ELSA GLoria™ -L

ELSA GLoria™ -L/MX

ELSA GLoria™ -XL

ELSA GLoria™ -XXL

User Manual

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Preface

Thank you for placing your trust in this ELSA product.

By buying a graphics board from the *GLoria* range, you have decided in favour of a graphics board designed for professional use in high-end 3D applications. The graphics processors and the video memory on these cards provide rapid graphics generation and ensure that the *GLoria* can be used for demanding applications in three-dimensional visualization and animation of complex objects.

The highest quality requirements in manufacturing and stringent quality control are the basis for our high product standards and consistent product quality.

About this Manual

This manual provides all the information you will need to get the best out of your ELSA graphics board. It will describe the ELSA utilities supplied and give you a short introduction into 3D imaging.

Changes to this Manual

ELSA products are subject to continual further development. It is therefore possible that the information printed in this manual is not current in all respects. However, information about the latest changes is always to be found in the README files on the *WINNERware* CD.

If you have questions to the topics covered in this manual or require additional help, our online services are at your disposal around the clock. The complete range of support and services provided by ELSA can be found in the "Advice and Help" chapter.

In very urgent cases the ELSA support hotline can be reached under the following number:
+49-241-606-6132

Before you continue

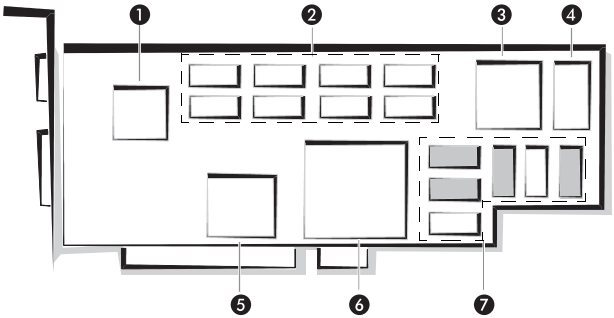
The installation of the ELSA GLoria and the associated drivers are described in the Installation Guide. Please read this information first before you start reading this manual.

Contents

Introduction

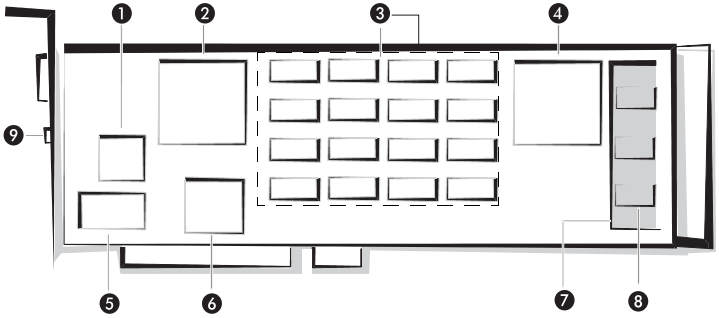
The graphics boards in the *ELSA GLoria* range are designed for professional CAD use. *ELSA GLoria* boards really show their strengths in 3D applications. The *GLoria-XXL* is the flagship product in the range. It is intended for high-end operations and offers uncompromising workstation power. The powerful 3Dlabs processors are at the heart of all the *ELSA GLoria* boards.

A Look at the *GLoria-L, GLoria-L/MX*



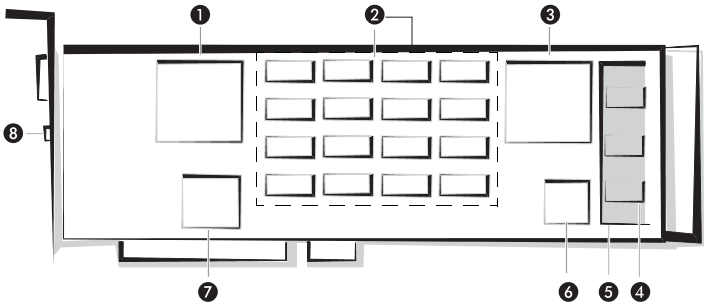
1. The RAMDAC converts the digital signals into analog signals at a maximum clock speed of 220 MHz.
2. The video memory ensures rapid image generation in the graphics board.
   GLoria-L has 8 MB VRAM
   GLoria-L/MX has 8 MB VRAM
3. S3's ViRGE VGA graphics chip with 1 MB video memory.
4. One of the BIOS's functions is to ensure that the graphics board can be recognized.
5. The GLINT Delta graphics coprocessor takes over many of the graphics processor's tasks. It is particularly useful in complex 3D calculations.
6. The graphics processor
   GLoria-L has a 3Dlabs GLINT 500TX
   GLoria-L/MX has a 3Dlabs GLINT MX
7. 8 MB additional EDO-DRAM memory for the Z buffer and textures and the sockets for memory expansion
   The four sockets on the graphics boards will accept a further 8 MB EDO-DRAM to give a total of 16 MB EDO-RAM.

A Look at the *GLoria-XL*



1. S3's Trio64V2/DX VGA graphics chip with 1 MB video memory.
2. The RAMDAC converts the digital signals into analog signals at a maximum clock speed of 250 MHz.
3. The video memory ensures rapid image generation in the graphics board. The *GLoria-XL* has 16 MB VRAM.
4. A 3Dlabs GLINT MX graphics processor.
5. One of the BIOS's functions is to ensure that the graphics board can be recognized. It provides full VBE 2.0 support.
6. The GLINT Delta graphics coprocessor takes over many of the graphics processor's tasks. It is particularly useful in complex 3D calculations.
7. The *GLoria-XL* will accept an additional 16 MB DRAM to a total of 40 MB DRAM.
8. 24 MB EDO-DRAM additional memory for the Z-buffer and textures
9. Interface for 3D shutter glasses

A Look at the *GLoria-XXL*



1. The RAMDAC converts the digital signals into analog signals at a maximum clock speed of 250MHz.
2. The video memory ensures rapid image generation in the graphics board. The *GLoria-XXL* has 16 MB VRAM.
3. A 3Dlabs GLINT MX graphics processor.
4. 24 MB EDO-DRAM additional memory for the Z-buffer and textures
5. The *GLoria-XXL* will accept an additional 16 MB DRAM to a total of 40 MB DRAM.
6. The Permedia 2 graphics chip from 3Dlabs with 2 MB video memory.
7. The GLINT Gamma graphics coprocessor takes over many of the graphics processor's tasks. It is particularly useful in complex 3D calculations.
8. Interface for 3D shutter glasses

Highlights of the *ELSA GLoria* Graphics Boards

- Multi-screen operation for Windows NT with identical *ELSA GLoria* graphics boards
- Ergonomic refresh rates over 100 Hz are possible in high-resolution graphics modes
- Detection of VESA DDC compatible monitors under Windows 95
- Support of power-saving monitors conforming with the VESA DPMS standard
  ELSA drivers for Windows NT and Windows 95
- *ELSAview 3D* for 3D visualization under AutoCAD R13/R14, Autodesk Mechanical Desktop and as a stand-alone application
- *ELSA POWERdraft* display list driver for AutoCAD for Windows

- Support Direct 3D under Windows 95 and OpenGL Windows NT. All boards support the Heidi interface except for the *GLoria-XL*.
- Hardware accelerated Z-buffering, Gouraud shading and texture mapping
- Optional ELSA 2D/3D programmer's interface (*POWERlib* Toolkit)
- ELSA LocalWeb, Internet WWW page and CompuServe Forum
- Six-year warranty
- The graphics boards comply with the CE and FCC guidelines.

System Requirements

- **Computer**: The *ELSA GLoria* boards are intended for use in computers with Pentium and Pentium-compatible processors. The *ELSA GLoria-XL* requires a Pentium II processor.
- **Bus**: Your computer must comply with the PCI 2.0 specifications. The *GLoria-XXL* requires a computer with AGP bus.
- **Monitor**: ELSA graphics boards work with the standard IBM VGA compatible horizontal scan frequency of 31.5 kHz while booting and in DOS operation. In addition, the monitor must be able to display the graphics mode selected.

Package Contents

Before installing your ELSA graphics board, please ensure that the package is complete. It should contain the following:

- Graphics board
- Documentation: Installation Guide and manual
- CD-ROM with installation and driver software, and utilities
- optional: Cable to connect the external VGA adapter and the *GLoria-L/MX*

If any part is missing please contact your dealer. ELSA reserves the right to change the supplied contents without prior notice.

CE Conformity and FCC Radiation Standard

CE

This equipment has been tested and found to comply with the limits of the European Council Directive on the approximation of the laws of the member states relating to electromagnetic compatibility (89/336/EEC) according to EN 55022 class B.

FCC

This equipment has been tested and found to comply with the limits for a Class B digital device pursuant to Part 15 of the Federal Communications Commission (FCC) Rules. The testing of this compliance involved the following procedures:

- Equipment Authorization

GLoria-L	KJGGLORIAL
GLoria-L/MX	KJGGLORIALMX
GLoria-XL	KJGGLORIAXL

- Declaration of Conformity

  GLoria-XXL see page 46

CE and FCC

These limits are designed to provide reasonable protection against radio frequency interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy. It may interfere with to radio communications if not installed and used in accordance with the instructions. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception (this can be determined by turning this equipment off and on), the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the distance between this equipment and the receiver.
- Connect the equipment to an outlet on a circuit other than that to which the receiver is connected.
- Consult your dealer or an experienced radio/TV technician.
- Caution: To comply with the limits for an FCC Class B computing device, always use a shielded signal cable.

Caution to the user: The Federal Communications Commission warns the user that changes or modifications to the unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Installing the Graphics Board and Adding Memory

For Your Safety

Please take note of the following guidelines in the interests of your safety and the correct operation of your new ELSA graphics board and your computer system:

- Because expansion boards are sensitive to static electricity, it is important to discharge (earth) yourself before touching the expansion board with your hands or tools. Simply touch a metal part of your computer housing.
- Always unplug the power cable before opening your computer so as to avoid contact with hazardous voltages.
- The devices should only be installed in or connected to those computers that fulfil all necessary technical requirements.
- Only use a shielded monitor cable to connect the monitor to the computer.
- Make sure that the slot into which you intend to install your board complies with the PCI specifications.
- During the warranty period, repairs should only be made by ELSA, otherwise your warranty and your entitlement to ELSA's product support will be void.

Changes or modifications to the device not expressly approved by ELSA AG can void your authority to operate the equipment.

Installing the Graphics Board

Installation of the *ELSA GLoria* is described in the enclosed Installation Guide. This will explain how to fit the board in your computer and how to install the ELSA drivers.

Memory Expansion

The texture memory of the *GLoria-L*, *GLoria-XL* and *GLoria-XXL* can be expanded by fitting additional memory chips of 8 MB or 16 MB. To expand the memory, you must insert chips into the free socket or sockets.

When Will I Need More Memory?

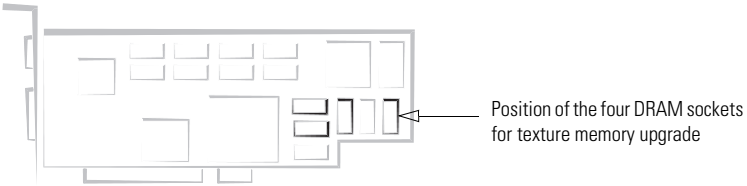
Generally it is useful to expand the graphics board memory if you wish to use a higher resolution with greater color depth. When you are working in 3D, the Z buffer will benefit from the additional memory. This will give you greater speed in texture representation.

Only use the memory expansion developed by ELSA for upgrading the graphics memory on ELSA graphics boards. ELSA accepts no responsibility for warranty and support if you use third-party memory chips.

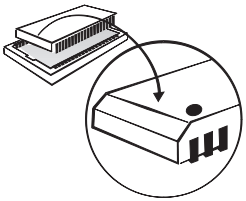
The memory chips developed by ELSA are specially designed for use in ELSA graphics boards. This practically excludes the risk of problems such as incorrect colors for individual pixels. Please consult our Support service in the unlikely event that you still experience video errors.

Installing the Memory Chips in the *GLoria-L* and *GLoria-L/MX*

You can add 8 MB texture memory if your *GLoria-L* or *GLoria-L/MX* has free sockets (40-pin SOJ sockets).

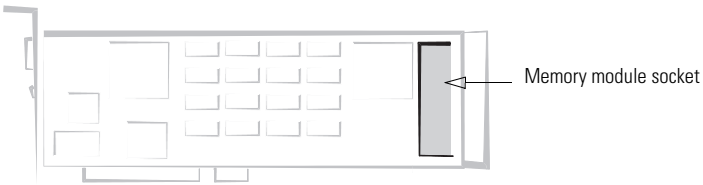


Make sure that the chip is correctly oriented in the socket when you are fitting the memory chips. The socket and the memory chip are marked with a notch, a chamfer or a dot. These must match up when the memory chip is inserted in the socket.

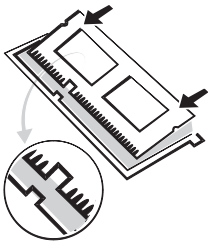


Installing the Memory Module in the *GLoria-XL* and *GLoria-XXL*

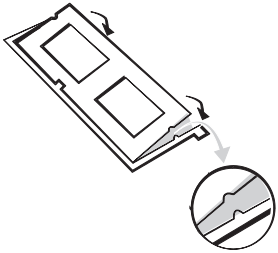
The socket for the 16 MB memory module on the *GLoria-XL* and *GLoria-XXL* is located at the back end of the graphics board (opposite the mounting bracket).



① The memory module has two memory chips on each side. Match up the position of the notch on the memory module with the peg on the socket. Slide the memory module gently and at a slight angle into the socket. Push the module forwards until you can no longer see the memory module contact strip.



② Carefully press the back end of the memory module downwards until you hear it snap into the retainers on each side.



Setting Up Your Graphics System

This section will explain how you can optimize the settings for the *ELSA GLoria* and customize it to your monitor after you have successfully installed the drivers as described in the Installation Guide.

What are Your Options?

The tables below show the maximum possible resolutions for the graphics boards. Note that these resolutions cannot be achieved under all operating conditions.

GLoria-L and *GLoria-L/MX*

Resolution	*GLoria-L* 8 MB VRAM + 8 MB EDO-DRAM				*GLoria-L/MX* 8 MB VRAM + 16 MB EDO-DRAM			
	Colors	Refresh-rate (Hz)			Colors	Refresh-rate (Hz)		
1920 x 1080	–	–			256/32K	75	75	–
1600 x 1200	256/32K/16M	80	80	80	256/32K/16M	81	81	81
1600 x 1000	256/32K/16M	90	90	90	256/32K/16M	97	97	91
1280 x 1024	256/32K/16M	117	113	113	256/32K/16M	117	117	117
1152 x 864	256/32K/16M	160	149	149	256/32K/16M	163	163	163
1024 x 768	256/32K/16M	188	188	188	256/32K/16M	200	200	200
800 x 600	256/32K/16M	200	200	200	256/32K/16M	200	200	200

32 K = 32,768 colors, 16 M = 16.7 million colors, = Z buffer/double buffering

GLoria-XL and *GLoria-XXL*

Resolution	Refresh rate with 32 K / 16 M colors	Available texture memory with	
		24 MB DRAM	40 MB DRAM
1920 x 1200	76 Hz *	7 MB	23 MB
1920 x 1080	85 Hz	8 MB	24 MB
1600 x 1280	78 Hz	8 MB	24 MB
1600 x 1200	84 Hz	8,5 MB	24,5 MB
1600 x 1000	104 Hz	10 MB	26 MB
1280 x 1024	131 Hz	11 MB	27 MB
1152 x 864	184 Hz	12 MB	28 MB
1024 x 768	231 Hz	13 MB	29 MB

*32 K = 32,768 colors, 16 M = 16.7 million colors, = Z buffer/double buffering, *32 K only*

What Makes Sense?

There are some basic ground rules for you to follow when setting up your graphics system. On the one hand, there are the ergonomic guide values, although nowadays these are met by most systems, and on the other hand there are limitations inherent in your system, e.g. your monitor. The question of whether your applications need to run using large color depths—perhaps even using TrueColor—is also important. This is an important condition in many DTP or CAD workstations.

The general rule is that a refresh rate of 73 Hz meets the minimum ergonomic requirements. The resolution to be selected is, furthermore, dependent on the capabilities of your monitor. The table below is a guide to the resolutions you might select:

Monitor size	Typical image size	Minimum resolution	Maximum resolution	Ergonomic resolution
17"	15.5" - 16"	800 x 600	1024 x 768	1024 x 768
19"	17.5" - 18.1"	1024 x 768	1280 x 1024	1152 x 864
20"/21"	19" - 20"	1024 x 768	1600 x 1200	1280 x 1024
24"	21" - 22.5"	1600 x 1000	1920 x 1200	1600 x 1000

Multi-Screen Operation

The *ELSA GLoria* boards are capable of multi-screen operation. This option enables you to extend your desktop over two or more monitors and so increase your working ergonomics.

Requirements

If you plan to realize a multi-screen solution you should consider the following points:

- Operating system Windows NT 4.0 or NT 3.51
- Identical graphics boards, including memory equipment
- A suitable number of unused PCI slots on the computer's mother board

The monitors used should also be of the same type. It is recommended that at least the screen diagonal of the monitors should be the same. When using monitors which feature

differing sizes or level of performance, the system will orientate itself according to the "weaker" unit.

Using two monitors makes a significant increase in the size of your desktop

e.g. 1600 x 1200

On each screen you can operate an application in full-screen mode.

results in a resolution of 3200 pixels x 1200 lines

Of course, you can also let one application take up the full width of both screens.

Application

If you have the ELSA driver for Windows NT installed already, then you have all the software required for multi-screen operation. When you start the computer, the ELSA driver recognizes the graphics boards. The 'Display' dialog in Control Panel contains entries for the additional resolutions used in multi-screen operation. To use one of these resolutions, you can select it from the list, or you can move the slider in the 'Display' dialog. How do you know if it is a single-screen or multi-screen resolution you are considering? To answer this question, just follow this formula: the horizontal resolution in multi-screen operation results from the horizontal resolution of the graphics board multiplied by the number of boards.

If, for example, the graphics board supports a resolution of 1600 x 1200 in TrueColor mode, then the resulting resolution for dual-screen operation would be 3200 x 1200.

Further information about setting up multi-screen operation with your operating system can be taken form the section see "ELSA DESKman" on page 22.

Changing the Resolution

You set the resolution of your graphics board in the Control Panel under Windows.

ELSA GLoria graphics boards are normally supplied with software on a CD-ROM. You will find all the utilities described in this manual on the CD—unless they are a component of the operating system.

Windows 95

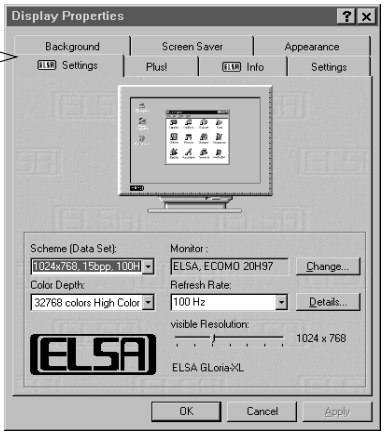
Under Windows 95, the 'ELSA Settings', which you may use to set up your graphics system, are automatically added to the Control Panel when you install the graphics drivers. The 'ELSA settings' function brings a significant benefit: Once you have specified the graphics board model and the monitor data, the program will automatically detect which settings are possible and which are not. This means, for instance, that it is impossible for you to select an incorrect refresh rate which might damage your monitor.

① Use the commands **Start** ▶ **Settings** ▶ **Control Panel**

② In the Control Panel you will find the **Display** program, among others. Double-click on the icon to open the **Display Properties** window which features various tabs.

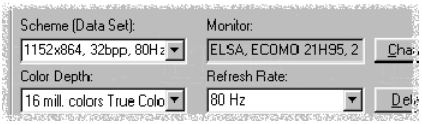
③ Click on the 'ELSA Settings' tab.

'ELSA Settings' has all the options for setting up the graphics board for your monitor.



You must check or set the following settings:

- the color depth
- the monitor type
- the monitor resolution (Scheme, Data Set) and
- the refresh rate



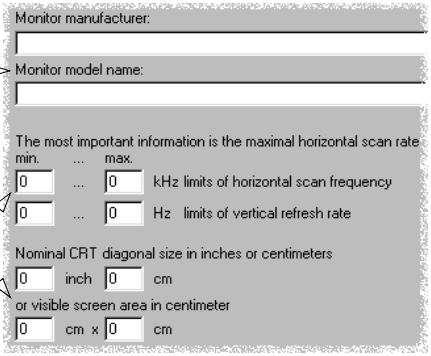
Selecting the Monitor

First click on **Change...** to call up the database of monitor types. You will be presented with a list of monitor manufacturers and monitor models. If the manufacturer of your monitor is listed, click on the name and select your monitor model. You have two options if your monitor is not listed. Select '_Standard monitor' from the top of the list as your monitor manufacturer. Then select the resolution required as your monitor type.

The second option requires that you know the technical specifications for your monitor. Consult your monitor manual, to ensure that you have the necessary information correct. Click on **Change...** in the 'Monitor type database' window. In addition to the information regarding the monitor manufacturer, and the model designation, you will have to enter the frequency ranges for the horizontal and vertical scan frequencies and specify the diagonal size of your monitor.

You can enter the monitor manufacturer and model type here if your monitor type is not listed in the monitors database.

The vertical and horizontal frequency ranges and the diagonal size of the screen are the important settings.



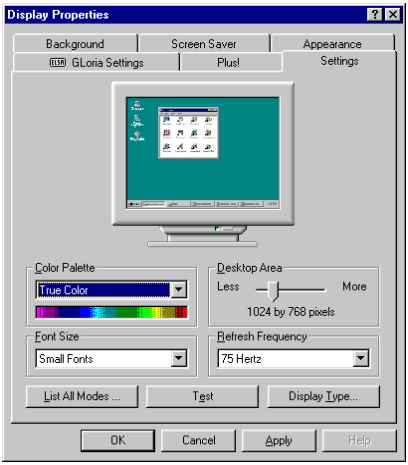
Check your entries for the image frequencies carefully, as otherwise you could damage your monitor. Look these up in your monitor manual or consult the monitor manufacturer.

Windows NT 4.0

The settings for the graphics driver are included in the Control Panel under Windows NT 4.0. Use the commands

Start ▶ Settings ▶ Control Panel

to open a dialog box, in which you will find the **Display** program, amongst others. Double-click on the icon to open an index card with a number of different tabs. Click on the 'Settings' tab.



You can select the possible settings for 'Color Depth', 'Font Size', 'Resolution' and 'Refresh Rate' from this dialog box. The available selection is determined by the ELSA driver you have installed. You should always check the configuration you have selected by clicking on the **Test** button.

You will find further information on how to customize your graphics settings under Windows NT 4.0 in your system manual.

Windows NT 3.51

① Click on the 'Control Panel' icon in the Main Group and select 'Display'. This will open the 'Display settings' dialog box. You now have the following options:

- The 'Color Depth' can be changed from 256 Colors to TrueColor, depending on the Desktop area.
- The 'Desktop area' can be freely resized, depending on the refresh frequency and the color palette.
- You can choose from several display refresh rates under 'Refresh frequency' .
- 'Font size' allows you to select small or large fonts for menus, title bars, etc.

② After making your selections, check the new graphics mode by means of a test pattern (**Test**). The test image will be displayed for five seconds when you click on **OK**. Select **Yes** if the test pattern appears correctly. If your monitor cannot display your selected graphics mode, click on **No** and select a different mode.

③ As soon as you confirm the changes, the 'Changing display settings' message box appears. Here you can choose between 'Restart now' and 'Don't restart'.

ELSA Tools

In addition to the ELSA drivers, the *WINNERware* CD includes utility programs for the various operating systems. Some of these tools are integrated into the Control Panel, others are installed separately and are stored in the 'ELSAware' program group on your system.

Windows 95

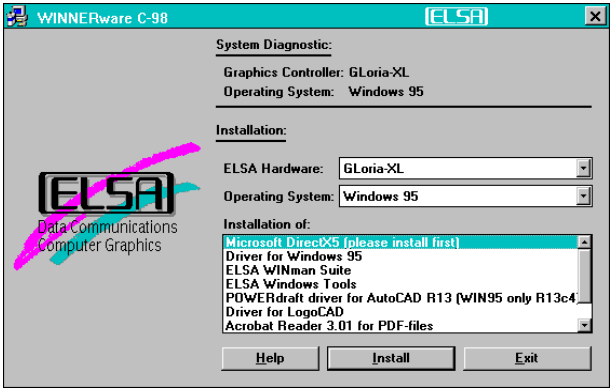
Installation under Windows 95 is most simple if you run the setup program from the *WINNERware* CD.

Installation

The CDSETUP.EXE program is found in the root directory of the *WINNERware* CD.

① Start CDSETUP.EXE, and check the **ELSA Windows Tools** entry under 'Installation of:'.

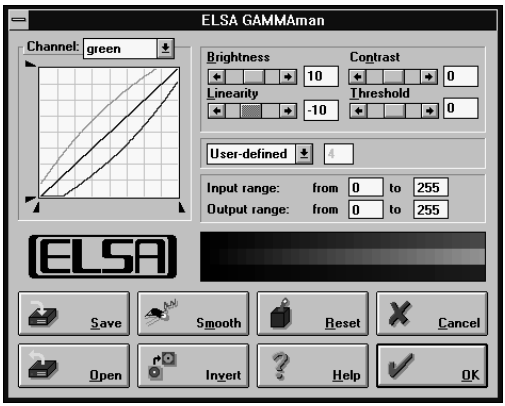
② Click on the **Install** button.



ELSA GAMMAman

GAMMAman allows DTP specialists a genuine WYSIWYG (what you see is what you get) color display on the monitor. This allows exact balance of the monitor colors to the color shadings of your printer. Thanks to *ELSA GAMMAman*, unpleasant surprises after print-

ing are prevented, and professional designers may customize the color space and even create an inverse color display.



Press F1 or click on the Help button to call up the Online help. The Online help has greater information on the various topics.

Windows NT 4.0

ELSA GLoria Settings

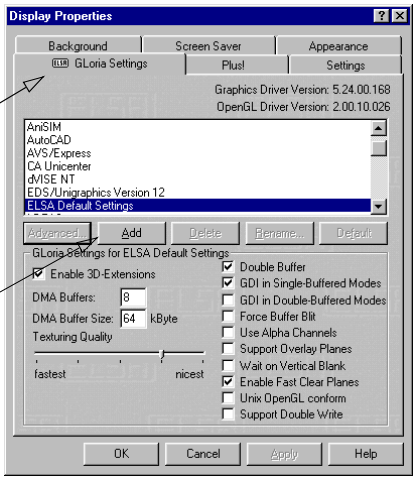
The '[ELSA] GLoria Settings' are part of the control panel and are automatically installed when you install the ELSA driver. Use the commands

Start ▶ Settings ▶ Control Panel

to open the 'Control Panel' folder, in which you will find the 'Display' program, among others. Double-click on the icon to open an index card with a number of different tabs. Click on the '[ELSA] GLoria Settings' tab.

Use the '[ELSA] GLoria Settings' tab to specify the 3D parameters individually for each application you have installed.

The **Add** button is available for you to enter and configure your own application entry.



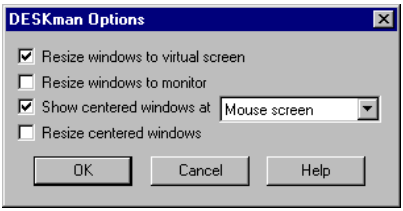
The '[ELSA] GLoria Settings' features a selection of many common CAD applications. The settings for these applications have already been optimized and set up for the ELSA drivers.

You can also add your own entries with customized 3D settings to this list. Just click on **Add**, enter the name of the application and enter the settings you require. Click on **Apply** to include the new entry in the selection list.

Press F1 or click on the Help button to call up the Online help. The Online help has more detailed information on the ELSA GLoria settings.

ELSA DESKman

The *ELSA DESKman* is used to control the appearance of applications and system messages in multi-screen operation. Select the corresponding entry in CD-Setup to display the README.TXT file for *DESKman*. You will find information about the installation and features available with the *DESKman*.



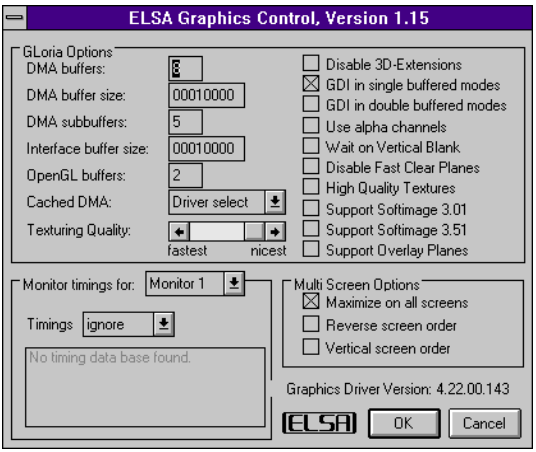
You can use the *ELSA DESKman* to make applications appear in ful-screen mode on one of the monitors. This is a convenient way of operating your CAD application on one screen and using *ELSAview 3D* on another, for example.

*Press F1 or click on the **Help** button to call up detailed information about ELSA DESKman.*

Windows NT 3.51

ELSA WinCtrl

You have the *ELSA WinCtrl* program to assist you in Windows NT 3.51. You can use this application to make detailed changes to the ELSA driver configuration and specify the settings for your monitor.



More information on the settings in WinCtrl can be found in the README.TXT and WINCTRLD.WRI files. You will find these on the CD in the `\GLORIA\`*'Board type'*`\WINNT35\I386` *directory (e.g. in the* `\GLORIA\XL\WINNT35\I386` *directory for the case of the GLoria-XL.*

ELSA Programming Toolkit *POWERlib*

ELSA offers the optional programmer's tool kit *POWERlib*, which you can use to create your own applications using the ELSA graphics board for graphical output. It is available for DOS (Protected Mode), for Windows 95, and for Windows NT.

The advantages are:

- Common programming interface for all ELSA graphics boards (including future models)
- Only one executable for all ELSA graphics boards
- Common programming interface under DOS, Windows 95, and Windows NT
- Significantly faster graphics functions compared to Windows-GDI
- Implemented clipping, objects will only be drawn in the permitted area, even where windows overlap
- Additionally available: 3D extension, display list, and 3D display list
- Windows online help for the programmer
- Support for several compilers (e.g. for Windows Microsoft Visual C++ and for DOS Watcom and Metaware HighC)

Call the ELSA service hotline on +49-241-606-5112 for more information.

ELSA POWERdraft for AutoCAD

ELSA POWERdraft is one of the most powerful productivity enhancement tools for AutoCAD R13 for Windows and AutoCAD LT 3 for Windows 95.

ELSA POWERdraft for AutoCAD supports the following environments:

- AutoCAD R13 under Windows NT 4.0
- AutoCAD R13c4 (and later) under Windows 95
- AutoCAD LT 3 for Windows 95 and Windows NT 4.0

Take careful note of the current entries in the CD-Setup window. It is possible that your version already includes a driver for AutoCAD R14. The latest drivers can also be downloaded from the ELSA Internet web site (see page 41).

Seamlessly integrated into the AutoCAD environment, your *POWERdraft* driver offers significant improvements over existing driver technology. *POWERdraft* is an extremely fast and reliable driver platform for AutoCAD. Proven 32-bit display list technology and an intimate knowledge of your ELSA graphics adapter combine to provide an excellent solution for the most demanding AutoCAD users.

Additionally, your *POWERdraft* driver includes the powerful utilities, *SuperView*, *MagniView*, *MultiView* and *Cockpit*, each designed to accent the AutoCAD drafting environment without inhibiting it. Fully dynamic and integrated through ELSA's SmartFocus technology, each utility is fully transparent to AutoCAD and available during any AutoCAD command.

SmartFocus

ELSA's SmartFocus technology, which is used in all *POWERdraft* windows, keeps you from having to switch the focus between driver windows and the AutoCAD windows. After using a function in one of the driver windows, any keyboard entry or crosshair movement automatically makes AutoCAD the active window again. You don't have to expressly click in a window to activate it, as is in the case with other drivers.

Installation

The CDSETUP.EXE program is found in the root directory of your *WINNERware* CD. Start this program, and continue as described below from step ④. Otherwise, or in the case of difficulty, please do the following:

① Start Windows.

② Select **File** ▶ **Run...** in the Program Manager.

③ Insert the *WINNERware* CD, change with **Browse...** to the directory for your graphics board (e.g. `\GLORIA\XL\ACAD\R13WIN` for the *ELSA GLoria-XL*) and start SETUP.EXE from there.

④ Confirm with **OK** and follow the instructions.

⑤ Select the language to be used in the installation dialogs.

SETUP finds your AutoCAD by reading the association for the file extension DWG.

You will have to modify the path accordingly if you wish to set up *POWERdraft* for a different AutoCAD installation. AutoCAD LT 3 for Windows 95 are detected automatically.

- AutoCAD R13 for Windows

  You should install the driver to a dedicated directory. The variable ACADDRV will be assigned to this directory automatically. Remember to select the driver in the AutoCAD configuration dialog. Select the 'Config/Screen configuration' command in AutoCAD.

*We recommend that you do **not** specify the AutoCAD directory as the target directory, as you would then be unable to install future versions in a separate directory.*

- AutoCAD LT 3 for Windows

  The driver will be installed in the AutoCAD LT 3 directory. An existing driver will be renamed.

  The driver is based on the *POWERlib*, a driver-independent, fast graphics library. Since this library can also be used by other drivers or applications, it may already be installed on your system. If the existing *POWERlib* library is not compatible with the driver, SETUP lets you choose whether to abort or to continue the installation. If you decide to continue, SETUP will inform you which other application(s) will no longer work due to the incompatibility.

After SETUP has finished you will find a new icon in your AutoCAD program group. Double click on the icon to see online help for the POWERdraft for AutoCAD driver. This help file includes documentation changes made after printing and a new version report, documenting changes from earlier versions, if applicable.

ELSAview 3D

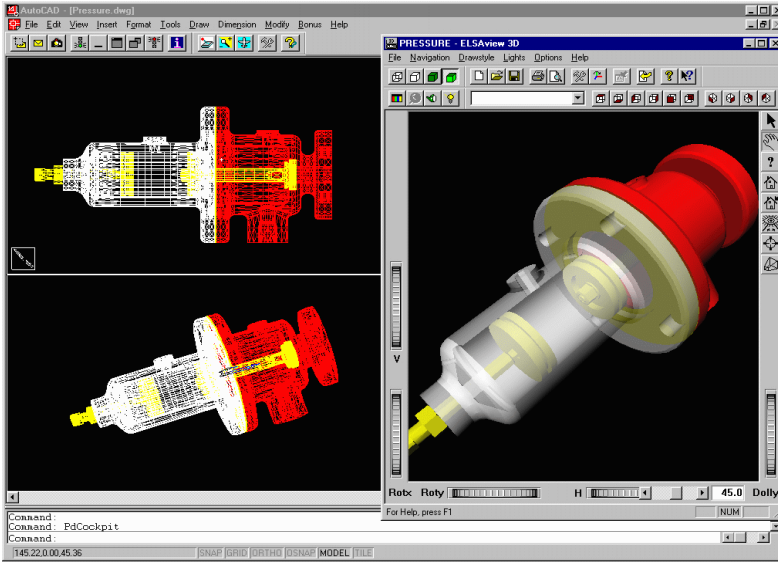
ELSAview 3D is a 3D viewer that can be run either as a standalone program or in conjunction with AutoCAD.

What Does *ELSAview 3D* Offer ?

Checking objects in 3D is a time-consuming business when designing 3D objects in the AutoCAD desktop. Every view must be rendered and will switch straight back to wire-

frame representation if the object is moved. *ELSAview 3D* is fully integrated in AutoCAD and allows constant monitoring of drawn objects in three-dimensional space. You can move the object on all three axes. In addition, you can use different light sources with different colors to illuminate the object. You can achieve a very plastic representation of the object through perspective correction and the ability to add 3D filters. The accuracy of the representation can be further enhanced depending on the resolution selected, the drawing size and the scale of the drawing.

Operation of *ELSAview 3D* makes a significant contribution to user friendliness. The most important control functions are found on a toolbar. You can move the object freely through space in real time using the mouse. The new position is automatically translated to the AutoCAD desktop.



Installation

The *ELSAview 3D* installation program may be found on the *WINNERware* CD. Insert the CD in your CD-ROM drive.

① Run SETUP.EXE from the directory for your graphics board (e.g. CD drive letter'`\GLORIA\XL\ACAD\PV3D\DISK1` for the *GLoria-XL*)

② You will be prompted to specify the AutoCAD installation directory in the next dialog box. The first AutoCAD directory is always offered as a default value. You may confirm this or select a different directory with Browse.

③ Enter the installation directory for the *ELSAview 3D* program files in the next dialog box.

④ The following dialog box allows you to specify whether the AutoCAD-ARX files should be updated only in the directory currently specified, on all local drives or over the entire network.

Once you have installed *ELSAview 3D* successfully, you will be able to start AutoCAD directly and work with *ELSAview 3D*.

Press F1 to call up the online help. The online help has context-related information on the various topics.

ELSA Driver for 3D Studio MAX/VIZ

ELSA offers a special driver for the 3D Studio MAX up to version 1.2 and 3D Studio VIZ. The development of this driver has been based on the Heidi driver from 3Dlabs, which takes full advantage of the graphics chip's capabilities. The optimization of the ELSA driver lets you reach higher display speeds and thus is indispensable for the *ELSA GLoria*.

① Ensure that 3D Studio MAX/VIZ has not been started.

② Insert the *WINNERware* CD into the CD-ROM drive and start the **SETUP.EXE** program from the directory for your graphics board (e.g. `\GLORIA\XL\3DSMAX` for the *GLoria-XL*).

The program guides you through each step of the installation. Read the instructions carefully, and answer and confirm each of the questions.

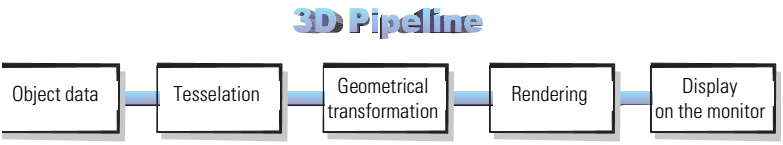
Further information on this special driver can be found in the README.TXT file in the directory for your graphics board on the WINNERware CD (e.g. `\GLORIA\XL\3DSMAX` *for the GLoria-XL).*

All About Graphics

3D Graphics Representation

The 3D Pipeline

What actually happens when a monitor displays a 3D object? The data describing the 3D object are passed through what is known as the 3D pipeline, in which the mathematical calculations for its representation in space and perspective on the monitor are carried out. What happens in detail?



Start: The object data

The pipeline starts at the object. The object description is made up of the data (points).

Tesselation

In the first step, the object is broken down into a number of polygons or triangles. The vertices of the triangles are described by coordinate points (x, y and z) with the 'z' value containing the depth information. Depending on the representation, these vertices also contain information concerning the material and texture. The volume of data to be processed increases enormously because of this conversion of the image information.

Geometrical transformation

This part of the 3D pipeline is very processor-intensive, as all the calculations for the 3D scene are carried out at this stage. Simplified, it comprises of the following steps:

- **Illumination**—The illumination of the scene by different light sources is calculated.
- **Transformation**—In transformation, the objects are aligned in perspective as seen from the observer's point of view.
- **Back face culling**—This process computes hidden surfaces resulting from the observation perspective chosen. Any object having an invisible front surface is omitted.
- **3D clipping**—In this process, each polygon is checked to determine whether it is partially or fully invisible. The invisible faces or parts of objects will be removed.

- **Scaling on the screen**—The above steps are now calculated for three-dimensional space using normalized coordinates. The on-screen image coordinates will only now be computed.

Rendering

At this stage, the 3D scene is filled with color shades and textures are applied. Different processes and methods are also applied here.

- **Texture mapping**—At this stage, the 3D object undergoes a sort of "face lift". The materials and textures are assigned. Different methods are used here to make the textures appear realistic, even when enlarged or reduced. As a first step, the textures are computed:
  - Point sampling is the simplest method. A pixel-by-pixel comparison is made between the texture template and the surface to be filled. This method leads to a very coarse representation, especially when enlarged.
  - In linear mapping, a new color value is interpolated from the adjacent pixels (or telexes) of a texture. This gives better results than point sampling, as the hard boundary between the coarse pixels is blurred.
  - The MIP mapping method stores a large number of enlargement stages for the texture. The depth information of a primitive is then used to determine which enlargement stages of the texture will be used in drawing. Normal textures seldom contain more than 256 colors.
    The first 15 bits of a 16-bit wide color representation are reserved for the colors (5/5/5 > R/G/B). Information concerning the transparency of the texture is carried in the alpha channel. The last bit is reserved for this information. Finally, a distinction is made in MIP mapping between bilinear and trilinear filtering. Bilinear filtering interpolates between two pixels of two textures, trilinear filtering interpolates between four pixels for each of two textures.
  - Bump mapping introduces a new dimension. Relief or raised textures can only be generated with the other methods in two dimensions using light and shadow effects. In bump mapping, the texture is additionally assigned height information, which allows very realistic three-dimensional effects to be created.

  The staircase effect is corrected by anti-aliasing. This is either done by interpolating mixed pixels, in which a new color value is computed from two adjacent color values, or by using transparent pixels of the same color which are overlaid over adjacent pixels.
- **Shading**—Shading takes account of the effects created by different light sources on the 3D object and provide for a very realistic overall impression. Here, too, there are different methods which are more or less processor-intensive:
  - Flat shading assigns a color value to each polygon. This results in a mosaic-like, jagged representation, which demands only a short processing time.

- In Gouraud shading, all the vertices of the polygons are assigned a color value. The remaining pixel information for the polygon is interpolated. This method gives a very gentle color transition, even with fewer polygons than are required for flat shading.
- The Phong shading method additionally takes a normal vector of reflectivity into consideration when interpolating. An even more realistic impression is generated by the representation of reflections and mirror images.
- Certain applications use ray tracing methods. This is a very computer-intensive and time-consuming process in which each individual pixel and its reflection in 3D space is calculated.

- **The frame buffer**

  The finished image will not be written to the frame buffer until this complex sequence of steps is completed. The frame buffer is made up of front and back buffer. The back buffer acts as a buffer page, in which the next image to be displayed is built up. This prevents the process of image drawing being visible. The duplicate storage method is also known as double buffering.

Flipping: Display on the monitor

The content of the front buffer is displayed on the monitor. When the drawing process in the back buffer is completed, this image is then passed to the front buffer in a process known as flipping.

The next image will only ever be displayed once the image drawing process in the back buffer is completed. This procedure should be repeated at least 20 times a second to give a smooth representation of 3D scenarios. In this context, we speak of frames per second (fops), a very important value for 3D applications. A cinema film runs at 24 fps.

3D Interfaces

Software interfaces, including 3D interfaces, are known as APIs (Application Program Interface). The question is what are these interfaces used for, and how do they work.

In simple terms: They make developers' work easier. The methods by which the various interfaces function, are comparable: In the past it was necessary to address the various hardware components directly in programming if you wanted to exploit their capabilities to the full. The APIs are a kind of translator operating between the hardware and the software.

The specification of standard definitions was the precondition for the proper function of these translation routines. These definitions are implemented by the hardware manufacturers during development and optimized for the hardware concerned. Developers can implement complex procedures relatively easily by using these definitions. They can use

a uniform command set when programming and do not need to know the characteristics specific to the hardware.

What APIs Are Available?

There are a good dozen more or less commonly found 3D APIs. However, in recent years, three formats have established themselves as the favorites: Direct 3D, OpenGL and HEIDI. ELSA graphics boards support these commonly found 3D interfaces. The functional differences between the interfaces are slight, as is shown by the table below. The decisive questions for the user concern extensibility, flexibility and possible portability to existing applications.

Function	Direct 3D	OpenGL	Heidi*
Alpha blending	■	■	■
Texture mapping	■	■	■
MIP mapping (not for *GLoria-L*)	■	■	■
Video motion mapping	■	□	■
Fogging	■	■	■
Anti-aliasing filter	■	■	■
Flat shading	■	■	■
Gouraud shading	■	■	■
Phong shading	□	□	□
Stencil buffer	□	■	□

Direct 3D

As a development of Mode X and DirectDraw under Windows 3.1x, Direct 3D is a branch of the DirectX multimedia family which was developed directly for Windows 95 to accelerate the slow 3D display characteristics of the operating system. Direct 3D is based on Microsoft's Common Object Model (COM), which is also used as the foundation to OLE technology (Object Linking and Embedding). Direct 3D cooperates with Direct Draw in two-dimensional display. A typical situation would be, for instance, rendering a 3D object while Direct Draw is placing a two-dimensional background bitmap. Microsoft claims to have corrected some of the weaknesses of the old version in the most recent version 5.0.

Immediate Mode and Retained Mode

As can be assumed from the two terms, immediate mode is a programming mode that is close to the hardware. Retained mode, on the other hand, is a programming mode that is largely predefined through an API interface. What does this mean in detail? Looking

at the two systems hierarchically, the immediate mode is also known as the low-level mode. The programming interface level is close to the hardware level and permits the programmer direct access to special functions in the hardware component concerned. The retained mode (high-level mode) makes it possible, for example, to load a defined 3D object with textures into a Windows application. Here it can be manipulated and moved using simple API commands. Translation takes place in real time, without the need to know the technical structure of the object.

For further information see the Internet WWW site http://www.microsoft.com

Heidi

Heidi is a purely immediate mode interface and does not operate with a display list. This makes it particularly suitable for application developers who already have access to graphics libraries. Well-known CAD programs such as 3D Studio MAX/VIZ, Whip by AutoCAD 13 and Mechanical Desktop use the Heidi system. In contrast to OpenGL, Heidi is an object-oriented interface and thus simplifies function calls. Hardware acceleration is achieved through standard interfaces or by means of direct hardware access to special 3D chips. Optimum performance can be achieved in this way. This API is extremely versatile and flexible thanks to the many plug-ins that are available in addition to the definitions Heidi supports internally.

For further information see the Internet WWW site http://www.ktx.com

OpenGL

Following its success in gaining a good reputation amongst professionals using CAD/CAM programs, OpenGL is now increasingly penetrating the PC market. OpenGL is platform-independent and makes a distinction between immediate and display list modes. A display list stores specific sequences that can be recalled again later. The object descriptions can then be taken directly from the list, resulting in very high performance. However, if objects need to be manipulated frequently, the display list will have to be generated again from new. In this case, the speed advantage is lost. OpenGL provides a wide range of graphics features, from rendering a simple geometric point, line, or filled polygon, to the most sophisticated representations of curved surfaces with lighting and texture mapping. The some 330 routines of OpenGL provide software developers access to these graphics capabilities:

For further information see the Internet WWW site http://www.sgi.com

Color Palettes, TrueColor and Gray Scales

Common graphics modes are listed in the following table. Not all graphics modes are available on the *ELSA GLoria* boards.

Graphics mode	bpp	bpg	Colors (from palette)	Max. gray levels
VGA 0x12	4	6+6+6	16 of 262,144	16
VGA 0x13	8	6+6+6	256 of 262,144	64
Standard	8	6+6+6	256 of 262,144	64
	8	6+6+6	256 of 16.7 million	256
HighColor	15	5+5+5	32,768	32
	16	6+6+4	65,536	16
	16	5+6+5	65,536	32
TrueColor	24	8+8+8	16.7 million	256

(bpp = bits per pixel; bpg = bits per gun)

VGA

In VGA graphics adapters, the digital color information stored in the video memory (4 bits for 16 colors or 8 bits for 256 colors) is converted into a digital 18-bit value in the graphics adapter in a CLUT (ColorLookUpTable). The 3 x 6 bits are converted separately for R/G/B (red/green/blue) in the RAMDAC (D/A converter) and transferred to the monitor as analog signals on just three lines (plus sync lines). The original color values are converted into completely different values by means of a translation table. The value stored in the video memory is thus not a color value, but only a pointer to a table in which the actual color value is found. The advantage of this method: Only 8 bits need to be stored for each pixel, although the color values are 18 bits wide; the disadvantage: Only 256 colors can be displayed simultaneously from a palette of 262,144 possible colors.

DirectColor

The situation is different in the case of DirectColor (TrueColor, RealColor and HighColor). In this case, the value stored in the video memory is not translated but is passed directly to the D/A converter. This means that the full color information must be saved for each pixel. The meanings of the terms RealColor, TrueColor, and HighColor can be confused, as they are not always used unambiguously.

HighColor and RealColor

HighColor and RealColor usually describe a 15 or 16-bit wide graphics mode, while TrueColor should only be used for the more professional 24-bit mode (or 32-bit) mode.

15 bits provide 5 bits each for the red, green and blue values, resulting in 32 levels per RGB component and thus 32,768 (= 32 x 32 x 32) different color hues.

The 16-bit graphics modes are organized differently. Most common are (R-G-B) 5-6-5 (e.g. XGA) and 6-6-4 (e.g. i860). 5-6-5 means that 5 bits are used for each of red and blue and 6 bits are used for green. In the case of 6-6-4, 6 bits are used for red and green and 4 bits for blue. Both ways of assigning the bits correspond to the color sensitivity of the human eye: this is highest for green and lowest for blue. 65,536 different colors can be displayed.

TrueColor

The TrueColor mode is more complex, using 24 bits per pixel. Here, 8 bits are available for each color component (256 levels), resulting in 16.7 million different color hues. There are more colors available than pixels on the screen (1.3 million pixels at a resolution of 1280 x 1024).

VESA DDC (Display Data Channel)

VESA DDC refers to a serial data channel between the monitor and the graphics board. Required for this is that both components support DDC and that the monitor cable includes the additional DDC line. An extended monitor cable is used so that the can send data about its technical specification, such as the name, model, maximum horizontal frequency, timing definitions etc. or receive commands from the graphics board.

There are various standards; DDC1, DDC2B, and DDC2AB.

DDC1

Only the monitor can send data (unidirectional). A line in the monitor cable is used to send a continuous data stream from the monitor to the graphics board. In the case of a standard IBM VGA compatible 15-pin monitor connector, pin 12 (formerly used as monitor ID bit 1) is used for data transmission, and the Vertical Sync signal of pin 14 is used as transmission clock (VCLK). An EDID data set (Extended Display Identification) of 128 bytes is sent repeatedly, from which the major monitor data can be read in the computer. The computer can then read the most important data, e.g. the monitor size, the extent of DPMS support and a list of the most important VESA monitor timings supported, and some freely definable monitor timings.

DDC2B

The data channel is based on the I2C bus type with the access bus protocol and can be operated in both directions (bidirectionally between monitor and board). In the case of a standard IBM VGA compatible 15-pin monitor connector, pin 12 (formerly used as monitor ID bit 1) is used for data transmission (SDA), and the pin 15 (formerly used as monitor ID bit 3) is used as transmission clock (SCL). The graphics board can request the short EDID

information (see DDC1) as well as the more comprehensive VDIF information (VESA Display Identification File).

DDC2AB

With DDC2AB additionally to DDC2B the computer may send commands for controlling the monitor, e.g. for adjusting the screen position or the brightness (similar to ACCESS bus).

Technical Data

In this section you will find detailed technical information on the graphics boards. All interfaces and their assignments are described in detail.

Characteristics of the Graphics Boards

	ELSA GLoria-L	ELSA GLoria-L/MX
Grafics processor	3Dlabs GLINT 500TX	3Dlabs GLINT MX
3D coprocessor	3Dlabs GLINT Delta	3Dlabs GLINT Delta
VGA	S3 ViRGE with 1 MB DRAM	S3 ViRGE with 1 MB DRAM
RAMDAC pixel timing	220 MHz	220 MHz
Memory	8 MB VRAM + 8 MB EDO-DRAM (expandable to 16 MB EDO-RAM)	8 MB VRAM + 8 MB EDO-DRAM or 16 MB EDO-DRAM
BIOS	VBE 1.2 support	VBE 1.2 support
Bus system	PCI	PCI
VESA DDC	DDC1 and DDC2B	DDC1 and DDC2B

	ELSA GLoria-XL	ELSA GLoria-XXL
Grafics processor	3Dlabs GLINT MX	3Dlabs GLINT MX
3D coprocessor	3Dlabs GLINT Delta	3Dlabs GLINT Gamma
VGA	S3 Trio64V2/DX with 1 MB DRAM	3Dlabs Permedia2 with 2 MB SGRAM
RAMDAC pixel timing	250 MHz	250 MHz
Memory	16 MB VRAM, 24 MB DRAM (expandable to 40 MB DRAM)	16 MB VRAM, 24 MB DRAM (expandable to 40 MB DRAM)
BIOS	VBE 2.0 support	VBE 2.0 support
Bus system	PCI	AGP
VESA DDC	DDC1 and DDC2B	DDC1 and DDC2B

Address Assignment for the ELSA Boards

The *GLoria-L*, *GLoria-L/MX* and *GLoria-XL* graphics boards are fully IBM VGA compatible and occupy the same memory area and specific addresses in the I/O range. The memory range above 1 MB is automatically assigned through the PCI BIOS interface.

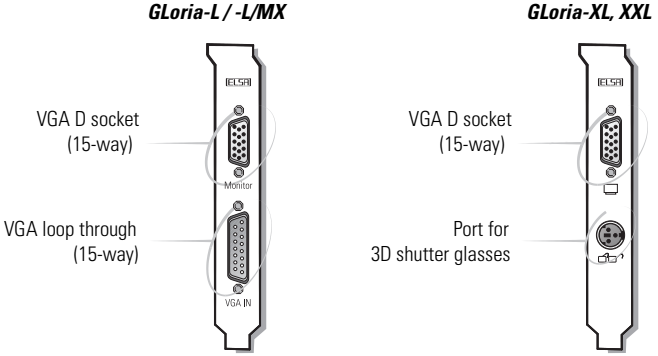
If you encounter any address conflicts, try to modify the I/O address of the expansion board causing the problem. The addresses of the ELSA graphics boards cannot be changed.

To ensure that your system functions properly, the addresses and ranges occupied by the ELSA graphics board must not be accessed simultaneously by other hardware components. The following addresses area affected:

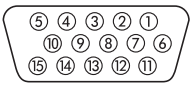
I/O addresses:	Standard VGA I/O	3B0-3DF
Memory addresses:	Video RAM	A0000-BFFFF
	Video BIOS-ROM	C0000-C7FFF

The *ELSA GLoria* requires an interrupt for proper operation, or else the board will not be correctly recognized during the driver installation. Use the manual supplied with your motherboard to determine which slot the *ELSA GLoria* is installed in. Then check your computer's BIOS setup and make sure that the automatic Plug&Play interrupt assignment for this slot is enabled or switched on. Information about settings in the BIOS can be taken from the documentation for your motherboard.

Ports on the Graphics Boards



The VGA D Socket

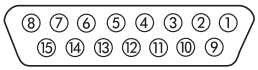


Pin Assignment

Connection	Signal	Connection	Signal
1	Red	9	+5 V
2	Green	10	Sync ground
3	Blue	11	Ground
4	Ground	12	Bidirectional data (SDA, DDC1/2B)
5	DDC ground	13	Horizontal synchronization
6	Red ground	14	Vertical synchronization
7	Green ground	15	Data timing (SCL, DDC2B)
8	Blue ground		

The *ELSA GLoria* issues analog signals in accordance with the requirements of Guideline RS-170. The synchronization information is sent separately. If your monitor provides a switch for the input impedance, you should select '75 Ohms' (= '75 Ω') for the R, G and B video inputs and '2 kOhm' (= '2 kΩ') for the sync inputs. You should only try other switch settings at the sync inputs if your monitor expects sync levels other than those used by normal monitors and does not produce a stable display. The switches are labeled “Low” and “High” only on some monitors. You can then refer to your monitor manual to find out what input impedance level this refers to, or you can experiment to find a position in which a stable image appears in all graphics modes.

The VGA D Sub Plug



Pin Assignment

Connection	Signal	Connection	Signal
1	In 2 video	9	Not used
2	Not used	10	Ground
3	Out S-video (luminance)	11	Ground
4	Out S-video (chrominance)	12	Ground
5	Out video	13	Ground
6	In 1 S-video (luminance)	14	Ground
7	In 1 S-video (chrominance)	15	Ground)
8	In 3 video		

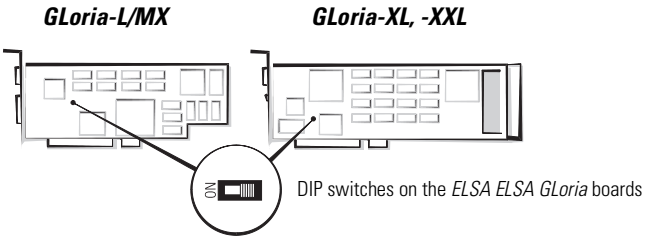
Port for 3D Shutter Glasses

You can connect 3D glasses to the VESA standard mini-DIN socket on the slot cover of the graphics boards. Special operating system drivers and the appropriate functions in the application software are a requirement for this function.

Switching Off the Integral VGA Adapter

The *ELSA GLoria* have an integral VGA adapter. If you have previously worked with a VGA adapter in your computer, you must remove it for normal single-screen operation. VGA adapters integrated in the motherboard of your computer must be deactivated in the computer BIOS. Alternatively, you can switch off the VGA adapter on the *ELSA GLoria* boards. In this event, you must set the DIP switches on the *ELSA GLoria* board to 'ON'.

The *GLoria-L* and *GLoria-L/MX* is connected to the external VGA adapter by an optional connecting cable.



DIP switches on the *ELSA ELSA GLoria* boards

Appendix

Frequently Asked Questions and Answers

Installation Problems with your ELSA Graphics Board

How can I know which PCI slot provides bus master capability?

According to the PCI specification, all PCI slots must be bus master capable. Nevertheless, some computers have PCI slots without bus master capability. You can consult the manual of your computer or check the slot settings with the SETUP program of your computer. You can also contact the dealer where you bought your computer. You could also simply try out several slots. Your computer and the ELSA graphics board cannot be damaged. If the SETUP configuration program of your computer allows you to control the bus master capability, enable it (set it to 'ON' or 'Enabled').

Can I use an ELSA graphics board with a fixed-frequency monitor?

In principle, it is possible to operate an ELSA graphics board with a fixed-frequency monitor. The monitor must accept separate H and V sync signals. However, only the compliant high resolution mode can be displayed. It is not possible to display the standard IBM VGA graphics modes (no DOS full screen). You will need an additional VGA monitor for this setting.

Problems with Windows 95

Why can't I select higher resolutions and refresh rates in the ELSA settings, even though these are supported by my monitor?

Please ensure that your monitor has been entered in both the ELSA and Windows 95 settings. Both settings are absolutely necessary, as the resolutions and refresh rates may be restricted otherwise.

The video playback resolution is sometimes good and sometimes not so good

There are some special combinations of Windows graphics mode, video resolution and video window size in which you will get reduced video resolution. In such cases you should try the following: avoid windows overlapping the video window, increase the size of the video window, or reduce the refresh rate of the Windows graphics mode.

When Windows 95 takes too long to boot

ELSA graphics boards and ELSA Windows drivers support DDC for automatic monitor recognition. Windows 95 checks the monitor on every start. You may shorten the boot time

by disabling the DDC check if your monitor does not support DDC. In *WINman Suite*, call 'ELSA Info' and switch the monitor detection off.

How can I switch back to the ELSA Windows driver after using the VGA driver?

If you had already installed the ELSA Windows driver before using the other driver, you will not have to repeat the installation procedure. The various steps are listed in the Installation Guide.

Where do I find information about the various versions of the Windows drivers?

You will find the latest release notes in the README file on the ELSA CD in the driver directory.

General Questions and Answers

My *GLoria* board is not much faster than my old board under Windows NT 4.0

Check whether the resolution and color depth you have selected supports hardware OpenGL. You can only do this with the OGLQUERY ELSA-Tool which you will find in the '\ELSAWARE\OGLQUERY\' directory on the WINNERware CD. Once you start the program, you will see a message box indicating which driver is active (Microsoft = software OpenGL, ELSA = hardware OpenGL).

How many energy saving levels does the DPMS screen saver have? (not applicable to Windows NT)

Most DPMS-capable monitors have a simple yet effective two-level power-saving circuit. The 10% power-saving level, which you can select on the ELSA screensaver, is thus skipped, and the monitor switches directly to the 80% power-saving level.

How can I get updated software?

The drivers are available for download to all ELSA customers: ELSA LocalWeb, through our Internet WWW site www.elsa.de, by direct FTP access ftp ftp.elsa.de or through the CompuServe Forum, enter GO ELSA (see "Frequently Asked Questions and Answers" on page 39).

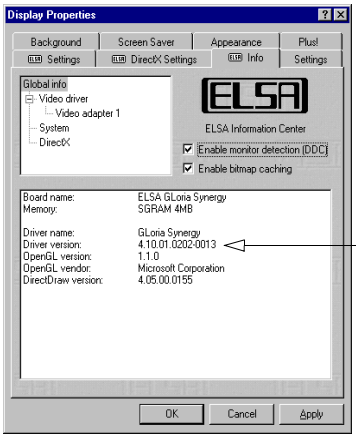
Advice and Help

If you encounter any problems during the installation or operation of your ELSA product, please consult this manual first. On the ELSA CD or floppy disk you will find a file called README.TXT, containing late-breaking changes and additional information not available when this manual was printed.

If you have further questions, you can contact our Support team. Ensure that you can provide the following information.

- Exact model name of your ELSA device.
- Version of the used ELSA driver or file date and time of the driver file.
- Operating system, hardware environment and bus system.

  You can call up information about your system via the ELSA Info program. Click on **Start** ▶ **Settings** ▶ **Display** to open the Display Properties window. Click on the ELSA Info tab for a display of various information about your system.



Especially important:
The version number of your graphics board driver

- Name and version of the application program with the error.
- A detailed error description. To be certain, try to reproduce the error at least three times and exactly describe the steps you took to deliberately trigger the error.

Who to Contact?

First you should contact the dealer where you bought your ELSA product. If there are still questions remaining, contact one of the following:

ELSA on the Internet

The ELSA Internet WWW site	www.elsa.com	
ELSA LocalWeb	+49-241-93 88 00	
(ELSA's dial-up WWW site:	ISDN	X75, V120, PPP
no Internet provider required!)	Analog	V.90, V.34
	Protocol	PPP oder MLPPP
	User name	guest
	No password	

ELSA and CompuServe

The ELSA forum in CompuServe GO ELSA

ELSA Support Faxline

By fax to the ELSA support faxline +49-241-606-6399

ELSA by Mail

Or write to ELSA

ELSA AG
Computer Graphics Support
Sonnenweg 11

52070 Aachen
Germany

ELSA Support Hotline

If very urgent, call the ELSA support hotline +49-241-606-6132

Mondays to Fridays from: 9.00 am until 5.00 pm (CET)

ELSA World Wide

You can contact the ELSA subsidiaries:

ELSA Inc.

2231 Calle De Luna Santa Clara California CA 95054 USA	Phone: Fax:	+1-408-919-9100 +1-800-272-ELSA +1-408-919-9120

ELSA Asia Inc.

7F-11, No. 188, Sec. 5 Nanking East Road Taipei 105 Taiwan R.O.C.	Phone: Fax:	+886-22-7685730 +886-22-7660873

ELSA Japan Inc.

Mita Suzuki Building 3F
5-20-14 Shiba, Minato-ku
Tokyo 108-0014
Japan

Phone: +81-3-5765-7391
Fax: +81-3-5765-7235

The ELSA LocalWeb

The ELSA LocalWeb provides direct access to ELSA's local Internet server, and contains the same information as the Internet web server www.elsa.com. Here you will find information about all ELSA products, the latest drivers, software and documentation, and you have the opportunity to put questions to our sales and support departments via the ELSA news server. To access the ELSA LocalWeb, you need a dialer program (e.g. the Dial-up Network in Windows 95) and an Internet browser.

To make a connection, first start the dialer software. Where information for the DNS server is requested, enter the IP address as 172.22.1.2. The user name is guest; no password is necessary. With a successful connection active, the browser software can be started.

Driver Updates

The latest versions of the ELSA drivers are always available for download from our Internet WWW site www.elsa.com or our LocalWeb and via direct FTP from ftp.elsa.com. You will also find lots of information and answers to frequently asked questions (FAQs). You might also consider the newsgroups on our Webpages. Before you contact the ELSA Support team, please make sure that you are using the latest driver versions.

Repair?

If you are not sure whether your ELSA expansion board is defective or if the problem is just a driver which is incorrectly installed, please call the ELSA support hotline before you send the board for repair. Should you need to send in the ELSA expansion board to be repaired, please use suitable packing material and the original box to prevent damage during transport. In addition, please include a copy of the original purchase receipt as well!

You can help reduce the repair time by including a detailed description of the fault with the device, which will help us track down the error source.

DOC–Declaration of Conformity

ELSA AG GLoria-XXL

Tested To Comply
With FCC Standards

FOR HOME OR OFFICE USE

Compliance Information Statement
(Declaration of Conformity Procedure)

Responsible Party:	**ELSA Inc.**
Address:	**2231 Calle De Luna Santa Clara, CA 95054 USA**
Phone:	**+1-408-919-9100**
Type of Equipment:	**Graphics Board**
Model Name:	**GLoria-XXL**

This device complies with Part 15 of the FCC rules.
Operation is subject to the following two conditions:
(1) this device may not cause harmful interference, and
(2) this device must accept any interference received, including interference that may cause undesired operation.
See user manual instructions if interference to radio reception is suspend.

On behalf of the manufacturer / importer
this declaration is submitted by

Aachen, March 11th 1998

Peter Padar
Director Quality Management
ELSA AG, Germany

Warranty Conditions

The ELSA AG warranty, valid as of 01.01.98, is given to purchasers of ELSA products in addition to the warranty conditions provided by law and in accordance with the following conditions:

1 Warranty Coverage

a) The warranty covers the equipment delivered and all its parts. Parts will, at our sole discretion, be replaced or repaired free of charge if, despite proven proper handling and adherence to the operating instructions, these parts became defective due to fabrication and/or material defects. Also we reserve the right to replace the defective product by a successor product or repay the original purchase price to the buyer in exchange to the defective product. Operating manuals and possibly supplied software are excluded from the warranty.

b) Material and service charges shall be covered by us, but not shipping and handling costs involved in transport from the buyer to the service station and/or to us.

c) Replaced parts become property of ELSA.

d) ELSA are authorized to carry out technical changes (e.g. firmware updates) beyond repair and replacement of defective parts in order to bring the equipment up to the current technical state. This does not result in any additional charge for the customer. A legal claim to this service does not exist.

2 Warranty Period

The warranty period for ELSA products is six years. Excepted from this warranty period are ELSA CRT color monitors and ELSA video conferencing systems with a warranty period of 36 months. Also excepted are the ELSA TFT Monitors with a warranty period of 12 months. This period begins at the day of delivery from the ELSA dealer. Warranty services do not result in an extension of the warranty period nor do they initiate a new warranty period. The warranty period for installed replacement parts ends with the warranty period of the device as a whole.

3 Warranty Procedure

a) If defects appear during the warranty period, the warranty claims must be made immediately, at the latest within a period of 7 days.

b) In the case of any externally visible damage arising from transport (e.g. damage to the housing), the transport company representative and ELSA should be informed immediately. On discovery of damage which is not externally visible, the transport company and ELSA are to be immediately informed in writing, at the latest within 7 days of delivery.

c) Transport to and from the location where the warranty claim is accepted and/or the repaired device is exchanged, is at the purchaser's own risk and cost.

d) Warranty claims are only valid if the original purchase receipt is returned with the device.

4 Suspension of the Warranty

All warranty claims will be deemed invalid

a) if the device is damaged or destroyed as a result of acts of nature or by environmental influences (moisture, electric shock, dust, etc.),

b) if the device was stored or operated under conditions not in compliance with the technical specifications,

c) if the damage occurred due to incorrect handling, especially to non-observance of the system description and the operating instructions,

d) if the device was opened, repaired or modified by persons not authorized by ELSA,

e) if the device shows any kind of mechanical damage,

f) if in the case of an ELSA Monitor, damage to the cathode ray tube (CRT) has been caused especially by mechanical load (e.g. from shock to the pitch mask assembly or damage to the glass tube), by strong magnetic fields near the CRT (colored dots on the screen), or through the permanent display of an unchanging image (phosphor burnt), or

g) if the warranty claim has not been reported in accordance with 3a) or 3b).

5 Operating Mistakes

If it becomes apparent that the reported malfunction of the device has been caused by unsuitable software, hardware, installation or operation, ELSA reserves the right to charge the purchaser for the resulting testing costs.

6 Additional Regulations

a) The above conditions define the complete scope of ELSA's legal liability.

b) The warranty gives no entitlement to additional claims, such as any refund in full or in part. Compensation claims, regardless of the legal basis, are excluded. This does not apply if e.g. injury to persons or damage to private property are specifically covered by the product liability law, or in cases of intentional act or culpable negligence.

c) Claims for compensation of lost profits, indirect or consequential detriments, are excluded.

d) ELSA is not liable for lost data or retrieval of lost data in cases of slight and ordinary negligence.

e) In the case that the intentional or culpable negligence of ELSA employees has caused a loss of data, ELSA will be liable for those costs typical to the recovery of data where periodic security data backups have been made.

f) The warranty is valid only for the first purchaser and is not transferable.

g) The court of jurisdiction is located in Aachen, Germany in the case that the purchaser is a merchant. If the purchaser does not have a court of jurisdiction in the Federal Republic of Germany or if he moves his domicile out of Germany after conclusion of the contract, ELSA's court of jurisdiction applies. This is also applicable if the purchaser's domicile is not known at the time of institution of proceedings.

h) The law of the Federal Republic of Germany is applicable. The UN commercial law does not apply to dealings between ELSA and the purchaser.

Glossary

- **3D** – Three-dimensional
- **3D clipping** – Process in geometric transformation in which invisible surfaces or parts of a 3D object are removed.
- **3D pipeline** – Sum of all steps required for the representation of virtual 3D scene on the monitor. These include →tesselation, →geometrical transformation and →rendering.
- **AGP** – stands for Accelerated Graphics Port and is a further development by INTEL based on the PCI bus. The AGP bus provides a greater bandwidth for data transmission and communicates directly with main memory. The bus is primarily intended for 3D graphics boards.
- **Aliasing** – the familiar "staircase effect". Jagged transitions are often formed between adjacent pixels in the representation of diagonals or curves. These "jaggies" can be smoothed out by anti-aliasing.
- **Alpha blending** – Additional information for each pixel for creating transparent materials.
- **Back buffer** – is the name for the image region built up in the background in the frame buffer during →double buffering.
- **Back face culling** – Method used to calculate the hidden faces of a 3D object.
- **BIOS** – Abbreviation of Basic Input/Output System. A program code in the read-only memory (ROM) of a computer which performs the self-test and several other functions during system startup.
- **Bump mapping** – Process by which textures are assigned depth information which allows the display of relief or raised structures.
- **Bus system** – A system of parallel data lines for the transfer of information between individual system components, especially to expansion boards (e.g. PCI bus).
- **Chrominance** – Color information in the video signal.
- **Clipping** – parts of polygons invisible to the representation are determined in clipping. These parts are then not displayed.
- **D/A converter** – Digital/Analog converter: A signal converter which converts a digital input signal to an analog output signal.
- **DCC** – (Digital Content Creation) DCC is the computer-based production of professional visualizations and animations for the field of digital media and the entertainment industry.
- **DDC** – stands for Display Data Channel. A special data channel through which a DDC-capable monitor can send its technical data to the graphics board.
- **DirectColor** – Generic term for TrueColor, RealColor and HighColor. The value that is stored in the video RAM is not translated but transferred directly to the D/A converter. This means that the full color information must be saved for each pixel.
- **Double buffering** – means that there are two display buffers. This means that the next image can be drawn in the page of the display buffer, which is initially invisible. This image will be displayed once it is ready and the next image will be prepared in the other page of the buffer. Animations and games can be made to look more realistic with this technique than with simple single buffer.

- **DPMS** – Abbreviation of VESA Display Power Management Signaling. This standard allows an energy-saving operation of monitors in several steps. The graphics boards described in this manual support VESA DPMS.
- **DRAM** – Abbreviation of Dynamic Random Access Memory. Volatile memory for read and write operations.
- **EDO-RAM** – Abbreviation for Extended Data Output Random Access Memory (Hyper Page Mode). EDO-RAM is very common on graphics boards, as the most recently used data persist in memory. A number of read accesses to similar data occur during the generation of an image, so that use of EDO-RAM gives a significant speed advantage.
- **FCC** – FCC compliance means that a device has been tested and found to comply with the limits for a Class B digital device pursuant to Part 15 of the FCC Rules, designed to provide reasonable protection against harmful interference in a residential installation.
- **FIFO method** – (first in, first out) a system used in batch processing and queues in which the first signal to arrive is processed first.
- **Fixed-frequency monitor** – A monitor that can only be operated at a specific resolution and refresh rate.
- **Flat shading** – →'Shading'.
- **Flipping** – The image generated in the →back buffer is displayed.
- **Frame buffer** – Part of the graphics memory in which the image next to be displayed on the screen is generated. In addition, transparency effects are calculated in the frame buffer.
- **Front buffer** – is the name for the visible image page in →double buffering.
- **Geometrical transformation** – The position of the object in space is determined from the observer's point of view.
- **Gouraud shading** – → 'Shading'.
- **Graphics accelerator** – refers to a graphics accelerator board, i.e a board particularly suited for graphics intensive user environments.
- **HighColor** – designates a 15-bpp or 16-bpp (bits per pixel) graphics mode, i.e. 32,768 or 65,536 colors.
- **Horizontal frequency** – The horizontal frequency (scan frequency) of a monitor in kHz. This value must be set in accordance with the operating limits of the monitor, otherwise the monitor might be damaged in extreme cases.
- **Horizontal scan frequency** – The horizontal scan frequency of a monitor in kHz. This value must be set in accordance with the operating limits of the monitor, otherwise the monitor might be damaged in extreme cases.
- **Interpolation** – A video image must be stretched or shrunk in order to fit into the display window. If pixels are simply multiplied (for example, a block of four equally colored pixels represents the original pixel), aliasing effects ("blocks" and "stairs") will occur. This can be avoided by interpolation procedures (using average colors for inserted pixels). Horizontal interpolation is relatively easy to perform, since the pixels are drawn to the screen in lines. Vertical interpolation is more difficult and requires a complete pixel line to be buffered.
- **MIP mapping** – In MIP mapping a number of textures are assigned to an object depending on distance. The representation of the object becomes more detailed as the observer approaches the object.

- **Multi-frequency/ MultiSync monitor** – A monitor that can be operated at various horizontal scan frequencies, or that automatically adapts itself to different video signals (resolutions).
- **OpenGL** – 3D software interface (3D API). E.g. implemented in Windows NT and available for Windows 95. Based on Iris GL from Silicon Graphics and licensed from Microsoft.
- **Page Flipping** – The image generated in the →back buffer is displayed
- **PCI bus** – Abbreviation of Peripheral Component Interconnect Bus. An advanced bus system, i.e. a system of parallel data lines to transfer information between individual system components, especially to expansion boards.
- **Phong shading** – → 'Shading'.
- **Pixel** – Picture element. Dot in the image.
- **Pixel frequency** – Pixel clock frequency (number of pixels drawn per second in MHz).
- **Primitive** – Simple, polygonal geometrical object, such as a triangle. 3D landscapes are generally broken down into triangles.
- **RAM** – Abbreviation of Random Access Memory. Chip memory of a computer or expansion board that can be read from and written to (unlike ROM = Read Only Memory).
- **RAMDAC** – The RAMDAC converts the digital signals to analog signals on a graphics board. VGA monitors are only capable of processing analog signals.
- **RealColor** – RealColor normally designates a 15-bpp or 16-bpp (bits per pixel) graphics mode, i.e. 32,768 or 65,536 colors).
- **Refresh rate** – or image refresh frequency (in Hz) indicates how many times per second an image on the monitor is refreshed.
- **Rendering** – Process for calculating the representation of a 3D scene, in which the position and color of each point in space is determined. The depth information is held in the →Z buffer, the color and size information is held in the →frame buffer.
- **Resolution** – The number of pixels in horizontal and vertical direction on the screen, for example 640 horizontal by 480 vertical pixels (640 x 480).
- **RGB** – Color information is saved in the Red/ Green/Blue color format.
- **ROM** – Abbreviation of Read Only Memory. Semiconductor memory that can only be read and not written to.
- **S-Video** – or S-VHS. Signal transmission of video information, where the signals for →chrominance and →luminance are separated. This results in a higher picture quality.
- **Shading** – Shading or rendering is a way to define the colors on curved surfaces in order to give an object a natural appearance. To achieve this, the surfaces are subdivided into many small triangles. The three most important 3D shading methods differ in the algorithm used to apply colors to these triangles:
  Flat shading: the triangles are uniformly colored.
  Gouraud shading: The color shades on a triangle are calculated by interpolating the vertex colors, resulting in a smooth appearance of the surface.
  Phong shading: the color shades on a triangle are calculated by interpolating the normal vector.
- **Shutter glasses** – Goggles which use stereoscopic LCD projection of 3D scenery to give the observer a strong impression of space.

- **Single buffer –** By contrast with double buffering, where the image buffer is duplicated, the single buffering mode is not able to access the next image, which has already been calculated. This means that animations will run jerkily.
- **Tearing –** A distinction is made in double buffering between the front buffer and the back buffer. The image change between the front buffer and the back buffer is synchronized in tearing.
- **Tesselation –** The objects for 3D calculations are divided up into polygons (triangles) in tesselation. The vertices, color and, if required, transparency values, are determined for the triangles.
- **Textures –** Wrapping a bitmap around an object, including perspective correction, for example wallpaper on a wall or a wood texture on furniture. Even a video can be used as a texture map.
- **TrueColor –** Graphics mode with 16.7 million colors (24 or 32 bits per pixel). In this mode, the color information saved in the display memory is not translated by a look-up table, but passed directly to the D/A converter. This means that the full color information must be saved for each pixel.
- **VESA –** Abbreviation of Video Electronics Standards Association. A consortium for the standardization of computer graphics.
- **VRAM –** Abbreviation for video RAM. Memory chip for fast graphics boards.
- **Z buffer –** 3D depth information (position in the third dimension) for each pixel.

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