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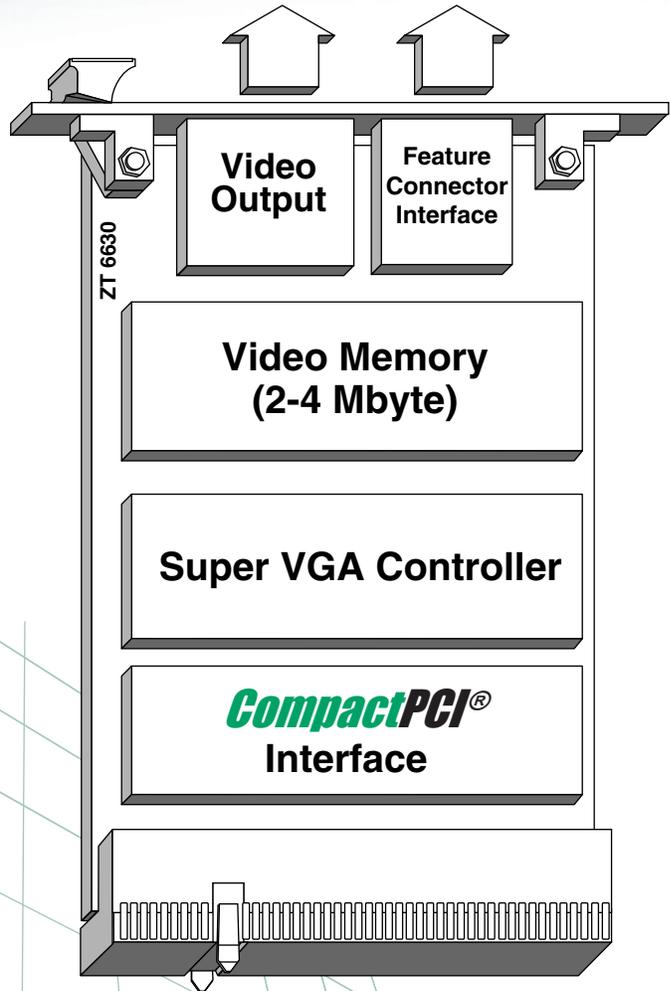
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ZT 6630

CompactPCI® Super VGA Interface

Hardware User Manual



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MANUAL ORGANIZATION

This manual describes the operation and use of the ZT 6630 CompactPCI Super VGA Interface. The following topics summarize each chapter and appendix included in this manual.

Chapter 1, "Introduction," offers an introduction to the ZT 6630 CompactPCI Super VGA Interface. It includes a product definition and a listing of product features.

Chapter 2, "Getting Started," summarizes the information you need to get your ZT 6630 operational. This includes system requirements, recommendations, and hardware/software installation. You should read this chapter in its entirety before you use the adapter.

Chapter 3, "Functional Blocks," presents a functional block diagram and a detailed description of each block of the ZT 6630.

Chapter 4, "Software," provides information about the video BIOS and installation instructions for the drivers and utilities included with the ZT 6630.

Chapter 5, "Utility Software," provides detailed instructions for using the CLMode and TSRFONT utilities included with the ZT 6630.

Chapter 6, "Display Drivers," provides detailed instructions for using the Autodesk - ADI 4.2, Lotus 123 v2.x, Lotus 123 v3.x, Microsoft Word (DOS), WordPerfect 5.1, 6.0, and WordStar display drivers included with the ZT 6630.

Chapter 7, "Microsoft Windows 3.1," includes Windows 3.1 driver installation, reconfiguring Windows 3.1, and Display Power Manager for Windows 3.1, a mechanism to control the amount of power used by a computer's monitor.

Appendix A, "Specifications," contains the electrical, mechanical, and environmental specifications for the ZT 6630.

Appendix B, "Video Modes," provides a guide to the modes available with the ZT 6630 to help you choose a monitor compatible with your application.

Appendix C, "Customer Support," offers technical support, warranty information and instructions for returning the ZT 6630 if service is necessary.

1. INTRODUCTION

The ZT 6630 is a CompactPCI® Super VGA Interface for the ZT 8905 Single Board Pentium Computer. The ZT 6630 utilizes the Peripheral Component Interconnect (PCI) bus to give exceptional video performance. The PCI bus supports 32 bits of data and runs at speeds up to 33 MHz giving it a theoretical bandwidth of 132 Mbytes/s.

The ZT 6630 is based on a 64 bit GUI VGA controller which incorporates a Bit Block Transfer (BitBLT) engine and a 24-bit true-color DAC. The ZT 6630 can support display resolutions up to 1280 x 1024 and color modes with up to 16.8 million colors. The ZT 6630 can be ordered with up to 4 Mbytes of video DRAM allowing it to support display resolutions up to 1280 x 1024 x 64K colors.

FEATURES

- IBM VGA compatible
- 32-bit, 33 MHz high performance PCI bus interface
- VGA and VESA® compatible BIOS
- Hardware BitBLT for Microsoft Windows™ and other GUIs
- Supports up to 4 Mbytes of video memory - 2 Mbytes standard
- 24-bit true-color DAC supports up to 16.8 million colors
- Optional Feature connector
- Multimedia support - overlay, color keying, Genlock
- 1280 x 1024 x 64K colors, interlaced
- 1024 x 768 x 64K colors, non-interlaced
- 800 x 600 x 16M colors, non-interlaced

2. GETTING STARTED

This chapter summarizes the steps required to get the ZT 6630 operational. Read this chapter in its entirety before using the board.

UNPACKING

Please check the shipping carton for damage. If the shipping carton and contents are damaged, notify the carrier and Ziatech for an insurance settlement. Retain the shipping carton and packing material for inspection by the carrier. Save the anti-static bag for storing or returning the ZT 6630.

Do not return any product to Ziatech without a Return Material Authorization (RMA) Number. See Appendix C, "[Customer Support](#)", for an explanation of the procedure for obtaining an RMA number from Ziatech.



Caution: Like all equipment utilizing MOS devices, the ZT 6630 must be protected from static discharge. Never remove any of the socketed parts except at a static-free workstation. Use the anti-static bag shipped with the ZT 6630 to handle the board.

SYSTEM REQUIREMENTS

The ZT 6630 Super VGA CompactPCI Board is designed to work with the ZT 6500 Single Board Pentium™ computer or other CPUs that adhere to the CompactPCI specification.

The ZT 6630 requires +5 VDC \pm 5% @ .840 A maximum and .640 A typical. The ambient temperature must be maintained between 0 and +65° Celsius to avoid improper operation and possible damage. The relative humidity should be less than 95%, non-condensing.

The I/O and memory map for the ZT 6630 varies according to the video mode. For the safest operation, allowing all modes to be used, I/O ports 100h through 104h, 46E8h, and 3B0h through 3DFh, as well as memory addresses A0000h through BFFFFh, should be reserved. The C0000h through C7FFFh range should also be reserved for the video BIOS. If linear addressing is used, the 16 Mbyte range from 41000000h to 41FFFFFFh should be reserved (1 Gbyte + 16 Mbyte to 1 Gbyte + 32 Mbyte). For proper operation of the ZT 6630 in a Ziatech DOS system, be sure to use Ziatech Industrial BIOS Version 4.3 or later.

SYSTEM RECOMMENDATIONS

Connecting to the analog CRT interface and the optional Feature connector are discussed in the following topics.

Analog Video Interface

The ZT 6630 must be used with an analog monitor. If your monitor is capable of both digital and analog modes, be sure it is set to analog.

Ziatech has tested the ZT 6630 video board with the NEC Multi-Sync (VGA compatible) family of monitors, the Amdek 310A monochrome monitor, the IBM PS/2[®] monitor, the Smartron SC-431 VGA monitor, and the Mitsubishi HL7955 high resolution, multiscan, 19-inch VGA monitor. We recommend that you use one of these displays with the ZT 6630, although any IBM compatible display should work.

Discussion of monitor timing specifications for supporting various display modes is provided in Appendix B, "[Video Modes](#)."

The ZT 6630 can be used in a wide variety of video applications. There are several considerations, however, that you must take into account when setting up a video system to ensure the best quality display. Such factors as environment, noise from surrounding equipment, video mode, distance from video source, and cabling all come into play.

The analog video signals are comprised of a horizontal and vertical sync and three color signals (red, green, and blue). The signals are driven by a RAMDAC which is used to convert the digital video data to analog signals. The RAMDAC's analog outputs have an impedance of 75 ohms. Ideally, the connecting cable to this output should have an impedance of 75 ohms.

Flat cable, which is often more convenient to use, has an impedance of approximately 100 ohms. A flat cable connection does cause some mismatch but does not noticeably degrade the quality of the video display over medium length runs. Ziatech has successfully run analog video over 15 feet in graphics mode with standard 28 gauge unshielded flat cable with no noticeable degradation to the display. The preferred method, however, is to switch from flat cable to 75 ohm cable and install it as close to the output connector as possible.

Feature Connector

The ZT 6630 has a Feature connector that can be used for video overlay applications or to drive flat panel displays that use a Feature connector interface (i.e., Planar EL640.480-A). The Feature connector uses a 26-pin, double row, 0.050 inch spaced connector. The connector is located above the VGA connector.

The Feature connector signals come directly from the VGA controller and consist of the same signals that are fed to the RAMDAC for producing the analog display. This data is fed at the pixel clock rate of the VGA controller. Depending on the graphics mode used, this can range from 12 to 28 MHz for standard VGA modes and up to 108 MHz for higher resolution SVGA modes. The Feature connector's useable upper limit is approximately 40 MHz, which corresponds to a maximum resolution of 800 x 600.

Because the Feature data can be at such a high clock rate, you must be careful when cabling to the connector. As with any high speed data cable, pay careful attention to noise reduction. Standard 28 gauge unshielded flat cable will work fine for short distances but at longer lengths noise will begin to degrade the system and cause pixel streaking. Shielded cable can be used for applications that require longer distances.

HARDWARE INSTALLATION

The ZT 6630 is designed to plug into a CompactPCI card cage. Steps for installing the ZT 6630 board are as follows:

1. Turn off the power to the CompactPCI card cage.
2. Place the ZT 6630 into the card cage.
3. Push down on the ZT 6630 until the connectors seat.
4. Connect the monitor to the 15-pin D VGA connector found on the ZT 6630.
5. Power up the system.

Jumpers

Since the ZT 6630 uses the PCI bus, which has been designed to support automatic configuration, there are no jumper options for the board.

SOFTWARE INSTALLATION

The standard VGA modes work fine for most applications; however, you may install additional drivers and utilities to increase the performance and resolution of specific software packages such as Microsoft Windows[®] 3.x and IBM OS/2[™].

Several disks containing drivers and utilities are included with the ZT 6630. Installation programs are provided on each disk to facilitate the easy installation of these drivers and utilities. The installation programs are self contained and guide the user through the installation procedure.

It is important to note that some display drivers need to have the associated vendor's application program already installed on the system prior to loading the ZT 6630 display drivers. In other cases, the loading of the display driver may be an integral part of the vendor's product installation process.

DOS Drivers and Utilities

Run the installation utility for the "DOS Drivers and Utilities disk (disk 1)" by first inserting the Disk into the A: drive and then typing:

```
A: [Enter]
INSTALL [Enter]
```

Follow the instructions on the screen to install the listed display drivers. You may press [Esc] at any time to abort the installation process and go back to DOS. Selected drivers are simply copied to the specified disk and directory. See Chapter 4, "[Software](#)," for additional installation details.

Windows Drivers and Utilities

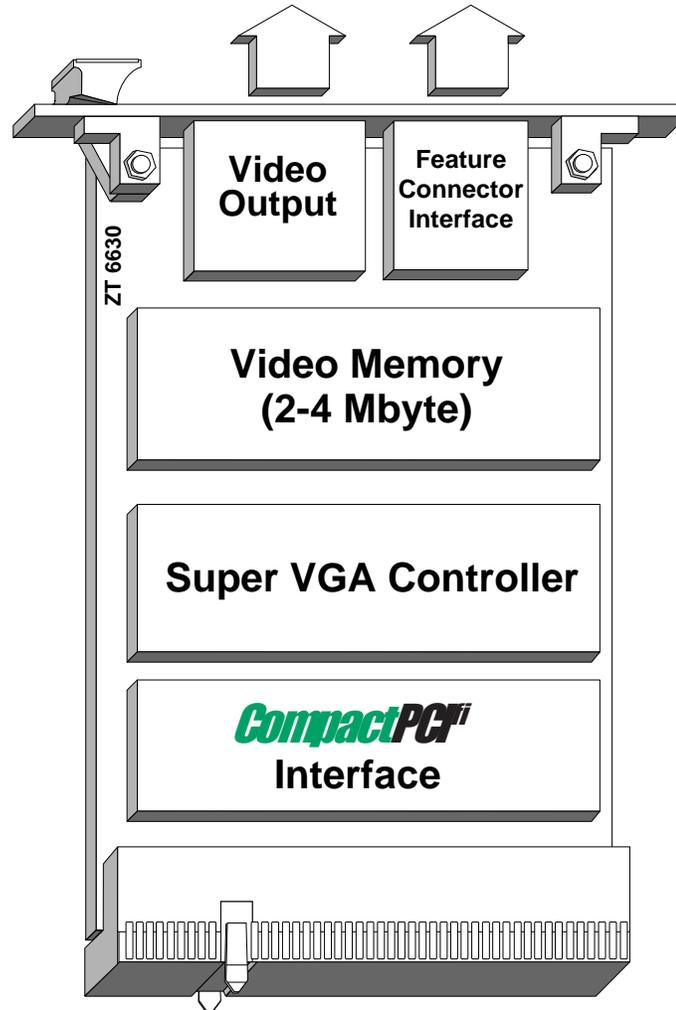
To run the installation program, start Windows 3.1. Insert the disk labeled "Windows 3.1 Display Drivers and Utilities" into your floppy disk drive. From the Windows Program Manager, select *Run* from the File menu. Type the letter of the floppy drive that the driver disk is in, followed by the word *install*. For instance, if the driver disk is in drive A:, type:

```
A:\INSTALL.EXE
```

Click on the OK button. Follow the on-screen directions to complete the installation. See Chapter 4, "[Software](#)," for additional installation details.

3. FUNCTIONAL BLOCKS

The following section gives a detailed description of the hardware components found on the ZT 6630. A block diagram of the ZT 6630 is shown below.



Functional Block Diagram

CPU INTERFACE

The ZT 6630 connects to the host CPU through a CompactPCI card cage. The interface consists of a 32-bit data/address bus and various control signals for PCI transfers.

The ZT 6630 supports bus speeds up to 33 MHz, giving a theoretical bandwidth of 132 Mbytes per second. The PCI bus allows the ZT 6630 to support the most demanding graphic applications without removing bandwidth from the backplane bus.

The connector pinout adheres to the CompactPCI standard. For more information on the CompactPCI standard contact Ziatech at <http://www.ziatech.com>.

VGA CONTROLLER

The ZT 6630 is based on the Cirrus Logic 5434 VGA controller. This controller is a highly integrated 64-bit GUI engine that has been optimized for handling graphic-intensive environments such as Windows and OS2. The controller uses a 64-bit data path to the video memory, allowing it to surpass many VRAM based controllers in performance. In addition, the 5434 contains several other performance enhancers such as a BitBLT accelerator, linear addressing, hardware cursor, color expansion and memory mapped I/O.

The 5434 is hardware register compatible with the IBM VGA standard and can support resolutions up to 1280 x 1024. The 5434 contains an integrated 24-bit RAMDAC, allowing the display of 16.8 million colors.

The 5434 supports the use of an on-board EEPROM to save monitor setting. This allows the user to set up the ZT 6630 for the best refresh rates and video modes for a particular monitor. The utility CLMODE.EXE supplied on the *DOS drivers and utilities* disk can be used to save these settings to EEPROM. See Chapter 5, "[Utility Software](#)", for more information on using the CLMODE.EXE utility.

Please note that once these settings are saved to EEPROM, the ZT 6630 always powers up using these modes and refresh rates. Make sure to reset the ZT 6630 to the default values (all modes using 60 Hz refresh rates) before switching to a different monitor that might not be able to handle the previous modes and refresh rates.

VIDEO MEMORY

The ZT 6630 can be ordered with up to 4 Mbytes of high speed 80 ns fast page mode DRAM, allowing it to support high resolution color graphics modes such as 1280 x 1024 x 64K colors. The memory is organized as eight 256K x 16-bit DRAMs. The Cirrus Logic 5434 controls accesses to the display memory and arbitrates between the display refresh requirements and CPU accesses. The address space occupied by the video memory depends on the video mode selected. The "[Display Memory Address Map](#)" table summarizes the address space for various video modes.

In order to allow for all possible modes of operation, memory address space from A0000 to C7FFFh should be reserved for the display memory and video BIOS. If certain video modes, such as monochrome text, are not used, it is possible to use the memory address space corresponding to the unused mode.

The Cirrus Logic drivers for Windows (supplied on the Drivers and Utilities Disks) use linear addressing to increase performance. Linear addressing allows the controller to see a contiguous area of memory instead of 64 K pages as with the standard VGA implementation. The ZT 6630's linear addressing region is mapped in the upper memory space at 41000000h to 41FFFFFFh (1 Gbyte + 16 Mbytes to 1 Gbyte + 32 Mbytes). Be sure to reserve this memory space for the ZT 6630 when using these drivers.

Appendix B, "[Video Mode](#)", contains specifications on the various video modes supported by the 5434 and the memory requirements for each mode.

Display Memory Address Map

Video Mode	MEMORY MAP			
	A0000- AFFFFh	B0000- B7FFFh	B8000- BFFFFh	Upper Memory 1GB + 16MB to 1GB + 32MB
Color Text Modes			X	
Mono Text Modes		X		
VGA Graphics	X			
Extended VGA Graphics	X	X	X	X

OUTPUT CONNECTORS

The ZT 6630 features two output connectors:

- Optional Feature connector
- Video Output connector

Optional Feature Connector

A Feature Connector ([J5](#)) is available for video overlay applications or for driving flat panel displays that use a Feature connector interface. The Feature connector uses a 26-pin, double row, 0.050 inch spaced header and is located on the ZT 6630 front panel.

See Appendix A, "[Specifications](#)," for detailed pinouts of all of the connectors and a list of connector and cable suppliers.

Video Output Connector

The ZT 6630 contains a standard 15-pin D VGA connector ([J4](#)), located on the ZT 6630 front panel.

See Appendix A, "[Specifications](#)," for detailed pinouts of all of the connectors and a list of connector and cable suppliers.

4. SOFTWARE

Software for the ZT 6630 consists of the video BIOS, utilities for performing various video control functions, and drivers for specific applications.

This chapter provides information about the video BIOS and installation instructions for the drivers and utilities.

The following chapters provide detailed instructions for using the various drivers and utilities included with the ZT 6630. Because the drivers and utilities are continually updated and added to, be sure to read the README.DOC file on your disks for the latest information and instructions.

VIDEO BIOS

The video BIOS provides for low-level control of the VGA controller. It is used to interpret higher-level commands and transform them into register-level instructions that the VGA controller can understand. The ZT 6630's BIOS is fully IBM VGA and VESA compatible. The BIOS is contained in a 32K EEPROM located on the ZT 6630. It is automatically installed during system initialization and is mapped to the standard 0C000 to 0C7FFh VGA BIOS memory space.

DRIVER AND UTILITY INSTALLATION

Three software disks are included with your ZT 6630. These disks contain the following:

- Disk 1: DOS drivers and utilities
- Disk 2: Windows 3.X drivers and utilities
- Disk 3: Windows 3.X drivers and utilities

Installation utilities have been provided on each disk to facilitate smooth installation.

It is important to note that some display drivers need to have the associated vendor's application program already installed on the system prior to loading the display drivers. In other cases, loading the display driver may be an integral part of the vendor's product installation process.

5. UTILITY SOFTWARE

The ZT 6630 comes with a set of utilities that allow you to take full advantage of the VGA controller's capabilities. These utilities include functions such as setting the ZT 6630 in various display resolutions. Below is a list of the utilities included with the ZT 6630 and a brief description of their function.

CLMODE - a DOS program for configuring the video modes supported by the ZT 6630

TSRFONT - a TSR program that makes a full 8x14 size character set available to programs that bypass the BIOS and draw characters directly on the screen.

WINMODE - a Windows utility that allows the user to change screen resolution and number of colors from within Windows. Information on this utility can be found in the "[WinMode](#)" topic of Chapter 7.

CLMODE

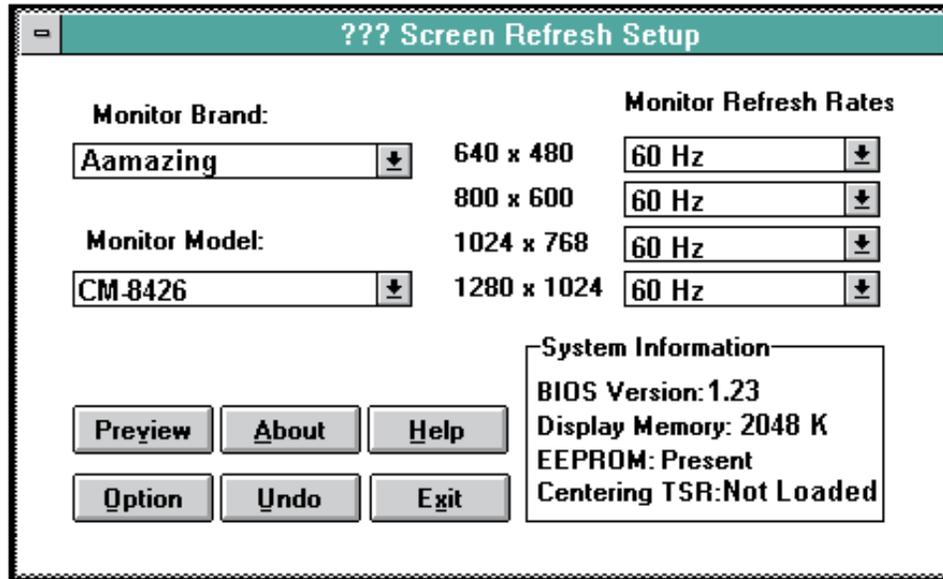
The CLMode utility allows the user to define the type of monitor attached, and set the video modes supported by the ZT 6630.

Using CLMode's Menu-Driven Interface

Change to the directory that contains the CLMode utility. At the DOS prompt type:

```
CLMODE [Enter]
```

The main pop-up window consists of a number of buttons. Each button represents a different option or menu. The underlined letter of a button name specifies the hot key combination for that item. Press [Alt] and the underlined letter keys simultaneously to select an option. Note that to use a mouse pointer for button selection, a mouse driver must be installed prior to running the CLMode utility.



CLMode Setup Window

Choosing the Monitor Brand/Model

Selecting the proper monitor brand/model allows the ZT 6630 to display the highest quality output of which it is capable with the attached monitor. The monitor model determines the video modes that are available to your system. It also determines the vertical refresh rates available. Generally, the higher the refresh, the better the screen looks. From the main setup window:

1. Select the **Undo** button at any time to void the operation.
2. Select the **Monitor Brand** text box. Use the up/down arrows to select your monitor brand. If your monitor brand is not shown then select "other brand."
3. Select the **Monitor Model** text box. Use the up/down arrows to select your monitor model. If your model is not shown, then select "other model."
4. Customize the monitor timings by setting the desired refresh rate for each resolution:
 - a. Consult your monitor manual to determine the correct rate for each resolution.
 - b. Select the **Monitor Refresh Rate** text box for each resolution and use the up/down arrows to set the correct rate.
6. When all of the settings are correct[†], select the **Exit** button.

[†] Before saving the new monitor type, you may view each of the new video timings and check that they are compatible with your monitor (see the "Video Modes Preview" and "Centering Adjust" topics).

Video Modes Preview

You can preview each of the video timings set in the CLMode main setup window to check that they are compatible with your monitor.

1. Select the **Preview** button on the main setup window to display the **Video Modes Preview** window.
2. Display each test screen from this window.
3. After each test screen is displayed, press [Enter] or the left mouse button to see the next video mode.
4. If there is a problem, press [Esc] or the right mouse button to return to the **Preview** window.

Try slower settings for any resolutions that did not work and verify your choices again.

Centering Adjust

Centering is available while in the **Video Modes Preview** window (only for extended Graphics modes 58h and greater). You can use the Right/Left/Up/Down arrow keys to adjust your screen accordingly.

The screen adjustments have predefined limits, and in some cases the limit for the right side adjustment for some modes will have already been reached when entering the **Preview** mode. In that case, no right side adjustment is allowed.

Once a mode is adjusted, the new values for horizontal and/or vertical positioning are saved within CLMode. When exiting from CLMode, you are prompted on whether you want to save these new parameters to TSR (CENTER.COM). If you choose to do this, the values to be used for the adjusted modes are stored in CENTER.COM on exit. CENTER.COM can then be loaded outside of CLMode. Once this is accomplished, all the modes that you have adjusted are the active modes set when that mode request is made.

To unload CENTER.COM, you must change the Monitor Type currently set in CLMode. This will unload CENTER.COM and uninstall all centering adjustments previously redefined. To save new centering adjustments for a different monitor type, repeat the above procedure. Your new adjustments are written into CENTER.COM over the previously defined adjustments.

An additional adjustment for monitor SYNC POLARITY is also available while centering is active. To adjust the polarity of the current mode, simply press the PgUp or PgDn keys (while in **Preview**) to cycle through the available options (Vertical Sync Polarity/Horizontal Sync Polarity):

+/+, +/-, -/+, -/-

Note: Centering will not be allowed if CENTER.COM is loaded. You must unload CENTER.COM before attempting to save new adjustments.

Limitations: You may only adjust and save 16 modes at a time to CENTER.COM.

Retrieving the Current VGA Controller Status

The information in the main CLMode window displays the VGA controller type, the BIOS version number and the amount of video memory present.

Exiting the CLMode

To exit CLMode at any time, press the [Alt] and [F4] keys simultaneously, or click the left mouse button on the system button of the main window (i.e., the top left corner button of the window, shown as a bar), or select the **Exit** button. When the CLMode utility exits, the current video mode, monitor type, and VGA refresh rate are displayed.

When CLMODE is exited, the settings are saved to the on-board EEPROM. These settings are automatically loaded by the video BIOS the next time the board is powered up. Note that CLMODE does not show the EEPROM present until it has been initialized. The presence of the EEPROM can be confirmed in the System Information Box of the main CLMode window.

Since the settings are saved to EEPROM, the ZT 6630 always powers up using these modes and refresh rates. Make sure to reset the ZT 6630 to the default values (all modes using 60 Hz refresh rates) before switching to a different monitor that might not be able to handle the previous modes and refresh rates.

Using CLMode's Command Line Options

When command line options for CLMODE.EXE are given at the DOS prompt, the menu-driven windows are not displayed. Instead, configuration, monitor type, video mode and refresh rate are set at the DOS prompt. The command line options for CLMODE.EXE are listed below:

```
CLMODE {modenum} {m{montype} | {s n} }[Enter]
```

Where: {modenum} mode
number

{montype} monitor type

Valid monitor types:

0	VGA
1	8514
2	Super VGA
3	Extended Super VGA
4	Multi-frequency
5	Extended Multi-frequency
6	Super Multi-frequency
7	Extended Super Multi-frequency

{montype} monitor type

t6=x(Hz)	640x480 @ (0 = 60, 1 = 72)
t8=x(Hz)	800x600 @ (0 = 56, 1 = 60, 2 = 72)
t1=x(Hz)	1024x768 @ (0 = 87i, 1 = 60, 2 = 70)
t2=x(Hz)	1280x1024 @ (0 = 87i, 1 = Not available)
s	List status information

Examples

To set video mode 3:

```
CLMODE 3 [Enter]
```

To select custom monitor timings with 640x480 at 60 Hz and 800x600 at 72Hz refresh type:

```
CLMODE t6=0 t8=2 [Enter]
```

Typing [S] as a command line option will display the current CLMode settings. The "Monitor Type Examples" table lists common monitor types and their associated values.

Monitor Type Examples

Monitor Type	Examples	Horizontal Frequency (kHz)	Vertical Frequency (Hz)	Display Resolutions
0	IBM 8512, 8513, 8503	31.5	60	640x480
1	IBM 8514, 8515	31.5 35.5	60 43.5 - interlaced	640x480 1024x768
2	NEC 2A	31.5 35.2	60 56	640x480 800x600
3	NEC II	31.5 35.2 35.5	60 56 43.5 - interlaced	640x480 800x600 1024x768
4	NEC 3D	31.5 37.8 37.8	60 60 43.5 - interlaced	640x480 800x600 1024x768
5	Sony CPD-1304, NEC 3FGx, Nanao 9065S, 9070U	31.5 48.0 48.0 48.0	60 72 60 43.5 - interlaced	640x480 800x600 1024x768 1280x1024
6	NEC 4D, 4FG, Nanao T240i	31.5 48.0 56.0 48.0	60 72 70 43.5 - interlaced	640x480 800x600 1024x768 1280x1024
7	NEC 5D, 5FG, 6FG, Nanao T550i, T560i, T660i, F550i, F750i,	31.5 48.0 58.3 48.0	60 72 72 43.5 - interlaced	640x480 800x600 1024x768 1280x1024

TSRFONT DRIVER

Some DOS application programs bypass the BIOS and directly draw characters to the screen. Programs that directly draw characters using the 8x14 font from the BIOS appear to be writing incorrect data to the screen. Typically this can occur in programs that offer a selection to use a graphics 25 or 34 line display mode. Other programs may appear to cut off the descenders of characters like "y" and "j".

Running the TSRFONT driver makes a full 8x14 size character set available to these programs, and should correct the type of display errors discussed above.

To run the TSRFONT driver, type

```
TSRFONT [Enter]
```

If you want to run TSRFONT automatically when you turn on your computer, add it to your AUTOEXEC.BAT file.

6. DISPLAY DRIVERS

The ZT 6630 is 100% VGA compatible. The display drivers described in this manual are supplied to improve the resolution for each supported software application package.

The ZT 6630 can support improved text resolution, providing greater readability when using the supplied drivers in text-based word processing programs. It also supports higher graphics resolutions, providing greater detail when using the supplied drivers in graphics-based programs.

Use the installation utility (INSTALL.EXE) to copy all display drivers directly to the appropriate application directories, where they may then be configured by the application software.

For the latest driver information, read the README.DOC file on the driver Disks.

Before you begin, note that not all video modes are available on all systems. If an extended mode driver is installed for a video mode that is not available, the application program does not function properly.

Many factors determine the list of available video modes. Some of these include the current monitor type, the amount of installed memory, and the revision of the VGA controller. To determine the modes that are available before beginning the driver installation, run the CLMode program with the VGA configured the way that it will be used and examine the list of available video modes.

The following drivers are included with the ZT 6630.

- AUTODESK - ADI 4.2
- LOTUS 1-2-3™ v2.x
- LOTUS 1-2-3 v3.x
- MICROSOFT WINDOWS (See "[Windows 3.1 Installation](#)" in Chapter 7 for installation instructions)
- MICROSOFT WORD (DOS)
- WORDPERFECT 5.1, 6.0
- WORDSTAR

AUTODESK - ADI 4.2

The ADI 4.2 driver provided with your ZT 6630 is the TurboDLDC*lassic*[™] display list driver from Panacea. It has two purposes:

1. To speed up AutoCAD[®] REDRAWs, PANs, and ZOOMs
2. To provide a more productive, user-friendly interface to AutoCAD (via the features described later in this manual).

The driver is memory resident and inserts itself between AutoCAD and the graphics board. It has no other effect on AutoCAD's operation besides speeding the program up. It runs with AutoShade 2[™] with RenderMan[®], and with 3D Studio to provide enhanced rendering support, but does not affect the speed of these programs since they do not support Display Lists.

Installing TurboDLDC*lassic* does not change any of the AutoCAD program files or alter any of the drawing files stored on disk. TurboDLDC*lassic* is designed to make using AutoCAD faster and more productive.

There are three things the driver does to speed operation:

1. AutoCAD stores drawings in a hierarchical structure, intermixing simple elements with complex ones. Every time the screen is updated, AutoCAD must decode this structure. However, TurboDLDC*lassic* translates the normal hierarchical structure into a Display List, a series of vectors or polygon fills. When you pan or zoom, TurboDLDC*lassic* uses the Display List, then writes the resulting vectors to the video board hardware. Since the hierarchical structure does not have to be decoded, drawing proceeds very quickly.
2. TurboDLDC*lassic* also maintains a Drawing Cache. The Drawing Cache is a compressed list that contains the current contents of a viewport. This pre-scaled portion of the Display List allows for even faster pans and zooms and redraws.
3. TurboDLDC*lassic* gives you numerous new user-interface features, such as the bird's eye view.

PANs and ZOOMs, aided by the Display List alone, run from two to twelve times faster than a non-display list driver. The Drawing Cache further speeds things up to the point that REDRAWs can be up to twenty-five times faster with TurboDLDC*lassic*, compared to the graphics drivers shipped with AutoCAD Features.

Autodesk - ADI 4.2 Features

The features provided by TurboDLDC*Classic* include:

- Bird's eye view.
- Accelerated redraws, pans, and zooms.
- Easy to use - no new commands or special menus to learn.
- Protected-mode ADI 4.2 driver - completely compatible with AutoCAD Release 12, Release 11/386, 3D Studio and AutoShade 2 with RenderMan.
- No memory conflicts. Works with AutoCAD's built-in Virtual Memory Manager
- Includes CustomColors™, which lets you interactively customize your logical and physical colors from within AutoCAD.
- Completely compatible with all Autodesk ADI 4.2 compatible third party software.
- Supports all AutoCAD Release 12 features, including rendering to viewports and 31-bit regen space.

Autodesk - ADI 4.2 Requirements

TurboDLDC*Classic* requires a 386, 486, or Pentium™ based PC that supports AutoCAD Release 12, 11/386, AutoShade 2 with RenderMan, or 3D Studio V1.x/2.x.

Additional extended memory is recommended for optimal performance. The driver actively uses about 300 Kbytes of RAM from extended memory for its operation. This memory is drawn from AutoCAD's memory pool and therefore does not affect normal DOS operation. The driver is loaded by AutoCAD at AutoCAD load time and is unloaded when AutoCAD is exited.

Additionally, the Display List size can vary from one tenth to three times the size of the current drawing file, particularly when using AutoCAD 12's 31-bit regen space.

You may wish to purchase and install additional RAM before installing TurboDLDC*Classic*, since it shares memory with AutoCAD. If AutoCAD is using a lot of memory, TurboDLDC*Classic* may not have enough. If there is significant hard disk activity while you are using TurboDLDC*Classic*, it may be an indication that you need to add more memory to your system.

Autodesk - ADI 4.2 Installation

1. Insert the DOS Drivers and Utilities Disk into Drive A: (or B:).
2. Run the installation program (INSTALL.EXE).
3. Choose the option for the Autodesk/AutoCAD drivers.
4. Specify the drive and directory in which you want them copied (such as C:\ACAD\DRV).

Since the startup is a little bit different for AutoCAD Release 12 than it is for older versions, please follow the instructions for the version of AutoCAD that you are using with *TurboDLDClassic*.

To Configure AutoCAD 12

1. Begin AutoCAD with the reconfigure switch by typing
`ACAD -R[Enter]`
2. Choose option 3, **Configure Video Display** from the AutoCAD configuration menu.
3. Type **Y** at the **Do you want to select...** message to display the available video options for AutoCAD.
4. Select **TurboDLDClassic by Panacea Inc.** from the list of display options.

Note: If you chose to install *TurboDLDClassic* into a sub-directory other than ACAD\DRV, be sure to modify the ACADDRV environment variable to include that sub-directory. Otherwise, the *TurboDLDClassic* selection does not appear in the list of available drivers.

To Configure AutoCAD 11/386

1. Run FASTACAD.BAT, which was copied to the TurboDLDC*lassic* sub-directory, by typing:

```
C:\TURBODLD\FASTACAD[Enter]
```

The above example shows that TurboDLDC*lassic* was installed on drive C: in the TURBODLD sub-directory.

2. Start AutoCAD and reconfigure it to use TurboDLDC*lassic* by selecting option 5, **Configure AutoCAD** from the AutoCAD main menu.
3. From the next menu, select option 3, **Configure Video Display**.
4. Choose Item 1, **P386 ADI 4.0/4.1 (R11)** as your display device. For more information, see your AutoCAD *Installation and Performance Guide*.

TurboDLDC*lassic* Configuration

After selecting the proper display device, the TurboDLDC*lassic* driver configuration menu appears.

Setup of TurboDLDC*lassic* requires configuration of its various operating parameters. These parameters have been logically grouped into menus based on their interaction with AutoCAD. A quick trip through each menu completes the configuration process. Context sensitive help can be obtained by typing [?] at any menu option. Please note that the DLDSETUP.HLP file must be present in order for help to appear. If you get an error message, be sure that the file DLDSETUP.HLP is in the ACAD\DRV sub-directory (R12), or in the TURBODLD sub-directory (R11).

If at any point during the configuration process you want to change an item on a previous screen, just press the [Esc] key to back up. Selecting NO SAVE, EXIT at the main configuration menu returns you to the AutoCAD configuration menu without making any changes.

At a minimum, a graphics board and screen resolution must be chosen from the Select Graphics Board/Resolution menu. If no display options are configured, the driver is automatically configured for Generic VGA, 640 x 480 resolution at 16 colors.

Select Graphics Board/Resolution

The first menu, Select Graphics Board/Resolution, configures TurboDLDC*lassic* for the graphics board and display and rendering resolutions to be used. Prior to configuring TurboDLDC*lassic*, run the CLMode utility and check the first screen to determine which Cirrus Logic chip and how much memory is on your VGA adapter.

- **Select Graphics Board** - Selects the graphics chip being used
- **Select Display Resolution** - Selects AutoCAD, 3D Studio and AutoShade main display screen resolutions
- **Select Rendering Resolution** - Selects AutoCAD 12, 3D Studio and AutoShade rendering resolutions

Note: When configuring TurboDLDC*Classic's* display options, the Rendering Board/Resolution options described below automatically appear *ONLY* when configuring AVE Render, 3D Studio or AutoShade. Otherwise, the Display Board/Resolution options are the only menu choices available.

Basic Configuration

Basic Configuration menu options set AutoCAD screen characteristics, number of text lines in the command-line area, font size, and dual screen mode.

- **AutoCAD Text Lines** - Selects the number of lines in AutoCAD command prompt area. The default is 3 lines, but values from 1 to 10 can be specified. A number larger than 3 might be useful if you are using this driver in a high resolution mode with small fonts, eliminating the need to frequently swap back and forth between the text and graphics screens.

If you do not want any lines of text at the bottom of the display, use AutoCAD to disable the command area (see the AutoCAD [Interface, Installation and Performance Guide](#) for more information). Press [Return] to continue with font selection.

- **Font Size** - Selects the AutoCAD display screen font or font file to be used. Choose the Font Size you would like to use for your AutoCAD menus, pull-downs, and dialog boxes: 8x8/8x14/8x16/12x20/12x24. For resolutions over 800x600 we recommend the 12x20 or 12x24 fonts. The default is the 8x14 font.
- **Dual Screen Mode** - Enables or disables dual screen operation of AutoCAD.

User Interface

User Interface options include the parameters for maneuvering within AutoCAD. Using these options, the Big Picture (Panacea's bird's-eye view) can be configured to suit your needs or allow for better differentiation within a complex drawing.

- **Double Click** - The Double Click option allows you to set the delay for TurboDLDC*Classic's* Big Picture pop-up. This value represents the largest amount of time that can elapse between the release of the digitizer button and the subsequent press of the same button in order to detect a double click and display the Big Picture. Setting this number too low results in the computer seeing two separate clicks, while setting the time too high may slow down response time for single button presses. Values between 10 and 30 are recommended.

The Double Click time is measured in hundredths of seconds. PC systems have a timing resolution of 5/100ths of a second; therefore, the entered time is rounded by the driver to the most closely approximate nearest multiple of 5. This means that a time setting of 23 is the same as a setting of 27, both of which get rounded to 25 (or one-quarter of a second). In simplest terms, when adjusting the timing value, it is best to use multiples of 5.

- **BP Button** - Sets the mouse/digitizer button to display the Big Picture (BP). With the BP Button option, TurboDLDC*classic* gives you the flexibility to use a double click on an available digitizer/mouse button as a Big Picture pop-up button. On the BP Button menu line, enter the number of any available digitizer button other than button 1 - button 1 is reserved as the pick button. Within AutoCAD, simply double click the chosen button to invoke the Big Picture.
- **BP Highlight Mode** - Controls how the BP appears on the screen.
 - Patt Line displays the BP using dotted lines to form the outer bounding box and the zoom crosshairs.
 - XOR Rect uses a contrasting rectangle to display the BP.
 - The Both option use a combination of Patt Line and XOR Rect to distinguish the BP.
- **BP Refresh** - In its fastest mode, TurboDLDC*classic* does not refresh the BP until a DLDREFRESH command is issued. Depending on a drawing's complexity, the BP could become confusing in this mode, displaying vectors that are actually erased, and no longer part of the drawing. To configure the BP to be updated as objects are drawn or erased, enable the BP Refresh. If speed is a major concern, disable it.
- **BP Cache** - Enables or disables TurboDLDC*classic*'s internal memory cache for BP functions. This cache speeds up BP operations on some graphics platforms, primarily on TIGA-based graphics boards. For this reason, the BP Cache is normally disabled. As a reference, on VGAs, the performance benefit of the BP Cache is as little as 1%. With a TIGA-based graphics board, however, the performance benefit of the BP Cache is as high as 400%.

Expert Configuration

The Expert Configuration menu sets the function of TurboDLDC*classic* itself. This menu allows for customization of the driver for speed or to adjust for memory constraints.

- **Display List** - Enables or disables the display list feature of TurboDLDC*classic*. This option should always be set to enable since disabling the Display List causes TurboDLDC*classic* to run as an ordinary non-display list driver.
- **Drawing Cache** - Enables or disables TurboDLDC*classic*'s internal drawing cache, a compressed list of the current viewport, which speeds up pans, zooms, and redraws. As in the Display List option, Drawing Cache should normally be enabled. In low memory situations, it may be desirable to disable the Drawing Cache. Disabling the drawing cache frees up memory for AutoCAD but may or may not have a visible

effect on your ZOOM and PAN performance. For example, on VGAs, the performance benefit of the drawing cache is as little as 5%. With a TIGA-based graphics board, however, the performance benefit of the drawing cache is as high as 400%.

- **AutoCAD Logical Drawing Space** - Using AutoCAD 31-Bit Space, this option configures TurboDLDC*lassic* for use with AutoCAD R12's 31-bit logical drawing space. When set to Yes, the driver uses AutoCAD's extended 31-bit drawing space. Selecting No uses a 15-bit drawing space, similar to that of AutoCAD R11.

The 31-bit logical space allows you to extend your Regen-less zooming ability by a factor of several million at the cost of more memory. Additional memory is used by AutoCAD for the drawing space, and by TurboDLDC*lassic* for the Display List. 31-bit zooming and panning is about 10%-20% slower than for 15-bit logical space. The Use AutoCAD 31-Bit Space setting is ignored for AutoCAD R11 installations.

- **Internal Command Echo** - The echo of TurboDLDC*lassic* internal commands can be enabled or disabled with the Internal Command Echo option. If you would like to see TurboDLDC*lassic*'s internal commands display at the AutoCAD command line as they are executed, enable this option.
- **Big Picture Zoom Mode** - Sets the BP zoom definition area display options. In a zoomed view of the static BP, as the current viewport is zoomed or panned:
 - Float mode causes the image in the BP to move around within the bird's-eye window, keeping the zoomed viewport area fixed in the center of the bird's-eye.
 - Freeze mode locks the current BP contents into place to provide a better overall frame of reference.
- **Regen Mode**
 - Fast Regen mode stores the AutoCAD drawing until the Display List is created, and then displays it, all at once.
 - Incremental mode displays the drawing in "chunks" as the display list is created. The Fast mode causes Regens to process approximately 5%-10% faster than the incremental.

Neither mode changes memory requirements.

After All Options Have Been Set

1. Use the arrow keys to scroll down to the **Save and Exit** option and then press the [Enter] key to continue.
2. Configure the AutoCAD screen display characteristics and type [Y] to accept the changes.
3. Exit to the AutoCAD drawing editor to begin using TurboDLDClassic. If you are reconfiguring AutoCAD, and currently have a drawing loaded, you must exit the drawing and reload the drawing.

The last step in setting up TurboDLDClassic is to configure the colors for AutoCAD.

1. From the AutoCAD Command Line, type DLDCOLOR[Enter], to start CustomColors, TurboDLDClassic's color configuration utility.
2. Make any desired color changes.
3. Save the new color palette, and then exit to return to the drawing editor.

Verifying Your TurboDLDClassic Installation

To verify that TurboDLDClassic is running and installed correctly, follow one of these two simple tests.

- If you have the AutoCAD side menu enabled, look for the Panacea Logo in the lower right-hand corner.
- If you are running AutoCAD without a side menu, type DLDVER[Enter] at the AutoCAD command prompt. If TurboDLDClassic is loaded and running, this command should return your current version, and serial number.

Reconfiguring TurboDLDClassic

To reconfigure TurboDLDClassic, follow the instructions in the following topics for your version of AutoCAD, Release 12 or Release 11.

AutoCAD Release 12

If you need to make changes to your Release 12 TurboDLDClassic configuration,

1. Type CONFIG[Enter] at the AutoCAD command prompt or use ACAD -R[Enter] when starting the program.
2. Select option 3, **Configure Video Display**.

3. Answer `No[Enter]` to the **Select a new videodriver...** prompt to start the TurboDLDClassic configuration program.
4. Make the desired changes to the driver and then **Save and Exit** to continue to the AutoCAD drawing editor.

AutoCAD Release 11

To change a Release 11 configuration:

1. Select option 5, **Configure AutoCAD** from the AutoCAD main menu.
2. From the configuration menu, select option 3, **Configure Video Display**.
3. Answer `no` to the **Select a new video driver...** prompt to start the TurboDLDClassic configuration program.
4. Change the desired driver options.
5. **Save and Exit** to return to the AutoCAD configuration menu.
6. Open or begin a new drawing.

To completely reconfigure TurboDLDClassic using Panacea's defaults,

1. Delete DLDSETUP.DAT from either the \ACAD\DRV sub-directory (R12) or the TURBODLD sub-directory (R11).
2. Follow the TurboDLDClassicConfiguration instructions earlier in this chapter.

Configuring an AutoCAD 11 Environment

During the TurboDLDClassic installation process, a FASTACAD.BAT file is created and placed into the TURBODLD sub-directory. FASTACAD.BAT contains four lines that set four separate environment variables:

- DLDCFG - used by TurboDLDClassic to find all of its configuration files
- DSPADI, RCPADI, and RDPADI - used by AutoCAD, 3D Studio, and AutoShade 2 with RenderMan, respectively, to find the driver file.

FASTACAD.BAT must be run prior to starting AutoCAD R11 and needs to be run only once per system boot. For automatic loading of the environment variables, you may add FASTACAD.BAT to the AUTOEXEC.BAT file or an AutoCAD startup batch file.

To add FASTACAD.BAT to your AUTOEXEC.BAT file, insert the line:

```
CALL D:\TURBODLD\FASTACAD
```

anywhere in the file. The above example assumes that FASTACAD.BAT resides in a sub-directory on drive D: called \TURBODLD.

If you do not wish to put FASTACAD in your AUTOEXEC.BAT file, you may put it in a batch file that also starts AutoCAD, or simply remember to run the file before starting AutoCAD.

If you get the message "Out of Environment Space" when you run FASTACAD.BAT, you need to enlarge your system's environment. This is accomplished by adding the following line:

```
SHELL=C:\COMMAND.COM /P /E:768
```

to your CONFIG.SYS file. The /E:768 specifies an environment size of 768 bytes. Change this number as appropriate. Reboot after modifying your CONFIG.SYS file in order for the changes to take effect.

Configuring AutoShade

To configure AutoShade V2.0 to use TurboDLDClassic:

1. Run the FASTACAD.BAT file from your TurboDLDClassic subdirectory to set the AutoShade environment variables.
2. Start AutoShade with SHADE /R[Enter]. This allows you to reconfigure AutoShade.
 - For the display device, select P386 Autodesk Device Interface display driver.
 - For the rendering display select the P386 Autodesk Device Interface rendering driver.

If you are running the display and rendering screen on the same monitor (i.e., single monitor), make sure to tell AutoShade this. A single monitor approach requires a redraw of the display screen after a rendering screen.

3. Next, follow the same installation steps that were used to select the graphics board and display/rendering resolutions for AutoCAD.

Configuring 3D Studio Release 1.X and 2.X

Configuring 3D Studio requires the following steps.

1. Set the environment variables for 3D Studio by running the PANA3DS.BAT file located in your TurboDLDClassic subdirectory.

2. Edit the 3DS.SET file, located in your 3DS directory. The following three lines may be changed to use the RCPADI rendering driver. Locate the lines that begin with:

```
RENDER-DISPLAY  
MAIN-DISPLAY  
MATERIAL-DISPLAY
```

and change them to read:

```
RENDER-DISPLAY=RCPADI  
MAIN-DISPLAY=RCPADI  
MATERIAL-DISPLAY=RCPADI
```

Be sure to remove the semicolon (;) or any spaces at the beginning of the line.

You must set only the **RENDER-DISPLAY** line to RCPADI in order to render at high resolution. If you do not need a high resolution main display screen or if you are not using the materials editor, you may keep **MAIN-DISPLAY** and **MATERIAL-DISPLAY** set to their defaults.

Note: For 3D Studio 1.x, there is no **RENDER-DISPLAY** line. The corresponding line is **DEFAULT-DISPLAY** and should be changed to read:

```
DEFAULT-DISPLAY="RCPADI"
```

The quotes around RCPADI must be used for this version of 3D Studio.

The **MATERIAL-DISPLAY** should only be configured for RCPADI when BOTH the Display AND Rendering Resolutions of TurboDLDC*classic* are configured for 256 color resolutions. An unpredictable Materials Editor screen appears if anything other than 256 colors is selected. If you are unsure about the function of the Materials Editor screen, use the Materials Editor as VGA. Please note that the use of the Materials Editor does not give you any more colors to choose from.

3. Save the above changes.
4. From your 3D Studio directory, delete the file 3DADI.CFG by typing:

```
DEL 3DADI.CFG[Enter]
```

This causes 3D Studio to start in its reconfiguration mode.

5. Start 3D Studio by typing 3DS[Enter].

During the 3D Studio reconfiguration start-up, you are prompted with a series of questions. After the first 3D Studio question appears and is answered, the TurboDLDC*classic* configuration program appears. Select a graphics board and display and rendering resolutions as you would for AutoCAD use.

Because RCPADI device drivers, by definition, are combined display and rendering devices, you are brought to the TurboDLDC*Classic* configuration menu during 3D Studio reconfiguration twice: once each for display and rendering. It is not necessary to select display and/or rendering resolutions the second time. Simply press the [Enter] key to remove the help screen and then highlight **Save and Exit** to continue to the next question.

If FASTACAD.BAT is used instead of PANA3DS.BAT to define the AutoCAD operating environment, the TurboDLDC*Classic* configuration menu also appears for RDPADI and DSPADI devices if they are present.

Configuring 3D Studio V3.X

Panacea's TurboDLDC*Classic* drivers run with 3D Studio release 3.X. Please use 3D Studio's default RCPADI Vibrant Graphic Driver Configuration. Follow the Vibrant Graphics Configuration Program Setup Procedures that are found in your 3D Studio 3.X Installation Manual for ADI 4.2 Drivers.

From your Turbodld Subdirectory, run PANA3DS.BAT to set the 3D Studio environment settings.

Run 3DS VIBCFG.

During Configuration for Vibrant Graphics there are four categories:

- Main-Display
- Materials-Display
- Render-Display
- Flic Playing

Set RCPADI for these four categories.

When Vibrant Graphic settings are complete, click OK to exit and save settings. The Setup for TurboDLDC*Classic* Drivers commences. Follow the menus to **Setup Display and Rendering Screen**. Save and Exit to 3D Studio.

Please note that the out-of-the-box Cirrus Logic drivers that are supported in 3D Studio release 3.X are supplied and maintained by Autodesk.

Note: TurboDLDC*Classic* only provides still rendering support for 3D Studio. TurboDLDC*Classic* does not play back rendered .FLI or .FLC files. This is a limitation of 3D Studio. The Mapping Icon colors, which are usually yellow and green, appear as black when using any external ADI driver. Also, 3D Studio has problems with large fonts. It is recommended that you use the default font settings.

Configuring AVE Render

AutoCAD 12's AVE Render uses TurboDLDC*classic's* rendering capabilities to render objects and drawings.

First Time Configuration

If AVE Render has never been configured, you are forced to run through the configuration process when you first select the AutoCAD render command. You are prompted as follows.

1. Select a Rendering Display Device. Since TurboDLDC*classic* is a combined display/rendering device, choose item 1, **P386 ADI Combined Display/Rendering Driver**, from the available choices.
2. Configure the Rendering Graphics Board and Resolution:
 - a. The TurboDLDC*classic* configuration program appears on the screen. Press the [Enter] key to continue past the help screen and display the Rendering Configuration menu.
 - b. Choose **Select Graphics Board/Resolution** to display graphics board and resolution menu selections.
 - c. Choose **Select Render Graphics Board** to select the graphics board to be used for renderings.
 - d. Choose **Select Render Resolution** to select the desired rendering resolution from the list of available choices.
 - e. Select **Return to Previous Menu**.
 - f. Select **Save and Exit**.
3. Select **Render Mode**, then select the rendering mode for TurboDLDC*classic*. Select either **Render to Viewport** or **Render to Screen**, depending on how you wish to view your renderings. Note that in order to render to a viewport you must be using a display resolution of at least 256 colors. Otherwise, AVE Render does not allow a render to viewport selection.
4. Select a Render Hard Copy Device. If you are using a render hard copy device, select your device type from the list of choices. If you are not using a hard copy device, accept the default of NULL.

After configuring AVE Render, return to the drawing and render it.

Reconfiguration

If you have previously configured AVE Render, type `RCONFIG[Enter]` at the AutoCAD command prompt to manually display the Render Configuration menu. Follow these steps to re-configure AVE Render.

1. Select option 2, **Configure Rendering Device** to choose a new rendering driver. Answer `[Yes]` to the **Select Different Rendering Device** question.
2. Select option 1, **P386 Combined Display/Rendering Driver**. The *TurboDLDClassic* configuration program appears on the screen.
3. Configure the rendering graphics board and resolution.
 - a. Press the `[Enter]` key to continue past the help screen and display the **Rendering Configuration** menu.
 - b. Choose **Select Graphics Board/Resolution** to display graphics board and resolution menu selections.
 - c. Choose **Select Render Graphics Board** to select the graphics board to be used for rendering.
 - d. Choose **Select Render Resolution** to select the desired rendering resolution from the list of available choices.
 - e. Select **Return to Previous Menu** and then **Save and Exit**.
4. Select the rendering mode for *TurboDLDClassic*. Select either **Render to Viewport** or **Render to Screen**, depending on how you wish to view your renderings. Note that in order to render to a viewport you must be using a Display resolution with at least 256 colors. Otherwise, AVE Render does not allow a render to viewport selection.
5. Select **Exit to the Drawing Editor** from the **Render Configuration** menu and then type `[Y]` to keep the changes you've just made. Press the `[F1]` key to change to the graphics screen if necessary.

Changing Colors

The CustomColors color configuration utility included with TurboDLDC*Classic* gives you the ability to modify all of your changeable AutoCAD colors, including menu colors, text colors, dialog box colors, and even drawing colors, while running AutoCAD.

CustomColors simulates an AutoCAD screen, complete with all possible objects. Type DLDCOLOR[Enter] at the AutoCAD drawing editor command line to edit the color configuration. Once you enter the utility, you are provided with the following configuration menu at the bottom of the screen:

```
(O)bject,  
(D)rawing,  
(P)hysical,  
(A)DI reset,  
(V)GA reset,  
(L)oad,  
(S)ave,  
(E)xit
```

The menu items perform the following functions.

Object

Selecting this option allows you to change the color of any AutoCAD screen object, such as the graphics area background color, the menu area text color, or the border line color.

Select the object whose color you want to change by moving the highlight box around with the left and right cursor control keys and pressing [Enter] when you have highlighted the desired object. Note that a one-line description of the object type is displayed at the top of the screen as you move the box around.

Once you have selected the object, another highlight box appears around the color boxes nearest to the bottom of the screen. These are the physical colors that the video board supports. Use the left and right cursor keys to select the physical color to be used for the object you have selected and press [Enter]. The screen quickly redraws with the new color selection for the object you have chosen, and returns to the start of object selection, allowing you to change the color of another object.

Note that at any time during color configuration, you can press the [Esc] key once or twice and return to AutoCAD. Also, pressing the question mark [?] key provides you with context sensitive help.

Drawing

This option allows you to modify AutoCAD drawing colors 0, 8 and 9, in a fashion similar to the way you change object colors.

When this option is selected, a highlight square appears in the drawing color area of the simulated AutoCAD display. The square can be manipulated using the four cursor keys. You may notice that the drawing color portion of the display is laid out just like the CHROMA drawing supplied with AutoCAD. Press [Enter] and the highlight moves down to the 16 physical colors, just as it does during the object color selection. Using the arrow keys, pick the physical color you want to represent the selected drawing color. Press [Enter] to have your selection take effect.

Physical

Choosing the Physical option from the menu allows you to alter the red, green, and blue components of the physical colors. A highlight box appears in the row of 16 physical colors at the bottom of the screen.

Use the arrow keys to select the color you wish to edit and press [Enter]. Three sliders appears near the bottom of the display, with the horizontal position of the slider for each of the color components (red, green, or blue - RGB) indicating the relative intensity of the component. Use the left and right arrow keys to move the slider for the selected component, or type in a number from 0 to 255.

Many graphics boards do not support 255 different intensities for each color component. Therefore, when you enter an intensity, Custom Colors rounds it to the nearest intensity that your graphics board supports. For example, VGAs support 64 intensities per RGB color component. This means intensities increase in multiples of 4 (256/64); therefore, an intensity of 0 is the same as an intensity of 3.

The up and down arrows allow you to select the component you want to alter. As you manipulate the sliders, all objects on the display that are of the same color as the selected physical color change hue, allowing you to visually determine the most appropriate setting for your display. Press [Enter] to set the RGB values you have selected for the physical color you are modifying.

ADlreset

Constructs a default ADI color palette, as defined in the Autodesk Device Interface Driver Development Kit.

VGAreset

Constructs a default VGA color palette in the first 16 color entries. The remaining palette colors remain identical to those used for ADI devices.

Load

Reloads the color information from the file DLDCOLOR.DAT. It is loaded from the directory pointed to by DLDCFG (AutoCAD R11), or from the AutoCAD R12 \DRV directory. If DLDCOLOR.DAT cannot be found, an error message is displayed.

This command is useful because it allows you to go back to your previously edited color configuration in case you have made mistakes in configuring your colors.

Note: Be careful not to accidentally wipe out your changes. Selecting **ADlreset**, **VGArreset**, or **Load** irrevocably wipes out any current color changes unless you have just saved your new setting. Use them only when you really need to, such as when you have made so many color changes that you cannot seem to get back to a reasonable place and just want to start over.

Save

Saves the current color palette to DLDCOLOR.DAT. It is saved to the directory pointed to by the DLDCFG environment variable in FASTACAD, or to the \ACAD\DRV (R12) directory if FASTACAD is not used.

Exit

Exits CustomColors. If you have made palette changes, but not saved them, you are asked if you want to save your changes before exiting.

When running at more than 8 bits-per-pixel (256 colors), setting physical colors via DLDCOLOR has no visible effect until a **Save** and **Exit** occurs.

TurboDLDClassic Commands

TurboDLDC*lassic* offers AutoCAD users many features and productivity options. This section alphabetically lists the basic commands found in TurboDLDC*lassic* and provides the correct syntax for their usage. For a brief summary of TurboDLDC*lassic* commands type DLDHELP at the AutoCAD command prompt.

Commands with a dagger (†) following them, when issued within AutoCAD, override the selections made during TurboDLDC*lassic* configuration, for the current drawing session only. Exiting AutoCAD and subsequently restarting causes all feature settings to revert back to those selected in the TurboDLDC*lassic* configuration menu. If you wish to make the current changes permanent, reconfigure TurboDLDC*lassic*.

The most important feature of TurboDLDC*lassic* is the addition of a world view called The Big Picture™ or BP for short. Bringing up the BP allows you to view where in the current drawing you are currently located in your active viewport, and it also gives you the ability to dynamically move to another part of the drawing without having to exit the function you are currently executing.

Note: Commands with a dagger (†) following them, when issued within AutoCAD, override the selections made during TurboDLDC*Classic* configuration, for the current drawing session only. Exiting AutoCAD and subsequently restarting causes all feature settings to revert back to those selected in the TurboDLDC*Classic* configuration menu. If you wish to make the current changes permanent, reconfigure TurboDLDC*Classic*.

DLDBIGPIC

To call up the Big Picture, at the AutoCAD command line, type DLDBIGPIC[Enter], or double click the right mouse button or button 2 on your digitizer puck (if you haven't redefined your BP Button double click). This brings up the BP on the display. Cross-hairs and a highlighted section indicate which part of the whole drawing you are currently viewing - the size of the image is determined by the AutoCAD logical drawing space being used, 15-Bit or 31-Bit. The selection or pick box has an **X** through it. Move the mouse/digitizer around to locate your pick box. If you can't see a small box moving, click the left mouse button (the pick button) to size down the pick area. In size mode, the pick box has a right pointing arrow in it (-->). If the contents of the BP are too small to work with, you may increase the size of the image in the window by pressing the [+] key on your numeric keypad. This performs an incremental zoom within the BP. Likewise, pressing the [-] key reduces the size of the contents of the BP. Pressing the [Home] and [End] keys puts the BP into its smallest and largest size, respectively. The smallest BP size is defined as being exactly the same view as that in the viewport referenced by the BP. The largest BP size is defined as the largest image possible without causing a Regen.

The BP pick box is always proportioned to the proper aspect ratio for the current viewport. Clicking the pick button again puts you back into the pick box move mode (**X**). This operation is very similar to using the **Zoom Dynamic** feature of AutoCAD. Once you have positioned the pick box on the area you would like displayed in the active viewport, click any button other than the pick button to initiate the zoom, or press the [Enter] key. If you want to abort the operation, just hold any button down, other than the pick button, until the BP disappears. You can also hit any key on the keyboard, other than [Enter], to cancel the BP. Note that the BP is updated with new drawing commands, but that moves or erases do not update the image unless BPREFRESH is enabled. A DLDREFRESH or a REGEN manually updates the BP with the current drawing changes.

DLDBPCACHE†

Enables or disables TurboDLDC*Classic*'s internal cache for BP features. This cache speeds up TurboDLDC*Classic*'s Big Picture functions. DLDBPCACHE is normally disabled. Performance benefits of the BP Cache vary from one graphics platform to the next. For example, on VGAs, the performance benefit of the BP Cache is as little as 1%.

DLDBPDIM

Resizing and repositioning the BP can be accomplished by typing this command at the AutoCAD prompt. DLDBPDIM allows you to tell the driver where you want the BP placed and how large you want it to be. The size is limited to being between one-quarter and one-half the width of the display. This command functions like the pan/zoom selection box in the BP, as far as positioning and dimensioning goes. To abort, hold the right mouse button, or any other digitizer button, down until the moving box disappears.

DLDBPFREEZE

Sets the Big Picture (BP) zoom definition area display options. DLDBPFREEZE toggles the Big Picture Zoom Mode parameter in TurboDLDC*Classic's* Expert Configuration Menu.

In a zoomed view of the static BP, as the current viewport is zoomed or panned, Float mode causes the image in the BP to move around within the bird's-eye window, keeping the zoomed viewport area fixed in the center of the bird's-eye. Freeze mode locks the current BP contents into place to provide a better overall frame of reference.

DLDBPHILIGHT[†]

Changes the highlight used to display the Big Picture among three modes, Patt Line, XOR Rect, and Both. Patt Lines use dotted lines to outline the Big Picture pick box. XOR Rect use a contrasting rectangle to highlight the pick box, and Both use a combination of Patt Lines and XOR Rect.

DLDBPREFRSH[†]

This convenience feature of TurboDLDC*Classic*, toggles the Big Picture update mode. If disabled, the BP is updated manually by issuing a DLDREFRESH command. When enabled, DLDBPREFRSH causes the BP to refresh automatically when an object is drawn or erased. The BP operations therefore are slower with DLDBPREFRSH enabled.

DLDBPSTATIC

Toggles the BP to stay on the screen at all times. Use this command if you want the BP on the screen in order to conveniently move into it whenever you want to zoom or pan. Typing DLDBPSTATIC puts up the BP at the position you set with DLDBPDIM. Note that the static BP disappears when other menus pop-up on the screen, and it also disappears if you draw any objects that may overwrite the BP. With these exceptions, the BP remains on-screen until you either exit the drawing screen or you type DLDBPSTATIC again.

DLDCOLOR

Invokes CustomColors™, Panacea's color configuration program.

DLDCOMPACT

Forces a manual garbage collect of Display List memory thereby returning unused display list memory back to the AutoCAD memory pool.

DLDDCACHE†

This command toggles the TurboDLDC*Classic* drawing cache on and off. The Drawing Cache is a compressed form of the current viewport which speeds pans, zooms, and redraws.

DLDDLIST†

This command toggles the display list function of TurboDLDC*Classic* on and off.

Please note that if the display list is turned off, AutoCAD runs as though you are using a standard non display list driver - pans, zooms, and redraws are MUCH slower with DLDDLIST disabled.

DLDECHO

Toggles internal TurboDLDC*Classic* command echoing at the AutoCAD command line. When TurboDLDC*Classic* commands are executed via the digitizer or pop-up menus, they generate internal commands which are displayed at the AutoCAD command line if DLDECHO is enabled. Disable DLDECHO to simplify the command line.

DLDHELP

Provides a list of TurboDLDC*Classic* commands with one-line description of each, within AutoCAD. It's recommended that you flip to the text screen by pressing the [F1] key to view the output.

DLDREFRESH

Refreshes the Big Picture to reflect the most current changes to a drawing. If the static BP is up, it is updated. If not, the next time the BP is brought up, it contains a current representation of your drawing, provided no changes are made between the DLDREFRESH command and the DLDBIGPIC command. For Automatic update of the Big Picture, see the DLDBPREFRSH command above.

DLDSTAT

Displays the current TurboDLDC*Classic* status. A listing of the current TurboDLDC*Classic* parameters is displayed at the AutoCAD command line. A flip to the graphics screen is recommended for this command.

DLDUSAGE

Use DLDUSAGE if you want a to-the-byte breakdown of how memory is being used, specifically for display list processing. DLDUSAGE returns information regarding the memory each viewport is occupying. Since AutoCAD supports multiple viewports, it is possible to have multiple display lists.

DLDVER

Displays the TurboDLDC*Classic* version, serial number and registered user's name at the AutoCAD command line.

DLDVISREGEN[†]

Toggles between the Fast and Visible Regen modes of TurboDLDC*Classic*. A Fast Regen creates the display list and then display the drawing all at once. A Visible Regen displays the drawing in chunks as the display list is created. This command is a dynamic form of the Regen Mode parameter in the Expert Configuration Menu. Since TurboDLDC*Classic*'s Fast Regen mode is faster than AutoCAD's, we highly recommend its use.

Memory Usage and Lists

TurboDLDC*Classic* shares extended memory with AutoCAD via the PharLap Virtual Memory Manager. This means that TurboDLDC*Classic* automatically pages to disk if it uses up all the RAM that AutoCAD has left for its use. See the AutoCAD *Installation and Performance Guide* for more information on Virtual Memory Management.

Please note that if you start seeing excessive hard disk accesses during PANs, REDRAWs, and ZOOMs while using AutoCAD with TurboDLDC*Classic*, try using the DLDCOMPACT command. If this does not affect the amount of disk access it is probably time to add more memory to your system. Contact your AutoCAD dealer for assistance in upgrading your memory.

Regarding display list memory, it is important to realize that TurboDLDC*Classic* speeds up AutoCAD operations by creating a Display List in memory, and sending that list to the graphics board for pans, zooms and redraws. But a display list takes up memory.

Memory Needed

For production use, it is recommended that at least 1 Megabyte is available for TurboDLDClassic. To determine how much memory AutoCAD is using, use the status command while in AutoCAD. Refer to the AutoCAD *Installation and Performance Guide* for more information. The Display List for a simple drawing like the shuttle Columbia might only require 20 Kbytes for the Display List. Complex drawings may require several megabytes.

Display Lists for a drawing range from one-tenth the size of the drawing file to three times the size; in general, the Display List averages about the same as the DWG file size. This means that you should count on the Display List generally taking up as much as twice the DWG file size. Also, complex objects such as circles and text "expand" when translated into display list format, so a drawing with a lot of complex objects and text has a larger Display List than a simpler drawing.

Keeping the Display List Small

Text takes up a disproportionate amount of space in the Display List. To keep the list small, put text in its own layer of the drawing. Then do not display the text layer when editing the rest of the figure. This keeps memory consumption down and speed up PANs, REDRAWs, and ZOOMs.

Read the AutoCAD Manuals

The AutoCAD manuals have an excellent section on performance, concentrating on memory usage. To get the most performance out of the program, read the appropriate sections of those manuals as well as this one.

Tips and Tricks

This section includes the topics "Upgrading From Older Panacea DLD Drivers" and "Maneuvering Through AutoCAD." These topics provide tips and tricks for using TurboDLDClassic more successfully.

Upgrading From Older Panacea DLD Drivers

Be sure to remove any reference to previous DLD driver commands (FASTACAD calls or SET parameters) or sub-directories that may be in your AUTOEXEC.BAT file or in AutoCAD start-up batch files. Such references could cause AutoCAD and TurboDLDClassic to look in the wrong place for setup information.

If you have been using a previous Panacea DLD driver and wish to use the color palette you customized for it with TurboDLDClassic, you may copy the DLDCOLOR.DAT file from your older DLD's sub-directory to the sub-directory you specified during the TurboDLDClassic installation process.

Maneuvering Through AutoCAD

Zooming

When zooming into an image, be aware of your AutoCAD grid snap setting. If you are zoomed extremely far into a drawing and you are having trouble moving your digitizer cursor, you may be snapping to a point that is not part of the zoomed viewport. If the cursor only moves to a single point, or is not on screen at all, turn the grid snap off.

TurboDLDClassic and Paper Space

TurboDLDClassic features do not work in AutoCAD's Paper Space. The execution of any TurboDLDClassic command in Paper Space results in an error message at the command prompt.

Zoom Dynamic

We do not recommend using ANY TurboDLDClassic features while in the Zoom Dynamic mode of AutoCAD. Because TurboDLDClassic cannot determine when Zoom Dynamic has been initiated, unpredictable results occur. Use the Big Picture feature of TurboDLDClassic to accomplish the same task as Zoom Dynamic, in a much more efficient fashion.

Switching Color Modes

When switching color modes, (from 16 to 256 or vice versa) the DLDCOLOR command should be run in order to reconfigure your color palette for the number of colors selected. A black cursor and disappearing crosshairs are both symptoms of a color palette problem.

AutoCAD R12's CONFIG command

Configuring TurboDLDClassic in the middle of a drawing session using the CONFIG command is a bit like exiting and re-starting AutoCAD. If you are using the static Big Picture, re-initialize it after returning from the **Configuration** menu.

Sticky Cursors

Sometimes, when using the Big Picture, the digitizer cursor appears to stick to the edge of the bird's-eye. This is normal and is the result of the digitizer puck responding to the whole screen area while the Big Picture only occupies a small portion of the screen. Because of the difference in resolutions between the screen and the digitizer, when the screen cursor enters the Big Picture area, the digitizer puck has more drawing area to cover in order to get to the same location as the screen cursor.

Using AutoCAD Commands

Since TurboDLDClassic is totally transparent to users with respect to using normal AutoCAD commands to REDRAW, PAN, and ZOOM, you still have to suffer from some of AutoCAD's nuances. One of these nuances is that ZOOM ALL and ZOOM EXTENTS both force a REGEN, because AutoCAD does not keep track of various boundaries necessary to avoid the REGENs. REGENs are rather time-consuming and do not use any display list processing to speed themselves up.

One way around this problem is to use another of AutoCAD's built-in features: the VIEW command. When you first load your image and see the whole drawing on the screen at once, just type `VIEW Save ALL[Enter]`, which saves the display position you see under a view named **All**. Then, after you have done some detailed editing and want to return to the big picture, type `VIEW Restore ALL[Enter]`, instead of `ZOOM All[Enter]` or `ZOOM Extents[Enter]`, and the full drawing is restored to the display at display list speeds, without a REGEN.

Another difference of AutoCAD is that if you zoom in too far or pan over too far, you may inadvertently cause a REGEN. AutoCAD again provides a very simple solution: the REGENAUTO command. Just type `REGENAUTO Off[Enter]` at the AutoCAD command prompt, and automatic REGENs are disabled. The REGENAUTO setting is also saved as part of your drawing file, so you only need to execute it once per drawing. You may even want to set REGENAUTO off in your ACAD.DWG drawing template so that all your drawings are created with REGENAUTO set off.

Third-Party Software

If you are having trouble with TurboDLDClassic and third-party AutoCAD applications, be sure that the third-party application supports ADI 4.2. In order to use the ADI 4.2 specification, third-party applications require new T-Drivers and therefore must be revised. If an application does not specifically say that it is ADI 4.2 compatible, it probably is not. Check with the manufacturer to be sure.

If your third-party application is ADI 4.2 compatible and you are having trouble using TurboDLDClassic, try running AutoCAD without the third-party application to try to isolate the problem. Also, try the third-party application with the VESA compatible driver shipped with AutoCAD. This also helps to isolate the source of the problem.

Also note that any third-party TSR that needs to access the display may not work properly when using AutoCAD with any advanced ADI display driver, especially if the TSR switches graphics modes. Most TSRs do not support the same graphics platforms as TurboDLDClassic and therefore are not able to accommodate mode switching back and forth.

Command Summary

This section alphabetically lists the basic commands found in TurboDLDC*lassic*.

DLDBIGPIC	Calls up the Big Picture - use digitizer clicks to define an area and zoom into it.
DLDBPCACHE	Enables or disables the Drawing Cache for TurboDLDC <i>lassic</i> advanced features.
DLDBPDIM	Allows resizing and repositioning of the Big Picture.
DLDBPFREEZE	Toggles the Big Picture Zoom Mode between Float and Fixed modes.
DLDBPHILIGHT	Selects the highlight mode used to display the Big Picture.
DLDBPREFRSH	Enables and Disables the Big Picture automatic update mode.
DLDBPSTATIC	Toggles the Big Picture to stay on the screen at all times.
DLDCOLOR	Invokes CustomColors™, Panacea's color configuration program.
DLDCOMPACT	Forces a manual clean-up of Display List memory returning any unused memory back to the AutoCAD memory pool.
DLDDCACHE	Toggles the TurboDLDC <i>lassic</i> drawing cache on and off.
DLDDLST	Toggles the display list function of TurboDLDC <i>lassic</i> on and off.
DLDECHO	Toggles internal TurboDLDC <i>lassic</i> command echoing at the AutoCAD command line.
DLDHLP	Provides a list of TurboDLDC <i>lassic</i> commands with one-line description of each, within AutoCAD. It's recommended that you flip to the text screen to view the output.
DLDFRESH	Refreshes the Big Picture to reflect the most current drawing changes.
DLDDSTAT	Displays a listing of the current TurboDLDC <i>lassic</i> parameters. A flip to the graphics screen is recommended for this command.
DLDDUSAGE	Gives a to-the-byte breakdown of how memory is being used for display list processing.
DLDDVER	Displays the TurboDLDC <i>lassic</i> version, serial number and registered user's name at the AutoCAD command line.
DLDDVISREGEN	Toggles between the Fast and Visible Regen modes of TurboDLDC <i>lassic</i> .

LOTUS 1-2-3 V2.X

To install a Lotus display driver, proceed as follows:

1. Run the installation program (INSTALL.EXE). Choose the option for the Lotus 1-2-3 drivers and specify the drive and directory where you want them copied to (such as C:\LOTUS).
2. From within the Lotus sub-directory type:
`INSTALL [Enter]`
3. From the next menu, select **Advanced Options** for Lotus 1-2-3 v2.2 or **Change Selected Equipment** for Lotus 1-2-3 v2.3.
4. For v2.2, select **Add New Drivers to Library** and go to step 5. For v2.3, select **Modify Current Driver Set** and go to step 6.
5. From the next menu, select **Modify Current Driver Set**.
6. From the next menu, select one of the display and resolution configurations.
7. From the next menu, select **Return To Menu**.
8. From the next menu, select **Save Changes**.
9. Enter the name you have selected for the driver set. We recommend that the driver set name reflect or include the driver's resolution (e.g. 132x43) The default driver set name assigned by the program is 123.SET.

You may create multiple driver sets with different display resolutions. To run Lotus 1-2-3 with a specific driver set, type:

```
123 SETNAME [Enter]
```

where SETNAME is the name of the desired driver set.

LOTUS 1-2-3 V3.X

To install a Lotus 3.0 or 3.1 display driver, proceed as follows:

1. It is assumed that Lotus 1-2-3 v3.0 or 3.1 is already installed on your hard disk, using the standard Lotus installation utility. To install this driver, make the directory containing 1-2-3 v3.0 the current directory. For example, if 1-2-3 is in the directory named 123R3, then type the following command:

```
CD \123R3[Enter]
```

2. One of the files used in the driver installation is named INSTALL.DDF. This is a text file used by the 1-2-3 installation utility, containing information on each of the drivers and modes of operation. If you have been using a driver supplied with another graphics adapter, you may want to make a backup copy of the INSTALL.DDF file currently in your 1-2-3 directory:

```
COPY INSTALL.DDF INSTALL.BAK [Enter]
```

3. Run the installation program (INSTALL.EXE). Choose the option for the version of Lotus 1-2-3 that you are using and specify the drive and directory where you want them copied to (such as C:\123R3). If the INSTALL.DDF has been copied to a backup file (see step 2 above), answer YES to the prompt to confirm overwriting the file.

4. Now run the Lotus installation utility by typing:

```
INSTALL[Enter]
```

5. Select **Change selected equipment** from the list. Note: If you are currently using another driver supplied with a graphics board, it may be necessary to choose **First-time installation**.
6. Select **Modify Current DCF**, or **Choose Another DCF** to modify, according to your preference. The following procedure is valid for either selection.
7. Select **Change Video Display**. This presents you with a list of all the display types provided with the 1-2-3 distribution, with two additional choices. GD543X 100 Column Display (800x600 resolution) supports 100x31, 100x42, and 100x75 16 color modes. GD543X 128 Column Display (1024x768 resolution) supports 128x40, 128x54, and 128x96 16 color modes. Select a resolution that best meets your requirements.
8. After your selection is made, choose the **Save Changes** option from the menu. Note that when some high-resolution modes are selected, a message may appear asking for the drive letter of the floppy disk. Before entering the drive letter, insert the disk that is requested in the floppy drive. After inserting the disk, you may enter the drive letter containing that Disk.

MICROSOFT WORD

The high resolution Microsoft Word 5.0 display driver supplied with your ZT 6630 supports both high resolution text and graphics. When using a Microsoft Mouse with the driver, please ensure that your mouse driver version level is 7.0 or above.

Note: The TSRFONT.EXE utility must be loaded prior to running an application requiring an 8x14 font. Please refer to the TSRFONT Driver topic in Chapter 5, "Utility Software" for more information.

Installing Word Display Drivers

To install the Word high resolution text driver supplied with your ZT 6630, follow these instructions:

1. If you have not already done so, install Microsoft Word onto your computer system. Follow the instructions supplied with Word. When asked for a screen display type, choose IBM Video Graphics Array (VGA).
2. Run the installation program (INSTALL.EXE). Choose the option for the Microsoft Word drivers and specify the drive and directory where you want them copied to (such as C:\WORD5).

Note: To use the new drivers they must be installed in the same directory as Word. Otherwise, they must be copied to the Word directory before they can be used.

3. INSTALL.EXE copies two screen drivers:
 - SCREEN8.VID - for 800x600 graphics resolution
 - SCREEN.VID - for 1024 x768 graphics resolution

The driver to be used must be named SCREEN.VID. When a file is renamed this, it will overwrite the existing display driver. If you wish to preserve the original, it should be renamed or copied prior to installation of the new drivers.

The new driver is now installed. To use it, run Word as you normally would. To view and change the screen resolutions:

1. Select Options.
2. Move the cursor to display mode.
3. Press [F1].
4. Choose the desired screen resolution from the list presented.
5. A sub-menu appears, listing all the choices of resolutions supported by the Cirrus Logic text driver. Select the desired resolution.

WORDPERFECT 6.0

To use high resolution modes with WordPerfect® 6.0, install the VESA driver that comes with WordPerfect and configure the program to use one of the VESA high resolution graphics modes.

Note: The TSRFONT.EXE utility must be loaded prior to running an application requiring an 8x14 font. Please refer to the TSRFONT Driver topic in Chapter 5, "Utility Software" for more information.

WORDPERFECT 5.1

The high resolution WordPerfect version 5.1 driver supplied with your ZT 6630 supports both high resolution text and graphics. WordPerfect allows graphics and text drivers to be set up separately, so be sure to install both of these drivers.

Note: The TSRFONT.EXE utility must be loaded prior to running an application requiring an 8x14 font. Please refer to the TSRFONT Driver topic in Chapter 5, "Utility Software" for more information.

Installing WordPerfect 5.1 Text Driver

To install the WordPerfect high resolution text driver supplied with your ZT 6630, follow these instructions:

1. If you have not already done so, install WordPerfect onto your computer system. Follow the instructions supplied with WordPerfect.
2. Run the installation program (INSTALL.EXE). Choose the option for the WordPerfect drivers and specify the drive and directory where you want them copied to (such as C:\WP51).
3. Start WordPerfect, and go into **SETUP** by typing [Shift-F1].
4. Choose Display by pressing [2], then text screen type by pressing [3].
5. Move the cursor to where GD543X appears on the list, and choose **SELECT**.
6. A sub-menu appears, listing all the choices of resolutions supported by the Cirrus Logic text driver. Select the desired resolution.

Installing WordPerfect 5.1 Graphics Driver

To install the WordPerfect high resolution graphics driver supplied with your ZT 6630, follow these instructions:

1. If you have not already done so, install WordPerfect onto your computer system. Follow the instructions supplied with WordPerfect.
2. Run the installation program (INSTALL.EXE). Choose the option for the WordPerfect drivers and specify the drive and directory where you want them copied to (such as C:\WP51).
3. Start WordPerfect, and go into SETUP by typing [Shift-F1].
4. Choose Display by pressing [2], then graphics screen type by pressing [2].

5. Move the cursor to where ZT 6630 appears on the list, and choose **SELECT**.
6. A sub-menu appears, listing all the choices of resolutions supported by the Cirrus Logic graphics driver. Select the desired resolution.

WORDSTAR

The WordStar™ display drivers support WordStar versions 5.5, 6.0, and above.

Installing WordStar Drivers

To install the WordStar high resolution text driver supplied with your ZT 6630, follow these instructions:

1. If you have not already done so, install WordStar onto your computer system. Follow the instructions supplied with WordStar.
2. Run the installation program (INSTALL.EXE). Choose the option for the WordStar drivers and specify the drive and directory where you want them copied to (such as C:\WS).
3. Using a text editor, enter the file FONTID.CTL in the WordStar directory and change the CRT_TYPE line to read: CRT_TYPE=CL800.WGD

When WordStar is executed, the display driver is used for page preview mode.

7. MICROSOFT WINDOWS 3.1

Topics covered in this section include Windows 3.1 driver installation, reconfiguring Windows 3.1, and Display Power Manager for Windows 3.1, a mechanism to control the amount of power used by a computer's monitor.

WINDOWS 3.1 INSTALLATION

The Windows 3.1 driver installation utility copies all of the graphics driver and utility files to your hard disk. It also allows you to:

- Configure your graphics system for Windows 3.1 in either DOS or OS/2 v2.1.
- Set the monitor refresh rates.
- Change the monitor resolution.
- Specify the number of available colors.
- Select large or normal size fonts.
- Configure font cache size.

After new options have been selected, you can either immediately restart Windows, in which case the new configuration will take effect immediately, or you can continue working in the current resolution, in which case the new resolution will take effect the next time Windows is started. In some configurations the AUTOEXEC.BAT file needs to be modified to make the changes permanent.

Using Install

To run the installation program,

1. Start Windows 3.1.
2. Insert the floppy labeled "Windows 3.1 Display Drivers and Utilities" into your floppy disk drive.
3. From the Windows Program Manager select **Run** from the **File** menu.
4. Type the letter of the floppy drive that the driver Disk is in, followed by the word install. For instance, if the driver disk is in drive A:, type A:\INSTALL.EXE.
5. Click on the **OK** button.
6. In the first dialog box that is displayed, you can set the path where you would like the utility programs to be installed.
 - If you want to use the default directory, click on **Continue**.

- To change to another directory, you can either type the path name or you can click on the down arrow and select a directory for installation. The drop down box works just like the **Directory** field in a file open dialog box. After you select the directory, press the **Continue** button.

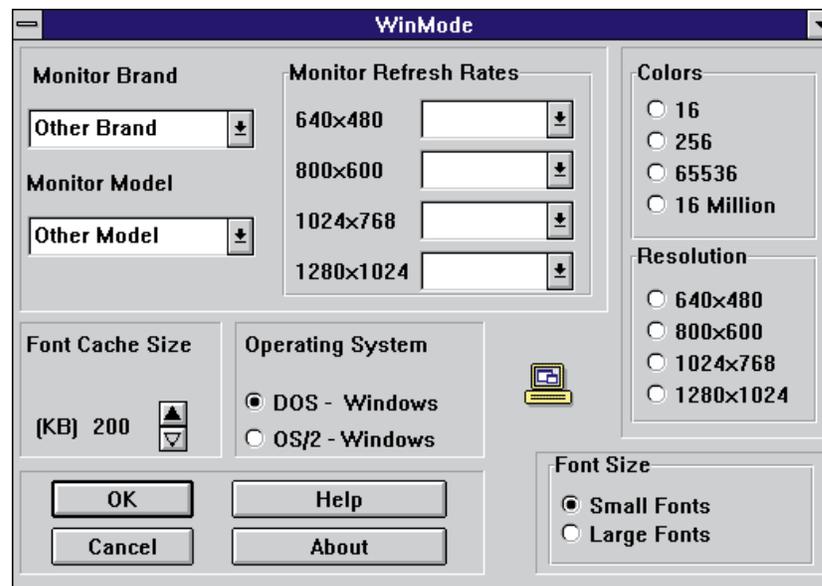
A new VGAUtil group is created in the Windows program manager. It contains the WinMode configuration utility icon. This utility can be used to set up resolutions, monitor types and other options.

WINMODE

The WinMode utility configures your graphics system for Windows 3.1 in either DOS or OS/2 2.1. It allows the user to change the monitor refresh rates, resolution, number of available colors, large or normal size fonts and font cache size.

After new options have been selected, the user can either immediately restart Windows, in which case the new resolution will take effect immediately, or continue working in the current resolution, in which case the new resolution will take effect the next time Windows is started. In some configurations the AUTOEXEC.BAT file needs to be modified to make the changes permanent.

WinMode assumes that the Windows drivers have been correctly installed and configured using the installation utility provided on the Windows 3.1 Drivers and Utilities Disk.



WinMode Main Window

Using WinMode

Run WinMode by double-clicking on its icon. The icon will be in the group that you specified during the *install* process.

The main window for WinMode contains the following buttons/menus for configuring your VGA board.

Resolution: These buttons let you choose the resolution that WinMode will use to run Windows 3.1 after Windows is restarted. Some of these buttons may be unavailable because of the amount of video memory in your system or if some of the monitor refresh rates have been set to **Unavailable**.

Colors: These buttons let you choose the number of colors that will be available to Windows 3.1 after Windows is restarted. Some of these choices may be unavailable. This is because of the amount of video memory in your system and the resolution that you have selected. If you have chosen **OS/2 v2.1** in the **Operating System** field, then the only possible choices are for 16 or 256 colors. Generally, 256 color mode will be the fastest choice. If you need more colors then there will be some slowdown in graphics performance.

Font Size: Small fonts are intended for lower resolution modes. Large fonts are intended for higher resolution modes.

Monitor Refresh Rates: The drop down list boxes let you select the monitor refresh rates for each resolution. If you select **Unavailable** for any screen resolution, any higher resolutions will also be unavailable. This will also turn off the corresponding choices in the **Resolution** box.

In general, the higher the refresh rate, the better the display quality and the lower the performance. This is because the graphics system can only do a fixed number of operations per second. The more time it spends redrawing the screen, the less time it has available to perform other operations.

Font Cache Size: The **Font Cache Size** lets you set the amount of system memory that will be available for font caching.

Next to the font cache size there is an up arrow and a down arrow. Click on the up arrow to increase the cache size. Click on the down arrow to decrease the cache size.

Font caching can increase the performance of Windows by saving the bitmaps of frequently used characters. Normally, when a character is displayed on the screen it first is created from the truetype outline and then copied to the screen. A cached character has already been created and stored and can be copied as needed.

WinMode has tried to determine the correct setting for this field for you, but you may change it. Just remember that memory set aside for font caching will not be available for Windows program and system usage.

Operating System: The **Operating System** buttons let you specify the operating system under which you are running Windows.

This is very important because the configuration and capabilities of the drivers are very different in OS/2 2.1 and DOS. The most obvious difference is that the drivers only work in 16 and 256 color modes in OS/2. There are a number of other differences in the configuration of the drivers.

Prior to installing OS/2 For Windows, you need to run WinMode and select the OS/2 2.1 option.

OK: The **OK** button closes the dialog box and accepts the choices that you have made.

After clicking **OK**, your computer will be reconfigured to use the choices that you have made. These changes may need to be added to your AUTOEXEC.BAT file for them to be permanent. If this is necessary, you will be prompted by the program.

If WinMode detects that you changed your Windows 3.1 configuration, you will be asked if Windows should be restarted. If you answer yes, Windows is restarted immediately. If you say no, then you have to exit Windows and restart it manually for the changes to take effect.

Cancel: The **Cancel** button closes the dialog box and exits the program without making any changes. Selecting **Close** from the control menu or double clicking on the control menu box will have the same effect.

About: The **About** button will display a dialog box with the version number of WinMode and a copyright notice.

Help: For help on WinMode, select the **Help** button. The main help screen contains an image of the WinMode screen. Place the cursor over the field(s) that you need help with. When the mouse pointer changes to a hand, click to display the help text for that field. Click again to make the pop-up text disappear.

RECONFIGURING WINDOWS 3.1

If you are in Windows, run WinMode to reconfigure the Windows 3.1 drivers.

If you are in DOS, proceed as follows to reconfigure the Windows 3.1 drivers.

1. Insure that Windows 3.1 and the extended resolution drivers are already installed on your computer.
2. From your Windows directory, at the DOS prompt, type SETUP[Enter] to run the Windows SETUP.EXE program. Follow the instructions on the screen. When you come to the screen that lists the hardware and software components such as display

adapter (e.g. VGA, CGA, etc.), keyboard type, mouse type, etc., go to the **Display** selection (by using cursor keys to move the highlighted bar) and press [Enter].

3. You will see a list of drivers and their associated resolutions, for example:

```
CIRRUS LOGIC 5434 v1.23, 1280x1024x16
CIRRUS LOGIC 5434 v1.23, 1024x768x16
CIRRUS LOGIC 5434 v1.23, 640x480x16
CIRRUS LOGIC 5434 v1.23, 640x480x256
CIRRUS LOGIC 5434 v1.23, 640x480x64K
CIRRUS LOGIC 5434 v1.23, 800x600x16
CIRRUS LOGIC 5434 v1.23, 800x600x256
```

4. Highlight the desired choice by moving the cursor to the correct display driver, and then press:
[Enter]
5. Setup will prompt you that the driver is already in your Windows directory and give you a chance to replace it. Use the existing driver.
6. Continue with the remainder of the setup procedure.

POWER MANAGEMENT SCREEN SAVER

The Display Power Manager for Windows 3.1 provides a mechanism to control the amount of power used by a computer's monitor. It provides a total of 5 levels of power savings.

The first level is a conventional screen saver that turns the screen black and bounces a logo around. The black screen provides substantial power savings and the animation lets you know that the computer is still active.

The other four levels of power savings are:

Reduced on mode - Reduced on mode is an optional power saving state that allows the computer to use some power savings while still fully operational. Currently this is limited to some portable computers that can lower the power usage on their LCD displays. This causes some degradation of display quality.

Stand by mode - Stand by mode is an optional power saving state that gives minimal power savings, but provides the fastest recovery time.

Suspend mode - Suspend mode is a mandatory state in which substantial power savings are achieved by the display. The trade off is that recovery times are longer than from stand by mode.

Off mode - Off mode provides the highest level of power savings and the longest recovery times. With this mode the display is actually turned off so that recovery times are equivalent to switching the monitor on.

These four levels match the power saving modes defined by the VESA VBE/PM standard. As you move down from one mode to the next, the amount of power being saved is greater, but so is the amount of time that it takes for a monitor to recover and be ready to display data.

The screen saver will cycle through all of the selected power saving modes one after another until the maximum selected power saving mode has been reached. You can specify the number of minutes each level is active. The number of minutes you specify for each level is the number of minutes after the previous mode has been enabled. It is not the total time before entering that mode.

1. Using the Windows Control Panel, select Desktop.
2. In the group Screen Saver within the Desktop dialog box, select the Screen Saver named Display Power Manager.
3. Select the desired delay before entering a power saving mode.

Select Setup to further configure the power saving options. The following sections describe these options. For further information on setting up Windows screen savers, please refer to the Windows User Guide.

Special Considerations

Some of the power saving modes are intended for specific display types, so not all of them are available on all video controllers. On some controllers, only the animated logo will be available.

For the power saving modes to have any effect beyond just blanking the screen, the monitor being used must have specific power saving features.

Note that if the screen saver is in any of the power saving modes, **moving the mouse will not wake it up**. This is different from normal screen savers and is used to keep the monitor from waking up because of accidents such as bumping the desk that the computer is sitting on. This is especially important if the password option is enabled, since once the password dialog box pops up, it stays there until the user turns it off. This is a limitation of the Windows 3.1 screen saver interface.

Using the Screen Saver

When the screen saver is started, it will initially display a bouncing logo on a black background. To enable additional levels of power savings, select them from the **Screen Saver Mode** section of the **Setup** dialog box.

Screen Saver Mode

The **Screen Saver Mode** section has four check boxes in it. They are

- ReducedOn
- StandBy
- Suspend
- Off

The screen saver detects the type of graphics controller that is being used and the types of power savings that it is capable of.

If the text immediately to the right of any of the check boxes is gray, that option is not available. If a power saving mode is available, then the text immediately to the right of the check box is black. If the box is selected with the mouse or the keyboard, the rest of the fields on the line will also turn black. If the check box is deselected, the other fields will turn gray.

The minutes field for each line can be changed only if the check box for that line is selected. The amount of time can be set for any number between 1 and 60. The number can either be typed directly, or by clicking on the up or down arrow next to the number. Holding the mouse button down on the arrow will quickly increase or decrease the minutes field.

The number of minutes that is specified for each level is the number of minutes after the previous mode has been enabled. It is not the total time before entering that mode.

Screen Saver Animation Speed

The scroll bar controls how fast the animation moves. The checkbox controls whether or not a bouncing sound will be played whenever the logo hits an edge of the screen.

Password Options

If the password checkbox is enabled, then the screen saver will prompt the user for a password before it quits. The password is the same one that is used for other Windows 3.1 screen savers.

The Energy Star Program

Energy Star is a program created by the US Environmental Protection Agency (EPA) to promote energy efficiency. The goal of this program is to lower electricity usage by making computers and related hardware more energy efficient.

Computers currently use an estimated 5% of commercial electricity consumption. Research shows that the vast majority of time personal computers are on, they are not actively in use. Additionally 30% - 40% are left running at night and on weekends.

Electricity generation accounts for 35% of all US emissions of carbon dioxide, the most prevalent greenhouse gas. It also accounts for 75% and 38% of all US emissions of sulfur dioxide and nitrogen oxides respectively, the two pollutants most responsible for acid rain.

The Energy Star logo is used to mark computers, peripherals and software that have adopted the EPA's power saving guidelines. Additional information is available at:

<http://www.epa.gov/>

VESA VBE/PM

The VESA VBE/PM is a software interface to the Video Electronics Standards Association (VESA) Display Power Management Signaling (DPMS) standard. For more information on VESA and these specifications contact them at:

<http://www.vesa.org/>

A. SPECIFICATIONS

This appendix presents the electrical, environmental, and mechanical specifications for the ZT 6630.

ELECTRICAL SPECIFICATIONS

Power requirements for the ZT 6630 are shown in the table below.

Power Requirements

Power Requirements	Minimum	Typical	Maximum
Supply Voltage, Vcc	4.75 V	5.00 V	5.25 V
Supply Current, Vcc = 5.0 V	310 mA	640 mA	840 mA

ENVIRONMENTAL SPECIFICATIONS

Operating Temperature: 0° to +65° Celsius

Storage Temperature: -40° to +85° Celsius

Relative Humidity: < 95% at 40° Celsius, non-condensing

MECHANICAL SPECIFICATIONS

The following topics provide specifications for ZT 6630 dimensions and weight, connector locations, connector descriptions, and connector pinouts.

Board Dimensions and Weight

Dimensions: 6.299" x 3.937" (160 mm x 100 mm)

Height: occupies one card slot

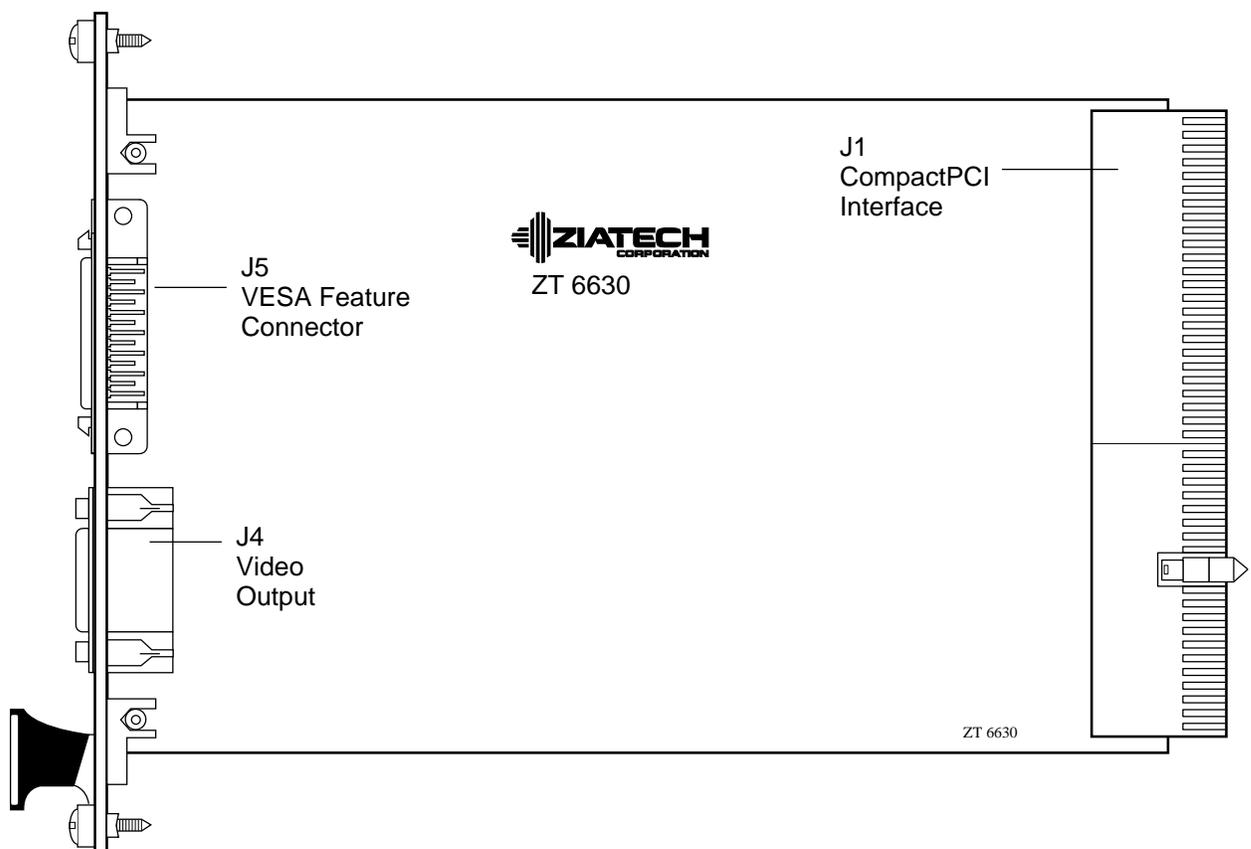
Weight: 5.3 oz. (148 g)

Connectors

As shown in the "ZT 6630 Connector Locations" illustration below, the ZT 6630 includes three connectors to interface to application-specific devices. The topics that follow provide descriptions of the individual connectors. Connector assignments are listed below.

Connector Assignment

- J1** CompactPCI connector
- J4** 15-pin D VGA connector
- J5** 26-pin Feature connector



Connector Locations

J1: J1 is a 270-pin 2 mm x 2 mm right-angle male connector providing the PCI local bus interface. J1 provides a complete 32-bit PCI interface. This connector is CompactPCI compatible. Refer to the CompactPCI Specification for details.

J1 PCI Interface Pinout

Pin	Z	A	B	C	D	E	F
47	GND	RSV	RSV	RSV	RSV	RSV	GND
46	GND	RSV	RSV	RSV	RSV	RSV	GND
45	GND	RSV	RSV	RSV	RSV	RSV	GND
44	GND	RSV	RSV	RSV	RSV	RSV	GND
43	GND	RSV	RSV	RSV	RSV	RSV	GND
42	GND	BRSV	GND	PRST#	BRSV	BRSV	GND
41	GND	BRSV	BRSV	DEG#	GND	BRSV	GND
40	GND	BRSV	GND	FAL#	BRSV	BRSV	GND
39	GND	AD[35]	AD[34]	AD[33]	GND	AD[32]	GND
38	GND	AD[38]	GND	V(I/O) ⁽²⁾	AD[37]	AD[36]	GND
37	GND	AD[42]	AD[41]	AD[40]	GND	AD[39]	GND
36	GND	AD[45]	GND	V(I/O) ⁽²⁾	AD[44]	AD[43]	GND
35	GND	AD[49]	AD[48]	AD[47]	GND	AD[46]	GND
34	GND	AD[52]	GND	V(I/O) ⁽²⁾	AD[51]	AD[50]	GND
33	GND	AD[56]	AD[55]	AD[54]	GND	AD[53]	GND
32	GND	AD[59]	GND	V(I/O) ⁽²⁾	AD[58]	AD[57]	GND
31	GND	AD[63]	AD[62]	AD[61]	GND	AD[60]	GND
30	GND	C/BE[5]#	GND	V(I/O) ⁽²⁾	C/BE[4]#	PAR64	GND
29	GND	V(I/O) ⁽²⁾	BRSV	C/BE[7]#	GND	C/BE[6]#	GND
28	GND	CLK4	GND	GNT3#	REQ4#	GNT4#	GND
27	GND	CLK2	CLK3	SYSEN# ⁽⁴⁾	GNT2#	REQ3#	GND
26	GND	CLK1	GND	REQ1#	GNT1#	REQ2#	GND
25	GND	5V	REQ64#	BRSV	3.3V	5V	GND
24	GND	AD[1]	5V	V(I/O) ⁽²⁾	AD[0]	ACK64#	GND
23	GND	3.3V	AD[4]	AD[3]	5V	AD[2]	GND
22	GND	AD[7]	GND	3.3V	AD[6]	AD[5]	GND
21	GND	3.3V	AD[9]	AD[8]	M66EN ⁽⁵⁾	C/BE[0]#	GND

J1 PCI Interface Pinout (con'd)

Pin	Z	A	B	C	D	E	F
20	GND	AD[12]	GND	V(I/O) ⁽²⁾	AD[11]	AD[10]	GND
19	GND	3.3V	AD[15]	AD[14]	GND	AD[13]	GND
18	GND	SERR#	GND	3.3V	PAR	C/BE[1]#	GND
17	GND	3.3V	SDONE	SBO#	GND	PERR#	GND
16	GND	DEVSEL#	GND	V(I/O) ^{(2),(6)}	STOP#	LOCK#	GND
15	GND	3.3V	FRAME#	IRDY#	GND	TRDY#	GND
KEY							
11	GND	AD[18]	AD[17]	AD[16]	GND	C/BE[2]#	GND
10	GND	AD[21]	GND	3.3V	AD[20]	AD[19]	GND
9	GND	C/BE[3]#	IDSEL	AD[23]	GND	AD[22]	GND
8	GND	AD[26]	GND	V(I/O)	AD[25]	AD[24]	GND
7	GND	AD[30]	AD[29]	AD[28]	GND	AD[27]	GND
6	GND	REQ#	GND	3.3V	CLK	AD[31]	GND
5	GND	BRSV	BRSV	RST#	GND	GNT#	GND
4	GND	BRSV	GND	V(I/O)	INTP	INTS	GND
3	GND	INTA#	INTB#	INTC#	5V	INTD#	GND
2	GND	TCK	5V	TMS	TDO	TDI	GND
1	GND	5V	-12V	TRST#	+12V	5V	GND
Pin	Z	A	B	C	D	E	F

J4: Video output connector. 15-pin standard D-type VGA connector. Connector pinouts are shown in the following table.

J4 Video Output Connector Pinout

Pin #	Description
1	Analog RED
2	Analog GREEN
3	Analog BLUE
4	Monitor ID 2
5	Digital Ground
6	Analog RED Ground
7	Analog GREEN Ground
8	Analog BLUE Ground
9	Vcc
10	Digital Ground
11	Monitor ID 0
12	Monitor ID 1/SDA
13	HSYNC
14	VSYNC
15	SCL
16	NC

J5: The Feature connector. 26-pin (dual 13-pin), female right angle connector with 0.050" lead spacing. Connector pinouts are shown in the following table.

J5 VESA Feature Connector Pinout

Pin	Function	Pin	Function
1	GND	26	P0
2	GND	25	P1
3	GND	24	P2
4	EVIDEO*	23	P3
5	ESYNC*	22	P4
6	EDCLK*	21	P5
7	NC	20	P6
8	GND	19	P7
9	GND	18	DCLK
10	GND	17	BLANK*
11	GND	16	HYSNC
12	NC	15	VSYNC
13	NC	14	GND

B. VIDEO MODES

The following topics summarize the video modes available on the ZT 6630 and give specifications for each mode.

STANDARD MODES

The ZT 6630 supports all standard VGA modes. These standard VGA modes are listed in the following table.

Standard VGA Modes

Mode #	VESA Mode #	# of Colors	Char. x Row	Char. Cell	Pixels	Display Mode	Pixel Freq. MHz	Horiz. Freq kHz	Vert. Freq. Hz
00/01	-	16/256	40x25	9x16	360x400	Text	14	31.5	70
02/03	-	16/256	80x25	9x16	720x400	Text	28	31.5	70
04/05	-	4/256	40x25	8x8	320x200	Graphics	12.5	31.5	70
6	-	2/256	80x25	8x8	640x200	Graphics	25	31.5	70
7	-	mono	80x25	9x16	720x400	Text	28	31.5	70
0D	-	16/256	40x25	8x8	320x200	Graphics	12.5	31.5	70
0E	-	16/256	80x25	8x8	640x200	Graphics	25	31.5	70
0F	-	mono	80x25	8x14	640x350	Graphics	25	31.5	70
10	-	16/256	80x25	8x14	640x350	Graphics	25	31.5	70
11	-	2/256	80x30	8x16	640x480	Graphics	25	31.5	60
11+	-	2/256	80x30	8x16	640x480	Graphics	31.5	37.9	72
11+	-	2/256	80x30	8x16	640x480	Graphics	31.5	37.9	75
12	-	16/256	80x30	8x16	640x480	Graphics	25	31.5	60
12+	-	16/256	80x30	8x16	640x480	Graphics	31.5	37.9	72
12+	-	16/256	80x30	8x16	640x480	Graphics	31.5	37.5	75
13	-	256/256	40x25	8x8	320x200	Graphics	12.5	31.5	70

Note: The EGA-compatible text modes (which use an 8x14 font) and graphic modes 10 and F use a 16 dot high font, with the bottom two lines truncated, in the absence of the 8x14 Font TSR (TSRFONT). This creates some errors in displaying characters with descenders, but does not restrict operation of programs using these modes. In text modes using the 8x14 font, the characters "g," "j," "p," "q," "y," and "ÿ" are truncated using a middle and bottom line algorithm to avoid truncation of descenders. For compatibility with some DOS applications that use the 8x14 font, the TSRFONT utility should be used. Applications such as DOSSHELL in Graphics 25 or 34 line display modes require the TSRFONT utility to be loaded.

EXTENDED MODES

The ZT 6630 supports standard VESA[®] and extended modes. These modes are listed in the following table.

Cirrus Logic Extended Video Modes

Mode #	VESA Mode #	# of Colors	Char. x Row	Char. Cell	Screen Format	Display Mode	Dot Clock MHz	Horiz. Freq kHz	Vert. Freq. Hz
14	-	16/256K	132x25	8x16	1056x400	Text	41.5	31.5	70
54	10A	16/256K	132x43	8x8	1056x350	Text	41.5	31.5	70
55 ¹	109	16/256K	132x25	8x14	1056x350	Text	41.5	31.5	70
58, 6A	102	16/256K	100x37	8x16	800x600	Graphics	36	35.2	56
58, 6A	102	16/256K	100x37	8x16	800x600	Graphics	40	37.8	60
58, 6A	102	16/256K	100x37	8x16	800x600	Graphics	50	48.1	72
58, 6A	102	16/256K	100x37	8x16	800x600	Graphics	49.5	46.9	75
5C	103	256/256K	100x37	8x16	800x600	Graphics	36	35.2	56
5C	103	256/256K	100x37	8x16	800x600	Graphics	40	37.9	60
5C	103	256/256K	100x37	8x16	800x600	Graphics	50	48.1	72
5C	103	256/256K	100x37	8x16	800x600	Graphics	49.5	46.9	75
5Di	104	16/256K	128x48	8x16	1024x768	Graphics	44.9	35.5	43 ²
5D	104	16/256K	128x48	8x16	1024x768	Graphics	65	48.3	60
5D	104	16/256K	128x48	8x16	1024x768	Graphics	75	56	70
5D	104	16/256K	128x48	8x16	1024x768	Graphics	77	58	72
5D	104	16/256K	128x48	8x16	1024x768	Graphics	78.7	60	75
5E	100	256/256K	80x25	8x16	640x400	Graphics	25	31.5	70

¹ Mode 55 will use a 16 dot high font, with the bottom two lines truncated, in the absence of the 8x14 font TSR (TSRFONT). The characters "g," "j," "p," "q," "y," and "ÿ" are truncated using a middle and bottom line algorithm to avoid truncation of descenders. For compatibility with some DOS applications which use the 8x14 font, the TSRFONT utility should be used.

² A character "i" stands for interlaced mode. 43.5 Hz or 87 Hz interlaced.

5F	101	256/256K	80x30	8x16	640x480	Graphics	25	31.5	60
5F	101	256/256K	80x30	8x16	640x480	Graphics	31.5	37.9	72
5F	101	256/256K	80x30	8x16	640x480	Graphics	31.5	37.5	75
60i	105	256/256K	128x48	8x16	1024x768	Graphics	44.9	35.5	43 ²
60	105	256/256K	128x48	8x16	1024x768	Graphics	65	48.3	60
60	105	256/256K	128x48	8x16	1024x768	Graphics	75	56	70
60	105	256/256K	128x48	8x16	1024x768	Graphics	77	58	72
60	105	256/256K	128x48	8x16	1024x768	Graphics	78.7	60	75
64	111	64K	-	-	640x480	Graphics	25	31.5	60
64	111	64K	-	-	640x480	Graphics	31.5	37.9	72
64	111	64K	-	-	640x480	Graphics	31.5	37.5	75
65 ³	114	64K	-	-	800x600	Graphics	36	35.2	56
65 ³	114	64K	-	-	800x600	Graphics	40	37.8	60
65 ³	114	64K	-	-	800x600	Graphics	50	48.1	72
65 ³	114	64K	-	-	800x600	Graphics	49.5	46.9	75
66	110	32K ³	-	-	640x480	Graphics	25	31.5	60
66	110	32K ³	-	-	640x480	Graphics	31.5	37.9	72
66	110	32K ³	-	-	640x480	Graphics	31.5	37.5	75
67	113	32K ³	-	-	800x600	Graphics	36	35.2	56
67	113	32K ³	-	-	800x600	Graphics	40	37.8	60
67	113	32K ³	-	-	800x600	Graphics	50	48.1	72
67	113	32K ³	-	-	800x600	Graphics	49.5	46.9	75
68i	116	32K ³	-	-	1024x768	Graphics	44.9	35.5	43 ²
68	116	32K ³	-	-	1024x768	Graphics	65	48.3	60

² A character "i" stands for interlaced mode. 43.5 Hz or 87 Hz interlaced.

³ 32K direct color/256 color mixed mode

68	116	32K ³	-	-	1024x768	Graphics	75	56	70
68	116	32K ³	-	-	1024x768	Graphics	78.7	60	75
69i	-	32K ³	-	-	1280x1024	Graphics	75	48	43 ^{2, 4}
6Ci	106	16/256K	160x64	8x16	1280x1024	Graphics	75	48	43 ^{2, 4}
6Di	107	256/256K	160x64	8x16	1280x1024	Graphics	75	48	43 ^{2, 4}
6D	107	256/256K	160x64	8x16	1280x1024	Graphics	108	65	60 ⁴
6D	107	256/256K	160x64	8x16	1280x1024	Graphics	126	76	71.2
6D	107	256/256K	160x64	8x16	1280x1024	Graphics	135	80	75
71	112	16M	-	-	640x480	Graphics	25	31.5	60
72	-	16M+A ⁵	-	-	800x600	Graphics	36	35.2	56
72	-	16M+A ⁵	-	-	800x600	Graphics	40	37.8	60
73i ⁶	-	16M+A ⁵	-	-	1024x768	Graphics	44.9	35.5	43 ²
74i	117	64K	-	-	1024x768	Graphics	44.9	35.5	43 ²
74	117	64K	-	-	1024x768	Graphics	65	48.3	60
74	117	64K	-	-	1024x768	Graphics	75	56	70
74	117	64K	-	-	1024x768	Graphics	78.7	60	75
75i ⁶	-	64K	-	-	1280x1024	Graphics	75	48	43 ²
76	-	16M+A ⁵	-	-	640x480	Graphics	25	31.5	60
76	-	16M+A ⁵	-	-	640x480	Graphics	31.5	37.9	72
76	-	16M+A ⁵	-	-	640x480	Graphics	31.5	37.5	75

² A character "i" stands for interlaced mode. 43.5 Hz or 87 Hz interlaced.

³ 32K direct color/256 color mixed mode

⁴ VESA has recently proposed a new specification for 43 Hz interlaced, and 60 Hz timing for 1280x1024 resolution modes. Cirrus Logic currently uses timings for these modes that differ from those proposed by VESA.

⁵ 16M colors, but with a 32 bit-per-pixel format. 16M+A indicates the same.

⁶ These modes require 4M of display memory to support.

Notes:

- Some modes are not supported by all the CL-GD543X controllers. Refer to the following table for more information.
- Some modes are not supported by all monitors. The best quality refresh rate for the monitor type selected will automatically be used.
- Implementations using CL-GD5434 restrict 1024x768 at 72 Hz refresh. In those implementations 70 Hz refresh will be substituted. For a higher refresh rate select 75 Hz.

C. CUSTOMER SUPPORT

This appendix offers technical and sales assistance contacts, warranty information, and necessary information for the return of a Ziatech product.

TECHNICAL/SALES ASSISTANCE

If you have a technical question, please call Ziatech's Customer Support Service at the number below, or e-mail our technical support team at tech_support@ziatech.com. Ziatech also maintains an FTP site located at ftp://ziatech.com/Tech_support.

If you have a sales question, please contact your local Ziatech Sales Representative or the Regional Sales Office for your area. Address, telephone and FAX numbers, and additional information are available at Ziatech's website, located at <http://www.ziatech.com>.

Corporate Headquarters

1050 Southwood Drive
San Luis Obispo, CA 93401 USA
Tel (805) 541-0488
FAX (805) 541-5088

RELIABILITY

Ziatech takes extra care in the design of the product in order to ensure reliability. The product was designed in top-down fashion, using the latest in hardware and software design techniques, so that unwanted side effects and unclear interactions between parts of the system are eliminated. Each product has an identification number. Ziatech maintains a lifetime data base on each board and the components used. Any negative trends in reliability are spotted and Ziatech's suppliers are informed and/or changed.

RETURNING FOR SERVICE

Before returning any of Ziatech's products, you must phone Ziatech at (805) 541-0488 and obtain a Return Material Authorization (RMA) number. Please supply the following information to Ziatech in order to receive an RMA number:

- Your company name and address for invoice
- Your shipping address and phone number
- The product I.D. number
- The name of a technically qualified individual at your company familiar with the mode of failure

Once you have an RMA number, follow these steps to return your product to Ziatech:

1. Contact Ziatech for pricing if the warranty expired.
2. Supply a purchase order number for invoicing the repair if the warranty expired.
3. Pack the board in **anti-static** material and ship in a sturdy cardboard box with enough packing material to adequately cushion it.

Note: Any product returned to Ziatech improperly packed will immediately void the warranty for that particular product!

4. Mark the RMA number clearly on the outside of the box.

ZIATECH WARRANTY

Warranty information for Ziatech products is available at Ziatech's website, located at <http://www.ziatech.com>.

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