INDUSTRIAL COMPUTER SOURCE®

Model PC104VGA
Product Manual

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INDUSTRIAL COMPUTER SOURCE®

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FORWARD

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Manual Errors, Omissions and Bugs: A "Bug Sheet" is included as the last page of this manual. Please use the "Bug Sheet" if you experience any problems with the manual that requires correction.

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Chapter 1: Introduction

The PC104VGA plugs directly into a PC/104 connector and performs all the functions of a standard Super VGA plug-in card.

The PC104VGA includes an auto-sensing feature for quick installation. If it detects that its DB-15 connector is attached to an analog monitor, it will automatically set itself to VGA mode regardless of its DIP switch settings.

Programs on the included utility diskettes allow you to switch between different graphic modules and select interlaced and non-interlaced modes. We also include drivers for popular software packages such as Windows, Lotus, WordPerfect, etc.

Specifications

PC/104 connector

Resolution:

640 x 480 with 256, 32K, 64K and 16.7M colors
800 x 600 with 256, 32K and 64K colors
1024 x 768 with 256 colors
1280 x 1024 with 16 colors

1 MB DRAM for high-speed memory access

16-bit data bus

Dimensions:

3.755" x 3.55" (96x 90 mm)

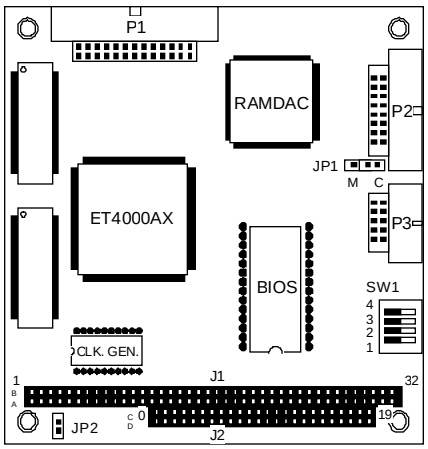

Figure 1: Locating Components

Common questions

How many Enhanced VGA modules can I install in my system?

Only one Enhanced VGA module in a system.

What other display modules can I install together with my Enhanced VGA module?

The Enhanced VGA module can be setup for color or monochrome operation. When configured for color operation, an IBM Monochrome Module or functional equivalent can coexist. When configured for monochrome operation, an IBM Color/Graphics Module or functional equivalent can coexist. Generally, your system may contain no more than one color module and one monochrome module.

If I have more than one display module installed, how do you know which one is active upon bootup?

The system configuration tables on the pages that follow show all valid combinations and corresponding switch settings of the Enhanced VGA and other display modules. The so-called “Primary Display” refers to the display that is active when the computer boots up. “Secondary Display” refers to the second display module that is installed. Note that while no display actually has to be attached to the secondary display module; a display must always be attached to the primary display in order to read the screen when your computer boots up. Once your computer has booted, the DOS MODE command can activate the secondary display (while deactivating the primary).

What monitors can I connect To my Enhanced VGA module?

The Enhanced VGA module can drive several types of display monitors:

-analog variable frequency color monitors

-IBM 8512, 8513 and 8514 analog color monitors

-TTL (digital) monochrome and color monitors

It is strongly recommended to use a variable frequency color monitor (Multisync-type monitor) with your Enhanced VGA module, because this type takes full advantage of the module’s advanced features. The variable frequency color display allows a maximum resolution of 1024 x 768 with 256 colors from a palette of 262,144 and supports all VGA and Extended text modes. The tables on following pages show how to set the switches on your module to accommodate different types of monitors.

Video Modes (switch settings)

The Enhanced VGA can be used with either an analog display monitor via a 15-pin connector or a digital (TTL) monitor via a 9-pin connector.

When only a digital monitor is connected through a 9-pin connector, you will still have to set the switches. The auto-sensing feature is only effective on the 15-pin connector.

The Enhanced VGA can coexist with either a Monochrome or Color/Graphics module (CGA). If a monochrome module is installed, the Enhanced VGA module must be configured for color mode (whether or not a monitor is attached). Only one color module and one monochrome module can exist in a single system.

VGA configuration

Enhanced VGA as primary display module

Use the following table if you want VGA as default mode when booting your system. In this setup, Enhanced VGA will be the primary video module and is attached to an analog monitor via a 15-pin video connector (DB15). The Enhanced VGA may drive either an IBM 85xx monitor or variable frequency monitor (analog mode).

<table>
<tr><th colspan="2" rowspan="2">Switch</th><th>Prim. Display

Attached to Enhanced VGA</th><th>Sec. Display

Attached to Monochrome Module</th></tr>
<tr><td>SW1</td><td>ON</td><td>Color 80 x 25</td><td>Monochrome</td></tr>
<tr><td>SW2</td><td>OFF</td><td>(IBM 85xx)</td><td>(IBM 5151) or none</td></tr>
<tr><td>SW3</td><td>OFF</td><td colspan="2" rowspan="2"></td></tr>
<tr><td>SW4</td><td>OFF</td></tr>
<tr><td>SW1</td><td>OFF</td><td>Color 80 x 25</td><td>Monochrome</td></tr>
<tr><td>SW2</td><td>OFF</td><td rowspan="3">Multisync, variable frequency analog monitor*</td><td>(IBM 5151) or none</td></tr>
<tr><td>SW3</td><td>OFF</td><td rowspan="2"></td></tr>
<tr><td>SW4</td><td>OFF</td></tr>
</table>

EGA configuration

Enhanced VGA as primary display module

Use the following table if you want EGA as default mode when booting your system. In this setup, Enhanced VGA will be the primary video module and is attached to a digital (TTL) display via a 9-pin video connector (DB).

Switch		Prim. Display Attached to Enhanced VGA	Sec. Display Attached to Monochrome Module
SW1	ON	Enhanced color monitor	Monochrome
SW2	ON	(IBM 5154) or compatible	(IBM 5151) or none
SW3	ON		
SW4	OFF		
SW1	OFF	Enhanced color or Multisync	Monochrome
SW2	ON	Display (IBM 5154/compatible or multisync monitor	(IBM 5151) or none
SW3	ON		
SW4	OFF		

CGA configuration

Enhanced CGA as primary display module

Use the following table if you want CGA as default mode when booting your system. In this setup, Enhanced VGA will be the primary video module and is attached to a digital (TTL) display via a 9-pin video connector (DB9).

Switch		Prim. Display Attached to Enhanced VGA	Sec. Display Attached to Monochrome Module
SW1	ON	Color 80 x 25	Monochrome
SW2	OFF	(IBM 5153)	(IBM 5151) or none
SW3	OFF		
SW4	ON		
SW1	OFF	Color 80 x 25	Monochrome
SW2	OFF	(IBM 5153)	(IBM 5151) or none
SW3	OFF		
SW4	ON		

Monochrome configuration

Enhanced VGA as primary display module

Use this table if the Enhanced VGA is the primary video module and configured for a monochrome display. The Enhanced VGA is attached to a digital (TTL) monochrome monitor via a 9-pin video connector (DB9).

Switch		Prim. Display Attached to Enhanced VGA	Sec. Display Attached to Monochrome Module
SW1	OFF	Monochrome	Color 80 x 25
SW2	OFF	(IBM 5151)	(IBM 5153) or none
SW3	ON		
SW4	OFF		
SW1	ON	Monochrome	Color 480 x 25
SW2	OFF	(IBM 5151)	(IBM 5153) or none
SW3	ON		
SW4	OFF		

CGA configuration

Enhanced VGA as Secondary Display Module

Use this table if both an Enhanced VGA and an IBM Color/Graphics Module are installed in your system. The Enhanced VGA is the secondary video module attached to a digital (TTL) monochrome monitor via a 9-pin video connector (DB-9).

Switch		Prim. Display Attached to Enhanced VGA	Sec. Display Attached to Monochrome Module
SW1	ON	Color 480 x 25	Monochrome
SW2	ON	(IBM 5151)	(IBM 5151) or none
SW3	OFF		
SW4	ON		
SW1	OFF	Color 40 x 25	Monochrome
SW2	ON	(IBM 5151)	(IBM 5151) or none
SW3	OFF		
SW4	ON		

Monochrome configuration

Enhanced VGA as Secondary Display Module

Use the following if both an Enhanced VGA and IBM Monochrome module are installed and the Enhanced VGA is to be the secondary module. The Enhanced VGA may drive either a digital (TTL) monitor via a 9-pin video connector (DB-9) or an analog monitor (IBM 82xx monitor or variable frequency monitor) via a 15-pin video connector (DB-15).

Switch		Prim. Display	Sec. Display
		Attached to Monochrome Module	**Attached to Enhanced VGA**
SW1	ON	Monochrome	Color 40 x 25
SW2	ON	(IBM 5151)	(IBM 5153) or none
SW3	ON		
SW4	ON		
SW1	OFF	Monochrome	Color 80 x 25
SW2	ON	(IBM 5151)	(IBM 5153) or none
SW3	ON		
SW4	ON		
SW1	ON	Monochrome	Enhanced color
SW2	OFF	(IBM 5151)	(IBM 5154)
SW3	ON		
SW4	ON		
SW1	OFF	Monochrome	Enhanced color
SW2	OFF	(IBM 5151)	(IBM 5154) or multisync,
SW3	ON		variable frequency
SW4	ON		TTL monitors
SW1	ON	Monochrome	Color 80 x 25
SW2	ON	(IBM 5151)	(IBM 85xx)
SW3	OFF		
SW4	OFF		
SW1	OFF	Monochrome	Color 80 x 25
SW2	ON	(IBM 5151)	multisync,
SW3	OFF		variable frequency
SW4	OFF		analog monitors

Software Installation

Your PC104VGA comes with two diskettes that contain the software drivers and software utilities. All software has to be "unpacked" before it can be used. Disk 1 contains a file called "INSTALL.EXE". Run this program to unpack software drivers and utilities and copy them to your hardisk.

The following describes your PC104VGA's utilities and system files.

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 files

EANSI.SYS

Replaces the ANSI.SYS device driver supplied with your DOS system disk. EANSI.SYS is compatible with the standard ANSI.SYS, and supports the extended screen modes provided by your display module.

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 is used to create new fonts and/or modify existing fonts. FNT font files are also included.

FLOAD.COM

The actual font loader, which is used to load a disk font into video memory.

TVDLAG.EXE

Diagnostic program that tests the video mode of your display module and reports the system configuration. This test can also be used to check/align your display screen.

DMODE.COM

Utility program which is used to switch the module display modes (e.g. EGA, CGA, Hercules, 132-column display, etc.). However, since your PC104VGA is a simplified version, EGA, CGA and Hercules modes cannot be set through software (e.g. no VGA-SYNC BIOS component on the module). The only way you can change the video mode is by switch setting.

VMODE.COM

Utility program which is used to switch the module's text modes (e.g. 132 x 44 etc.)

Install the FASTBIOS.SYS device driver

The FASTBIOS.SYS device driver transfers the contents of the video ROM BIOS to PC system memory. This utility enhances video BIOS operation speed considerably when used in 80286-and 80386-based systems.

Loading of FASTBIOS.SYS is achieved by adding the following line in the system file CONFIG.SYS:

DEVICE=FASTBIOS.SYS

This must be the FIRST device driver that is loaded in the CONFIG.SYS file. If it is loaded after another device, the following message may result:

FASTBIOS NOT INSTALLED

another (earlier installed) device driver has taken over video interrupt; make sure the line DEVICE=FASTBIOS.SYS occurs first in your CONFIG.SYS file.

Trying to install FASTBIOS.SYS in any system other than 80286 or 80386 results in the following message:

FASTBIOS requires an 80286 or 80386 machine

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

FASTBIOS Installed

Please remember to reboot your system after adding FASTBIOS to your CONFIG.SYS file, and ensure that theFASTBIOS.SYS file resides in the same directory as CONFIG.SYS.

NOTE:

If your PC provides shadow RAM, please use shadow RAM instead of using the FASTBIOS.SYS device driver. Shadow RAM provides the same high speed BIOS operation as FASTBIOS.SYS without consuming system memory.

Extended Text Modes with EANSI.SYS

EANSI.SYS is a replacement for ANSI.SYS, and both should not be used at the same time. To install EANSI.SYS in the system, add the next line to the CONFIG.SYS file:

DEVICE=EANSI.SYS

EANSI.SYS should appear in the CONFIG.SYS file in the same manner as your standard DOS ANSI.SYS would. EANSI.SYS is compatible with the standard ANSI.SYS and gives additional support for the extended screen modes provided by your display module. Once installed with above command, EANSI.SYS provides all the screen control and keyboard remapping features of ANSI.SYS (see your DOS Technical Reference manual).

EANSI.SYS may be used to select the extended 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
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 under 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.

Custom Font Loader And Font Editor

The Custom Font Loader and Font Editor let you instantly change the set of characters (character font) displayed on the screen. For example, the letter “A” could be displayed as A or A., or could even be changed to a different character entirely. This is very useful for scientific and foreign language application, as well to simply customize 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 diskette, or you can use the font editor to create or customize your own fonts.

The font software consists of:

FONT.DOC

the latest information about the font software, describing new fonts and features.

FEDIT.DOC

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 menu for more information.

FLOAD.COM

the font loader, that loads a selected from disk into video memory. 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 packaged on your Diskette include the two standard fonts, a 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. Files on your Diskette with the extension .FNT contain the fonts.

NOTE:

Fonts may be loaded in the 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 Diagnostic Test Program

On your diskettes you'll find a test program called TVDIAG.EXE which can help you verify that your module and attached display monitor are working properly.

1. At the DOS prompt, type TVDIAG then press ENTER.
2. The test will start and it will prompt you for further instruction

Software Mode Switching with DMODE.COM

Your display module is compatible with the following standards: IBM's VGA, EGA, CGA, MGA and the Hercules mode. Please note that your display module is a simplified version (without VGA-SYNC BIOS installed) that does not support software mode switching.

Selecting 70Hz/72Hz Flicker-Free Display

In addition to the standard 60 Hz display, your display module provides 70 Hz and/or 72 Hz flicker-free display.

You may select the 70 Hz or 72 Hz display via the DMODE menu or by using the DMODE command syntax as explained under DMODE COMMAND?

The following is a list of available frequencies and various resolutions that your display module can offer. Please make sure that your monitor is capable of supporting the frequencies required.

Resolution	Horizontal Frequency	Vertical Frequency
640 x 480	31.5 KHz	60Hz
640 x 480	38 KHz	72Hz
800 x 600	35.5 KHz	56Hz
800 x 600	31.5 KHz	60Hz
800 x 600	31.5 KHz	72Hz
1024 x 768*	35.5 KHz	43.5Hz
1024 x 768	48 KHz	60Hz
1024 x 768	55 KHz	70Hz
1280 x 1024*	48 KHz	43.5Hz

*Interlaced display

Video Modes

Graphic Modes

Mode No.	Resolution	Mode	Colors
4,5	320 x 200	CGA	4
		EGA	4 out of 64
		MCGA	
		VGA	4 out of 256K
6	640 x 200	CGA	2
		EGA	2 out of 64
		MCGA	2 out of 256K
		VGA	2 out of 256K
D	320 x 200	EGA	16 out of 64
		VGA	16 out of 256K
E	640 x 200	EGA	16 out of 64
		VGA	16 out of 256K
F	640 x 350	EGA	monochrome
		VGA	monochrome
10	640 x 350	EGA	16 out of 64
		VGA	16 out of 256K
11	640 x 480	MCGA	2 out of 256K
		VGA	2 out of 256K
12	640 x 480	VGA	16 out of 256K
13	320 x 200	MCGA	256 out of 256K
		VGA	256 out of 256K
25	640 x 480	Extended	16 out of 256K
29	800 x 600	Extended	16 out of 256K
2D	640 x 350	Extended	256 out of 256K
2F	640 x 400	Extended	256 out of 256K
2E	640 x 480	Extended	256 out of 256K
30	800 x 600	Extended	256 out of 256K
37	1024 x 768	Extended	6 out of 256K
38	1024 x 768	Extended	256 out of 256K
3D	1280 x 1024	Extended	16 out of 256K

Text Modes

Mode	Rows	Cols	Char. Box	Mode	Colors
0,1	25	40	8 x 8	CGA	16
			8 x 14	EGA	16 out of 64
2,3	25	80	8 x 16	MCGA	16 out of 256K
			9 x 16	VGA	16 out of 256K
			8 x 8	CGA	16
			8 x 14	EGA	16 out of 64
			8 x 16	MCGA	16 out of 256K
			9 x 16	VGA	16 out of 256K
7	25	80	9 x 14	MDA	Monochrome
			9 x 14	EGA	Monochrome
			9 x 16	VGA	Monochrome
22	44	132	8 x 8	Extended	16 out of 256K
23	25	132	8 x 14	Extended	16 out of 256K
24	28	132	8 x 13	Extended	16 out of 256K
26	60	80	8 x 8	Extended	16 out of 256K

VMODE.COM For Software Text Mode Switching

Your display module can support multiple text. The way to switch between these text modes is by executing VMODE.COM at DOS prompt. After this program is executed, there will be a menu scree. You can move the highlight bar to choose the target mode and hit enter key to set the desired mode.

Other Information

Using The Extended Color Text Modes

This application Note describes how to select the display module's 132-column text mode 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 display module BIOS supports the following 132-and 80-column text modes. These modes are not used by IBM VGA. The numbers are in decimal except as noted.

The 132-column modes are selected exactly as the standard modes 0-7 and D-13 are selected:

Mode	Columns	Rows	Length of Memory Map
22 hex	132	44	132 x 44 x 2=11616=2D60 hex
23 hex	132	25	132 x 25 x 2=6600=19C8 hex
24 hex	132	28	132 x 28 x 2=7392=1CEO hex
26 hex	80	60	80 x 60 x 2=9600=2580 hex

1. Place a 0 in register Ah to indicate “select mode” function.
2. Place the mode number in register AL.
3. Execute at INT 10H instruction, generating software interrupt 10 hex, which invokes the Display module 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 other text modes.

Memory is organized with even bytes as character codes and odd bytes as attributes, again just like normal 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 80 x 25 length of 4000 bytes.

Troubleshooting

If you have problems after installation, please check the following:

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 your Display module are set properly and that the module is seated properly in the PC/104 bus.
d. Ensure that the system CPU module’s switches/jumper(s) are set properly for use with your display module.
e. Ensure that no other switch settings on the CPU module 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 display module.

Software Drivers

8514/A Emulation Driver

The instruction that follows explain how to install the appropriate 8514/A emulation driver for your needs. On the Disk 1 Diskette under 8514/Al subdirectory you should find these files:

RIXA14.EXE
RIXA18.EXE
STAN0715.FNT
STAN0814.FNT
STAN1220.FNT
README.DOC (this file)

Two emulators are provided. Choose either emulator depending on your video memory configuration and the number of colors desired. The following table illustrates the available resolutions by driver name according to the video memory configuration on your display module.

Resolution	Color	Mode	Memory Required	Driver
640x480	16	12	512K	RIx14
1024x768	16	37	512KB	RIx14
640x480	256	2E	512KB	RIx18
1024x768	256	38	1M	RIx18

Installation

1. Create a subdirectory on the hard disk called RIXAl or any other name.
2. Copy the contents of the diskette to that newly-created subdirectory.

   Decide which version of the emulator is needed based on the amount of video memory on your display module and the number of colors you wish to use.
3. Type RIXAIx at the DOS prompt, where x is either 4 or 8.
4. You can now run your application software under 8514/A emulation,

Please remember to load the appropriate emulation driver before running application software that requires 8514/A. You might want to create a simple batch file that loads the emulation driver and your software automatically to simplify the process.

EXAMPLE (acadai.bat):

```
RIXA18
ACAD
```

You may need to reconfigure some software to run under an 8514/A driver. Please check the user manuals of your applications to determine if such a driver is supported.

To unload the driver, simply type the loading command followed by /U (e.g. RIZA18/U)

Driver Installation For Lotus 2.2 and 2.3

LOTUS 1-2-3 Version 2.3 Driver Installation

The following are generic instructions for the installation of TLI text and graphics drivers for Lotus 1-2-3 Version 2.3. Lotus should first be installed for normal VGA and it is suggested that normal operation be assured before loading TLI extended mode drivers.

1. Copy the files from the Lotus Driver Diskette to another diskette, placing all driver files in the same directory for the program to locate them during the installation process.
2. Enter Lotus INSTALL; e.g. C:\LOTUS>:INSTALL [enter]

   Press [enter] again after the Lotus logo appears.
3. From the Main Menu , choose the “Change Selected Equipment” option.
4. From the menu, choose “Add New Drivers to the Library.”
5. When asked from which drive the drivers can copied, indicate “A” or “B” depending on which drive the TLI drivers are located.
6. When the program is finished copying the drivers, choose “Save the Current Driver Set”. You are then prompted to name the driver set. This name can be anything you choose , or if no name is specified, the default name “123.set” will be assigned.
7. The Lotus INSTALL program will then display three font sizes to choose from:

   (1) Basic
   (2) Medium
   (3) Extended

   Choose (2) Medium.

8. Answer “Yes” when asked if you want to generate fonts sizes now.
9. After pressing ENTER you are returned to DOS.
10. After returning to the DOS prompt, type C:\LOTUS>:INSTALL [enter].
11. Select the “Change Selected Equipment” option again.
12. Choose “Modify the Current Driver Set” option.
13. Select “Text Display”.
14. Select the desired driver.
15. After returning to the submenu, select “Graphic Display.”
16. Select the desired driver.
17. After returning to the submenu, choose “Return to Previous Menu” and choose “Save the Current Driver Set.”
18. Choose an arbitrary name for the driver set just defined or let the program default to “123.set.”
19. Press ENTER to move to the next menu and select the size of the font (medium is recommended).

20. Answer “Yes” when asked if you want to generate fonts sizes now.
21. Press ENTER to go to DOS and start Lotus the name of the defined driver set.

LOTUS 1-2-3 Version 2.2 Driver Installation

The following are generic instructions for the installation of TLI text and graphics drivers for Lotus 1-2-3 Version 2.2 . Lotus should first be installed for normal VGA and it is suggested that normal operation be assured before loading TLI extended mode drivers.

1. Copy the files from the Lotus Driver Diskette to your Lotus directory.
2. Enter Lotus INSTALL;e.g. C:\LOTUS.:INSATLL [enter]
3. From the Main Menu, select “Advanced Options.”
4. From the Advanced Options menu, select “Add New Drivers to Library.”
5. After returning to the Advanced Options menu, select “Modify Current Driver Set”, which then brings up the configuration menu.
6. From the configuration menu, select the “Text Display” option, and then select the desired driver.
7. After returning to the configuration menu, select the “Graphic Display” option, and then select the desired driver.
8. After returning to the configuration menu, select “Return to Menu”. This returns you to the Advanced Options menu.
9. From the Advanced Options menu, select “ Save Changes”. Assign an arbitrary name to the driver set or let the program default to the 123.set driver set name. This brings you to the Exit menu.
10. From the Exit menu, select “Yes” to leave install.

Driver Installation For WordPerfect 5.0-5.1

The following instructions are applicable to users of WordPerfect 5.0 and 5.1 at 800 x 600 or 1024 x 768 resolution.

The enclosed drivers, WP800.WPD, WP1024.WPD and WP51ET4.VRS are used by WordPerfect to display at 800 x 600 and 1024 x 768 resolutions. The drivers need to be copied to the directory where WordPerfect resides. Upon loading the program, the following steps should be taken to choose the desired resolution:

1. From the document screen displayed after entering WordPerfect, press SHIFT/F1 to get to the Setup menu.
2. From Setup, choose Display option. This brings up the Setup: Display menu.
3. From the Setup: Display menu, choose “Graphics Screen Type”.
4. From the Setup: Graphics Screen Type menu, choose either:

"VGA Module 800 x 600 16 color " or
"VGA Module 1024 x 768 16 color (V.5.0) or
"Tseng ET4000 Based SVGA"
option and select from:

VGA	1024X768	16 color
VGA	1024X768	256 color
VGA	800X600	16 color
VGA	800 x 600	256 color
VGA	800 x 600	16 color
VGA	800 x 600	256 color

5. Exit from the menus and begin using WordPerfect.

Driver Installation for Windows 3.0 and 3.1

The provided disks provide Windows 3.0 and 3.1 drivers. Their installation procedure is basically the same. Use the INSTALL program to unpack and copy the files to a new directory on your harddisk.

Installation from Hard Disk:

1. Having the drivers loaded on the harddisk makes it easy and fast to change drivers in the future.
2. Go to your Windows directory and type SETUP.
3. Select "Display" under "System Information" by moving the menu bar over the item and pressing RETURN.
4. Select "Other disk..." to direct the program to the subdirectory holding the new drivers.
5. When asked where the drivers will be found, state the following (deleting what the program has displayed in the input window):

   [drive:]\[directory]
   e.g.:C:\et4drv31 (for Windows 3.0)

6. Select the desired driver from the new menu with additional video drivers.
7. Proceed normally through the remainder of the process. Check Microsoft Windows installation procedures if necessary.

Pin Assignments

Pin Number	J1/Row A	J1/Row B	J2/Row C	J2/Row D
0	-	-	GROUND	GROUND
1	IOCHCHK	GROUND	SBHE*	MEMCS16*
2	SD7	RESETDRV	LA23	IOCS16*
3	SD6	+5V	LA22	IRQ10
4	SD5	IRQ9	LA21	IRQ11
5	SD4	-5V	LA20	IRQ12
6	SD3	DRQ2	LA19	IRQ15
7	SD2	-12V	LA18	IRQ14
8	SD1	OWS	LA17	DACK0*
9	SD0	+12V	MEMR*	DRQ0
10	IOCHRDY	(KEY)	MEMW*	DACK5
11	AEN	SMEMW*	SD8	DRQ5
12	SA19	SMEMR*	SD9	*
13	SA18	IOW*	SD10	DRQ6
14	SA17	IOR*	SD11	DACK7*
15	SA16	DACK3*	SD12	DRQ7
16	SA15	DRQ3	SD13	+5V
17	SA14	DACK1*	SD14	MASTER*
18	SA13	DRQ1	SD15	GROUND
19	SA12	REFRESH*	(KEY)	GROUND
20	SA11	SYSCLK	-	-
21	SA10	IRQ7	-	-
22	SA9	IRQ6	-	-
23	SA8	IRQ5	-	-
24	SA7	IRQ4	-	-
25	SA6	IRQ3	-	-
26	SA5	DACK2*	-	-
27	SA4	TC	-	-
28	SA3	BALE	-	-
29	SA2	+5V	-	-
30	SA1	OSC	-	-
31	SA0	GROUND	-	-
32	GROUND	GROUND	-	-

P2	pin number	Signal	15-pin Connector
	1	RED	1
	2	GREEN	2
	3	BLUE	3
	4	ID BIT 2	4
	5	GROUND	5
	6	GROUND	6
	7	GROUND	7
	8	GROUND	8
	9	NC	9
	10	GROUND	10
	11	ID BIT 0	11

P2	pin number	Signal	15-pin Connector
	12	ID BIT 1	12
	13	H SYNC	13
	14	V SYNC	14
	15	ID BIT 3	15
	16	NC	--

P1	pin-number	Signal
	1	C0
	2	C1 (BLUE)
	3	C2 (GREEN)
		C3 (RED)
	5	C4 (2ND GREEN)
	6	C5(2ND BLUE)
	7	C6 (2ND RED)
	8	C7
	9	DAC CLOCK
	10	BLANK*
	11	H SYNC
	12	VSYNC
	13	GROUND
	14	GROUND
	15	GROUND
	16	GROUND
	17	SIV (SELECT INTERNAL VIDEO)
	18	SIS (SELECT INTERNAL SYNC)
	19	SICLK (SELECT INTERNAL CLOCK)
	20	N.C.
	21	GROUND
	22	GROUND
	23	GROUND
	24	GROUND
	25	N.C.
	26	N.C.

P3	pin-number	Signal	9-pin Connector
	1	GROUND	1
	2	2ND RED	2
	3	RED	3
	4	GREEN	4
	5	BLUE	5
	6	2ND GREEN	6
	7	2ND BLUE	7
	8	H SYNC	8
	9	V SYNC	9
	10	GROUND	10

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BUG REPORT

While we have tried to assure this manual is error free, it is a fact of life that works of man have errors. We request you to detail any errors you find on this BUG REPORT and return it to us. We will correct the errors/problems and send you a new manual as soon as available. Please return to:

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Manual Revision: **42448-003-1A**

Please list the page numbers and errors found. Thank you!