Table of Contents

Checklist

In addition to your manual, your Ultragraphics carton should contain the following items:

- Ultragraphics (High Resolution Monochrome Adapter)

- One Everex utility diskette

- One Ultragraphics demonstration diskette

- Owner Registration and Warranty Card

- Foam padding and packing materials.

If any of these items are missing or damaged, please consult your place of purchase.

NOTE 1: Save all the Everex packaging materials that accompany the Ultragraphics. If you ever ship the Ultragraphics for any reason without adequate packaging, your warranty may be affected. As with any major purchase you make, keep the sales invoice and receipt.

NOTE 2: Circuit boards are sensitive to static electricity which can damage their delicate electronics. You can easily pick up static electricity, especially in dry weather or in carpeted rooms. To avoid damaging a board, rid your hands of static by touching something metal before touching the board, then handle it by the edges only.

Section 1: How to Use This Manual

Section 2 presents the features and default settings of the Ultragraphics. If you are already familiar with graphics boards, you can use the installation summary in Section 2.3 to get the Ultragraphics up and running right away. If you are a first-time user or want more information about installing the Ultragraphics, read Sections 3 and 4 for more comprehensive configuration and installation instructions.

Section 3 describes the jumper and switch settings used to configure the Ultragraphics.

Section 4 provides step-by-step instructions for installing and testing your Ultragraphics.

Section 5 introduces the utility software that accompanies your Ultragraphics, and explains the installation and use of the Everex Windows, AutoCAD, Ventura Publishing, and GEM drivers, and the EV16X32 Extended Fonts.

Section 6 explains how to get help if you encounter any problems installing or operating the Ultragraphics.

Appendix 1 serves as a technical reference should you want more information about the Ultragraphics' hardware specifications and register settings.

Appendix 2 contains technical information to assist you in programming the hardware I/O ports.

Section 2: Introduction

2.1 Features

The Ultragraphics is one of the most versatile high-resolution monochrome video adapters on the market. Your Ultragraphics offers you all of following features:

- 1664x1200 pixel display with landscape scanning.

- Horizontal scan frequency of 74.63KHz.

- Two color or 1 bit per pixel.

- Vertical non-interlacing scan frequency of 60Hz.

- Option to enable or disable on board 16KB BIOS.

- Ability to set jumpers to any four continuous I/O programmable addresses.

- Software configurable 16KB memory window for four display read/write pointer.

- Hardware vertical panning or scrolling.

- Hardware-switchable reverse video.

- Ability to boot up as a stand-alone monitor card.

- Ability to emulate most INT 10 functions.

- Up to two pages of screen memory.

- Hardware rapid screen clearing, and rapid fill with "1" or with latch data.

- Capability to write with latch data.

- Eight bytes write-once function.

2.2 Physical Layout

Figure 1 presents a diagram of your Ultragraphics with all the jumper locations you need to know.
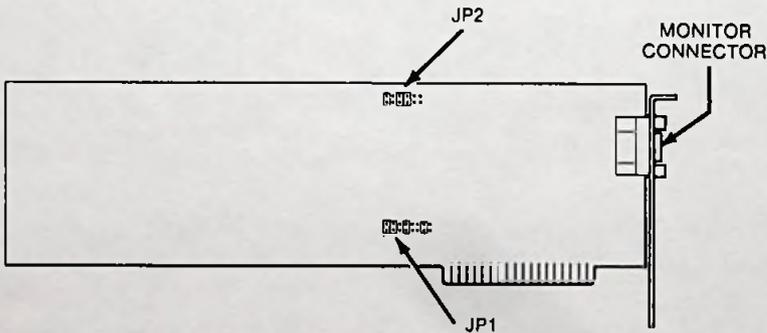
Figure 1. Jumper Locations

2.3 Installation Summary

1. Make sure that you have a high-resolution monochrome monitor. Two types of monitor are recommended for use with the Ultragraphics adapter (see Section 3.1 for more information about selecting a monitor).

    If you use the 19" Moniterm Monitor, please be sure to install the monitor cable correctly (see Section 3.4).

2. Verify that the default configuration for the Ultragraphics matches the way you will be using the board, and that there are no hardware conflicts (see Table 1 following this Summary).

3. Do you want to change the factory default settings?

    If YES, refer to Section 3 and configure as necessary.

4. Install the Ultragraphics in any available expansion slot, and test the board using the Everex utility program (Section 4).

5. Reboot your system.

6. That's it! You have completed installation of your Ultragraphics.

TABLE 1
Ultragraphics Factory Default Settings

Function	Jumper Name	Default Setting	Default Positions	Jumper Meaning
I/O Port Address	JP1	2D0-2D3	1,2 = OFF	Address A9
			3,4 = ON	Address A8
			5,6 = OFF	Address A7
			7,8 = OFF	Address A6
			9,10 = ON	Address A5
			11,12 = OFF	Address A4
			13,14 = ON	Address A3
			15,16 = ON	Address A2
BIOS ROM (16KB)	JP2	CC000-CFFFF	1,2 = OFF	Address A14
			3,4 = OFF	Address A15
			5,6 = ON	Address A16
			7,8 = ON	Address A17
			9,10 = OFF	BIOS Enable
			11,12 = ON	Factory Setting

NOTE: When jumper is ON, = logic 0. When jumper is OFF, = logic 1.

Section 3: Configuration

3.1 Selecting a Monitor

Two types of monitors are recommended for use with the
Ultragraphics adapter:

1) 19" Moniterm model VY1000
   Everex part number MON-00010-00
2) 15" Princeton model LM-301

Note: Everex carries only the 19" Moniterm monitor.

If you have any doubt about whether your monitor is
high-resolution, contact the dealer from whom you
purchased the monitor.

3.2 Default Jumper Settings

Figure 2 provides the factory default settings for all functions of the Ultragraphics. Make sure that your adapter is set up the way you plan to use it. If you would like to change any of the default settings, turn to Section 3.3 for more information.
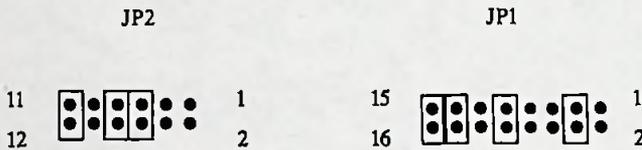
Figure 2. Default Jumper Settings for the Ultragraphics

NOTE: JP1 is set to I/O address 2D0-2D3
JP2 is set to BIOS ROM address CC000-CFFFF.
When jumper is ON = logic 0.
When jumper is OFF = logic 1.

3.3 Changing the Default Jumper Settings

The Ultragraphics communicates with your computer by the way its jumpers are set. You can change the I/O or memory addresses by changing the jumper settings. Refer to the following figure to determine the location of the jumper(s) you would like to change.
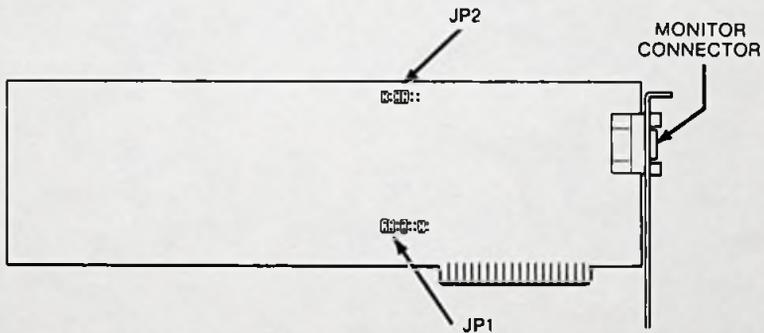
Figure 3. Jumper Locations on the Ultragraphics

Helpful Hint: Each black plastic jumper shunt has a hole which simplifies its removal from the connector pins. "Off" means remove the jumper shunt from the pins. Leave the shunt on one pin only when you want to take the jumper shunt off. This will make the shunts easy to find when you want to reconnect the pins.

To remove or adjust the placement of the jumper plugs, bend a paper clip, insert the bent end into the hole and pull the jumper up. You can also use a paper clip to replace the jumper on the connector pins (See Figure 4).
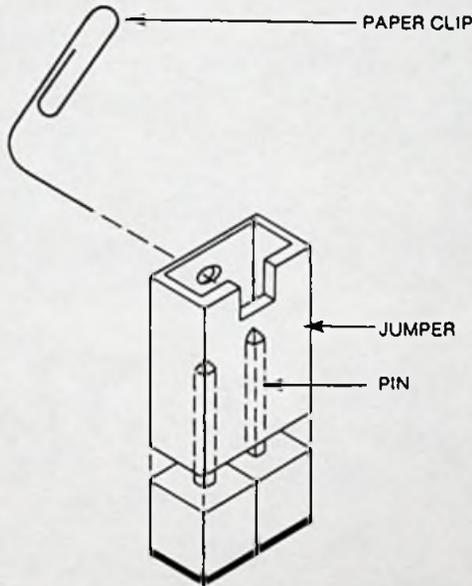
Figure 4. Moving Jumper Shunts

3.3.1 Choosing the I/O Port Address

The I/O address for the Ultragraphics is controlled by an eight-position jumper located at JP1. The Ultragraphics leaves the factory configured for I/O address 2D0-2D3.

<div align="center">

TABLE 2
I/O Port Addresses

</div>

Jumper	I/O Address
15,16	A2
13,14	A3
11,12	A4
9,10	A5
7, 8	A6
5, 6	A7
3, 4	A8
1, 2	A9

NOTE: When the jumper shunt is ON, the logic = 0. When the jumper shunt is OFF, logic = 1.

Examples of I/O addresses at JP1:

1. Address = 2D0-2D3.
    (1,2),(5,6),(7,8), and (11,12) = OFF (no shunt).
    (3,4),(9,10),(13,14), and (15,16) = ON (shunt in place).
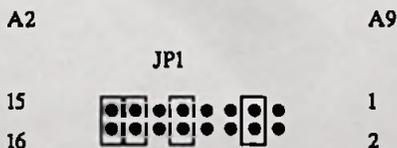
Figure 5. I/O Address 2D0-2D3

2. Address = 2D4-2D7.
    (1,2),(5,6),(7,8),(11,12), and (15,16) = **OFF**.
    (3,4),(9,10), and (13,14) = **ON**.

A2   A9

                    JP1

15   •|•|•|•|•|•|• •|•|•   1
16   •|•|•|•|•|•|• •|•|•   2
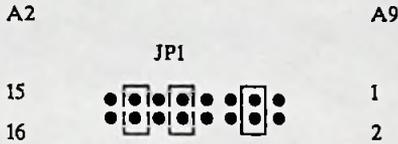
Figure 6. I/O Address 2D4-2D7

3.3.2 Enabling/Disabling the BIOS ROM

The Ultragraphics offers a BIOS ROM provision which supports its display functions. The BIOS ROM is decoded and enabled by jumper pins 9 and 10 located at JP2. When jumpers 9 and 10 are in the OFF position, the BIOS ROM is enabled. Pins 11 and 12 at JP2 select whether the BIOS is 8KB or 16KB. If pins 11 and 12 are ON, the BIOS is 16KB. If pins 11 and 12 are OFF, the BIOS is 8KB. However, these two jumper sets (9,10 and 11,12) are factory-preset. The jumpers from 1 to 8 on JP2 select the BIOS ROM address. Table 3 lists the BIOS ROM addresses available by changing the jumper settings at JP2.

TABLE 3
The BIOS ROM Jumper Settings

System Address JP2 BIOS ROM Address	A17 (7,8)	A16 (5,6)	A15 (3,4)	A14 (1,2)
**C0000-C3FFF	ON	ON	ON	ON
**C4000-C7FFF	ON	ON	ON	OFF
C8000-CBFFF	ON	ON	OFF	ON
* CC000-CFFFF	ON	ON	OFF	OFF
D0000-D3FFF	ON	OFF	ON	ON
D4000-D7FFF	ON	OFF	ON	OFF
D8000-DBFFF	ON	OFF	OFF	ON
DC000-DFFFF	ON	OFF	OFF	OFF
***E0000-E3FFF	OFF	ON	ON	ON
***E4000-E7FFF	OFF	ON	ON	OFF
***E8000-EBFFF	OFF	ON	OFF	ON
***EC000-EFFFF	OFF	ON	OFF	OFF
***F0000-F3FFF	OFF	OFF	ON	ON

NOTE: ON and OFF signify logic "0" and logic "1" for the system address.

* Default manufacturing setting.

** Set the BIOS ROM to one of these addresses to use the Ultragraphics as a stand-alone video card.

*** These addresses may not be used on an IBM AT or compatible system.

3.4 Monitor Cable Installation

The video cable for the 19" Moniterm Monitor is polarized. The side with the BLACK plastic shrink tube connects to the Ultragraphics adapter; the other side, with a plastic shrink tube in any color except black, connects to the monitor.

The 15" Princeton LM-301 monitor includes a non-polarized cable. The Princeton cable connectors are interchangeable, so you can connect either side of the cable to the Ultragraphics or monitor.

NOTE: Your high-resolution monitor supplies -5V to an ECL logic circuit on the Ultragraphics, so it is important that you always turn off both the monitor and the system before removing the cable. For the same reason, you should always turn the monitor power on before you turn on your system.

3.5 Ultragraphics as a Stand-Alone Video Card

The Ultragraphics adapter can also boot up as a stand-alone video adapter. If you plan to use the Ultragraphics as a stand-alone video card, you will need to set its BIOS ROM at jumper location JP2 to inform the system BIOS that there is a video card installed.

Valid Addresses are C0000-C3FFF and C4000-C7FFF. Figure 7 illustrates the proper jumper setting at JP2 for each of these addresses.

C0000-C3FFF   **C4000-C7FFF**

JP2   JP2

11 ▢•▢▢▢ 1   11 ▢•▢▢• 1
12 ▢•▢▢▢ 2   12 ▢•▢▢• 2
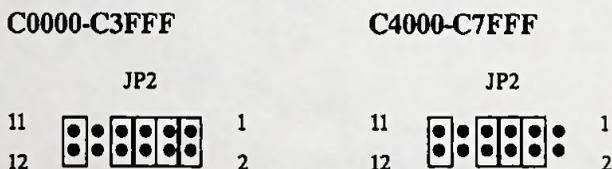
Figure 7. JP2 BIOS ROM Settings

You will also need to set the dipswitch block SW1 on your system board for enhanced monochrome display. See Section 4.1 for details on this procedure.

If you use the Ultragraphics as a stand-alone video card with the IBM AT BIOS, the first line of the display will appear distorted during the bootup memory check. The IBM AT BIOS uses the protected mode during this operation, which prevents the system from communicating with the BIOS to display normal text. The resulting distorted display during the memory check does not affect bootup or system operation, and should be ignored.

Section 4: Installation

4.1 Physical Installation

Before You Begin: Remove your monitor from the top of your computer and clear an area around your desk leaving plenty of room to work.

1. Turn OFF the computer's power. Turn the system unit so that you have easy access to the back and disconnect the power cord. **Make sure there is no power to your system!** Also turn off the power to all peripheral devices attached to your computer (printers, external drives, etc.).

2. Remove the retaining screws that hold the cover on your system and set them aside. Slide the cover forward. When it stops sliding, tilt the cover up and lift it away. Refer to Figure 8.
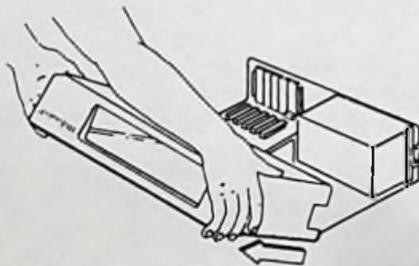
Figure 8. Removing The Cover

3. If you've never looked inside your system before, you may be bewildered by all the cables and boards. Try not to disconnect anything, but push the cables gently to one side to see underneath them.

4. If the Ultragraphics will be the only video card in your system, you will need to set the system switch SW1 for the appropriate video display.

    a. **In the IBM PC and XT,** locate SW1 on the floor of your system, behind the left drive bank. Set switches 5 and 6 to the ON position for enhanced video display. Please see Figure 9A.

    NOTE: The IBM PC and some compatibles have a second dipswitch block called SW2 on the system board near SW1. Be careful not to confuse the two.

MONOCHROME
80×25

KEY   ON · PUSH SWITCH UP   NO CHANGE

       OFF · PUSH SWITCH DOWN
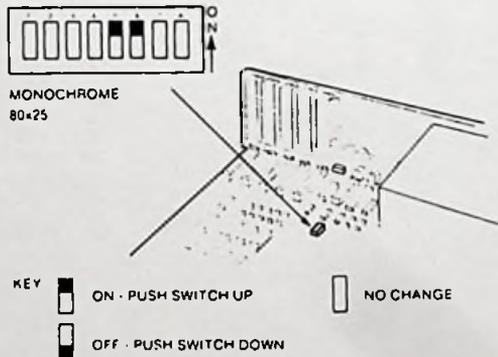
Figure 9A. SW1 in the IBM PC and PC XT

b. **In the IBM AT,** you will need to set SW1 for monochrome display. SW1 is a two-position slide switch on the floor of your system behind the left drive bank. Move the switch toward the back of the chassis for monochrome display. See Figure 9B.
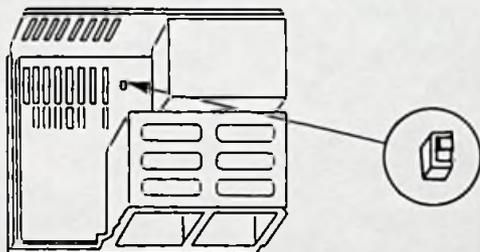
Figure 9B. SW1 in the IBM AT

5. Find an available expansion slot and remove the screw that holds the slot cover in place. Then remove the expansion slot cover. See Figure 10.
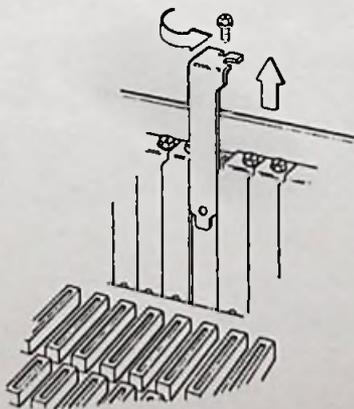
Figure 10. Removing the Expansion Slot Cover

6. Hold the Ultragraphics by the top edge and carefully push the board into the available slot. Make sure that the gold-plated connector fingers on the bottom of the board slide all the way into the slot. The mounting bracket should be aligned with the system's bracket. See Figure 11.
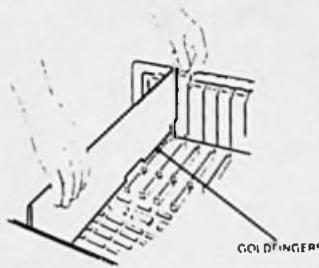
Figure 11. Installing the Ultragraphics

7. Insert the slot cover screw that you removed earlier, and tighten it to secure the Ultragraphics board into the unit.

8. Replace the computer's cover. You can slide the cover on without lifting the computer. Insert and tighten all the screws you removed from the computer's back panel.

9. Reconnect the power cord and any other cables which were disconnected earlier.

NOTE: The video cable for the Ultragraphics is polarized (one side is marked for the monitor, the other for the Ultragraphics). Make sure this cable is connected properly. Your high-resolution monitor supplies -5V to an ECL logic circuit on the Ultragraphics, so it is important that you always turn on the monitor BEFORE you turn on your computer.

10. Boot up the system with DOS (either on a diskette or from a hard disk drive).

11. If the Ultragraphics is the only video adapter in your system and you have an IBM AT or compatible system, run the SETUP Program on the Advanced Diagnostics diskette (or an equivalent program for compatible systems) and indicate that you have monochrome display.

12. Test the Ultragraphics with the diagnostic program included on the Everex utility diskette.

13. Congratulations! Your Ultragraphics is installed and ready to use. Go on to Section 4.2 to test the Ultragraphics, then to Section 5 for instructions on installing and using the Everex utility software programs.

4.2 Testing the Ultragraphics

The Ultragraphics diagnostic program will only take a few minutes to run and will assure you that your Ultragraphics is correctly configured for your system, and that all hardware and memory chips are working properly.

To Run the Ultragraphics Test:

Insert the Everex utility diskette and type:

    ULTRATST ID [test times]

1. The **ID** option specifies which features of the Ultragraphics will be tested. The Ultragraphics program menu will offer you four choices for the ID:

    [0] = Test All Features
    [1] = Test Four Read/Write Pointers
    [2] = Test 512K Memory
    [3] = Test AUTOFILL Functions
    [4] = Draw Graphics Patterns

2. The **[test times]** entry determines the number of times the test will run. Acceptable values are from 1 to 65535; the default value is 1.

Examples:

The command line: **Indicates the following:**

ULTRATST 0   Test all features once
ULTRATST 0 2   Test all features twice
ULTRATST 2 12   Test 512K memory twelve times.

If you need to cancel the diagnostic procedure at any time, just press the [Esc] key to exit the testing program and return to DOS.

Section 5: Software

5.1 Software Summary

The Everex utility diskette that accompanies your Ultragraphics contains five software programs designed to help maximize your system's performance with the Ultragraphics: a Microsoft Windows Driver, an AutoCAD Driver, the EV16X32 Extended Font Loading Program, a Ventura Publishing Driver, and a GEM 2.x Driver. Sections 5.2 through 5.6 explain the installation and operation of each program.

NOTE: You must have a mouse installed in your system to install and use the Ventura Publishing and GEM drivers.

5.2 Microsoft Windows Driver

The Everex utility diskette contains a high-resolution driver for Microsoft Windows in 1664x1200 pixel graphics resolution in two shades.

The driver on the Everex utility diskette is called EV235WIN.DRV. You will find the driver and the other necessary files in the subdirectory called "WINDOWS" on the Everex utility diskette.

5.2.1 Windows Driver Installation

NOTE: The high-resolution drivers require you to make copies of the original Microsoft Windows BUILD and SETUP diskettes. Do NOT modify the original Microsoft Windows diskettes. Remember to put write-protect tabs onto the original Microsoft Windows diskettes.

1. Boot up your computer from DOS (either from a hard disk or floppy diskette).

2. Copy the files from the Microsoft Windows SETUP diskette onto a blank formatted diskette with the DOS command DISKCOPY.

3. Copy the files from the Microsoft Windows BUILD diskette onto a blank formatted diskette with the DOS command DISKCOPY.

4. Insert the Windows SETUP *backup* diskette into Drive A and remove the following files to make room for the Everex high-resolution drivers. At the DOS > prompt type:

   A: **[ENTER]**
   DEL ATTDC.DRV   **[ENTER]**
   DEL ATTDEB.DRV   **[ENTER]**

5. Remove the Windows SETUP *backup* diskette. Insert the Everex utility diskette into Drive A and the Windows SETUP *backup* diskette into Drive B. (If you only have one floppy drive, insert the Everex utility diskette into Drive A; you will then have to exchange diskettes in the following procedures.)

6. Replace the deleted driver with Everex's high-resolution drivers by typing:

   COPY A:\WINDOWS*.DRV B: [ENTER]

7. Remove both diskettes from the floppy drives. Insert the Windows BUILD *backup* diskette into Drive A and delete the following files to make room for the Everex high-resolution files. At the DOS > prompt type:

    A: **[ENTER]**
    DEL ATT*.*   **[ENTER]**

8. Remove the Windows BUILD *backup* diskette. Insert the Everex utility diskette into Drive A and the Windows BUILD *backup* diskette into Drive B.

9. Replace the following Windows files with Everex's files by typing:

    COPY A:\WINDOWS*.LGO B: [ENTER]
    COPY A:\WINDOWS*.GRB B: [ENTER]

10. When the files are copied, go through the Windows SETUP program to inform Windows of its new high-resolution drivers.

11. The Windows SETUP program needs to know what kind of graphics adapter you have. Choose the Everex Ultragraphics (1664x1200) Hi-Res Mono Display.*

* Everex recommends two monochrome monitor types for use with the Ultragraphics: 19" Moniterm model VY1000 and 15" Princeton model LM301.

12. You will be prompted to insert the Windows BUILD diskette. Make sure you use the BUILD *backup* diskette with the Everex files. Continue the Windows installation procedures as the program instructs you.

13. That's it! Use normal Windows operating procedures to view Windows in its new high-resolution display.

5.3 AutoCAD

The Everex utility diskette included with your Ultragraphics adapter contains a specially-designed AutoCAD driver called EV235ADI.

NOTE: This driver supports AutoCAD versions 2.50 and higher ONLY.

5.3.1 Installing EV235ADI

The EV235ADI program is memory-resident. The EV235ADI driver must be loaded before you can run AutoCAD, but doing so once is enough until you reboot.

To load the EV235ADI program:

1. Boot up your computer and get into the subdirectory where your AutoCAD program files are stored. For example, if your AutoCAD software is in a subdirectory called \ACAD, use the DOS change directory command to access that directory:

   C: **[ENTER]**
   CD\ACAD   **[ENTER]**

2. Insert the Everex Utility diskette into Drive A.

3. Copy the \ACAD subdirectory of the Everex utility diskette into the subdirectory where your AutoCAD software is stored. At the DOS prompt type:

   COPY A:\ACAD\EV235ADI.EXE   **[ENTER]**
   COPY A:\ACAD\EV235PRM.EXE   **[ENTER]**

4. Load the EV235ADI display driver by typing:

   EV235ADI   **[ENTER]**

5. You will need to set your system to the ADI display driver in order to run EV235ADI. To set the correct display driver, type:

   ACAD   **[ENTER]**

6. The main AutoCAD menu will appear. Enter 5 to select Option 5, "Configure AutoCAD."

7. AutoCAD will display the current system configuration. Press **[ENTER]** to continue.

8. The AutoCAD configuration menu will appear. Enter **3** to select Option 3, "Configure Video Display."

9. The current video display will appear, and AutoCAD will ask you if you want to change the current video display. If the display listed is **ADI display**, you are already set to run EV235ADI. Just enter N, press **[ENTER]** four times to exit to the main AutoCAD menu, and go on to Step 14.

   If the current video display is not **ADI display**, enter Y, press **[ENTER]**, and go on to Steps 10-14.

10. A list of display types will appear, with **ADI display** placed first on the list. AutoCAD will ask you to enter the device number; enter **1** to select **ADI display**, and press **[ENTER]** to confirm your choice.

11. AutoCAD will display the hexadecimal code corresponding to **ADI display**: 7A. Press **[ENTER]** to confirm this value, then press **[ENTER]** four more times to exit to the configuration menu.

12. AutoCAD will ask you to enter Selection 0. Enter 0 and press **[ENTER]**.

13. AutoCAD will ask if you want to keep the configuration changes you just made. Enter Y and press [ENTER] to save your selections and exit back to the main AutoCAD menu.

14. You have finished installing the EV235ADI driver and configuring the video display; go on to Section 5.3.2 for instructions on running AutoCAD with EV235ADI.

5.3.2 Running AutoCAD

The EV235ADI driver can also be adapted to your current needs with the following parameters:

   EV235ADI /s/g/t/i [ENTER]

Where:

/s =   **Toggle Multi Screen Enabled:** This toggle selects dual or single screen display capability. You must load the EV235ADI driver on the system monitor to use the dual screen display. If you load EV235ADI on the high-resolution monitor, your text entries will overwrite the graphics on that monitor. Enter /s to enable the multi-screen display. If you omit this parameter, EV235ADI will default to a single monitor setting.

/g =   **Toggle Graphics Reverse Video Enabled:** This toggle allows you to switch between reverse and normal video graphics display. The default setting is reverse video mode enabled; enter /g to disable the reverse video mode.

/t =   **Toggle Text Reverse Video Enabled:** Same as /g, but applies to text mode. The default setting is normal video; enter /t to display reverse video text.

/i =   **Enable/Disable Interrupt 10H Emulation:** Enabling Interrupt 10H emulates scroll page up and scroll page down for 1664x1200 instead of 80x25 size. The default setting is emulation enabled; enter /i to disable emulation.

NOTE: The default interrupt setting for EV235ADI is 7AH. If you want to change this default interrupt setting or make the EV235ADI parameters permanent, then run EV235PRM.EXE (type "EV235PRM" and follow the instructions on the screen).

These parameters will load and configure the AutoCAD display driver. Next, type:

ACAD   [ENTER]

Loading EV235ADI From Your AUTOEXEC.BAT File

You can also set up your system to load EV235ADI automatically whenever you turn it ON or reboot, by including the EV235ADI program in your AUTOEXEC.BAT file. Use your word processing program or a line editor to load the AUTOEXEC.BAT file. When the file is loaded, add the following lines:

```
CD \ACAD                    [ENTER]
EV235ADI [any parameters]   [ENTER]
ACAD                        [ENTER]
```

After you have added the EV235ADI program into the AUTOEXEC.BAT file, make sure to save the file with its new routine.

5.4 EV16X32 Extended Fonts

The default font size for the Ultragraphics display is 8 pixels by 16 pixels. However, you can switch to the extended font size of 16 pixels by 32 pixels by using the INT 10H video functions emulated by the Ultragraphics. The EV16X32 program provided on your Everex utility diskette enables you to switch into the INT 10H extended video mode of 60H or 61H and load these extended fonts.

To install and load EV16X32:

1. Boot up your computer and get into the subdirectory where your font files are stored. If your fonts are stored in a subdirectory called \FONTS, for example, use the DOS change directory command to access the \FONTS subdirectory:

    C: CD\FONTS   [ENTER]

2. Insert the Everex utility diskette into Drive A.

3. Copy the following files from the Everex utility diskette into the subdirectory where your fonts are stored on your hard disk drive. At the DOS prompt type:

    COPY A:EV16X32.COM [ENTER]
    COPY A:MODE60.COM [ENTER]
    COPY A:MODE61.COM [ENTER]

4. If you are using the Ultragraphics as a stand-alone video card, go on to Step 5. If you have a dual-monitor system, you will need to switch to the INT 10H extended 60H or 61H video mode to load EV16X32. Type **MODE60** to enter the INT 10H 60H extended text mode, or **MODE61** to enter the INT 10H 60H graphics mode.

5. Type **EV16X32** to load the extended fonts.

6. The EV16X32 extended fonts are loaded into memory. If the Ultragraphics is installed as a stand-alone video card, just use your system as you normally would; the extended fonts will remain in memory until you reboot.

   If you have a dual monitor system, use the DOS MODE MONO or MODE CO80 command to return to your regular monitor, and use your system as you usually would.

5.5 Ventura Publishing Driver

NOTE: You must have a mouse installed in your system to install and use the Ventura Publishing driver.

The Everex utility diskette includes two high-resolution drivers for Ventura Publishing. The program called VPDRIVER works with Ventura Publishing version 1.0 and 1.01; the program called VPDRV_1 is for Ventura Publishing version 1.1. The Ultragraphics can display 1664X1200 graphics resolution with these Ventura Publishing drivers.

NOTE: The high-resolution drivers require you to make a copy of the original Everex utility diskette. Installing the drivers may modify the diskette; creating and using a work diskette will preserve the original Everex utility diskette. To make a copy of the Everex diskette, use the following procedures:

You need a blank diskette in order to create the *Work Diskette.*

1. Boot up your computer from DOS (either from a hard disk or floppy diskette). At the DOS prompt type:

   diskcopy a: b: [ENTER]

2. DOS will prompt you for the SOURCE diskette; the Everex utility diskette is the source diskette and the blank diskette is the TARGET diskette. Insert the Everex utility diskette into Drive A and close the drive door, then hit any key to proceed with the diskcopy command. The target diskette will be known as your *Work Diskette.* Follow the instructions as they appear on the screen.

3. Place the original Everex diskette in a safe place and proceed using the *Work Diskette.*

NOTE: The Ventura Publishing batch file called VP.BAT must be stored in the root directory of your system disk. Installing the Everex high-resolution drivers modifies the original VP.BAT file to include the high-resolution drivers.

Use the following steps to run Ventura Publishing in a high-resolution graphics mode:

1. Install Ventura Publishing according to its instructions.

2. When the program prompts you to select a video card, select the letter that corresponds to the video card installed in your system OTHER than the Ultragraphics. For example, if you have installed the Ultragraphics with an EGA card, type the letter C. If the Ultragraphics is installed in your system as a stand-alone video card, you can select any of the letters displayed.

3. If you have a dual-monitor system, run the Ventura Publishing program to verify that it works correctly, then go on to Step 4. If the Ultragraphics is installed as a stand-alone video card, don't run Ventura Publishing yet, since the enhanced resolution will not be available until you complete all of the following steps.

4. Insert the *Work Diskette* created from the Everex utility diskette into Drive A. Run the driver program by typing:

   A: **[ENTER]**
   CD \VENTURA   **[ENTER]**
   INST_VP   **[ENTER]**

5. Type the name of the Everex device driver. For Ventura Publishing versions 1.0 and 1.01, type:

VPDRIVER **[ENTER]**

Or, for Ventura Publishing version 1.1 type:

VPDRV1_1 **[ENTER]**

6. A menu will appear on the screen asking which hard disk drive the Ventura Publishing software is stored on. Please indicate which hard disk drive contains the Ventura Publishing program.

7. The driver program will prompt you for the type of graphics card and display you have. The Ultragraphics will be the only option displayed; enter A to confirm your selection of the Ultragraphics and the 1664x1200 resolution.

8. You will be asked to indicate the type of mouse you have. Select the letter of the mouse connected to your computer.

9. The driver program will prompt you for the communication port you are using for your mouse. Enter the letter of the communications port connected to your mouse.

NOTE: Some bus mouses, such as the Microsoft Bus Mouse, do not require a communication port.

10. You will be asked to confirm your setup selections. Enter **Y** and follow any other instructions that appear on the screen.

11. Your new Ventura Publishing driver is installed and ready to go. Switch to the hard disk drive where Ventura Publishing is stored, and type "VP" to see what Ventura Publishing looks like with the Ultragraphics high-resolution mode.

5.6 GEM Driver

NOTE: You must have a mouse installed in your system to install and use the Everex GEM 2.x driver.

The Everex utility diskette contains high-resolution drivers developed for GEM 2.x, which displays 1664x1200 pixel resolution with the Ultragraphics adapter.

NOTE: The high-resolution drivers require you to make copies of the original Everex utility diskette. Installing the drivers may modify the diskette; creating and using a work diskette will preserve the original Everex utility diskette. To make a copy of the Everex diskette, use the following procedures:

You need a blank diskette in order to create the GEM *Work Diskette.* If you have already created a *Work Diskette* according to the instructions in Section 5.5, label this new diskette *Work Diskette #2.*

1. Boot up your computer from DOS (either from a hard disk or floppy diskette). At the DOS prompt type:

    diskcopy a: b: [ENTER]

2.   DOS will prompt you for the SOURCE diskette; the Everex utility diskette is the source diskette and the blank diskette is the TARGET diskette. Insert the Everex utility diskette into Drive A and close the drive door, then hit any key to proceed with the diskcopy command. The target diskette will be known as your *Work Diskette.* Follow the instructions as they appear on the screen.

3.   Place the original Everex diskette in a safe place and proceed using the *Work Diskette.*

Use the following steps to run GEM in a high-resolution graphics mode:

1.   Install GEM as usual according to its instructions.

2.   When the program prompts you to select a video card, select the video card installed in your system OTHER than the Ultragraphics. For example, if you have installed the Ultragraphics with an EGA card, select EGA. If the Ultragraphics is installed in your system as a stand-alone video card, you can select any of the options displayed.

3. If you have a dual-monitor system, run the GEM program to verify that it works correctly, then go on to Step 4. If the Ultragraphics is installed as a stand-alone video card, don't run GEM yet, since the high-resolution graphics mode will not be available until you complete all of the following steps.

4. Insert the *Work Diskette* you created from Everex' utility diskette into Drive A, and run the program by typing:

    A: [ENTER]
    CD \VENTURA   [ENTER]
    INST_GEM   [ENTER]

5. Switch to the hard disk drive where the GEM program is stored, and run GEM from the hard disk:

    GEM   [ENTER]

6. The GEM Main Menu will appear on the screen. Use your mouse, and double-click on the icon of the floppy disk.

7. Double-click on the line that says "GEMSETUP.APP."

8. The GEM SETUP screen will appear. Click the mouse on the Ultragraphics video card and resolution. Hold down the left mouse button, and drag the cursor to the top of the menu; release the button at the top of the menu to select the graphics card.

9. Move the cursor to the Menu option that says "Categories." Then click the mouse once on the option that says "Screen Fonts."

10. Select a font by clicking the mouse button on the font of your choice, then hold down the left mouse button and drag the cursor to the top of the menu where you will release the button. Select at least three fonts for best results.

11. RESELECT THE MOUSE. Move the cursor to the top of the Menu and the option that says "Categories;" click the mouse on the "Mouse" option.

    Once you've selected the type of mouse attached to your system, hold the left mouse button down, and drag the cursor to the area of the Menu that reads "Chosen Mouse;" you can then release the button.

12. Move the cursor to select "Categories" again; this time click the mouse on "Mouse Ports."

   NOTE: Some mouses do not require a serial port, such as the Microsoft Bus Mouse.

13. Move the cursor to the top of the Menu that says "File;" click the mouse on the option that reads "Save Summary."

14. Click the mouse on the "OK" prompt.

15. You will see a message similar to the following:

   Your new summary has been saved.

   Click on the "OK" prompt again.

16. Quit the GEM program, and the old setup resolution. To quit GEM, move the cursor to the top of the screen where it says "File," and then click the mouse button on the option that reads "Exit to DOS."

17. Run GEM to see how it looks with the Ultragraphics high-resolution display.

* Everex recommends two monochrome monitor types for use with the Ultragraphics: 19" Moniterm model VY1000 and 15" Princeton model LM301.

Section 6: Troubleshooting

6.1 How to Get Assistance

In order to simplify the troubleshooting of your Ultragraphics, the Technical Support Department recommends that you have the following items and information present before placing your call:

- Owner's Manual and Reference Guide for your Everex product.

- Version of DOS you are currently using

- Contents of your CONFIG.SYS file

- Contents of your AUTOEXEC.BAT file

Use the following checklist to gather information which will help the Technical Support Department to give you faster and more efficient service.

- What is the brand name and model of the computer and monitor you are currently using?

- What brand and capacity hard disk drive(s) do you have?

- What other peripheral products are installed in your computer? (For example, do you have a modem, multifunction card, etc?)

- Make note of any other facts or circumstances which seem strange or relevant to you.

- If it does become necessary to return the unit to Everex for service, we will need the following additional information:

  - Serial number of your Ultragraphics card (printed on a small white sticker, usually on the back side of the card).

  - Date and place of purchase

- Finally, when you call, please try to be near your computer, so you can follow the technician's suggestions while on the phone.

Appendix 1: Technical Reference

A1.1 I/O Port Addresses

The Ultragraphics uses four I/O locations. The BASE port address where the board resides is user-selectable; you determine its address through an eight-position jumper block located at JP1. Jumper position (1,2) is the MSB of the BASE port address and jumper position (15,16) is the LSB of the BASE port address.

J1 pin	Function
1,2	A9 (MSB of BASE port address)
3,4	A8
5,6	A7
7,8	A6
9,10	A5
11,12	A4
13,14	A3
15,16	A2 (LSB of BASE port address)

Note: Jumper ON = Logic 0, OFF = Logic 1.

The addresses of all other registers in this appendix depend upon the BASE port address you configure at JP1.

A1.1.1 Display Control Register
(Read/Write)

Write	=	BASE port address + 0
Read	=	BASE port address + 0

bit 7: AUTOFILL, fill memory with value selected by PDSEL<1> AND PDSEL<0>.

bit 6: WRALL, write to 8 bytes at once.

bit 5: not used.

bit 4: INVERT, invert display image.

bit 3: PDSEL<1>.

bit 2: PDSEL<0>.

bit 1: ENWR8B, enable write to 8 bytes with write. pointers zero (W0WR L) or one (W1WR L).

bit 0: ENPLANE, enable plane display.

PDSEL1, PDSEL0   FUNCTION
(Selects value to be used by the Display Control register AUTOFILL function (bit 7) to fill the memory.)

00	write processor data to memory
01	write latched data to memory
10	write 0 to memory
11	write 1 to memory

A1.1.2 Memory Control Register
(Read/Write)

Besides the four I/O ports and the 16KB BIOS ROM address, the Ultragraphics also requires another 16KB windows address to access the display memory. At power-up the BIOS ROM will reach the memory space in the 16KB boundary anywhere between A0000 to DCFFFF. If 16KB of system space is found, the BIOS ROM will program the Memory Control Register with a value to match the system space address for the windows address access. The Memory Control Register is described as follows:

Write = BASE port address + 1
Read = BASE port address + 1

bit 7:   VSYNC, read only
bit 6:   HSYNC, read only
bit 5:   Logic ONE, to enable memory R/W pointers
         Logic ZERO to disable memory pointers
         (This bit resets to zero at power-up.)
bit 4:   A18, MSB of display memory address
bit 3:   A17, display memory address
bit 2:   A16, display memory address
bit 1:   A15, display memory address
bit 0:   A14, LSB of display memory address

NOTE: A19 is assumed to be 1.

A1.1.3 Display Address Registers
(Write Only)

Display Address Low   =   BASE port address + 2
Display Address High   =   BASE port address + 3

These two registers are write-only registers. They contain the low and high byte of the starting display address. They should normally be set to 0. Each increment of the display-address register is equivalent to 16 bytes of memory or 128 pixels on display.

A1.1.4 Read I/O Address
(Read Only)

Read I/O Port Address = BASE port address + 2. This contains the JP1 settings of the card.

A1.1.5 Display Pointer Registers (Read/Write)

Write pointer	0	= BASE port address + 8000
Read pointer	0	= BASE port address + 0003
Write pointer	1	= BASE port address + 8001
Read pointer	1	= BASE port address + 1003
Write pointer	2	= BASE port address + 8002
Read pointer	2	= BASE port address + 2003
Write pointer	3	= BASE port address + 8003
Read pointer	3	= BASE port address + 3003

These four registers are read/write. Each register contains a pointer which points to 4KB of display memory. The read/write pointer depends on the base address programmed in the Memory Control register, plus address lines A13 and A12 during the access cycle. The address lines A13 and A12 decode a total of 16KB of memory address for system access with 4KB (A11-A0) per pointer. For example, the first 4KB of this 16KB will use the Display Pointer Write 0 pointer, the second 4KB would use the Display Pointer Write 1 pointer and so on.

The registers are defined as follows:

Bit 7: not used
Bit 6: pointer address (PA5) (MSB)
Bit 5: pointer address (PA5)
Bit 4: pointer address (PA4)
Bit 3: pointer address (PA3)
Bit 2: pointer address (PA2)
Bit 1: pointer address (PA1)
Bit 0   pointer address (PA0) (LSB)

A1.1.6 Memory Map

The decoding of the display memory address depends on the window address set by the Memory Control register. This register contains the location of the window address to access the display memory using system address space. Bits 1 and 6 in the Display Control register select the organization and function of this window.

ENWR8B	WRALL	1ST 4KB	2ND 4KB	3RD 4KB	4TH 4KB
0	0	W0	W1	W2	W3
0	1	W0*	W1*	W2*	W3*
1	0	W0*	W1*	W2	W3
1	1	W0*	W1*	W2*	W3*

* = write 8 bytes at once.

W0 = Write pointer 0
W1 = Write pointer 1
W2 = Write pointer 2
W3 = Write pointer 3

A1.2 INT 10H Video Functions

The Ultragraphics emulates most of the INT 10H video functions. Table 4 is followed by a more detailed explanation of each of these functions.

TABLE 4
INT 10H Video Functions

(AH)	=	00H	Set Mode
(AH)	=	01H	Set Cursor Type
(AH)	=	02H	Set Cursor Position
(AH)	=	03H	Read Cursor Position
(AH)	=	04H	Read Light Pen Position
(AH)	=	05H	Select Active Display Page
(AH)	=	06H	Scroll Active Page Up
(AH)	=	07H	Scroll Active Page Down
(AH)	=	08H	Read Character at Current Cursor Position
(AH)	=	09H	Write Character at Current Cursor Position
(AH)	=	0AH	Write Character at Current Cursor Position
(AH)	=	0BH	Ignored
(AH)	=	0CH	Write Dot
(AH)	=	0DH	Read Dot
(AH)	=	0EH	Write Teletype to Active Page
(AH)	=	0FH	Read Current Video State
(AH)	=	10H	Ignored
(AH)	=	11H	Ignored
(AH)	=	12H	Ignored
(AH)	=	13H	Write String
(AH)	=	60H	(AL) = 0 Return Physical Display Parameters
(AH)	=	60H	(AL) = 1 Toggle Between Normal/Reverse Video
(AH)	=	60H	(AL) = 2 Move Block
(AH)	=	60H	(AL) = 3 Change Screen Buffer Segment
(AH)	=	60H	(AL) = 4 Toggle On/Off Video
(AH)	=	60H	(AL) = 5 Font Loading

1. (AH) = 00H **Set Mode**
   (AL) =   Requested video mode

   The Ultragraphics supports the following video modes:
Mode (Hex)	Type	Maximum Colors
60	Text	Mono
61	Graphics	Mono

2. (AH) = 01H **Set Cursor Type**
   (CH) =   Top line for cursor
   (CL) =   Bottom line for cursor

3. (AH) = 02H **Set Cursor Position**
   (DH,DL)=   Row, column (0,0 is upper left).

4. (AH) = 03H **Read Cursor Position**
   On Return:
   (DH,DL)=   Row, column of current cursor
                  for requested page.
   (CH,CL)=   Cursor type currently set.

5. (AH) = 04H **Read Light Pen Position**
   On Return:
   (AH) = 00H **Light pen switch not activated.**
   (BX, CX, DX) are altered on return.

6. (AH) = 05H **Select Active Display Page**
   (AL) =   New page number (0-127). Program
                  first three pointers in sequence.

7. (AH) = 06H **Scroll Active Page Up**
   (AL) =   Number of lines blanked at bottom
                  of window.

8.   (AL)   =   00H **Blank entire window.**
    (CH,CL)=   Row, column of upper left
                    corner of scroll.
    (DH,DL)=   Row, column of lower right
                    corner of scroll.

9.   (AH)   =   07H **Scroll Active Page Down**
    (AL)   =   Number of input lines blanked at top
                    of window

10. (AL)   =   00H **Blank entire window.**
    (CH,CL)=   Row, column of upper left
                    corner of scroll.
    (DH,DL)=   Row, column of lower right corner
                    of scroll.

11. (AH)   =   08H **Read Character at Current Cursor**
    Position
    On Return:
    (AL)   =   Character read.

12. (AH)   =   09H **Write Character at Current Cursor**
    Position
    (CX)   =   Count of characters to write
    (AL)   =   Character to write

13. (AH)   =   0AH **Write Character at Current Cursor**
                    Position
    (CX)   =   Count of characters to write.
    (AL)   =   Character to write.

14. (AH) = 0CH Write Dot
    (DX) =   Row number.
    (CX) =   Column number.
    (AL) = 0   Erase the pixel.
          = 1   Write the pixel.

NOTE: If bit 7 of (AL) is set, then the pixel value is exclusively ORed with the current contents of the dot.

15. (AH) = 0DH Read Dot
    (DX) =   Row number.
    (CX) =   Column number.

16. (AH) = 0EH Write Teletype to Active Page
    (AL) =   Character to write.

17. (AH) = 0FH Read Current Video State
On Return:
    (AL) = .   Mode currently set.
    (AH) =   Number of character columns on
                   screen.
    (BH) =   Current active page number (0-127).

18. (AH)   = 13H Write String
    (ES:BP) =   Pointer to string write.
    (CX)   =   Character-only count.
    (DX)   =   Position to begin string, in cursor
                     terms.

NOTE: The following are extended functions to support the Ultragraphics cards. You can call sub-functions 0, 1, 3, and 4 from any monitor or user mode.

19. (AH)　　=　　60H　Return Physical Display Parameters
　　　　　　　　　　　for Active Display
　　　(AL)　　=　　0
　　　Return:
　　　(BX)　　=　　　　　Screen buffer segment.
　　　(DX)　　=　　　　　Base port of card.
　　　(AL)　　=　　60H　Successful.

20. (AH)　　=　　60H　Toggle Between Normal/Reverse Video
　　　(AL)　　=　　1
　　　Switches the video state between normal and reverse
　　　video.
　　　Return:
　　　(AL)　　=　　60H　Successful.

21. (AH)　　=　　60H　Move Block
　　　(AL)　　=　　2
　　　Moves 64KByte data in the memory.
　　　(SI)　　=　　　　　Offset of source.
　　　(DI)　　=　　　　　Offset of destination.
　　　(BL)　　=　　　　　Source page (0 to 127).
　　　(BH)　　=　　　　　Destination page (0 to 127).
　　　(CX)　　=　　　　　Length in bytes.
　　　Return:
　　　(AL)　　=　　60H　Successful

22. (AH)　　=　　60H　Change regent buffer segment
　　　(AL)　　=　　3
　　　(BX)　　=　　　　　Screen buffer segment
　　　Return:
　　　(AL)　　=　　60H　Successful

23. (AII)　　=　　60H　Turn off/on video display
　　　(AL)　　=　　4
　　　Switches the video display on and off.
　　　Return:

```
      (AL)    =    60H   Successful.

24.   (AH)    =    60H   Font Loading
      (AL)    =    5
      (DS:DX)=             Pointer to user (font table).
      (CX)    =             Count to store.
      (BL)    =             Width in pixels of characters.
      (BH)    =             Height in pixels of characters.
```
This call initiates a mode set, completely resetting the video environment but maintaining the screen buffer.

A1.3 BIOS Data Area

The Ultragraphics adapter shares the BIOS Data Area. The BIOS routines use 256 bytes of memory from absolute address Hex 400 to Hex 4FF (see Table 5).

Table 5
Shared BIOS Data Area

Address	Function	Size
40:49	Display Mode Set	Byte
40:4A	Number of Columns	Word
40:4C	Length of Regen Buffer in Bytes	Word
40:4E	Starting Address in Regen Buffer	Word
40:50	Cursor Position	Word
40:52 to		
40:59	Reserved when in Ultragraphics mode	Word
40:5A	Unused	Word
40:5C	Unused	Word
40:5E	Unused	Word
40:60	Cursor Type	Word
40:62	Display Page	Byte
40:84	Number of Rows on	
	the Screen (Minus 1)	Byte
40:85	Character Height	
	(Bytes/Character)	Word

Interrupts: The Ultragraphics BIOS replaces original interrupt 010H to interrupt 7FH, and also replaces original timer interrupt 1CH to 7EH.

Appendix 2: Port Programming Tips

Appendix 2 contains information to assist you in programming the Ultragraphics adapter's ports; however, all of these functions can be implemented through Video Interrupt 10H. If you decide to implement hardware functions, please keep in mind the following:

1. In the text mode, the firmware emulates the cursor. Before you begin programming the Ultragraphics, you will need to switch to graphics mode to avoid problems with the cursor function.

2. Once you are done programming the Ultragraphics, remember to restore all the Register Write pointers.

```
RegBase         equ   02d0h              ;assume base port = 2d0h
ScreenSegment   equ   0c000h             ;assume display area ram
;Read/Write Registers
RegControl      equ   RegBase+0000h      ;control register
RegStatus       equ   RegBase+0001h      ;status and bank address
;Write Register
RegWPointer     equ   RegBase+8000h      ;bank pointer to read
;Read Register
RegRPointer     equ   RegBase+0003h
;Register Control bits
rCPland         equ   00000001b          ;enable/disable display plane
rCPatSel0       equ   00000100b          ;10 = fill 0 in memory
```

```
rCPatSel1          equ   00001000b        ;01 = latch data
                                          ;11 = fill 1 in memory
rCInvert           equ   00010000b        ;invert display image
rCAutoFill         equ   10000000b        ;autofill memory with 0 or 1 in
                                          ;combination of rCPatSel0 and
                                          ;RCPatSel1
;Register Bank Address bit definitions
rBHorzSync         equ   00000100b        ;horizontal synchronous bit
rBVertSync         equ   00001000b        ;vertical synchronous bit


;ClearScreen:
;        This subroutine fills screen memory with zero (only display area).
;        entry:none
;        exit :none
ClearScreen        proc                   near
        mov   dx,RegBase                  ;base port
        in    al,dx                       ;get the register control bits
        jmp   $+2                         ;I/O Delay
        push  ax                          ;save the register control bits
        or    al,rCAutoFill+rCPatSel1 ;fill memory with value
        out   dx,al                       ;rCPatSel0 is zero
        mov   dx,RegStatus
Delay1:
        in    al,dx                       ;point to status register
        test  al,rBVertSync               ;wait for 1 screen refresh time
        jz    Delay1                      ;on vertical synchronous
Delay2:
        in    al,dx                       ;wait for 1 screen refresh time
        test  al,rBVertSync
```

```
          jnz      Delay2
Delay 3:
          in       al,dx
          test     al,rBVertSync
          jz       Delay3
          pop      ax                      ;get original control bits
          mov      dx,RegBase              ;get the base port
          out      dx,al                   ;restore original control bits
          ret
ClearScreen     endp
```

;ReadBank
```
;         This subroutine programs hardware to read the present enabled
;         banks
;         entry:  ah : read bank of pointer (0 - 3)
;         exit :  al : contains bank number in the specified pointer


ReadBank        proc            near
          xor      al,al                   ;clear al reg
          mov      cl,4                    ;move low nibble to high nibble
          shl      ah,cl
          mov      cl,4
          mov      dx,RegRPointer          ;RegRPointer
          or       dx,ax                   ;requested pointer
          in       al,dx                   ;read the pointer in al
          ret
ReadBank        endp
```

```
;SwitchBank
;          This subroutine switches bank of the given pointer
;          entry:  ah : switch bank of pointer (0 - 3)
;                  : al : switches bank of specified pointer (0 - 127)
;          exit:   none
SwitchBank      proc            near
        mov     dx,RegWPointer  ;get write pointer
        or      dl,ah           ;requested pointer
        out     dx,al           ;write the pointer - switch the bank
        ret
SwitchBank      endp


;CopyData
;          This subroutine shows how to use latch memory to copy 4 bytes
;          entry: none
;          exit : none
CopyData        proc            near
        mov     dx,RegBase      ;base port
        in      al,dx           ;read present state
        jmp     $+2             ;I/O Delay
        push    ax
        or      al,rCPatSel0
        out     dx,al
        mov     ax,ScreenSegment ;established es
        mov     es,ax
        xor     si,si           ;let copy 1st 4 bytes - source
        mov     di,3000h        ;let copy those bytes - destination
        mov     al,es:[si]      ;latch the data - source
        stosb                   ;write 1st latch byte - destination
```

```
        stosb                       ;       2nd  latch  byte
        stosb                       ;       3rd  latch  byte
        stosb                       ;       4th  latch  byte
        pop     ax                  ;restore  original  status
        out     dx,al
        ret
CopyData        endp
```