ELSA WINNER 2000 Office™

User Manual

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Preface

Thank you for placing your trust in this ELSA product.

With the *WINNER 2000/Office* you have selected a graphics board which was designed to meet the demands of high-performance multi-tasking environments. The graphics processor on the board ensures high-speed generation of on-screen graphics making this board ideal for power users of professional office applications. ELSA products are subject to the highest of standards in production and quality control which are the foundation for consistently high product quality.

About this Manual

This manual provides all the information you will need to get the best out of your ELSA graphics board. For instance, which resolution is best for which monitor, or how is the board upgraded? The accompanying ELSA utility programs are described, and you will find detailed information about 3D acceleration.

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.

Current information about updates can always be found in the README files on the ELSA CD.

If you have further questions or need additional help, you can rely on our online services which are available to ELSA customers. Look for information in the appendix "Advice and Help".

In very urgent cases the ELSA Hotline can be reached under the following number:

+49-241-606-6131

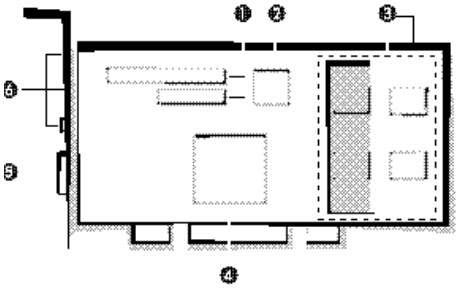
Before you read on...

The installation of the WINNER 2000/Office hardware and software drivers is described in full in the Quick Start guide which accompanies this manual. You should refer to that document before attempting to install your board, and before reading this manual

Contents

Introduction

A Look at the *WINNER 2000/Office*



Brief Description and Characteristics

1. The VMI interface
2. The BIOS carries out many tasks, including the identification of the *WINNER 2000/Office* to the computer. The Flash-BIOS equipment enables quick and easy upgrades
3. Display memory: 4 MB SGRAM, with socket for expansion to 8 MB
4. Graphics processor: PERMEDIA 2 from 3DIabs with integrated GLINT Delta chip
5. Monitor connector
6. Video-In/Video-Out connectors (depending o the model)

WINNER 2000/Office Highlights

- Pixel clock frequency up to 230 MHz
- In graphics modes, ergonomic refresh rates over 100 Hz are possible
- Plug&Play integration
- Recognition of VESA-DDC compatible monitors (DDC1 and DDC2B)
- Supports energy-saving monitors with VESA DPMS compatibility
- ELSA drivers for Windows NT, Windows 95, and OS/2 Warp 4
- Hardware support for the 3D graphics standards Direct3D, OpenGL, and EnDIVE
- Hardware accelerated 3D 16-bit Z-buffering, Gouraud shading, and texture mapping
- Product support via ELSA LocalWeb, Internet WWW site, newsgroups, and CompuServe forum
- Six-year warranty
- This board complies with the CE and FCC rules and has the following FCC IDs:

  With video equipment:

  – PCI bus: KJGP2VIVOUP (4 MB), KJGP2VIVO (8 MB)

  – AGP bus: KJGP2VIVOUPAGP (4 MB), KJGP2VIVOAGP (8 MB)

  Without video equipment:

  – PCI bus:KJGP2EASY (4/8 MB)

  – AGP bus: see page 45

Package Contents

Before installing your ELSA graphics board, please ensure that nothing is missing from your package. It should contain the following:

- documentation: installation guide and manual
- graphics board
- **Only with video-equipped graphics boards:**
  Video adapter cable from S-Video (Hosiden) to Composite (Cinch)
- CD-ROM with installation software, drivers, and utilities

If any part is missing please contact your dealer.

ELSA reserves the right to change the supplied contents without prior notice.

System Requirements

- **Computer:** ELSA graphics boards are suited for operation in computers with Intel Pentium or Pentium-compatible CPUs.
- **Bus:** Your computer's bus system needs PCI-2.0 compliant bus slots (with bus master capability) or an AGP bus.
- **Monitor:** ELSA graphics boards work with the standard IBM VGA compatible horizontal scan frequency of 31.5 kHz when booting and in DOS operation. In addition, the monitor must be capable of displaying the graphics mode you select.

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

PCI, with video function	KJGP2VIVOUP (4MB), KJGP2VIVO (8MB)
AGP, with video function	KJGP2VIVOUPAGP (4MB), KJGP2VIVOAGP (8MB)
PCI, without video function	KJGP2EASY (4/8MB)

- Declaration of Conformity

  AGP, without video function see page 45

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 *WINNER 2000/Office* 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 *WINNER 2000/Office* can be equipped with 4 or 8 MB SGRAM. If your board has an empty socket then it is equipped with 4 MB. If you wish to improve the performance of your graphics board, you can fit the free socket with additional SGRAM.

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

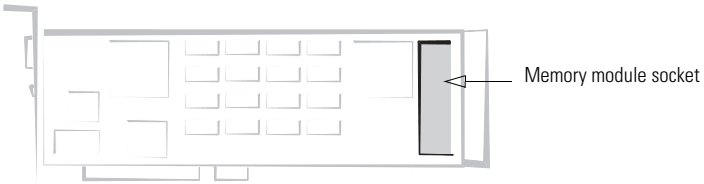
from the additional memory. This will give you greater speed in texture representation.

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.

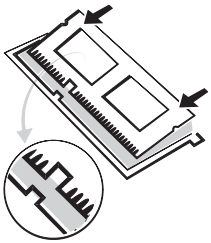
The memory chips developed by ELSA are specially designed for use in ELSA graphics boards. This practically excludes the risk of problems such as incorrect colors for individual pixels. Please consult our Support service in the unlikely event that you still experience video errors.

Installing the Memory Module in the *WINNER 2000/Office*

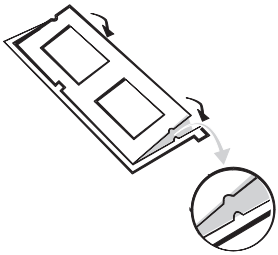
The socket for the 4MB memory module on the *WINNER 2000/Office* is located at the back end of the graphics board (opposite the mounting bracket).



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.



After Installing the Drivers

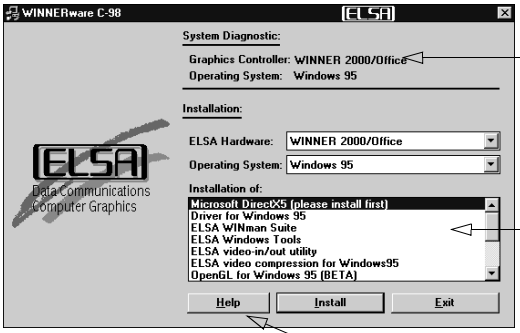
In this chapter you will find descriptions of

- where you can find the software for operating your ELSA graphics board,
- the performance characteristics of your graphics board, and
- how you can most effectively tuning for the combination of monitor and ELSA graphics board.

Software Installation from the CD

Once you have successfully completed the steps described in the installation guide, your *WINNER 2000/Office* is integrated into your computer system with installed drivers. In this way, you have very likely come to know the program ELSA CD-Setup. This program should start automatically after inserting your *WINNERware* CD, but if not, then you can run the CDSETUP.EXE from the CD's root directory.

CD-Setup recognizes the operating system and the ELSA graphics board. Based on this information, the program displays the driver and the selection of software supported. All of these programs are on the *WINNERware* CD: Just highlight the items you want, and click on **Install**.



Graphics board and operating system are identified

List of software which can be installed

Information about the entries listed

The Right Settings

Our tip is: Invest a little time at this stage and you won't regret it. Take your time to set up your system just right. Your eyes will thank you for it, and you are guaranteed to have more fun in front of your screen.

To set up your system properly, the following questions should be answered:

- What is the maximum resolution I can set on my system?
- Which color depth do I want to use?
- What value should I set for my display refresh rate?

To help you find the answers to these questions, this chapter has been divided according to the operating systems available. Just look for the section about the operating system you use. All the information you need is here and all the software you need, if not already a part of your operating system, is on the *WINNERware* CD.

What are Your Options?

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

	Max. Refresh Rate (Hz) / Z-Buffer, Double Buffering					
Color Depth:	**256 Colors**		**HighColor**		**TrueColor**	
SGRAM:	**4MB**	**8MB**	**4MB**	**8MB**	**4MB**	**8MB**
1920 x 1200[1)]	73/–	73/–	–/–	73/–	–/–	–/–
1920 x 1080	79/–	79/–	–/–	79/–	–/–	–/–
1792 x 1120	80/–	80/–	80/–	80/–	–/–	–/–
1600 x 1200	85/–	85/✓	85/–	85/–	–/–	–/–
1600 x 1000[1)]	101/–	101/✓	101/–	101/–	–/–	–/–
1536 x 960[1)]	110/–	110/✓	110/–	110/–	–/–	–/–
1280 x 1024	130/✓	130/✓	130/–	130/✓		73/–
1152 x 864	171/✓	171/✓	171/–	171/✓	86/–	100/–
1024 x 768	200/✓	200/✓	200/–	200/✓	108/–	108/✓
800 x 600	200/✓	200/✓	200/✓	200/✓	177/–	177/✓

[1)] Resolutions for 16:10 wide-format monitors (e.g. ELSA ECOMO 24H96)
HighColor = 65,536 colors, TrueColor = 16.7 million colors

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 guidelines, although nowadays these are met by most systems, and on the other hand there are limitations inherent to your system, e.g. your monitor. The question of whether your applications need to run using large color depths—perhaps even TrueColor—is also important. This is an important condition for many DTP or CAD workstations. We recommend that games and "normal" Windows applications are operated in HighColor with 65,536 colors.

"More Pixels, More Fun"

This is an opinion which is widespread, but which is not entirely true under all circumstances. The general rule is that a refresh rate of 73 Hz meets the minimum ergonomic requirements. The resolution to be selected also depends 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

Changing the Resolution

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

The WINNER 2000/Office is normally supplied with software on a CD-ROM. You will find all the utilities described in this manual on the WINNERware CD – unless they are a component of the operating system.

Windows 95

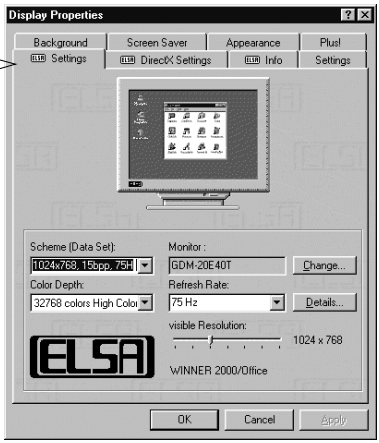
Under Windows 95, the 'ELSA Settings', which you may use to set up your graphics system, are automatically added to the Control Panel when you install the graphics drivers. The 'ELSA settings' function brings a significant benefit: Once you have specified the graphics board model and the monitor data, 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.

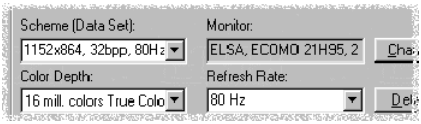
③ Click on the 'ELSA Settings' tab.

'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

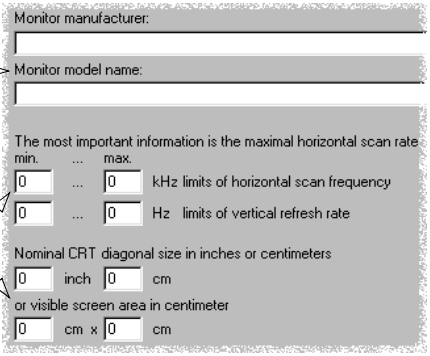
First click on **Change...** to call up the database of monitor types. You will be presented with a list of monitor manufacturers and monitor models. If the manufacturer of your monitor is listed, click on the name and select your monitor model. You have two options if your monitor is not listed. Select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



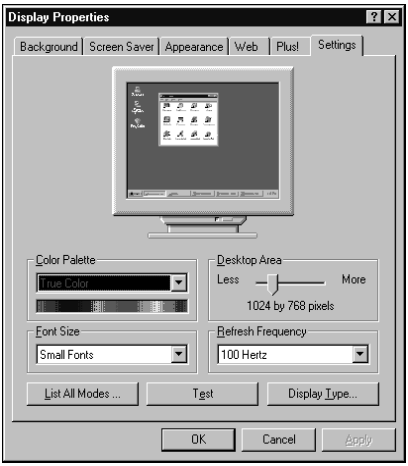
Check your entries for the image frequencies carefully, as otherwise you could damage your monitor. Look these up in your monitor manual or consult the monitor manufacturer.

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.

OS/2 Warp 4

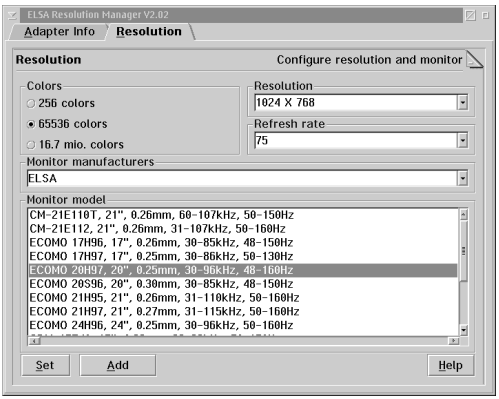
ELSA supplies a proprietary GRADD driver for OS/2 Warp 4.

① Install the ELSA GRADD driver by selecting the drive and directory containing the driver files for your graphics board.

② Start the **SETUP.EXE**.

You can call up the README file by clicking on the 'Introduction' tab. This file contains further information about the ELSA GRADD driver and the operation of the Setup program.

Once the ELSA driver is installed you will find a new folder on your desktop containing the ELSA utilities described here. Start the program 'ELSA Resolution Manager' from this menu.



The *ELSA Resolution Manager* enables the easy configuration of the OS/2 graphic user interface. Under 'Resolution' the monitor can be selected and the required resolution defined. It is important to test the resolution with **Set**. Untested resolutions will not be installed. The system must be restarted for the changes to come into effect.

Please be certain that the information about the monitor is correct and entered in full. This is the only way to be sure of avoiding any damage to the monitor through overload.

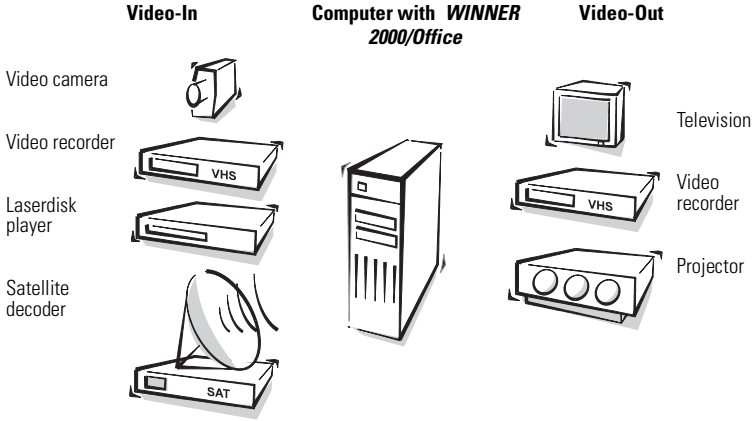
Video–What's In, What's Out?

This section is relevant only for those boards equipped for video functionality. You can check if this is the case with your board by looking at the connectors on the mounting bracket of the WINNER 2000/Office. If your board is fitted with a VGA connector only, then you unfortunately cannot make use of the functions described here.

The *WINNER 2000/Office* can process video signals under Windows 95/ NT 4.0 and OS/ 2 Warp 4. The first part of this section describes how to connect devices for video signal input and output and which sockets apply. The second part concerns the software setup. What do you have to do to capture video sequences and how do you make a certain application window appear on a video projector.

Signal Interchange–An Overview

Below we will show you just how open the *WINNER 2000/Office* is to all sides.



The illustration shows you, on the left, the input devices which can be connected to the graphics board. Your ELSA graphics board has three inputs, two of these are composite video inputs and one is a S-VHS input. The board is capable of processing the PAL, NTSC and SECAM video standards.

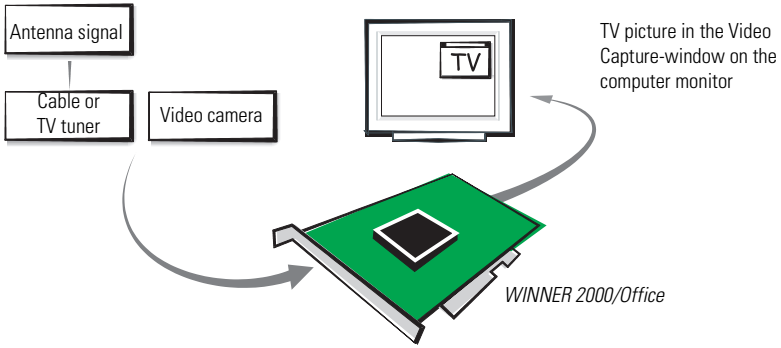
On the right, you see the devices capable of displaying the VGA signal from the computer. You can send the content of the computer screen through the video-out sockets to a television, a video recorder or a projector.

You can operate your WINNER 2000/Office with a monitor and a TV simultaneously.

Video-In

Before the *WINNER 2000/Office* can react, the signals must be clear. It is of no use if you try to connect the antenna to the *WINNER 2000/Office*. The antenna's HF signal transmits information for several channels, and not a simple, unambiguous video signal as required by the *WINNER 2000/Office*. If you wish to display a TV picture on your monitor, then you cannot simply take the antenna-output of your video recorder. Instead, the video recorder's Scart connector must be connected with the composite input of the *WINNER 2000/Office*.

Example Video Signal processing with *WINNER 2000/Office*



Video-Out

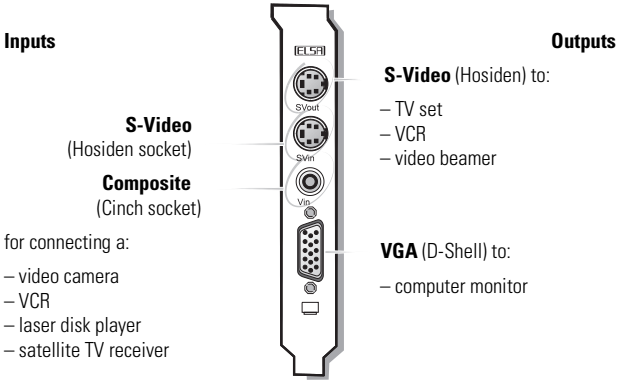
Unlike a computer monitor, a television set is not able to process the VGA signal from a graphics board. Comparing the 15-pin output for the monitor with a coaxial antenna cable makes it immediately clear that the signals are handled in fundamentally different ways. The *WINNER 2000/Office* is equipped with its own translator, a chip which converts VGA signals for the television. This signal can of course be used by other devices such as projectors with a video input or a video camera.

Input and Output Connectors of the *WINNER 2000/Office*

After getting a general overview in the previous section, we will now describe in detail the input and output connectors on the *WINNER 2000/Office*. If, for example, you wish to connect an older video camera and you have trouble finding a suitable adapter, then the description of the pin assignment for various connectors in the appendix of this manual may be of use to you.

Connectors on the Mounting Bracket

On the bracket of the *WINNER 2000/Office* you will find the following connectors:



Connecting to the Video Inputs

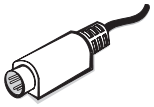
The *WINNER 2000/Office* features two video input connectors; an S-Video socket for S-Video and S-VHS signals, and a second socket for composite and VHS signals, otherwise known as FBAS. Connecting a video device to an input socket may, under some circumstances, be possible only with the help of an adapter. The following table should help you to judge this.

Video Source Device	Type	Source Device Connector	Input Socket on the *WINNER 2000/ Office*
Video camera	S-VHS, Hi8	Hosiden	→ S-Video
	all others (e.g. VHS)	Cinch, mini-DIN, proprietary	→ Composite
VCR	S-VHS	Scart, Hosiden	→ S-Video
	VHS	Scart, Cinch	→ Composite
Laser disk		Scart	→ S-Video
Satellite receiver		Scart	→ Composite

Connecting to the Video Outputs

Apart from the VGA socket for connecting your computer's monitor, the *WINNER 2000/ Office* features an additional video output socket. You can connect video players or recorders equipped with an S-Video input or with a Cinch socket (composite input). You

can use the supplied adapter for this. Be sure to check the Connector settings for the Video-Out.



Hosiden plug
Plug for connecting video signal sources and video players or recorders to the *WINNER 2000/Office*. Your graphics board is supplied with a special adapter (Hosiden plug → Cinch socket) for supplying composite inputs with S-Video signals.

Cinch socket
With the adapter's Hosiden plug connected with the S-Video output of the *WINNER 2000/Office*, you can use a Cinch cable from a video player or recorder and connect this to the Cinch socket on the adapter.

Cinch plug
You need a cable with a Cinch plug to feed a composite video signal to the

Connection to a TV Set

You can connect any normal TV set to the *WINNER 2000/Office*. Refer to the operating manual for your television to find out which video standards it supports, or ask your TV dealer. You can connect PAL or NTSC devices to the *WINNER 2000/Office*.

Some VCRs and TV sets provide only a SCART connector for video input. To connect the WINNER 2000/Office to the device you will need a SCART-to-S-Video/composite adapter which should be switchable between video-in and video-out. Your local TV/video dealer should be able to provide you with a suitable adapter.

ELSA Video Settings

If you have installed the ELSA drivers and tools (See page 7) an ELSA icon will appear in the task bar at the bottom right of your screen. A click on this icon opens up a dialog box from which you can call up the commands for the video settings. The video input for the *WINNER 2000/Office* can be defined and adjusted using the ELSA video settings. You can set the following options:

- The signal source ('Video Capture: Source')
- The video display ('Video Capture: Source')
- The resolution of the video recording ('Video Capture: Format')
- The video display ('Display: Video Out')
- A preview window for the signal at the video input ('Video Viewer')

If you have connected a video input device to the *WINNER 2000/Office*, you will need to change your settings under 'Video capture: Format' and 'Video capture: Source'.

Video Display on the Monitor

It may be enticing to record video material, but... We must remind you that copyright-protected material must not be copied or duplicated without permission. ELSA accepts no responsibility for copyright violations!

You can connect any normal video camera or any video device to the graphics board. Connect the video output on the device to the suitable socket in the composite video adapter cable. Their is no risk of confusing the input sockets because of the different shapes of the composite video and S-Video plugs.

Make sure that you do not mix up the input and output sockets on the composite video adapter cable when connecting the video camera.

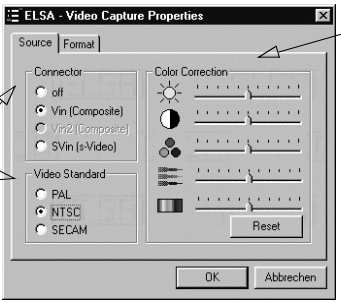
The video input on the *WINNER 2000/Office* is compatible with "Video for Windows". Thus any application that supports this standards should work.

Once you have connected the video source, started your computer and loaded Windows, click on the ELSA symbol in the task bar in the bottom right of the screen and select the **Video capture: Format** ▶ **Start** command from the dialog box.

Video capture: Source

You now need to specify which video source you wish to choose on the 'ELSA - Video Recording Properties' tab. The color correction setting options allow you to adapt the input signal. This covers brightness, contrast, color, image sharpness and hue. The setting for the hue, however, is only effective for NTSC input signals.

Here you can set which video source is to be displayed, and which video standard this source uses.



These color correction controllers affect the video image only.

Select **PAL**, **NTSC** or **SECAM** as your video standard. PAL is the normal video standard in Europe. The manual for your video recorder or video camera can help if you have any queries.

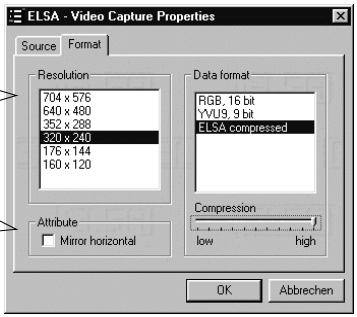
Select which video input you wish to be active from the Connection option group. For example, you can connect a video recorder to each of the two composite inputs (In2 video and In3 video) and a video camera to the S-VHS input (In1 S-Video). Clicking on the relevant input determines which video source sends your signal to the *WINNER 2000/Office*.

Video capture: Format

Clicking on the 'Format' tab brings up a selection of possible video resolutions. Select the resolution you require for video display and recording and confirm your settings by clicking **OK**.

Select the resolution with which the Video-In signal should be displayed.

How the other guy sees you–no mirror image.



It is worth considering the data format for video recordings. The ELSA Codec for video data compression features a highly effective reduction procedure which saves disk space and, depending on your computer system, can work in real time.

Recording video involves very large amounts of data. The following tips will help you to record without frame dropping.

- Close other programs, especially DOS boxes, while recording videos.
- Stop any simultaneous video output.
- Carry out a hard-disk optimization before recording.
- Use a separate hard disk for recording.
- Use the ELSA video compression if you have a Pentium 166 processor, or better.
- Deactivate the audio recording if not required.

AVI files recorded with the ELSA compression require a codec installed in the system for playback. Thus you should follow two steps when recording:

First record the video with the ELSA compression to benefit from the advantages outlined above.

Then use 'MainActor' (See page 24) to convert the file into a more common format such as MPEG, Indeo™ or Cinepak™. You could also use any video editing program which supports the "Video for Windows" codec.

If you want to playback video recorded with the ELSA compression, best results are achieved with the Windows Media Player using RealColor or TrueColor modes. A color depth with just 8 bits/pixel (256 colors) can result in poor image quality with coarse color transitions (see "Color Palettes, TrueColor and Gray Scales" on page 34).

For a detailed description of the various data formats refer to see "Video Formats: Compressors At Work" on page 37.

How Does the Video Image Get Onto the Computer Monitor?

The *WINNERware* CD has programs you can use to display the video image. One particularly exciting application when the video camera is connected is to use Microsoft NetMeeting (See page 23). You can set up conferences using video information via a TCP/IP network (e.g. the Internet) or via a telephone line using a modem. For example, you can show on the screen the video image of the participants in a conference. Entire video sequences can be recorded with MainActor, another program on the *WINNERware* CD. Special formats allow linking of animated video sequences to Internet pages (See page 24).

Video can also be viewed with the Video Viewer. Start this from the ELSA *WINman Suite* icon in the task bar.

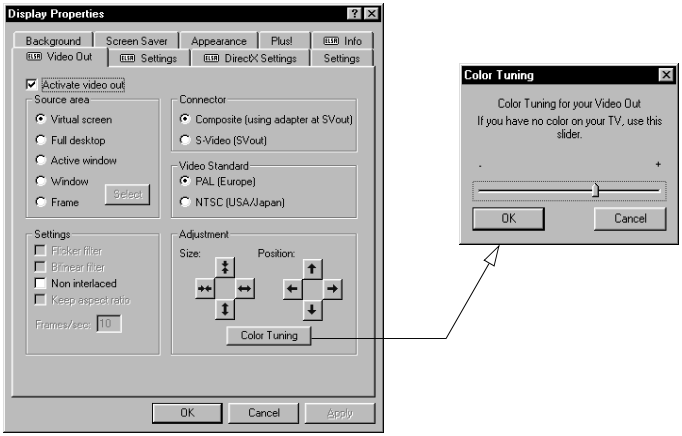
The Computer Display on TV/Video

What you see on your computer monitor can also be displayed on video, TV, or via a video beamer. The entire screen, or even just a part of it; the active window of any application, for example.

① Click on the ELSA symbol in the task bar and use

Display: Video Out

to call the dialog for the ELSA Video Out.



② Next, check if the video output is active.

③ Now check the video standard. Depending on the standard you require, activate either PAL or NTSC.

④ Under 'Connector', select the video input type, be it composite or S-Video.

Should a black and white image appear on your TV, call the ELSA Video Out dialog and click on **Color Tuning**. In the Color Tuning window, move the slider left or right to adjust the color-carrier frequency until a colorful and stable picture is seen on your TV.

By now, you should see your monitor display on the video device. In the 'Source area' field you will see several options for the deciding which part of the image should be displayed. Under 'Settings' and 'Adjustment' you can further optimize the quality, size and position of the on-screen image.

Video-In under OS/2

The Video-In features of the *WINNER 2000/Office* are available to you under OS/2 Warp 4. This is, however, not true when using multi-screen operation. As well as the drivers for the Video-In function, you should also install the MainCodec as supplied by ELSA. The MainCodec "translates" Windows-typical video into formats understood by OS/2. This applies not only to the input format, but also to the output formats.

Installation

Before installing the driver, check that the installation of your OS/2 included the multimedia setup.

① In the 'System Setup' call 'Install/Remove' and select 'Multimedia Application Install'. You will find the driver files in the following directories:

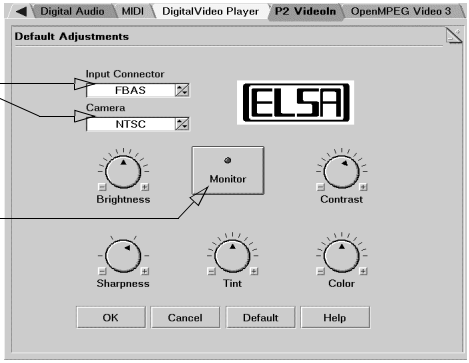
- Video driver: `\WINNER\2000OFC\OS2\GRADD\VIDEOIN`
- MainCodec: `\ELSAWARE\MAINACT\OS2\CODEC`

② Confirm the subsequent questions including the changes to the system files, and then restart your computer.

After restarting your computer, the Multimedia Setup of OS/2 now contains a new registry card, 'P2 VideoIn'. This card provides various functions for processing and controlling the video input signals. Make sure you check the settings for Input Connector and Camera under 'Default Adjustments'.

Check the settings for Input Connector and Camera format

Activate the video preview with the **Monitor** button



*Use the F1 key or the **Help** button to open the online help, which will give you further information about individual topics.*

Programs for Recording Video

Two programs for recording and playing back video are already featured in OS/2 Multimedia Setup. These programs, 'VideoINRecorder' and 'Digital Video', are located in the Multimedia folder. Further information and a detailed description of the functions these programs offer can be found in your OS/2 manual.

Apart from these standard programs, you can install the program MainActor/2 (See page 1) which can be installed from the *WINNERware*-CD. To install MainActor, access the `\ELSAWARE\MAINACT\OS2` directory and call the **INSTALL.CMD** file.

Useful Stuff and More

Apart from the ELSA drivers, the *WINNERware* CD also contains additional programs and utilities for use with the *WINNER 2000/Office*. We will now introduce you to a selection of these. Information about other programs can be taken from the README files on the CD (see "Software Installation from the CD" on page 7).

Win 95
Win NT
OS/2

Neat, Meetings!

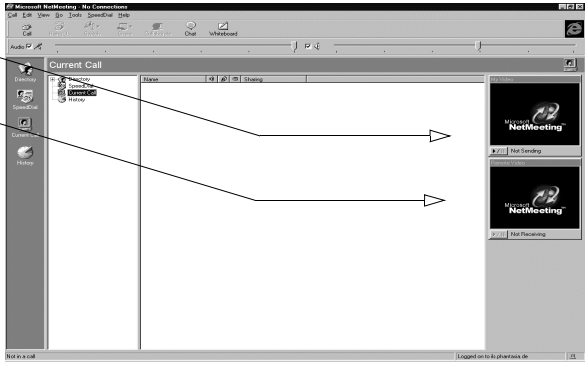
You will find Microsoft's NetMeeting conferencing program on the *WINNERware* CD. This program offers users a completely new way of communicating via the Internet or within networks. The following list is a short summary.

With NetMeeting you can, for instance:

- Call up anyone over a network or through a modem
- Carry on conversations over the Internet
- See the people you call up using a modem or network
- Work in one application with others (application sharing)
- Use the whiteboard to draw during an online conference
- Send written messages in chat mode
- Set up a call link, so that others can call you from your webpages
- Send files to all the participants in a conference

Your picture could be shown in video here...

...and the remote site here.



You can connect a video camera to the video input of the *WINNER 2000/Office*. The picture can be shown in a Microsoft NetMeeting conference.

F1

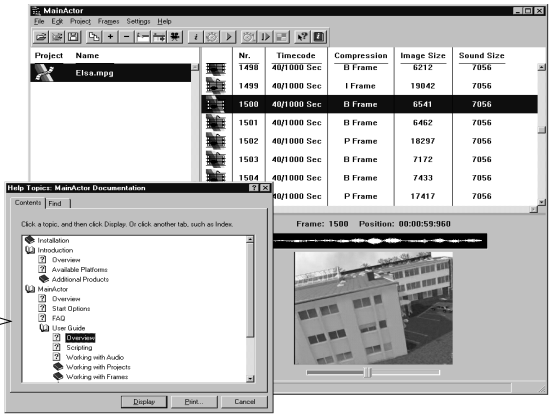
The F1 key or the **?** *menu command calls up NetMeeting's online help. You will find more information about the program here.*

Win 95
Win NT
OS/2

MainActor–The Principal Performer

In What Role?

That is for you to decide! You will find MainActor on the CD. MainActor is a multimedia package that allows you to load, edit, and playback any animations, images and sounds; you can also convert these to a wide variety of formats. Edited projects may be stored as new animations or images.



It is easy to start using MainActor, thanks to its comprehensive online help.

MainView is the external player for MainActor. It is used if you only wish to playback videos, without having to load them into MainActor. MainView can also be called from other programs.

MainActor has a Format

The table below lists all the formats for the loading and saving modules of the program package currently available:

Loading modules			Saving modules	
AVI BMP DL FLC/FLI GIF	GIF-Anim IFF IFF-Anim3/5/7/8/ JPEG	MPEG MPEG-Audio PCX Quicktime WAV	AVI BMP FLC/FLI GIF / GIF-Anim JPEG MPEG-I	MPEG-I/II MPEG-Audio Video Data Quicktime WAV

F1

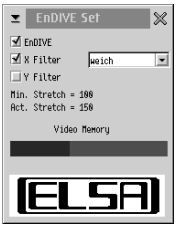
Open MainActor's online help by pressing F1 or selecting Help from the menu bar. You will find more information about the program here.

ELSA TOOLS

Win 95
Win NT
OS/2

ELSA *EnDIVE Set*

With the ELSA utility *EnDIVE Set* for OS/2 Warp 4 you can select or deselect the EnDIVE support, which is an x/y filter for improving the quality of enlarged or reduced video playback. You can also observe how the offscreen video memory is being used. This function is only active during video playback or when another program using *EnDIVE* is active.



The video window should be no smaller than the size indicated by "Min.Stretch" for the x/y filter to work. The values under "Act. Stretch" are the actual dimensions of the current video window.

Win 95
Win NT
OS/2

ELSA *DESKman*

This program is used in dual-screen mode (PCI version only) to set on which screen the message boxes, maximized windows and full-screen command lines appear. You can select the right-hand or left-hand screen, or the current mouse position. The settings are immediately effective. If the Advanced Power Management BIOS is active, you can additionally use the ELSA *DESKman* to switch the driver support of the APM on or off. Changes here are only effective after restarting the computer.

The dual-screen drivers are on the *WINNERware* CD in the directory: `\WINNER\2000OFC\OS2\DUALSCR\`

The Video-In function is not available with dual-screen operation.

Technical Data

ELSA Graphics Board Addresses

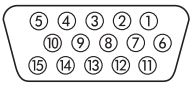
The ELSA graphics boards are 100% IBM VGA compatible and occupy memory and several I/O addresses accordingly. To ensure the proper functioning of your system, it is essential to make sure that the I/O and memory addresses occupied by the graphics board are not used by other hardware components

This affects the following addresses:I

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

Higher memory ranges (above 1 MB) will be allocated via the PCI BIOS interface. If you come across any address conflicts, try to modify the I/O address of the expansion board causing the conflict. The addresses of the ELSA graphics boards cannot be changed.

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 *WINNER 2000/Office* 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 S-Video Connector

Pin Assignment

Pin	Signal	Pin	Signal
1	GND, ground (Y)	2	GND, ground (C)
3	Y, intensity (luminance)	4	C, color (chrominance)

The VMI Bus

The VMI bus is a new interface standard defined by the VESA (Video Electronic Standards Association). This interface allows the following modules to be connected to the graphics board:

- MPEG (DVD drives)
- Video-phone
- TV tuner
- Digitizer

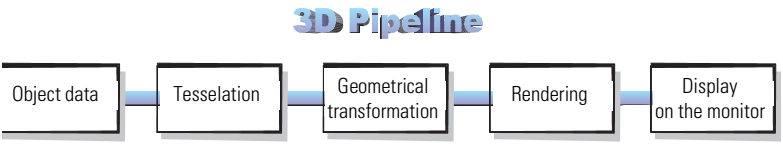
The VMI bus provides a direct, digital connection between the plug-on module and the graphics board.

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

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 *WINNER 2000/Office* 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).

Video Signal Formats

There are two common standards for the transmission of video signals: Composite video and S video. The IEEE 1394 format is currently supported only by Sony equipment.

The monitor and graphics board communicate on three color channels. The color information is split into three color signals for red, green and blue (RGB). Video information for a television, on the other hand, only makes a distinction between monochrome and color information (luminance and chrominance).

Composite Video

Composite video—also known as FBAS—packs the luminance and chrominance information in a single signal. In this way, all the information required for a video image can be transmitted over a single cable. This method is a great benefit for transmissions from a television transmitter. But this method also has clear disadvantages regarding signal quality: The nesting of luminescence (Y) and chrominance (C) is imprecise and leads to errors in the video image.

S-VHS

The solution to the disadvantages of composite video format is clear. S-VHS or Y/C offers the answer: the separation of the Y and C signals. The cost of having the second cable necessary to implement this is more than compensated for by the enhanced image quality. Video cameras that use the Hi-8 or SVHS-C method separate the Y and the C signals wile recording. When transferring the signal to a television or a video recorder, you should use the Hosiden connector or an S-VHS-compatible Scart cable, if possible.

IEEE 1394

This format—also known as FireWire—is a special case. It is the best solution in terms of quality, as it is a digital process. This development was a joint Apple and Sony initiative for transmitting digital video information. The video data are transmitted directly as they are produced, line by line. The throughput for IEEE 1394 is currently 100 Mbps. Transfer rates of 200 and 400 Mbps are already in sight.

Video Formats: Compressors At Work

Recording videos on your hard disk can quickly take up a great deal of its capacity. The amount of space required depends directly on the resolution and on the data format. The Video for Windows driver support the formats RGB16 and YVU9. Especially noteworthy is the video compression technique developed by ELSA.

RGB16

This data format works in RGB color space. 5 bits/pixel are required for each of the three color components red, green and blue, and another 1 bit/pixel is required for the filling. This means that a total of 16 bits/pixel, or 2 bytes/pixel, are required for storing one frame of video. The color resolution of RGB16 pictures is similar to RealColor under Windows. The advantage of RGB16 is that this format can be directly "understood" by Windows. The disadvantage is the large amount of storage space required. With a resolution of 320x240 pixels, a single picture takes up 150 kilobytes, and with a resolution of 640x480 pixels, four times the capacity, or 600 KB per image, is required.

YVU9

YVU9 requires less space with 9 bits/pixel. This format works in YVU color space and provides 256 gray shades per pixel in comparison with just 32 gray shades with RGB16. The compression of these files is achieved by reducing the color resolution. The human eye is more sensitive to differences in brightness than to differences in color, which means that the compressed YVU images are, qualitatively, no different to those which are not compressed. A YVU9 picture at 320x240 resolution takes up about 84 KB. A YVU9 picture with a resolution of 640x480 pixels requires four times the capacity, or 336 KB per image.

When processing YVU9 video you should use the 'MainActor' program. Other video processing programs frequently do not support this format.

ELSA Compression

The ELSA video compression technique reduces the data quantity even further. A special process stores just 3 to 5 bits per pixel. Like YVU9, the ELSA video compression works in YVU color space. The compression rate depends on the type of images being compressed. Images clean of interference can be better compressed than noisy ones. Large unchanging areas, uniform brightness and low color variation also enable a better compressed than with complex images. A frame with 320x240 pixels compressed with the ELSA technique takes up about 48 KB. A frame with 640x480 pixels generally reaches a higher rate of compression than with 320x240 pixels, and takes up approximately 120 KB.

Your computer carries out the ELSA video compression in real time while you record the video. Utilizing the ELSA compression presents you with several advantages:

- you can record videos at a higher frame rate,
- you can record videos in higher resolutions,
- the drop rate is lower, and
- you can record longer video sequences on hard disk than is possible without data compression.

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

After installing the drivers, my Windows 95 only displays 16 colors. I also get the error message 'No ELSA driver active'.

The driver is not installed correctly. This can have a number of causes. In addition to the installation notes in the 'README.TXT' file of the ELSA graphics driver, please check the following potential problems:

- No interrupt (IRQ) was assigned to the *WINNER 2000/Office*: To function correctly, the *WINNER 2000/Office* must have an interrupt. This must be assigned in the BIOS of the mainboard. This can be checked in the Device Manager under **Settings** ▶ **Control Panel** ▶ **System**. Click on 'Computer', then on 'Properties'. This window must contain the interrupt assignment of the graphics board—the interrupt must be reserved exclusively for the graphics board. If this is not the case, check the docu-

mentation of your mainboard for information on assigning an interrupt to the graphics board. An update of the mainboard BIOS may also be necessary.

- Computer type: The *WINNER 2000/Office* is designed for computers with Pentium or Pentium-compatible processors. It is not suitable for computer systems based on i486 or compatible processors.
- Old drivers and tools are still installed or the installation was not reset to VGA: Uninstall all of the tools and drivers for your old graphics board before removing it (e.g. under **Settings ▶ Control Panel ▶ Add/Remove Programs**). Next, install the 'Standard VGA Driver' or 'PCI-Compatible Graphics Board'.
- Mainboards with new chipsets: Newer mainboards (e.g. Intel TX) often come with a diskette or CD with a patch for Windows 95. This patch must be installed to ensure that all hardware components, such as other PCI devices or special mainboard system components are correctly recognized. The failure to install this patch can lead to massive difficulties with the installation.
- DirectX 5 is not installed: The DirectX 5 software interface must be added to Windows 95 to ensure that all applications can interact closely with the hardware of the graphics board. This can be accomplished by running DXSETUP.EXE, which you can find under \ELSAWARE\DIRECTX5\DIRECTX\ on your *WINNERware CD*. DirectX 5 must be on your system before installing the graphics drivers.

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.

Video Function Problems

Video-In: The video preview window for my application is black

Check which video input connector your video source device is connected to. Then check in 'Video Capture Properties' that the setting for 'Connector' is for the correct input.

General Questions and Answers

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

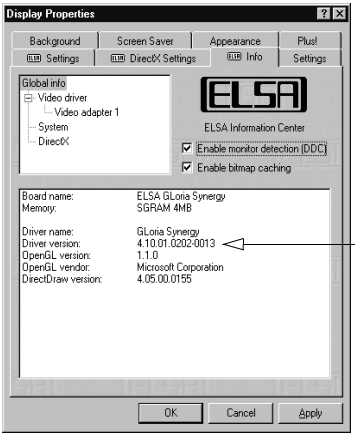
On the WINNERware CD you will find a list of the questions most frequently asked of the support hotline. In many cases you will quickly find a help for solving problems. The file can be read with the Acrobat Reader which is also included on the CD.

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	+49-241-606-6131	
	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

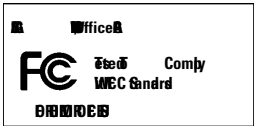
The latest versions of the ELSA drivers are always available for download from our Internet WWW site www.elsa.com or our LocalWeb and via direct FTP from ftp.elsa.com. You will also find lots of information and answers to frequently asked questions (FAQs). You might also consider the newsgroups on our 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



Compliance Information Statement
(Declaration of Conformity Procedure)

Responsible Party:	ELSA Inc.
Address	2 Calle De Ina Santa Clara,CA S
Phone:	0
Type of Equipment:	Graphics Card
Model Name:	WINNER Office

This device complies with Part 5 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 found

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

Achen, April 2nd 0

Peter Pedra
Director Quality Management
ELSA 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).
- **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 HiColor. 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 sev-

eral 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** – See "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.
- **HiColor** – 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.
- **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.
- **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 give the observer a highly space-conscious impression of a 3D scene by using a stereoscopic LCD projection.
- **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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