette while simultaneously renaming it to GEMSETUP.TXT.

After the GEM Device Driver Disk #1 is copied with the new GEMSETUP.TXT file, you can proceed with the installation.

3. Install GEM as per instructions. When the program asks, "Which graphics card and display do you have?", respond with choice:

VGA Adapter (800 x 600) 16-color Mode;VGA 800 or
VGA Adapter (1024 x 768) 16-color Mode;VGA 1024

as your video adapter, whichever is appropriate for your hardware configuration.

The GEM installation program will ask you to insert the Qtec VGA1024 Driver Diskette into drive A and the installation will continue. Complete the GEM installation as instructed.

4. You can now begin using GEM 2.2.

Driver Installation for GEM 3.0-3.1

The following instructions are applicable to users of GEM Versions 3.0 and 3.1, and the Qtec VGA1024 Adapter.

Please be sure that your monitor is capable of displaying these resolutions in order to utilize the drivers. Choosing a higher resolution than your monitor is capable of displaying will bring unsatisfactory results.

The enclosed GEM driver files require a new GEMSETUP.TXT file to be installed in place of that which is on GEM System Master Disk. The drivers make full use of the extended graphics modes of the Qtec VGA1024 Adapter.

Before installing GEM, perform the following steps:

1. Make a DISKCOPY of GEM System Master Disk. This copy will be used in place of the original during installation.

2. Copy the appropriate Setup file, GEMSETUP.V31 for Version 3.1 or GEMSETUP.V30 for Version 3.0, from your Qtec VGA1024 Driver Diskette to the newly-created copy of the GEM System Master Disk, as GEMSETUP.TXT.

Example:

For Version 3.0, C:>COPY A:GEMSETUP.V30 B:GEMSETUP.TXT

For Version 3.1, C:>COPY A:GEMSETUP.V31 B:GEMSETUP.TXT

Please note that you are copying the GEMSETUP file from your Qtec VGA1024 Driver Diskette to your GEM System Master Disk while simultaneously renaming it to GEMSETUP.TXT.

3. After the GEM System Master Disk is copied and prepared with the new GEMSETUP.TXT file, you can proceed with the installation.
4. The installation of VGA extended mode drivers is a 2-step process.
 - a. Install GEM as per instructions, selecting
IBM 16-Color VGA for PS/2 (640x480) or Compatible
as your video driver. Complete the GEM installation instructions normally. After completing installation, it is a good idea to start GEM to ensure that it operates properly before doing the next step.
 - b. Assuming that GEM worked properly with the IBM VGA driver loaded, reinsert your System Master Disk and run GEMPREP again. This time, choose to change your configuration. You want to change the video adapter part of the configuration in order to load the Qtec VGA1024 driver.

Select from the followings:

VGA Adapter (800x600) 16-Color Mode or
VGA Adapter (1024x768) 16-Color Mode

The program will ask you to insert the GEM DRIVER PACK diskette. This is your Qtec VGA1024 Driver Diskette. The driver will load and the program will conclude.

5. You can now begin using GEM 3.

DRIVER INSTALLATION FOR WORDPERFECT 5

The following instructions are applicable to users of WordPerfect 5.0 at 800x600 or 1024x768 resolution. Please note that, to use the 800x600 or 1024x768 mode, an ANALOG variable-frequency or functional equivalent monitor is required. Please be sure that your monitor is capable of displaying these resolutions in order to utilize the drivers. Choosing a higher resolution than your monitor is capable of displaying will bring unsatisfactory results.

The enclosed drivers, WP800.WPD and WP1024.WPD, are used to enable WordPerfect 5.0 to be displayed at 800x600 and 1024x768 resolution respectively. The drivers need only to be copied onto the disk directory where WordPerfect 5.0 resides. Upon loading the program the following steps should be taken to choose the resolution desired:

1. From the document screen displayed after entering WordPerfect, press SHIFT/F1 to get to the Setup menu.
2. From Setup, choose option 3 - Display. This brings up the Get Setup: Display menu.
3. From the Get Setup: Display menu, choose option 5 - Graphics Screen Type.
4. From the Get Setup: Graphics Screen Type menu, choose either;
VGA Adapter 800x600 16 color
or
VGA Adapter 1024x768 16 color
5. Exit from the menus and begin using WordPerfect.

**FOR
SOFTWARE
DEVELOPERS**

USING THE EXTENDED COLOR GRAPHICS MODES

Introduction

Besides the standard VGA/EGA/CGA/MDA/Hercules compatibilities the Qtec VGA1024 has additional display modes. These new modes are designed to increase the resolution up to 1024x768 (when using an IBM 8514, NEC MultiSync XL, or other compatible monitor).

This application note describes how to identify an Qtec VGA1024, how to select the extended color modes from application programs and how these High Resolution memory maps are organized.

Selecting Extended Color Graphics Modes

The Qtec VGA1024 BIOS supports the following extended modes. The numbers are in decimal except as noted.

Mode	Mode Type	Length of Memory Map
37 hex	Graphics	128x768 = 98304 = 18000 hex (each plane)
30 hex	Graphics	100x600 = 60000 = EA60 hex (each plane)
2E hex	Graphics	80x480 = 38400 = 9600 hex (each plane)

The HiRes modes are selected exactly as the standard modes 0-7 and D-10 are selected:

Place a 0 in register AH to indicate "select mode" function

Place the mode number in register AL

Execute an INT 10 instruction, generating software interrupt 10 hex, which invokes the Qtec VGA1024 BIOS to set the mode.

The above calling sequence should be familiar to anyone who has ever called the BIOS from assembly language or from a machine-language driver, and is the standard BIOS interface for video mode select.

Extended Color Graphics Memory Map

The HiRes color graphics memory map begins at A000:0000, just like the IBM VGA/EGA 640x350 mode. As indicated in the table above, the length of the extended color graphics modes memory map is longer than the normal mode 10h length.

80x60 Text Mode Memory Map

The 80x60 color text memory map begins at B800:0000 just like any other color text. Memory is organized with even bytes as character codes and odd bytes as attributes, again just like normal color text. As indicated in the table above, the length of the 80x60 color text memory map is longer than the normal mode 2 length of 4000 bytes.

USING 132- AND 80-COLUMN TEXT MODES

This application note describes how to select the Qtec VGA1024 board's 132-column text modes from application programs and how the 132-column text modes memory map is organized.

Selecting 132- and 80-Column Color or Monochrome Text Modes

The Qtec VGA1024 board BIOS supports the following 132- and 80-column text modes on variable-frequency monitors. These modes are not used by the IBM EGA. 132-column modes are not supported on the IBM 8503, 8512, 8513, and 8514 analog monitors. The numbers are in decimal except as noted.

Mode	Columns	Rows	Length of Memory Map
22 hex	132	44	132x44x2 = 11616 = 2D60 hex
23 hex	132	25	132x25x2 = 6600 = 19C8 hex
24 hex	132	28	132x28x2 = 7392 = 1CE0 hex
*18 hex	132	44	132x44x2 = 11616 = 2D60 hex
*19 hex	132	25	132x25x2 = 6600 = 19C8 hex
*1A hex	132	28	132x28x2 = 7392 = 1CE0 hex
26 hex	80	60	80x60x2 = 9600 = 2580 hex

* 132-column monochrome modes

The 132-column modes are selected exactly as the standard modes 0-7 and D-12 are selected:

- . Place a 0 in register AH to indicate "select mode" function
- . Place the mode number in register AL
- . Execute an INT 10H instruction, generating software interrupt 10 hex, which invokes the Qtec VGA1024 BIOS to set the mode

The above calling sequence should be familiar to anyone who has ever called the BIOS from assembly language or from a machine-language driver, and is the standard BIOS interface for video mode select.

132-Column Color Text Memory Map

The 132-column color text memory map begins at B800:0000 (monochrome at B000:0000), just like any other color text. Memory is organized with even bytes as character codes and odd bytes as attributes, again just like normal color text. The row offset register (CRTC register 13 hex) is normally set to 66 (42 hex) to compensate for the greater width of the screen, and so the start of each row is 264 bytes after the start of the row above it, as opposed to the 80-column row offset register of 40 (28 hex) and 160 bytes from the start of one row to the start of the next.

As indicated in the table above, the lengths of the 132-column memory maps are longer than the normal mode 2 length of 4000 bytes.

USING HARDWARE ZOOM, PAN FEATURE

The ZOOM programs once loaded are available at the software interrupt level. Several function calls have been defined that will allow you to take advantage of the hardware zoom functions in the Qtec VGA1024. The function code is passed in the AX register and any parameters requested are sent via the other 8088 registers.

The interrupt number is defined at the time ZOOM is initialized and can be found by executing the following code sequence after the ZOOM programs have been made resident:

Assembler

```
MOV      AH, 0FFH; NEW FUNCTION - QUERY ZOOM INTERRUPT
INT      16H ;
```

Output

```
AL+1     = Zoom interrupt number
AL       = Old BIOS keyboard handler interrupt number
BX       = Hot key
```

Note that all windows and parameters are undefined until set by the programmer.

Lattice C

```
#include<dos.h>
q__zoom__int()
{
    union REGS in, out;

    in.x.ah=0xff;
    int86(0x16,&in,&out);
    return(out.x.al);
}
```

Once the application program has determined the interrupt number of the zoom drivers it can invoke any of the zoom functions described on the following pages.

Zoom Functions

The following is description of the zoom driver interrupt functions loaded by the ZOOM programs. A function is selected by placing the function code in the AX register and performing a software interrupt. The interrupt number is initialized at the time the ZOOM program is loaded.

Zoom Display

Function Code

AX = 0

Arguments

BX = zoom factor

Description

Zooms the display based on given zoom factor. Valid zoom factors are from 0 through 7.

Lattice C Example

```
#include<dos.h>
zoom(factor)
int factor;
{
    union REGS in,out;
    in.x.ax = 0;
    in.x.bx = factor;
    int86(zoom__int,&in,&out);
}
```

Center Zoom Window

Function Code

AX = 1

Arguments

BX = x coordinate to center

CX = y coordinate to center

Description

This function will attempt to position the zoom window in such a manner as to make the coordinates x,y appear as close to the middle of the display as possible. This is useful when using a mouse or other input device for panning and scrolling.

Lattice C Example

```
#include<dos.h>
main()
```

```

{
    zoom(2);
    while(1)
    {
        mouse(&x,&y);
        zcenter(x,y);
    }
}
zcenter(x,y)
int x,y;
{
    union REGS in,out;
    in.x.ax = 1;
    in.x.bx = x;
    in.x.cx = y;
    int86(zoom__int,&in,&out);
}

```

End Zoom

Function Code

AX = 2

Arguments

None

Description

Unzooms the display and returns the window to its original state.

Lattice C Example

```

#include<dos.h>
zoom__end()
{
    union REGS in,out;
    in.x.ax = 2;
    int86(zoom__int,&in,&out);
}

```

Report Zoom

Function Code

AX = 3

Arguments

None

Return

AX = zoom factor

Description

Returns the current zoom factor in the AX register.

Lattice C Example

```
#include<dos.h>
q__zoom
{
    union REGS in,out;
    in.x.ax = 3;
    int86(zoom__int,&in,&out);
    return(out.x.ax);
}
```

Enter Specify Mode

Function Code

AX = 4

Arguments

None

Description

This mode is entered whenever the user hits the pre-defined hot key. See the information on specify mode above.

Lattice C Example

```
#include<dos.h>
zoom__specify()
{
    union REGS in,out;
    in.x.ax = 4;
    int86(zoom__int,&in,&out);
}
```

Query Zoom Window

Function Code

AX = 5

Arguments

BX = Segment address of return argument array

CX = Offset address of return argument array

Description

This function is used to find out what the current zoom window is set to. The programmer should pass the segment and offset values of a 14 byte array that will be filled as follows:

```
offset [0] x start of zoom window
offset [1] y start of zoom window
offset [2] x end of zoom window
offset [3] y end of zoom window
offset [4] current zoom factor
offset [5] zoom offset start x
offset [6] zoom offset start y
```

A programmer might use this function when multiple zoom windows may be used in an application, but the last zoom window must be preserved. The programmer can query the current zoom window, change window, and then restore the zoom window to the original settings.

Lattice C Example

```
#include<dos.h>
q__zoom__window(window)
int window[];
{
    union REGS in,out;
    in.x.ax = 5;
    in.x.bx = getdatas();/* Data segment of window[] */
    in.x.cx = (int)window;
    int86(zoom__int,&in,&out);
}
```

Set Zoom Window

Function Code

AX = 6

Arguments

BX = Segment address of window coordinate array

CX = Offset address of window coordinate array

Description

This function will set the zoom window. The zoom window is the area of the display where zooming begins. The programmer must pass the segment and offset values of an array which contains the coordinates of the new zoom window. The format of the array should be as follows:

```
offset [0] x start of zoom window
offset [1] y start of zoom window
offset [2] x end of zoom window
offset [3] y end of zoom window
```

Note the restrictions on x coordinate values described in the equation below.

$$0 \leq (x_zoom_end - x_zoom_start / (x_zoom_factor + 1) \% (x_zoom_factor + 1)$$

In English this means that the width of the zoom window must be a multiple of the pixel replication factor.

Lattice C Example

```
#include<dos.h>
set__zoom__window(window)
int window[];
{
    union REGS in,out;
    in.x.ax = 6;
    in.x.bx = getdatas();/* Data segment of window[] */
    in.x.cx = (int) window;
    int86(zoom__int,&in,&out);
```

Query Application Key

Function Code

AX = 7

Arguments

None

Returns

AX = 0/1

Description

In specify mode the END key on the keypad has been reserved for application specific functions. This function returns the current toggle state of that key.

This key has been used in the AutoCAD driver for example, to tell the AutoCAD driver whether or not to pan and scroll using the mouse. When the value returned is a 1 the display window is left alone. When the value returned by this function is a 0 the AutoCAD driver will invoke the Center Zoom Window function each time a new cross-hair cursor is drawn. This has the effect of panning the display using the mouse or the keyboard.

Lattice C Example

```
#include<dos.h>
q__end__key()
{
    uninon REGS in,out;
    in.x.ax = 7;
    int86(zoom__int,&in,&out);
    return(out.x.ax);
}
```

Set Zoom Offset

Function Code

AX = 8

Arguments

BX = x start of zoom offset

CX = y start of zoom offset

Description

This function is used to set the first byte of video memory that will appear in the upper left hand corner of the zoom window. In essence, this function controls panning and scrolling in the zoom window.

Lattice C Example

```
#include<dos.h>
zscroll(x,y)
int x, y;
{
    union REGS in,out;
    in.x.ax = 8;
    in.x.bx = x;
    in.x.cx = y;
    int86(zoom__int,&in,&out);
}
```

NOTE

Following additional Hardware and Zoom software are also available from your Dealer.

1. Sample source code in BASIC.
2. Sample source code in C.
3. Hardware Window/Zoom application generator which:
 - Captures any graphics image.
 - Creates Hardware Zoom functions on captured graphics images (similar to the demonstration software included).
 - Supports:- 640x480 in 16 or 256 colors.
 - 800x600 in 16 or 256 colors.
(available in July 1989)

PROGRAMMING INTERFACE

The functions that are supported as program calls to the adapter are listed in this section. These calls are made through software interrupt 10H (INT 10H).

Functions are identified by the content of the AH register at the time of the call; in some cases, the AH register identifies a group of similar functions and the AL register identifies the specific function. The primary functions are:

Interrupt 10 functions

(AH)	Function
00H	Mode set
01H	Set cursor type
02H	Set cursor position
03H	Read cursor position
04H	Read light pen position (not supported)
05H	Select active display page
06H	Scroll active page up
07H	Scroll active page down
08H	Read character at current cursor position
09H	Write character(s) at current cursor position
0AH	Write character(s) only at current cursor position
0BH	Set color palette
0CH	Write dot
0DH	Read dot
0EH	Write teletypewriter to active page
0FH	Return current video state
10H	Set palette registers
11H	Character generator routine
12H	Alternate select
13H	Write string
1AH	Display combination code
1BH	Return functionality/state information
1CH	Save/restore
14H	Reserved
15H	Reserved
16H	Reserved
17H	Reserved
18H	Reserved
19H	Reserved

BIOS FUNCTION CALLS

All values in hexadecimal unless otherwise noted.

AH=0 Set video mode.

Input:

AL=mode to set (see table below).

Output:

None.

Note: If bit 7 of AL is 1, then the regen buffer is not cleared in modes driven by the board-modes driven by pass through to BIOS may be cleared.

Mode	Type	Colors/ Shades	Alpha Formate	Buffer Start	Box Size	Max. Pages	Display Size
0	A/N	16/256K	40X25	B8000	8X8	8	320X200
0*	A/N	16/256K	40X25	B8000	8X14	8	320X350
0+	A/N	16/256K	40X25	B8000	9X16	8	360X400
1	A/N	16/256K	40X25	B8000	8X8	8	320X200
1*	A/N	16/256K	40X25	B8000	8X14	8	320X350
1+	A/N	16/256K	40X25	B8000	9X16	8	360X400
2	A/N	16/256K	80X25	B8000	8X8	8	640X200
2*	A/N	16/256K	80X25	B8000	8X14	8	640X350
2+	A/N	16/256K	80X25	B8000	9X16	8	720X400
3	A/N	16/256K	80X25	B8000	8X8	8	640X200
3*	A/N	16/256K	80X25	B8000	8X14	8	640X350
3+	A/N	16/256K	80X25	B8000	9X16	8	720X400
4	APA	4/256K	40X25	B8000	8X8	1	320X200
5	APA	4/256K	40X25	B8000	8X8	1	320X200
6	APA	2/256K	80X25	B8000	8X8	1	640X200
7	A/N	4	80X25	B0000	9X14	8	720X350
7+	A/N	4	80X25	B0000	9X16	8	720X400
D	APA	16/256K	40X25	A0000	8X8	8	320X200
E	APA	16/256K	80X25	A0000	8X8	4	640X200
F	APA	4	80X25	A0000	8X14	2	640X350
10	APA	16/256K	80X25	A0000	8X14	2	640X350
11	APA	2/256K	80X30	A0000	8X16	1	640X480
12	APA	16/256K	80X30	A0000	8X16	1	640X480
13	APA	256/256K	40X2	A0000	8x8	1	320X200
18	A/N	4	132X44	B0000	8X8	2	1056X352
19	A/N	4	132X25	B0000	9X14	4	1188X350
1A	A/N	4	132X28	B0000	9X13	4	1188X364
22	A/N	16/256K	132X44	B8000	8X8	2	1056X352

23	A/N	16/256K	132X25	B8000	8X14	4	1056X350
24	A/N	16/256K	132X28	B8000	8X13	4	1056X364
25	APA	16/256K	80X60	A0000	8X8	1	640X480
26	A/N	16/256K	80X65	B8000	8X8	3	640X480
29	APA	16/256K	100X37	A0000	8X16	1	800X600
2A	A/N	16/256K	100X40	B8000	8X15	4	800X600
2D	APA	256/256K	80X25	A0000	8X14	1	640X350
2E	APA	256/256K	80X30	A0000	8X16	1	640X480
30	APA	256/256K	100X37	A0000	8X16	1	800X600
37	APA	16/256K	128X48	A0000	8X16	1	1024X768

A/N = Alphanumeric mode (text)

APA = All points addressable modes (graphics)

* = Extended graphics adapter text modes with 350 scan lines.

+ = 9x16 character cell enhanced text modes with 400 scan lines.

Note that there are a number of distinct text modes available including 132-column monochrome text modes.

Notes:

1. AL bit 7 can be 0 or 1. When set to 1, the MODE SET function does not clear the display buffer.
2. Default modes are 3+ for color monitor and 7+ for monochrome monitor.
3. Modes 0 through 6 emulate IBM color graphics adapter support.
4. Modes 0, 2, and 5 are identical to modes 1, 3, and 4 respectively.
5. There is no hardware cursor in graphics (APA) modes. Altering the hardware cursor type has no effect in these modes.
6. Selecting the number of scan lines in alphanumeric modes is detailed under "(BL) = 30H, Select Scan Lines for Alphanumeric Modes."
7. Use of the equipment flags variable at address 0:410 (applicable bits are <5,47>:
 - * Binary XX11 XXXX = monochrome
 - * Binary XX10 XXXX = color

If there is only one adapter, then in EGA mode, the equipment flag forces a color or monochrome mode to be set, with conversion if necessary.

If there is more than one video adapter in the system, the equipment flag setting at the time of the set mode call determines if the mode should be set in the color or monochrome adapter. If necessary, color modes will be converted to monochrome mode 7 and monochrome modes to color mode 3.

In VGA mode, the equipment flag automatically gets changed to agree with the mode being set.

AH=1 Set cursor type (start and stop scan lines)

Input:

CH=start scan line for cursor.

CL=end scan line for cursor.

Output:

None.

Note: Only bits 0 through 4 should be set.

AH=2 Set cursor position.

Input:

BH=page for which cursor is to be set.

DH=row position cursor is to be set to.

DL=column position cursor is to be set to.

Output:

None.

Note: (0,0) is upper left of screen.

AH=3 Read cursor position.

Input:

BH=page for which cursor is to be read.

Output:

CH=current start scan line for cursor.

CL=current stop scan line for cursor.

DH=row position of cursor in selected page.

DL=column position of cursor in selected page.

AH=4 Read light pen position

Input:

None.

Output:

AH=0 then light pen switch not activated, return values invalid.

1 then light pen switch activated, valid values returned.

BX=pixel column.

CH=raster line.

CX=raster line (new graphics modes).

DH=row of character light pen position.

DL=column of character light pen position.

AH=5 Select active page.

Input:

AL=page to select as active page.

Output:

None.

AH=6 Scroll up active page.

Input:

AL=number of lines rows are to move up.

0 means blank window.

BH=attribute used to fill blank line or lines at bottom.

CH=row of upper left corner of scroll window.

CL=column of upper left corner of scroll window.

DH=row of lower right corner of scroll window.

DL=column of lower right corner of scroll window.

Output:

None.

AH=7 Scroll down active page.

Input:

AL=number of lines rows are to move down.

0 means blank window.

BH=attribute used to fill blank line or lines at top.

CH=row of upper left corner of scroll window.

CL=column of upper left corner of scroll window.

DH=row of lower right corner of scroll window.

DL=column of lower right corner of scroll window.

Output:

None.

AH=8 Read character and attribute at cursor position.

Input:

BH=page to read from.

Output:

AH=attribute of character at cursor position.

AL=character read from cursor position.

Note: Attribute valid in text modes only. Only characters drawn in white matched in graphics modes.

AH=9 Write character and attribute at cursor position.

Input:

AL=character to write at cursor position.

BH=page to write character and attribute to.

BL=attribute to write character with in text mode.

=foreground color in graphics mode.

CX=number of times to write character and attribute.

Output:

None.

Note: If bit 7 of BL is 1 in graphics mode, then the character is XOR'd into video memory, else the character displaces the previous contents of video memory. (XOR not valid in 256 color modes.)

Note: In 256 color modes, the value passed in BH is used as the background color.

AH=0A Write character only at cursor position.

Input:

AL=character to write at cursor position.

BH=page to write character and attribute to.

BL=(in graphics modes only) foreground color for character.

CX=number of times to write character and attribute.

Output:

None.

Note: See notes for function AH=9 above.

AH=0B Color select for color/graphics adapter compatible modes.

Input:

BH=0 means set the background color specified by BL.

<>0 means set the palette specified by BL.

BL=color value to be used:

- * When setting the background color, BL selects any of the 16 colors with a value of 0-15 with bits 0-3.
- * When selecting the palette, BL operates as follows:
 - bit 0=0 selects palette 0 (green/red/brown).
 - bit 0=1 selects palette 1 (cyan/magenta/white).

Output:

None.

Note: In text modes, the set background function sets the border color only. In graphics modes, the set background function sets both the border and background colors.

Note: This function is implemented via emulation, since the EGA does not have the same color registers as the color/graphics adapter.

Note: Actual operation is to set palette register 0 for background, palette register 11h for overscan, and palette registers 1-3 for palette colors 1-3. Palette registers are set in any graphics mode, although this was valid only in 320x200 graphics mode on the color/graphics adapter.

AH=0C Draw graphics pixel.

Input:

AL=color (actually attribute that goes to the palette RAM to draw pixel in.

BH=page to draw pixel in.

CX=screen column to write pixel at.

DX=screen row to write pixel at.

Output:

None.

Note: If bit 7 of AL is 1, then the pixel is XOR'd with the contents of video memory (except in 256 color modes).

AH=0D Read graphics pixel color (actually attribute that goes to the palette RAM).

Input:

BH=page to read pixel from.

CX=screen column to read pixel from.

DX=screen row to read pixel from.

Output:

AL=pixel value read (attribute of pixel).

Note: Interpretation of value returned depends on graphics mode in effect.

AH=0E Write TTY.

Input:

AL=character to write.

BL=color to draw character in graphics mode.

Output:

None.

Note: Carriage return, backspace, line feed, bell are commands, not displayed characters. Cursor is moved to the right after character is displayed, with wrap and scroll at right margin of screen.

AH=0F Return video information.

Input:

None.

Output:

AL=video mode in effect.

AH=text columns supported in current mode.

BH=active display page.

Note: Bit 7 of AL is set to 1 if the regen buffer is not to be cleared when the mode is set.

AH=10 Set EGA palette registers.

AL=0 set color for a single palette register.

Input:

BH=color to set palette register to.

BL=palette register to set color of.

Output:

None.

AL=1 set color for overscan (border color) register.

Input:

BH=color to set overscan register to.

Output:
None.

AL=2 set colors for all 16 palette and the overscan registers.

Input:
ES:DX=address of table organized as follows:
bytes 0-15=colors for palette registers 0-15.
byte 16=color for overscan register.

Output:
None.

AL=3 select interpretation of intensity/blink attribute bit.

Input:
BL=0 select high intensity background.
1 select blinking.

Output:
None.

AL=4 reserved

AL=5 reserved

AL=6 reserved

AL=7 read individual palette register (VGA only)

Input:
BL=palette register to read (range 0 to 15)

Output:
BH=value read

AL=8 read overscan register (VGA only)

Input:
None.

Output:
BH=value read

AL=9 read all palette registers and overscan (VGA only)

Input:
ES:DX points to 17 byte table area

Output:
bytes 0-15 = palette values
bytes 16 = overscan value

AL=10h set individual color register (external palette) (VGA only)

Input:

BX=color register to set
DH=red value to set
CH=green value to set
CL=blue value to set

Output:

None

AL=11h reserved

AL=12h set block of color registers (VGA and XL only)

Input:

ES:DX=pointer to table of color values in RGB format
(i.e. 3 bytes for each entry)
BX=starting index
CX=number of color registers to set

Output:

None

AL=13h select color page (VGA only)

BL=00 select paging mode

Input:

BH=paging mode
0 - selects 4 register pages of 64 registers
1 - selects 16 register pages of 16 registers

Output:

None

BL=01 select page

Input:

BH= Page value (0 to nn, where nn = 3 in page mode 0
and nn = 15 in page mode 1)

AL=14h reserved

AL=15h read individual color register (VGA only).

Input:

BX=color register to read.

Output:

DH=red value read.
CH=green value read.
CL=blue value read.

AL=16h reserved.

AL=17h read block of color registers (VGA only).

Input:

ES:DX=pointer to destination for RGB table (3 bytes/entry).

EX=starting index.

CX=number of color registers read.

Output:

(ES:DX)=table.

AL=18h reserved.

AL=19h reserved.

AL=1Ah read color page state (VGA only).

Input:

None.

Output:

BL=current paging mode.

BH=current page.

AL=1Bh sum colors to gray shades (VGA only).

(This call reads R, G, and B values found in external palette ram and performs a weighted sum <30% red, 59% green and 11% blue>, then writes the result into each R, G, and B component of color register <original data is overwritten>.)

Input:

BX=starting index

CX=number of color registers to sum

AH=11 Font interface

AL=0 load user font into soft font (text mode).

Input:

BH=# of bytes per character

BL=# of soft font to load font into

CX=# of characters to store

DX=offset into table of first character to store

ES:BP=pointer to font to load

Output:

None

AL=1 load ROM monochrome font into soft font (text mode)

Input:

BL=# of soft font to load font into

Output:

None

AL=2 load ROM 8x8 double dot font into soft (text mode)

Input:

BL=# of soft font to load font into

Output:

None

AL=3 select fonts displayed (text mode)

Input:

BL=specification for high/low attribute bit 3:

bits 0-1=soft font # selected when attr bit 3 is 0.

bits 2-3=soft font # selected when attr bit 3 is 1.

Output:

None.

Note: The following funtions AL=1X are the same as AL=0X, except:

- * The active page must be zero.
- * The char_height variable will be recalculated.
- * The crt_rows variable will be recalculated as:
INT((200 | 350 | 400 |)/char_height) - 1
- * Regen_length will be recalculated as:
(crt_rows + 1) * crt_columns * 2
- * The CRTC will be reprogrammed as:
Max scan line = char_height - 1
Cursor start = char_height - 2
Cursor end = char_height - 1
(cursor_type set via set_cursor_type BIOS function)
Vert disp end= ((crt_rows + 1) * char_height) - 1
[char_height*2 above if double scan]
Underline = char__height - 1 (monochrome modes only)

AL=4 load ROM 8x16 font into soft font (text mode)

Input:

BL=# of soft font to load font into.

Output:

None.

AL=10 load user font into soft font (text mode).

Input:

BH=# of bytes per character.

BL=# of soft font to load font into.

CX=# of characters to store.

DX=offset into table of first character to store.

ES:BP=pointer to font to load.

Output:

None.

AL=11 load ROM monochrome font into soft font (text mode).

Input:

BL=# of soft font to load font into.

Output:

None.

AL=12 load ROM 8x8 double dot font into soft font (text mode).

Input:

BL=# of soft font to load font into.

Output:

None.

AL=14 load ROM 8x16 font into soft font (text mode).

Input:

BL=# of soft font to load font into.

Output:

None.

AL=20 set user font chars 128-255 for color/graphics adapter compatible modes (graphics).

Input:

ES:BP=pointer to font to load.

Output:

None.

AL=21 set user font (graphics).

Input:

BL=# of rows on screen, as follows:
0 then user specified # rows.

DL=# rows

1 then 14 rows.

2 then 25 rows.

3 then 43 rows.

CX=character height.

ES:BP=pointer to font to load.

Output:

None.

AL=22 set ROM 8x14 font (graphics).

Input:

BL=# of rows on screen, as follows:
0 then user specified # rows.

DL=# rows.

1 then 14 rows.

2 then 25 rows.

3 then 43 rows.

AL=23 set ROM 8x8 double dot font (graphics).

Input:

BL=# of rows on screen, as follows:
0 then user specified # rows.
DL=# rows.
1 then 14 rows.
2 then 25 rows.
3 then 43 rows.

AL=24 set ROM 8x16 font (graphics).

Input:

BL=# of rows on screen, as follows:
0 then user specified # rows.
DL=# rows.
1 then 14 rows.
2 then 25 rows.
3 then 43 rows.

AL=30 return font information.

Input:

BH=0 return pointer to upper 128 graphics characters
(INT 01Fh pointer-color/graphics adapter compatible
modes).
BH=1 return pointer to graphics font (INT 043h pointer).
BH=2 return pointer to ROM 8x14 font.
BH=3 return pointer to ROM 8x8 double dot font.
BH=4 return pointer to top half of ROM 8x8 double dot
font.
BH=5 return pointer to ROM supplement from 9x14 text.
VGA=> BH=6 return pointer to ROM 8x16 font.
VGA=> BH=7 return pointer to ROM supplement from 9x16 text.

Output:

CX=char_height.
DL=crt_rows - 1.
ES:BP=pointer to table selected by BH.

AH=12 Return EGA information or select alternate printscreen
handler.

BL=10 return information.

Input:

None.

Output:

BH=0 color mode, addressed at 03DX.
=1 monochrome mode, addressing at 03BX.

BL=installed video memory as follows:

0 = 64K bytes installed

1 = 128K bytes installed

2 = 192k bytes installed

3 = 256K bytes installed

CH=feature bits (bits 4-7 of info_1 shifted right)

CL=switches (bits 0-3 of info_1)

BL=20 select this BIOS's print screen routine, which supports all modes of this BIOS.

Input:

None.

Output:

None.

Note: This function selects the print screen routine built into this ROM to replace the standard BIOS print screen routine.

BL=30 select scan lines for text modes.

Input:

AL=scan lines to set (takes effect on next mode change).

0 = 200 scan lines

1 = 350 scan lines

2 = 400 scan lines

Output:

AL=12h

BL=31 set default palette load.

Input:

AL=# enable/disable palette loading.

0 = enable palette loading.

1 = disable palette loading.

Output:

AL=12h

BL=32 Enable/disable video.

Input:

AL=# enable/disable video.

0 = enable video.

1 = disable video.

Output:

AL=12h

BL=33 Enable/disable gray scale summing.

Input:

AL=# enable/disable gray scale summing.
0 = enable summing.
1 = disable summing.

Output:

AL=12h

BL=34 Enable/disable cursor emulation.

Input:

AL=# enable/disable cursor emulation.
0 = enable emulation.
1 = disable emulation.

Output:

AL=12h

BL=35 select/deselect display

Input:

Buffers for adapter and planar video are initialized then:

AL=# select/deselect adapter/planar video.

0 = initial deselect adapter video

1 = initial select planar video

2 = deselect active display

3 = select inactive display

ES:DX=pointer to 128-byte buffer

Output:

AL=12h

BL=36 Enable/disable video output.

Input:

AL=# enable/disable video output.

0 = enable video output

1 = disable video output

Output:

AL=12h

AH=13 Write text string.

Input:

AL=0 text string is characters only. Cursor not moved from original position.

BL=attribute to write text string with.

1 text string is characters only. Cursor moved to end of text string.

BL=attribute to write text string with.

2 text string is alternating character/attribute sequence. Cursor not moved from original position.

3 text string is alternating character/attribute sequence. Cursor moved to end of text string.
BH=page to write text string to.
CX=count of characters (not bytes) in string to display.
DH=row position at which to start displaying string.
DL=column position at which to begin displaying string.
BS:BP=pointer to text string to be written.

Note: Scroll, backspace, carriage return, if any, will take place in the active page only.

AH=1A Read/write display code function.

Display combination codes:

00 - No display
01 - Monochrome with 5151
02 - CGA with 5153/4
03 - Reserved
04 - EGA with 5153/4
05 - EGA with 5151
06 - Professional Graphics System with 5175
07 - VGA with analog BW
08 - VGA with analog color
09 - Reserved
0A - System 30 with 5153/4
0B - System 30 with analog BW
0C - System 30 with color
0D to FE - Reserved
FF - Unknown

AL=0 read display code.

Input:

None.

Output:

AL=1Ah

BL=active display code

BH=alternate display code

AL=1 write display code

Input:

BL=active display code

BH=alternate display code

Output:

AL=1Ah

AH=18 Return functionality/state information

Input:

BX=implementation type

ES:DI=buffer (40h bytes)

Output:

AL=1Bh

Buffer, in the following format:

<u>Offset</u>	<u>Type</u>	<u>Description</u>
00	word	Offset to static functionality information
02	word	Segment to static functionality information
04	byte	Video mode
05	word	Number of columns on screen
07	word	Length of regen buffer
09	word	Start address of regen buffer (offset)
0B	8*word	Cursor position for 8 pages (row, column)
1B	word	Cursor mode setting (start, end)
1D	byte	Active page
1E	word	CRTC address
20	byte	Current setting of 3x8 register (mode register)
21	byte	Current setting of 3x9 register
22	byte	Rows on screen
23	word	Character height
25	byte	Active display combination code
26	byte	Alternate display combination code
27	word	Colors supported for current video mode
29	byte	Display pages supported for current video mode
2A	byte	Scan lines in current video mode 0=200 1=350 2=400 3=480 5=512 (Note: IBM reserves this) 6=600 (Note: IBM reserves this) 7-255=reserved
2B	byte	Primary character block 0=block 0 1=block 1 . . . 255=block 255
2C	byte	Secondary character block

2D	byte	Miscellaneous state information 0-1=all modes on all monitors active 1-1=summing active 2-1=monochrome active 3-1=mode set default palette loading disabled 4-1=cursor emulation active 5-0=background intensity / 1=blinking 6-7=reserved
2E	byte	Reserved
2F	byte	Reserved
30	byte	Reserved
31	byte	Video memory available 0 = 64KB 1 = 128KB 2 = 192KB 3 = 256KB 4-255=reserved
32	byte	Save pointer state information 0 512 character set active 1 dynamic save area active 2 alpha font override active 3 graphics font override active 4 palette override active 5 DCC extensive active 6-7=reserved
33-3F	byte	Reserved

Format of static functional table:

bit flags: 0=not supported
1=supported

<u>Offset</u>	<u>Type</u>	<u>Description</u>
00	byte	Video modes 0 mode 0 1 mode 1 2 mode 2 3 mode 3 4 mode 4 5 mode 5 6 mode 6 7 mode 7

01	byte	Video modes 0 mode 8 1 mode 9 2 mode A 3 mode B 4 mode C 5 mode D 6 mode E 7 mode F
02	byte	Video mode 0 mode 10 1 mode 11 2 mode 12 3 mode 13 4 6-7 reserved
03	byte	Video modes (IBM reserves this) 0 mode 18 1 mode 19 2 mode 1A 3 mode 1B 4 mode 1C 5 mode 1D 6 mode 1E 7 mode 1F
04	byte	Video modes (IBM reserves this) 0 mode 20 1 mode 21 2 mode 22 3 mode 23 4 mode 24 5 mode 25 6 mode 26 7 mode 27
05	byte	Video modes (IBM reserves this) 0 mode 28 1 mode 29 2 mode 2A 3-7 reserved
06	byte	Reserved
07	byte	Scan lines available in text mode 0 200 scan lines 1 350 scan lines 2 400 scan lines 3-7 reserved
08	byte	Character blocks available in text mode

09	byte	Maximum number of active character blocks in text modes
0A	byte	Miscellaneous functions
		0 all modes on all monitors
		1 summing
		2 character font loading
		3 mode set default palette loading
		4 cursor emulation
		5 EGA palette
		6 color palette
		7 color paging
0B	byte	Miscellaneous functions
		0 light pen
		1 save/restore
		2 background intensity / blinking control
		3 DCC
		4-7 reserved
0C	byte	Reserved
0D	byte	Reserved
0E	byte	Save pointer functions
		0 512 character set
		1 dynamic save area
		2 alpha font override
		3 graphics font override
		4 palette override
		5 DDC extension
		6-7 reserved
0F	byte	Reserved

AH=1C Save/restore video state

AL=0 return save/restore state buffer size

Input:

CX=requested states

output:

AL=1Ch

BX=# of 64 byte blocks needed for save buffer

AL=1 save state

Input:

CX=requested states

ES:BX=pointer to save area

Output:

(ES:BX) area modified

AL=1Ch

AL=2 restore state

Input:

CX=requested states

ES:BX=pointer to save area

Output:

AL=1Ch

Requested states in CX - defined as follows:

bit 0=1 - save/restore video hardware state

bit 1=1 - save/restore video BIOS date area

bit 2=1 - save/restore video external palette

bits 3-F=reserved.

HARDWARE REFERENCE

UNDERSTANDING YOUR QTEC VGA1024 ADAPTER

The Qtec VGA1024 consists of the following key components and functions:

1. The Tseng Labs ET3000-AX video ASIC chip (CRTC)
2. The memory
3. The digital-to-analog converter chip
4. Oscillators
5. Video BIOS
6. VGA-SYNC ROM
7. PC bus connector

The Tseng Labs ET3000-AX video ASIC chip (CRTC)

This is the heart of the Qtec VGA1024 adapter. It defines the card's hardware compatibilities, resolutions, speed and functionalities. The rest of the components on the board are peripherals to the ET3000-AX chip.

The Memory

a) Memory size

Your Qtec VGA1024 adapter consists of either 256KB DRAM or 512KB DRAM. The size of memory on the adapter determines the graphics resolutions and number of colors the adapter provides.

The following resolutions/colors requires 256KB DRAM

- . 320x200 in 256 colors
- . 640x350 in 16 colors
- . 640x480 in 16 colors
- . 800x600 in 16 colors

The following resolutions/colors requires 512KB DRAM

- . 640x480 in 256 colors
- . 800x600 in 256 colors
- . 1024x768 in 16 colors

b) Memory type and speed

Qtec VGA1024 uses 64Kx4 (4464) DRAM. 8 pieces of 64Kx4 DRAM will comprise 256KB and 16 pieces of 64Kx4 DRAM will comprise 512KB.

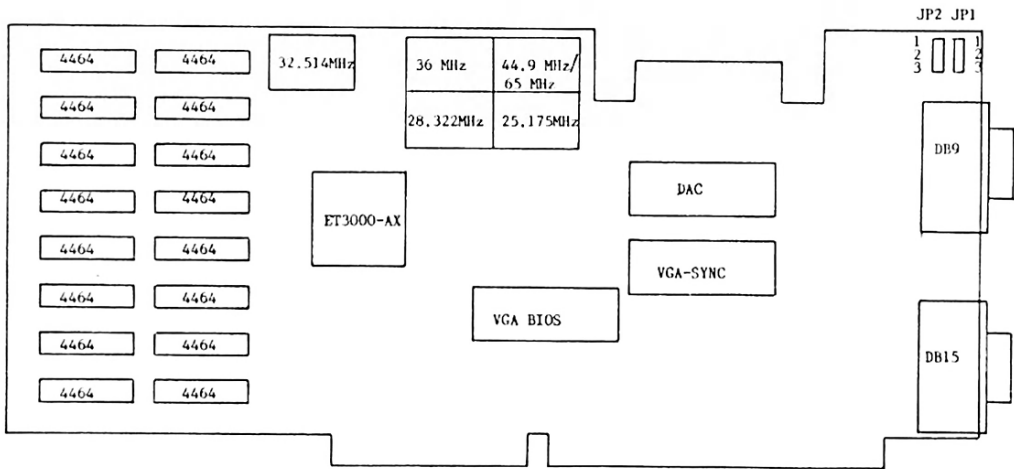
DRAM speed of 120 nanosecond is critical but acceptable in most cases. DRAM speed of 100 nanosecond is recommended especially when using graphics resolution of 800x600 in 256 colors and 1024x768 non-interlaced mode (see oscillators section for details).

The digital-to-analog converter chip

The Qtec VGA1024 basically functions in digital mode. However, the VGA and new-generation monitors operate in analog mode. The digital-to-analog chip converts the digital signals into analog signals before they are transmitted to the analog monitor.

Oscillators

Oscillators are the sources of various timing frequencies required to generate various resolutions of the display adapter. Following is a table of your Qtec VGA1024's oscillators, their resolutions and frequencies:



Qtec VGA1024 board

Qttec VGA1024 board with 512KB memory

Oscillator Speed (MHz)	Resolution	Horizontal Frequency (KHz)	Vertical Frequency (Hz)
32.514 (16.257)	640x350 (EGA digital)	21.85	60
	720x350 (Hercules/MDA digital)	18.43	50
25.175	320x200 (VGA & CGA)	31.5	70
	640x400 (double scanned)	31.5	70
	640x350 (EGA in VGA mode)	31.5	70
	640x480 (VGA graphics)	31.5	60
28.322	720x400 (80x25 text display)	31.5	70
	1056x352 (132x44 text display)	22.7	60
	1056x350 (132x25 text display)	22.7	60
	1056x364 (132x28 text display)	22.7	60
36.000	800x600 (extended VGA graphics, 16/256 colors)	35.5	56
44.900	800x600 (extended VGA graphics, 16 colors)	38.0	60
	1024x768 (extended VGA graphics, interlaced mode)	35.5	43.5
65.000 (option)*	1024x768 (extended VGA graphics, non-interlaced mode)	48.5	60

Note: *

1. Your Qttec VGA1024 16-bit version adapter comes with 5 oscillators (25.175MHz, 28.322MHz, 32.514MHz, 36.000MHz, 44.900MHz) and either 512KB or 256KB memory.

The resolutions stated in this table are based on the memory size of 512KB. If your adapter has 256KB memory, you will not have all resolutions stated. You may upgrade your adapter to obtain maximum resolutions and colors by adding additional 256KB memory into the memory sockets provided on the adapter.

2. For 1024x768 non-interlaced mode operation, please specify such requirement when ordering the Qttec VGA1024 board. Field upgrade may not be possible.

Video BIOS

This is the video Basic Input-Output System. It is the software interface for programmer to program the Qtec VGA1024 adapter. It simplifies and unifies programming of the Qtec VGA1024 adapter.

The video BIOS is being constantly revised to improve compatibility with PC system BIOS, system software, application software, device driver software.

VGA-SYNC ROM

Some Hercules, CGA, EGA software (eg. Microsoft Windows) by-pass the BIOS and generate their respective frequencies which are different/incompatible to the VGA monitor frequency. The VGA-Sync converts these frequencies to the VGA monitor's frequency, therefore, allowing you to run all pre-VGA software standards on a VGA monitor. VGA-Sync is a transparent, fast and reliable method to assure full software compatibility.

PC Bus Connector

Qtec VGA1024 comes with 16-bit bus which provides faster operation compared to other 8-bit bus VGA board. The 16-bit Qtec VGA1024 is also compatible with the PC's 8-bit bus. It automatically switches itself to 8-bit operation when inserted into an 8-bit slot.

SERVICE

IN CASE OF DIFFICULTY

If you have problems after installation, one of the following is most probably the cause.

- a. Ensure that all cables are properly connected, and that all plugs are firmly seated in their sockets.
- b. Ensure that the display monitor is properly connected and that its power is turned on.

Power OFF the computer system and all other connected devices before checking the following:

- c. Ensure that the switches on the Qtec VGA1024 board are set properly and that the board is seated in the expansion slot.
- d. Ensure that the system motherboard switches/jumper(s) are set properly for use with the Qtec VGA1024 board.
- e. Ensure that no other switch settings on the motherboard have been accidentally changed. Refer to the documentation provided with your computer to determine the correct switch settings.

If checking these items does not locate the problem, there may be a malfunction of the computer system, display monitor or the Qtec VGA1024 board. Please fill-in the Problem Report Form on the next page to assist your computer Dealer in locating the problem.

PROBLEM REPORT FORM

DATE: _____

COMPANY: _____ PHONE: _____

CONTACT: _____ FAX: _____

INFORMATION ON PURCHASED VIDEO BOARD:

BOARD MODEL: _____ PART NO. _____ REV. _____

OSCILLATORS ON BOARD: (MHZ)

___ 32.514 ___ 25.175 ___ 28.322 ___ 36.0 ___ 44.9 ___ 65.0

MEMORY SIZE ON BOARD: ___ 512KB ___ 256KB

VIDEO BIOS DATE: _____ VGA-SYNC DATE: _____

DIP-SWITCH SETTING: SWITCH 1 ___ ON ___ OFF
 SWITCH 2 ___ ON ___ OFF
 SWITCH 3 ___ ON ___ OFF
 SWITCH 4 ___ ON ___ OFF

JUMPER SETTING: JP1 ___ 1 & 2 ___ 2 & 3
 JP2 ___ 1 & 2 ___ 2 & 3

INFORMATION ON COMPUTER SYSTEM:

COMPUTER TYPE: ___ PC ___ PC/XT ___ PC/AT ___ 386

___ PS/2 MODEL ___ OTHERS: _____

CPU CHIP SET: _____ CPU SPEED: _____

BUS SPEED: _____ WAIT STATE: _____

PROBLEM EXISTS AT 8 MHZ, 0-WAITSTATE? ___ YES ___ NO

BIOS AUTHOR: _____ VERSION: _____

INFORMATION ON MONITORS:

TYPE: _____ MODEL: _____ TTL: _____ ANALOG: _____

TYPE: _____ MODEL: _____ TTL: _____ ANALOG: _____

(Fill in both if you connect 2 monitors to the Qttec VGA1024).

INFORMATION ON ADD-IN BOARDS:

OTHER GRAPHICS BOARD _____

MEMORY BOARD _____

MULTIFUNCTION BOARD _____

LAN BOARD _____

OTHERS _____

SOFTWARE INFORMATION:

OPERATING SYSTEM (version):

MS-DOS _____ PC-DOS _____ OS/2 _____

XENIX _____ OTHERS: _____

APPLICATION SOFTWARE:

_____ VERSION: _____

_____ VERSION: _____

_____ VERSION: _____

PROBLEM DESCRIPTION:

(If problem is intermittent, please state so)

Does the same problem exist in other computers made by different manufacturer using different BIOS?

___ Yes ___ No Remark: _____

Does the same problem exist with other Qtec VGA1024 boards or other VGA boards?

___ Yes ___ No Remark: _____

SERVICE INFORMATION

If your product needs repair, return it to the Dealer from whom it was purchased.

If the repair is required during the warranty period, enclose proof of purchase with the returned product. During the warranty, your product will be repaired or replaced without charge.

If the repair is required after the warranty period, there will be a service charge. Contact your Dealer for repair prices for any out of warranty product.

To return your product for service, package the product securely and mail it post-paid. Your Dealer and the Manufacturer will not be responsible for damage due to shipping.

Remember to enclose your proof of purchase and a brief description of the problem to you Dealer.

LIMITED WARRANTY

The Manufacturer warrants to the original purchaser of this product that it shall be free of defects resulting from faulty manufacture or components for a period of one (1) year from the date of sale. Defects covered by this Limited Warranty shall be corrected either by repair or, at the Manufacturer's election, by replacement. In the event of replacement, the replacement unit will be warranted for the remainder of the original one (1) year period or thirty (30) days, whichever is longer. THERE ARE NO OTHER ORAL OR WRITTEN WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THOSE OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. ANY IMPLIED WARRANTIES ARE LIMITED IN DURATION TO ONE (1) YEAR FROM THE DATE OF SALE. This Limited Warranty is non-transferable and does not apply if the product has been damaged by accident, abuse, misuse, modification, misapplication, shipment to the Manufacturer or service by someone other than the Manufacturer. Transportation charges to the Manufacturer are not covered by this Limited Warranty. To be eligible-for warranty service, a defective product must be sent to and received by the Manufacturer within fifteen (15) months of the date of sale and be accompanied by a copy of the sales receipt. The Manufacturer does not warrant that this product will meet your requirements; it is your sole responsibility to determine the suitability of this product for your purposes.

THE MANUFACTURER'S SOLE OBLIGATION AND LIABILITY UNDER THIS WARRANTY IS LIMITED TO THE REPAIR OR REPLACEMENT OF A DEFECTIVE PRODUCT. TICL SHALL NOT, IN ANY EVENT, BE LIABLE TO THE PURCHASER OR ANY THIRD PARTY FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, DAMAGES RESULTING FROM INTERRUPTION OF SERVICE AND LOSS OF BUSINESS) OR LIABILITY IN TORT RELATING TO THIS PRODUCT OR RESULTING FROM ITS USE OR POSSESSION.

In order to protect your Warranty, and to assure that your Dealer can most effectively meet your current and future needs, please complete the attached Warranty Registration Card and return to your Dealer within 30 days after purchase.

Please note you Serial Number Here _____
and Date of Purchase _____ and retain this portion of the
Warranty for your records. Thank you.

