
User Manual

SPEA FIRE GL

High-Performance 3D CAD/VR Graphics Board



Part Number 1740 3050

Rel. 0795.1

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FCC Compliance

This board has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in residential installation. This device generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

Installing the Software from the SPEA Media Gallery CD

You have received the SPEA software on CD. It is also possible that your package also includes 3.5" diskettes. This manual describes the installation from the Media Gallery CD as this is the most common method. If you intend to install from the diskettes, please take note of the README files on these disks and the starting instructions on the diskette labels.

Important Note

You **must imperatively** read the README file on the Media Gallery CD and all the documentation supplied with your graphics board **before** installing it! If you fail to do so SPEA can not accept any responsibility for claims that may be caused as a consequence.

To see the README file, put the CD in your drive and change to the ...\\SPEA\\INSTALL\\FIREGL directory. Then type:

```
SHOW README.ENG
```

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General Information

Guide to this Manual

This manual is structured in the following way:

Introduction

Describes the basic characteristics of the board

Hardware Installation

The detailed instructions for installation of the hardware

Software Installation

Covers the installation of the software provided with the board

Appendices

These contain other information you should review (technical data, troubleshooting, connector pin-outs, utility software etc.)

Index

To enable you to locate topics in this manual quickly

Symbols and Conventions

The following symbols and syntax conventions are used in this manual:

Warnings are headed as such and are emphasized by the following pictogram in the left margin (printed manual only!):



Screen messages are indicated by *courier* type.

DOS commands to be entered are written in capital letters, example:

```
E:  
SPEA
```

DOS commands must be confirmed with the ENTER (RETURN) key unless otherwise stated.

Important notes are headed as such and are emphasized by the following pictogram in the left margin (printed manual only!):



Directory names mentioned in this manual are examples and are written in capital letters, e.g. C:\SPEA\GDC.

This manual refers to your CD-ROM drive as E:. If your drive has a different name please use this accordingly (e.g. D:).

Cross references to other parts of the manual are shown in *italic* type.

Useful tips are headed as such and are emphasized by the following pictogram in the left margin (printed manual only!):



Delivery Scope Checklist

Your SPEA product package should contain the following items:

- SPEA FIRE GL graphics board
- Media Gallery CD containing all the software
- This manual

SPEA Media Gallery CD

The SPEA software is supplied on the Media Gallery. The current software is also available from the SPEA Bulletin Board (SPEA Mailbox) service and via CompuServe. The latest versions of this software can be downloaded from these sources around the clock or obtained from future editions of the Media Gallery CD.

Last-Minute Changes - README file

Our software is constantly being improved and updated. This means that it may not have been possible to document the most current software changes. The latest information is contained in a file README.

The README file appears on the screen automatically at the end of the software installation. You can also read this file at any time from your hard disk (after the installation) with the command:

```
SHOW README
```

or from your CD with:

```
E:\SPEA\INSTALL\FIREGL  
SHOW README.ENG
```

Warranty

You have a 3 year warranty for your SPEA graphics card. To ensure your warranty, it is necessary that you keep the invoice of the graphics card. If your graphics card is damaged, contact your local retailer first.

Your board is a complex electronic device and can only be repaired by authorized technical personnel with the required equipment. Do **not** attempt to change or repair any parts of this product. Doing so will render your warranty invalid.

Support

The following support services are offered by SPEA Software AG:

- Technical support (telephone, SPEA ExpertLine)
- Online information and software updates per modem (SPEA Mailbox, CompuServe, Internet)
- Software updates via the SPEA Media Gallery CD

Further information concerning these support services can be found in the 'SPEA ExpertLine section at the end of this manual.

Company Address

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D-82319 Starnberg

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Introduction

Board Features

Your SPEA board is a high-end, dual processor, VGA compatible PCI bus graphics accelerator specially designed to speed up 3D applications (such as CAD and Virtual Reality) running in graphics-intensive environments such as Windows, Windows NT and Windows® 95. It produces workstation class performance on a PC.

The hardware incorporates 2 graphic chips for 3D and 2D acceleration respectively.

3D Accelerator:

- 3Dlabs GLINT 300SX 3D rendering processor
- 64 bit hyper-pipelined architecture
- 2.5 Giga operations/sec.
- 300,000 Gouraud shaded, 24 bit, anti-aliased, depth-buffered 3D triangles/sec.
- Fast display memory access and Z buffer
- Anti-aliasing for high-quality images
- High functionality due to double buffering and overlays
- Accelerates OpenGL, HOOPS, SP3D and other 3D API's
- 8 MB DRAM local memory - extendable up to 12 MB
- Hardware-supported point, line, rectangle and polygon drawing
- Vertex level interface, avoids the host overhead found in scan-line interfaces
- On-chip S3-compatible shared framebuffer interface making the 300SX ideal for use with the Vision968

2D Accelerator:

- 64 bit S3 Vision968 graphics accelerator chip
- 220 MHz pixel clock
- 8 MB fast access video memory (VRAM)
- Accelerates multimedia applications due to incorporated S3 multimedia extensions
- Accelerated bitBLT, line drawing, fills, text and window clipping
- Integrated video acceleration

Other features:

- Power management (DPMS) support to reduce power consumption
- Third party applications support based on SP3D
- 100% OpenGL compatible

Software for your Board

Various software drivers for standard applications as well as useful utilities are supplied with your board. Additional software (drivers for specific applications) are also available, but not a part of the standard delivery scope.

Standard Software Delivery

- Intuitive menu-guided installation program
- SPEA BigWin enhanced accelerator driver for Windows 3.x
- SPEA Windows tools (DPMS, virtual screen)
- SPEA BigWinNT enhanced accelerator driver for Windows NT
- SPEA BigBlue driver for OS/2
- SPEA utilities (e.g. configuration programs)
- 3D driver software for the following applications:
 - AutoCAD 13 (DOS and Windows)

Optional Software

This software is available via SPEA's Mailbox (and partially via CompuServe):

- S3 AutoCAD 12 driver
- S3 3D-Studio driver
- OpenGL driver

Check the current contents lists in the Mailbox and CompuServe to see if other drivers are available (drivers from chip manufacturers will be made available on release).

3D API Support

SP3D, OpenGL and 3DR

The SPEA FIRE GL is well equipped to handle complex and time-consuming 3D rendering processes which are becoming increasingly important in modern CAD and virtual reality application fields.

The SPEA FIRE GL supports the leading programming interfaces such as SP3D, Intel's 3DR, Microsoft's DDDI, Criterion Renderware and Rendermorphics Reality Lab.

Hardware Installation

Notes and Warnings

Requirements

1. IBM-compatible PC (80486, Pentium®) PCI version 2.0 (or higher) bus system
2. Multisync monitor
3. One free PCI expansion slot
4. MS-DOS 6.2 or higher, Windows 3.1x, Windows NT or Windows® 95 operating system
5. Screwdriver

Warning about Static Electricity

Static charges *can* cause severe damage to microcircuits. Undertake the following steps to make sure that your valuable hardware is sufficiently protected:

- Hold the SPEA card on its edges only. Don't touch edge connectors or exposed circuitry.
- Leave the SPEA card in the anti-static protective bag until ready to install it in your computer.
- If possible, ground your body when handling the SPEA card. The metal power supply housing is generally considered the best place to ground yourself.
- Do not place the SPEA card on a metal surface.
- Make the least possible movement to avoid building up static electricity from your clothing, carpets and furniture.

Monitor Compatibility

The boards of the SPEA series offer high performance in resolutions, refresh rates and colors. Especially the ergonomic SPEA refresh rates up to 100 Hz give absolutely flicker free performance. The SPEA boards are optimally configured to be combined with the SPEA MultiSync monitors.

Of course SPEA boards can also be connected to other VGA or high resolution MultiSync monitors. Please be aware of the fact, that you can only get use of the full power of the graphics board if the horizontal (kHz) and vertical (Hz) refresh rates of your monitor are as high as required by the graphics board.

Example: The technical specifications of a multisync monitor could be as follows: max. resolution 1280 x 1024; max. horizontal frequency 50 kHz; max. vertical frequency (refresh rate) 90 Hz.

If you wish to use one of the video modes listed in the file BIOS.TXT included with this product, then all three of the above mentioned parameters may not exceed the specifications of this monitor.

In our example, the mode 1024 x 768 with a horizontal frequency of 48.5 kHz and a refresh rate of 60 Hz may be selected, whereas the next higher refresh rate of 70 Hz (at the same resolution) is not possible, as the required horizontal frequency is 56.5 kHz in this case, which exceeds the specifications of the monitor.

**Warning:**

If you permanently use your monitor with frequencies that are too high you may damage the monitor. Therefore before you start to change the refresh rate with programs described in this manual (e.g. SPTUNE, V7SETUP), have a look in your monitor manual about its technical data (horizontal and vertical refresh rate, possible resolutions).

If your monitor operates in either digital or analog modes, set it to analog mode. You may need a new cable or a 9- to 15-pin cable adapter to use this mode.

Check your monitor owner's manual for further information.

Possible Conflicts with COM 4

**Note:**

If you are using COM 4, e.g. for a **modem** or another peripheral device, then note that your SPEA graphics board uses the same I/O address, namely 02E8 hex.

For this reason it is **vital** that you reconfigure the other device to another port. Failing to do so will cause an address conflict and problems with both devices up to a system crash.

Typical PC Platform

A typical PC platform for your board could be:

- Colani Tower 500 ZE-90, PCI bus, 90 MHz, 16 MB (AutoCAD users: 16MB minimum)
- SPEA 2085 MS Monitor

Using more than one Board

Some of the features of some SPEA drivers (e.g. BigFocus) can only be used with board combinations.

SPEA offers the package 'SPEA DoubleScreen DOS FIRE GL' which enables the use of a SPEA FIRE GL with a V7-MIRAGE P-64. If you are interested in using this combination please contact your distributor for more information.

Preparing your Computer



Note:

Please note, that the applications you want to install SPEA drivers for have to be already completely installed (for Standard VGA (640 x 480, 16 colors) on your system prior to using the SPEA software. It is a good idea to do this before removing an existing graphics adapter as not every application permits the configuration of the video mode used from the DOS plane.

Changing your PC's BIOS

If a board other than a VGA board was previously installed, it is necessary to change the PC's hardware configuration. This is sometimes done by changing a jumper on the motherboard after removing the old board (check your motherboard or PC manual) although it more common to change your PC's BIOS SETUP.

Exception:

If you have a system with a EGA/VGA display adapter built onto the motherboard. In this case, the on-board EGA/VGA display adapter must be disabled before installing the SPEA card.

Please check your PC manual to find the location of the corresponding switch.



Warning:

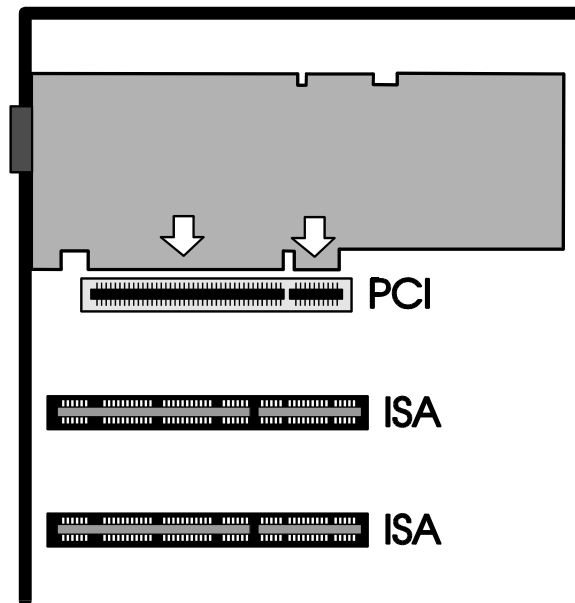
Simultaneously using two active VGA/EGA units in one PC will inevitably lead to system failure!

If your system doesn't have to be re-jumpered for a VGA board then first proceed with the following installation steps and then run your BIOS SETUP program and select 'VGA' (else 'IBM VGA') as your graphics board type. Check your PC manual for information on its BIOS SETUP.

Installing the Board

The SPEA board is simply installed in a PCI expansion slot:

1. Switch off your computer and all external options (printer, display, and others) and unplug all power cords from the electrical source.
2. Remove the cover mounting screws and save them for later.
3. Remove the cover of the computer.
4. Select a free PCI expansion slot and remove its metal slot cover. Save the screw to secure the graphics card later.
5. Hold the card by the edges and press it firmly into the expansion slot.



Installation in a PCI expansion slot

6. Align the slot in the mounting bracket of the SPEA card with the screw hole in the rear panel of the computer case. Use the screw you removed from the expansion slot cover or the previously installed video adapter to secure the SPEA card in place.
7. Secure ribbon cables and gently push them down and out of the way before you replace the system cover.
8. Replace the computer cover. Secure it with the screws you removed earlier.
9. Reconnect any peripheral equipment cables you may have disconnected.
10. Securely attach your monitor cable to the 15-pin VGA output connector on the board. The other end is hooked up to the monitor as described in the manual of the monitor manufacturer.

Additional Instructions

Please switch on your monitor before you switch on your computer. Doing it the other way around could damage your monitor.

The SPEA board has been designed to 'plug & play' without any modifications being made to the default switch or jumper settings. If however, it appears that the card is not performing optimally, you can change the settings. Refer to *Appendix B: Technical Details* for more information.

Note that your monitor is running in standard modes and that higher refresh rates etc. are not available at this stage of the installation! It is necessary to run the programs SPTUNE.EXE (for DOS applications) and V7SETUP.EXE (for Windows) in order to optimize the board's output signals for use with specific monitors. These programs are described further on in this manual.

Hardware Compatibility: the PCI Bus and the Graphics Board

The functionality of a graphics system depends mainly on two components: the graphics board and the motherboard.

If the design of either the bus or the PCI mainboard is not compliant with the approved PCI specifications you may experience problems with the graphics board.

SPEA has successfully tested the SPEA graphics boards in PCI bus mainboards with a clock rate of 90 Mhz.

After Installing the SPEA Board

If you have correctly installed the SPEA board, the DOS prompt will appear on your monitor when the boot procedure is finished.

If your system does NOT boot it should, check again to see that the installation instructions were properly followed, or refer to *Appendix C (Troubleshooting)*.

Software Installation and Configuration

Basic Software Installation

Preparation

Please note, that the applications you want to install SPEA drivers for have to be already completely installed (for Standard VGA - 640 x 480, 16 colors) on your system prior to using the SPEA software. It is a good idea to do this before removing an existing graphics adapter as not every application permits the configuration of the video mode used from the DOS plane.

Our software is constantly being improved and updated. This means that it may not have been possible to document the most current changes in this manual. The latest information is contained in a file named README.

Please check the exact directory names and paths of your applications, as you will be asked for these during the software installation of the SPEA drivers.

Basic Software Installation

1. Put the Media Gallery CD in drive E: and start the installation (from E:) as follows:

DOS:

call SPEAINST.BAT from the DOS prompt

Windows 3.x:

call SPEAINST.BAT from the DOS prompt

Windows NT / Windows® 95

open a DOS box and enter SPEAINST.BAT

OS/2:

open an OS/2 window, change to drive E: and then call SPEAOS2.CMD

2. Choose `English (E)` as your language for the installation.
3. Follow the instructions on the screen. After confirming your board type you will be presented a menu for selecting the desired software applications.
4. Select the option `'Utilities'`.
5. Press the ENTER key. You will be asked about the disk drive and directory names where the SPEA software should be copied.
6. Enter the disk drive and directory names and follow the instructions on the screen. All files are copied into the defined directories automatically now.
7. A README file appears on the screen during the installation. Take the time to read this file!
8. Follow the instructions through to the end.

**Note:**

Most applications require you to reconfigure them to use your SPEA graphics board. Please refer to the sections of the relevant software application to complete your installation correctly.

Before you start to configure the software applications, you may wish to change the monitor settings, resolutions or number of colors used. This is handled by the program SPTUNE.EXE for DOS applications and V7SETUP.EXE (within Windows) for Windows applications.

Software Driver Installation

Windows 3.1x (BigWin Driver)

If Windows is not installed on your system yet, install it for standard VGA with the user defined setup (from the DOS command prompt) before continuing.

Note:

You must have already installed the basic software from the CD before continuing.

1. Put your Media Gallery CD in drive E:
2. Change to this drive and type:
SPEAINST.BAT
from the DOS command prompt.
3. If not already marked, select your board in the list which appears.
4. Click on the `Installation` button (on the right).
5. Confirm your board again.
6. Select the Windows driver option shown.
7. Accept the name `CONTINUE.BAT` for the batch file as proposed.
8. End the primary installation and change to the root of your hard disk.
9. Type `CONTINUE.BAT`. Windows and the installation program `V7SETUP` are automatically started.
10. Select a monitor and screen video mode and when finished, click on `OK`.
11. Restart Windows as suggested in the next dialogue box. This ends the installation.

You can reconfigure your graphics display from now on using the SPEA `V7SETUP` menu and various Windows tools.

SPEA V7SETUP

SPEA V7SETUP is a program with various options to set the monitor used, resolution, colors, refresh rates etc. for **Windows applications** (the monitor settings used for DOS applications are made using the program SPTUNE - see Index).

To use V7SETUP simply doubleclick on the SPEA V7 icon. The dialog box then will then appear. Configure your system keeping the specifications of your monitor in mind.



Warning:

You can damage your monitor if you select a refresh rate that is too high for it! Read your monitor manual refresh rate information.

Any changes made via SPEA V7SETUP are only activated after Windows has been restarted.

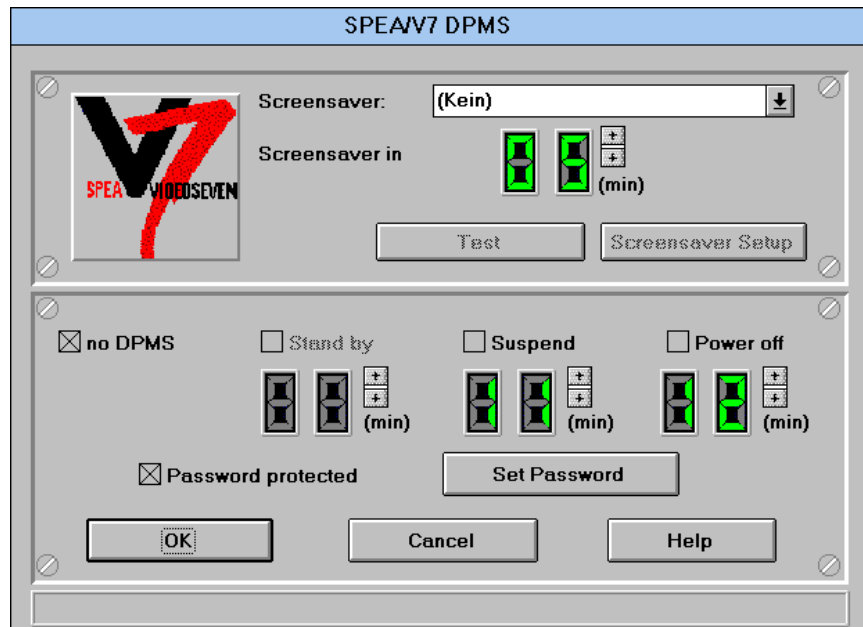
The test button is only active for the current mode. If you change the settings it will be deactivated. Restart Windows with the new settings and call SPEA V7SETUP again, the button will be active again.

SPEA WinTools

SPEA offers its customers various tools which can be used to simplify or enhance the use of Windows.

SPEAenergy (DPMS)

SPEAenergy is a power management utility (DPMS) for Windows. DPMS is a specification set by VESA which defines modes for reducing the power consumption of monitors and video devices.



You can use SPEAenergy to reduce power consumption by defining timeout values, e.g. for the deactivation of certain circuit elements which reduce the power consumption level in stages (e.g. from 120 W to 100 W to 30 W to 5W). Via a dialog box you can activate 4 different DPMS modes. These are: ON, STAND-BY, SUSPEND and OFF.



Note:

You must have a monitor that supports DPMS.

SPEAenergy is automatically installed with V7SETUP (i.e. you will find the SPEAenergy icon in the SPEA Program group that is created).

Using SPEAenergy

Start SPEAenergy by double clicking on the SPEAenergy icon. A self-explanatory dialog box appears for defining your settings. If you need help, consult the online help integrated in this program.

If you want to finish SPEAenergy you have to close the SPEAenergy icon that is displayed at the bottom of your desktop.

SPEAview

SPEAview is a SPEA utility for Windows which can be used to setup the graphics display mode for Windows applications. The program is automatically installed in connection with V7SETUP. You will find its icon in the SPEA program group.

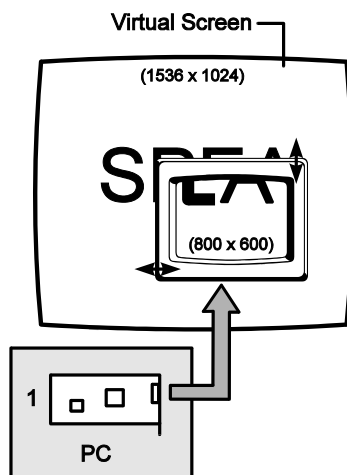
To start the program simply double click on the SPEAview icon.

Using SPEAview



With SPEAview you can:

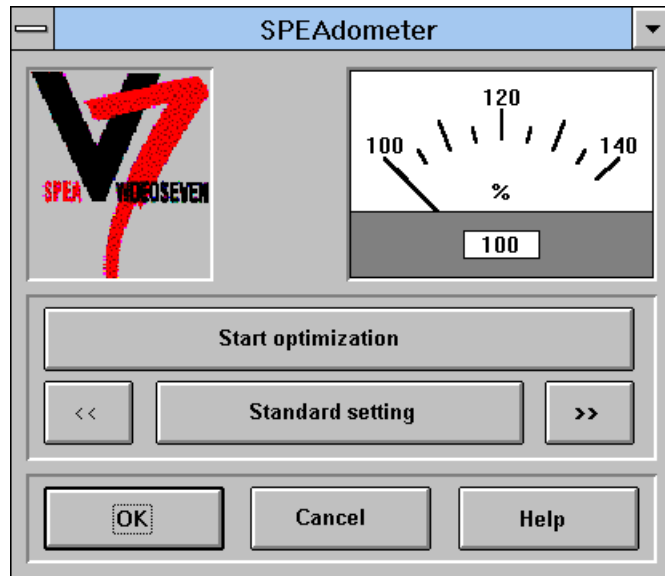
- change the resolution without leaving Windows (Set button)
- assign various resolution and number of colors to different Windows applications (Set button)
- use the *Virtual* button to activate the virtual screen option. When activated, the visible section can be changed by moving the mouse cursor to one of the edges of the monitor display.
- use the *Camera* button (Bird's eye) to see or control which part of the active image you have displayed on the screen when working with the Virtual Screen feature.
- define which of the offered features you want to display in the menu bar of SPEAview and where the menu bar should appear when the program is activated (with the *Set* button in the menu bar).
- use the ? button to call online help about the program.



SPEAdometer (board refresh rate tuning)

SPEAdometer is used to increase the refresh rate of your board under Windows within safe limits. Performance boosts up to 60% are possible with SPEAdometer.

The menu is self-explanatory but if you should need further information consult the integrated online help.



SPEA MediaStation

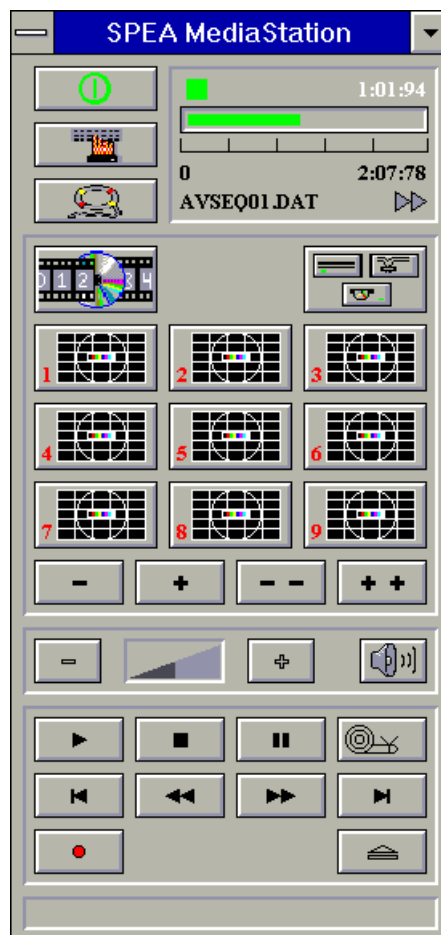
MediaStation is SPEA's easy-to-use control software to playback MPEG 1 (*.MPG), *.VPG, *.AVI and VideoCD *.DAT files under Windows.

The TV's remote control can be used to select and playback files or films (e.g. VideoCDs), program and save film sequences, modify the volume, colours and display size.

When you click on the MediaStation icon in the SPEA program group, the remote control appears on the screen. Click on the power button on the top left side of the remote control to switch on the TV window on the screen.

The functions on the remote control correspond to the ones of a real TV's remote control.

If you click on the two arrows a track bar will be added to the right side of the remote control. This track bar contains a slider to move quickly within a video and a display area for time or frames.



Via MediaStation's online help you can obtain additional information about all the buttons and dialogue boxes of MediaStation. Just click on the 'lifebelt' on the remote control. If you have problems playing back files please refer to the Troubleshooting section at the end of this manual.

Important Notes:

1. You can playback Video CD's labelled with 'Video CD' and CD-I's. But please make sure that your CD-ROM drive supports the format you want to playback.
2. Handle Video CDs with great care. Due to the nature of the data they contain, they are much more sensitive to surface damage than ordinary music CDs.
3. Standard MPEG 1 and AVI files can be played back with MediaStation, however, check your README file for information on the current support status!
4. You **must** be using either a HighColor (65.536 colors) or TrueColor (16.7 million colors) mode to playback MPEG and AVI files. To make sure this is the case, click on the V7SETUP icon in the SPEA group and select an according mode.

We've kept the following descriptions very brief as we intend to integrate multimedia features as they come onto the market. Check your README file and the MediaStation online help for the latest information on file playback and recording.

Using the MediaStation Remote Control

Note that the function of a button on the control is displayed in the lower bar of the control when the cursor is positioned over it. If you're unsure about the exact function consult the online help.

Playback Speed & Volume

The playback volume is primarily controlled by the Media Player program (MPLAYER.EXE) supplied with Windows.

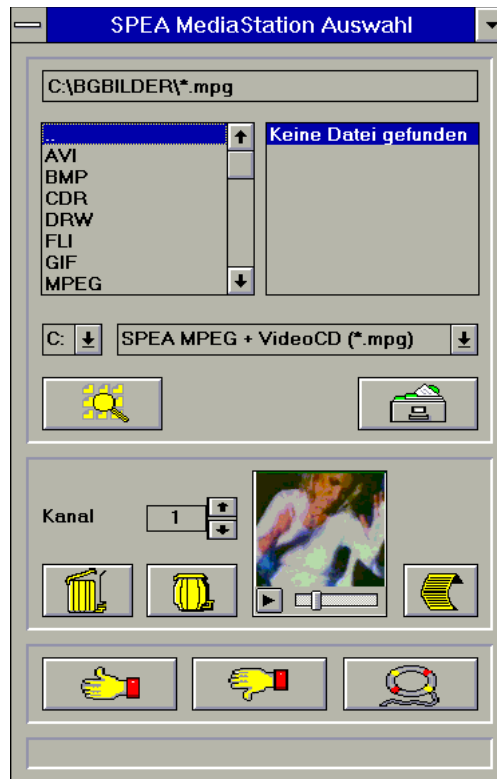


If you turn the volume off here, then the remote control volume will have no effect! If you are using a sound board which has a separate volume control, make sure that this is not muted or turned down! If it is, the MediaStation will not playback with sound. To change the Media Player settings it is necessary to close the MediaStation remote control first!

The speed of film files is fixed and can only be reduced to step mode (the snail button on the control). Changes to the Windows Media Player have no effect.

MPEG / AVI / VideoCD Playback

1. Open the MediaStation remote control
2. Click the right mouse button over a channel on the remote control. The file selection box appears:



3. Select a channel number, then drive, directory and file type before picking a file
4. Click on the 'Thumbs-up' (OK) button. The selected file is transferred to the selected remote control channel (e.g. 1)
5. Click on the respective channel button on the remote control to open the TV and prepare the film
6. Click on the Play button of the remote control

Tips:

To shortcut the playback procedure, doubleclick on the file in the selection box. It is then played back *without* being saved to the selected remote control channel. The file is only transferred to a channel when you confirm with the OK button.

To see a preview of the film, pick a file with a single click of the right mouse button. A miniature film preview is then loaded which can be played back with the play button under the image.

You can drag & drop a file from the file selection box to a channel of the remote control using the left mouse button!

Single Frame Capture (all formats)

It is possible to capture a single frame of an AVI, MPEG or other playable file in two ways:

With SPEA's MediaStation

Requirement: Video In is active on the TV window.

1. Click on the Pause button when the frame you want to capture appears on the TV.

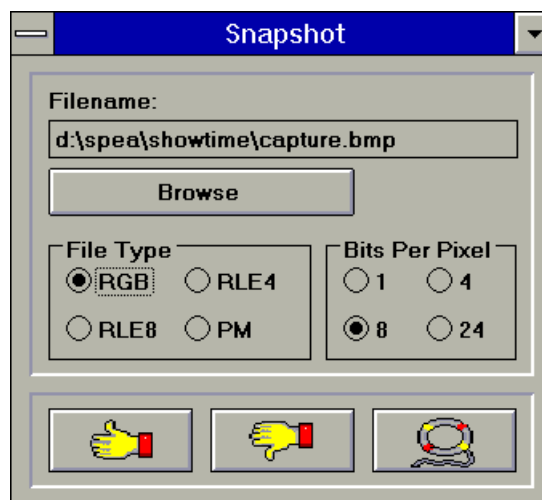
With the << and >> buttons or via the track bar you can exactly select the desired frame.

2. As soon as you the frame is shown click on the Record button.

Note:

Instead of clicking onto the Pause button and then on the Record button you can also click with the right mouse button ONTO the active TV, the result is the same.

The following dialogue box appears where you can define the snapshots. More information you'll find in the online help of the dialogue box.



3. As soon as you click on the OK button a snapshot will be saved as BMP file.

You can edit this Bitmap file in programs like e.g. Paintbrush.

With a Windows Hotkey function

1. Start the playback of the file you want to capture a frame of
2. Pause or stop the playback when you reach the frame you need
3. Click on the MediaStation TV window frame
4. Hit the combination ALT + Print

The window is then captured into the Windows Clipboard. Using Paintbrush (for example) you can then edit the picture and if necessary remove the border of the captured image that looks like a TV frame.

Windows NT (BigWinNT Driver)

If Windows NT is not installed on your system yet, install it for standard VGA with the user defined setup (from the DOS command prompt) before continuing.

Refer to the Windows NT documentation to determine what shutdown or log-off procedures, if any, should be performed before continuing with this installation.

Note:

You must have already installed the basic software from the CD before continuing.

1. Put your Media Gallery CD in drive E:
2. Start Windows NT and login as administrator.
3. Open a DOS box, change to the CD drive and type:
SPEAINST.BAT
4. If not already marked, select your board in the list which appears.
5. Click on the `Installation` button (on the right).
6. Confirm your board again.
7. Select the Windows NT driver option shown.
8. Read the README file automatically shown.
9. End the primary installation and close the DOS box.
10. Select the Windows NT options `File` and then `Run`.
11. Start the installation program from the CD by selecting the file
E:\SPEA\INSTALL\NT\V7SETNT.EXE
12. In the V7SETNT menu, select a monitor and screen video mode and when finished, click on OK.
13. Restart Windows NT as suggested in the next dialogue box.
This ends the installation.

You can reconfigure your graphics display from now on using the SPEA V7SETNT menu and various Windows tools.

Windows® 95 (BigWin95 Driver)

If Windows® 95 is not installed on your system yet, install it for standard VGA before continuing.

Note:

You must have already installed the basic software from the CD before continuing.

1. Put your Media Gallery CD in drive E:
2. Open a DOS box, change to the CD drive and type:
SPEAINST.BAT
3. If not already marked, select your board in the list which appears.
4. Click on the `Installation` button (on the right).
5. Confirm your board again.
6. Select the Windows® 95 driver option shown.
7. Read the README file automatically shown.
8. End the primary installation and close the DOS box.
9. Select the Windows® 95 options `Start` and then `Run`.
10. Select the program `V7SETUP` from the CD. It is located in the following directory: `E:\SPEA\INSTALL\FIREGLV7SETUP.EXE`
11. Select a monitor and screen video mode and when finished, click on `OK`.
12. Restart Windows® 95 as suggested in the next dialogue box. This ends the installation.

You can reconfigure your graphics display from now on using the `SPEA V7SETUP` menu and various Windows tools.

AutoCAD DOS & Windows (SPEA BigFocus)

SPEA's BigFocus driver is supplied for use with AutoCAD 13 running under DOS or Windows. The driver includes all the 3D viewer functionality contained in the 3D-World and 3D-Win packages normally retailed as separate add-on products (e.g. performance boost, button-click fast rendering, view and layer manipulation, spyglass lense, bird's-eye view, view export and various animation possibilities). Check the BIGFOCUS.ENG file installed in your SPEA directory after the software driver installation for the latest information on driver features.

The main menu (DOS) and SPEA toolbar (Windows) are self-explanatory but if you should need further information consult the integrated online help.

BigFocus DOS Installation

Note:

You must have already installed the basic software from the CD before continuing.

1. Put your Media Gallery CD in drive E:
2. Change to the CD drive and type:
SPEAINST.BAT
3. If not already marked, select your board in the list which appears.
4. Click on the `Installation` button (on the right).
5. Confirm your board again.
6. Select the BigFocus driver for your version of AutoCAD from the list shown.
7. This ends the primary installation.

Reconfiguring AutoCAD DOS for BigFocus:

8. Start AutoCAD with the `-r` parameter and select the menu item `'Configure video display'`.
9. You will be asked whether you wish to change the current configuration. Confirm this.
10. Select the BigFocus driver from the list that is shown.
11. Save your changes.

BigFocus Windows Installation

Note:

You must have already installed the basic software from the CD before continuing.

1. Put your Media Gallery CD in drive E:
2. On the DOS prompt, change to the CD drive and type:
SPEAINST.BAT
3. If not already marked, select your board in the list which appears.
4. Click on the `Installation` button (on the right).
5. Confirm your board again.
6. Select the BigFocus driver for AutoCAD for Windows from the list shown.
7. Accept the name `CONTINUE.BAT` for the batch file as proposed.
8. End the primary installation and change to the root of your hard disk.
9. Type `CONTINUE.BAT`. The Windows and the installation program `SETUP.EXE` are automatically started.
10. Follow the instructions on the screen. The installation routine will decompress and copy various files onto your harddisk.
11. An important file will also be created on your hard disk:
`DSBIGFOC.INI`
`DSBIGFOC.INI` contains an important entry that you may need to change to accommodate for your hardware (see 'GDIBypass' in the online help).

Reconfiguring AutoCAD for Windows to use BigFocus:

12. Start `ACADWIN`, Select "Options", "Configure", and when selecting the display driver choose:
`SPEA BigFocus - Accelerated Display Driver - by SPEA AG.`
13. Save your changes.

OS/2 2.1x & 3.0 (SPEA BigBlue)

Installation Requirements

OS/2 has to be installed for the standard VGA driver for both the OS/2 environment and Windows-OS/2 sessions.

Note:

You must have already installed the basic software from the CD before continuing.

Features of the Driver

This driver supports 256 color modes in the OS/2 Workplace shell.

The BigWin driver can be installed in the Windows Session in all available resolutions and also with color depth higher than 256 colors.

Also if the BigWin is configured in another resolution than the OS/2 environment it is possible to switch between both desktops without any problems.

Installation

1. Start OS/2.
2. Put the Media Gallery CD in your CD drive.
3. Open an OS/2 window.
4. Change to the CD drive.
5. Enter at the prompt:
SPEAOS2
6. Select `English (E)` as your language.
7. Select the option '`Drivers and utilities for SPEA Software products`'.
8. In the following lists confirm your board type.
9. Select the OS/2 driver listed.
10. Accept the name `CONTINUE.CMD` as proposed.
11. Follow the instructions on the screen.
12. The program `CONTINUE.CMD` starts the program `V7SETOS2`, which is very similar to the Windows configuration program `V7SETUP`. The menu is self-explanatory. If you have any doubts about the function of any of the menu options, consult the integrated online help.

Installation of the BigWin Drivers

If the OS/2 drivers have been installed as described in the previous chapter the Windows Session will start with the same resolution as OS/2.

Use `V7SETOS2` to change the resolution or refresh rate.

Note:

The virtual screen program '`SPEAview`' will not work on an OS/2 system. The same applies to '`SPEAdometer`'.

Appendix A - Utilities

Tuning Utilities

SPEAtune - Monitor/Graphics Board Tuning

If you use a SPEA graphics board and you do not have a SPEA monitor, you can use SPEAtune to test the display on your multiscan monitor to save up to 6 optimized monitor settings (if your monitor does not offer this facility).



SPEAtune is not needed if you are using a SPEA multiscan monitor as these devices are already optimized (tuned) for harmonized use with a SPEA graphics board and therefore already give the best performance possible.

What can you use SPEAtune for?

SPEAtune enables you to match the maximum screen refresh rate (vertical frequency) of your monitor. You can test the different values (Hz) with a test image to find the best results before saving one value.

You can test and save one monitor frequency value (x kHz horizontal frequency, x Hz vertical frequency) for each video mode the graphics board supports. For example:

79.1 kHz (horizontal) / 74 Hz (vertical) for 1280 x 1024 x 256

80.8 kHz (horizontal) / 100 Hz (vertical) for 1024 x 768 x 256

Using SPEAtune

Start SPEAtune **from the DOS prompt** and the directory C:\SPEA\GDC with the following call:

```
SPTUNE
```

The program is menu driven and self-explanatory. Use the help button to receive online help for all menu options.

Adjusting the monitor frequency - monitor frequency setup

Select a vertical refresh rate your monitor is capable of (Monitors)

Use the option `Test image` to check the display quality of various test images and resolutions with the chosen refresh rate.

Save the new setting and exit the monitor frequency setup.

Image tuning - Tuning Setup



This menu item is only necessary if your monitor is not able to store various display settings with different resolutions.

You may want to modify some of the parameters that define the display of your monitor (e.g. change sync polarity) or change the display position or increase or decrease the display size. These changes can be done in the Tuning Setup menu.

Start the Tuning Setup. Select a refresh rate and the number of colors. The optimal refresh rate is selected automatically (shown in yellow), it depends on the monitor frequency you selected in the monitor frequency setup.

Start the Tuning image via the tuning button. Modify some parameter - if necessary - (e.g. change sync polarity, change display position). Save the

new setting by exiting the tuning image via the RETURN key. If you have modified the parameter and saved the new setting this entry appears at the end of the list in yellow with the remark `user`.

You can store a maximum of 6 user-defined settings.

Proceed as shown above for all resolutions and number of colors you want to work with and exit the Tuning Setup afterwards via the `Save` button to save all modifications.

If you change the monitor

Please note that you have to readjust the vertical refresh rate (via the menu `Monitors`) in case you change your monitor.



Warning

If you permanently activate your monitor with a refresh rate that is too high for your monitor, you may damage it! If you are not sure about the monitor frequencies your monitor supports, inform yourself about the resolution and refresh capabilities in your monitor manual.

The vertical refresh rates are automatically assigned to the chosen monitor frequencies (see also VGA table in the file BIOS.TXT on the Media Gallery CD or in your SPEA directory).



If you have stored user defined settings with a former monitor these user defined settings remain even if you change the monitor.

The current version of SPEAtune does not allow the user to simultaneously reset all the settings made.

Delete obsolete settings as follows:

1. activate the Tuning Setup after you have changed the monitor frequency.
2. search the user defined setting and activate the frequencies list.
3. click to the lowest possible frequency in the active list, start the tuning image and save the tuning image without any changes by the RETURN key.

The user defined setting is now deleted and the optimal refresh rate for your monitor is selected (in yellow).

Note that SPTUNE can only be started and changes made if the following call is in your AUTOEXEC.BAT: `'V7HFREQ t'`. This is normally automatically included during the software installation.

Configuration Utilities

VESA Modes

VESA support is provided in the on-board BIOS. Applications and games can be executed without any further steps.

V7HFREQ - Higher Refresh Rates under DOS

The utility V7HFREQ.COM allows you to set higher refresh rates than 60Hz under DOS. If you selected the utilities option during the software installation, you will find the program in your SPEA\GDC directory.

Start the program from this directory with the call:

V7HFREQ ?

You will be shown an overview of all the possible parameters and options available.

Appendix B - Technical Details

Basic Technical Data

Processors: 300SX (3Dlabs), Vision968 (S3)

8 MB VRAM

8 MB DRAM (extendable up to 12 MB)

HighColor (65,536 simultaneous colors) up to 1600 x 1200

TrueColor (16.7 mill. simultaneous colors) up to 1280 x 1024

Dotclock: according to video mode (see BIOS.TXT in your SPEA\GDC directory).

Jumpers

The SPEA FIRE GL has **one** jumper.

Jumper No. 1 (=JP1 on the board)

is marked accordingly on the board. This jumper is only necessary if you need to extend the board's DRAM memory to use special applications which can use a 32 bit localbuffer for the 300 SX chip (stated in the documentation of the software application manufacturer).

Jumper position 1-2 (default):

No memory extension present, localbuffer depth size: 32 bit
(z buffer part: 16 bit)

Jumper position 2-3:

Memory extension (12 MB total) present, localbuffer size: 48 bit
(z buffer part: 32 bit)

Memory Extension

Necessity of Memory Extension

Your SPEA FIRE GL is fitted with 8 MB DRAM. This memory size is adequate for the majority of applications on the market. **Please note that extending the memory does not automatically mean that you have access to higher resolutions, faster refresh rates or higher color depths.** Special CAD and VR applications can however use an extended z buffer for the 300 SX chip (check the documentation of the software manufacturer). The memory extension of the SPEA FIRE GL is designed for these applications only.

Extending Memory to 12 MB

If you wish to extend your board's memory from 8 MB to 12 MB, then please contact your local distributor.

Memory Addresses

It is necessary to make sure that all I/O and memory addresses reserved for the graphics board are not used by other hardware devices.

Your board uses the following addresses:

I/O addresses:

Standard VGA I/O	3B0-3DF
Graphics Engine	x2E8-x2EA

Memory addresses:

Video RAM	A000-BFFF
PCI Bus:	
Video ROM	C000-C7FF*

*** During the boot procedure the board uses a 64k memory block (C000 - CFFF)!**



Warning:

Please note that some fax and modem cards also use the address 2E8 (COM#4). In this case deactivate COM#4 and use another address for the corresponding hardware device.

Memory Addresses during Booting

The SPEA FIRE GL requires double the amount of memory (64 kB instead of 32 kB Video ROM) *during the boot procedure*. It may occur that memory areas are occupied which are also addressed by other devices.

If you install devices with an own BIOS-ROM (e.g. SCSI-, ESDI controller or network card) please be aware of the fact that the memory area from C000 - CFFF may not be addressed. In this case it is necessary that you change the BIOS address of the other device (depending on the corresponding device via jumper, DIP switch or software).

Video Modes

Tables containing the video modes your board can handle can be found in the file BIOS.TXT on the CD. This file is installed in your new SPEA directory during the software installation if you selected the option 'Utilities'.

VGA Output Connector

Pin	Function
1	Red
2	Green
3	Blue
4	Not used
5	ground
6	Red Return (ground)
7	Green Return (ground)
8	Blue Return (ground)
9	Key (no pin)
10	Sync Return (ground)
11	not used
12	not used
13	Horizontal Sync (+)
14	Vertical Sync (-)
15	Not used

VESA Feature Connector

The auxiliary VESA-compatible connector can be used to allow pass-through VGA to a coprocessor card that does not directly support VGA.

Pin	Function	Pin	Function
1	Ground	2	Pixel Data 0
3	Ground	4	Pixel Data 1
5	Ground	6	Pixel Data 2
7	(See Note)	8	Pixel Data 3
9	(See Note)	10	Pixel Data 4
11	(See Note)	12	Pixel Data 5
13	Unused	14	Pixel Data 6
15	Ground	16	Pixel Data 7
17	Ground	18	Pixel Clock
19	Ground	20	Blanking
21	Ground	22	Horizontal Sync
23	Unused	24	Vertical Sync
25	No Pin (key)	26	Ground

Note:

7, 9, and 11 are inputs to the DAC. All are active LOW.

- 7: External Pixel data
- 9: External Sync and Blanking
- 11: External Pixel Clock

Appendix C - Troubleshooting

General Considerations

- Make sure the SPEA board is firmly seated in its expansion slot, and that it is not touching other boards in your system.
- Be sure your monitor cable is properly connected to the SPEA board and that your monitor power switch is on. You may also need to verify your cable pinout, since some monitors use a non-standard configuration.
- Recheck your computer's switch and jumper settings.
- Make sure other peripherals such as EMS cards, disk controllers or LAN cards are not using the same memory address as the SPEA board. Check with the manufacturer or your user's manual for information about designating exclusions for memory locations when invoking your device driver.
- Some other things to think about
Your AUTOEXEC.BAT or CONFIG.SYS file may contain commands that are interfering with the operation of the SPEA board. Try booting your system without these files. If the SPEA board works properly, identify and remove the conflicting command(s).
- Systems with motherboard VGA controllers
If your system has a display controller on the motherboard, be sure to disable it before trying to run the SPEA board. Consult your computer's User Manual for the correct switch or jumper settings your motherboard requires.

Commonly Asked Questions

General problems

Problem

- The system does not work properly, some problems occurred during installation.
- The system beeps when booting or the graphics board cannot be initialized.
- Problems with network systems occur.

Action

- Check again, if all connections are correct and if the graphics board is placed secure in the expansion slot.
- Be sure that you have installed the most up to date software driver. (You can find them in the SPEA mailbox.
- Remove all other hardware (e.g. Sound-board, networking card) from your system in order to find out possible hardware conflicts.
- The following I/O addresses may not be used from hardware devices as these are the addresses the graphics board uses:
03B0 - 03DF, 02E8 - 02EA(hex).

- Deactivate COM#4 (COM#4=DISABLED) via the system setup. This address must be free, but many fax and modem cards use it. In this case use another I/O address for the corresponding hardware.
- Deactivate all other VGA components in your system (in case a VGA part is built onto your motherboard or several graphics boards are installed in your system). Only one VGA part can be active in a system.
- Install the graphics board in another slot or - if possible - in another PC.
- BIOS system setup:
Install SHADOW RAM for the Video BIOS.
- Minimize the clock rate of your system.

Problem

- DOS 6.0 (5.0): General Problems with Windows

Action

- Check the following entries in the CONFIG.SYS file:
HIMEM.SYS, QEMM386.SYS or 386MAX.SYS must stand at the first position.
- An INCLUDE command is not allowed for memory management. Instead you have to exclude memory areas which are used by other hardware devices (e.g. Scanner, Soundboard a.s.o.) with the EXCLUDE command. For the graphics board this is the area x=A000-C7FF.
- Reduce the cache from 2048kB to 1024kB.

Question

- Is it possible to run DOS with more than 60 Hz?

Answer

- Yes, using the program V7HFREQ located in your SPEA\GDC directory (if you installed the utilities).

Problem

- The SPEA Utilities are not available.

Action

- The SPEA Utilities are packed (and not visible) on the SPEA CD. To use them you have to install them via the SPEA installation program from the SPEA CD. Select the option 'Utilities' to copy the utilities into the \SPEA\GDC directory.

Problem

- The Fax or Modem card does not work any longer.

Action

- Deactivate COM#4 (COM#4=DISABLED). This address must be free, as the graphics board uses it. Use another I/O address for the Fax or Modem card.

Problem

- The installation program of the SPEA CD does not work correctly.

Action

- Add the following entry to the AUTOEXEC.BAT file and restart your system:
SET COMSPEC=C:\DOS\COMMAND.COM

Problems with Windows

Problem

- The Windows startup lasts very long. Is the V7SETUP logo responsible for that?

Action

- No, the V7SETUP logo does not have any influence on the Windows startup.
Create a permanent swap file.
- Defragment your hard disk regularly (e.g. with Norton SpeedDisk).
- Remove unnecessary entries from your WIN.INI file (e.g. fonts, programs).

Problem

- Fonts are displayed incorrectly.
- Icons or Windows are displayed unclear or not complete.
- The image scrolls through when clicking on the scroll bar.
- Pixels remain on the screen.
- The image flickers.
- The system crashes.

Action

- Add the following entry to the SYSTEM.INI file under the section `[CAR1K.DRV]:CHIPSYNC=1`
- Reduce the refresh rate via the V7SETUP
- Reduce the clock rate of the system via the System-BIOS Setup.

Problem

- Windows or applications under Windows crash.
- Mouse functions or icons are not correct.
- Wrong colors are displayed.

Action

- Set - depending on the SETUP of your system - `DEQUOPLE REFRESH`, `REFRESH=HIDDEN`, `REFRESH=AT-STYLE` or `REFRESH` to 'disabled'.
- Use COM port #2 for your mouse.

Problem

- Working with QEMM 6.x: Windows cannot be started.

Action

- If you get the message 'no UMBs free' set the following entry into the CONFIG.SYS:
`C:\QEMM386.SYS R1:ST:M RAM X=C000-C7FF`
alternatively:
`C:\QEMM386.SYS R1:ST:M RAM XST=C000`
also:
Call the program QWINFIX from the QEMM directory in Windows to prepare Windows to work with QEMM.

Problem

- The Test button of the V7SETUP is not active.

Action

- The Test button is only active with the actual settings. If you change any setting in the V7SETUP the Test button becomes inactive. Restart Windows (with the saved new settings) and call V7SETUP again. The Test button is now active for the new setting.

Problem

- No DOS prompt appears after the Windows is terminated.

Action

- Delete the additional remark 'V7START.DLL' from the entry
DRIVERS=MMSYSTEM.DLL
in the boot block [boot] of the SYSTEM.INI file.

Appendix D - Lexicon

Terminology in Computer Graphics

Analog Display

A monitor that uses variable color control voltages to display a very large number of colors but requires very few inputs.

ANSI

American National Standards Institute.

ASCII

American Standards Committee on Information Interchange. A standard used by IBM and compatible computers to represent numbers and characters in binary form.

Authoring Systems

Authoring systems are used to create multimedia applications. They combine existing presentation information (texts, images and sound) and control the flow of these during the multimedia show. The dialogue with the user is controlled with this software. The individual information must have already been created and saved with special programs.

AUTOEXEC.BAT

A batch file that directs the activities performed by the computer during system startup.

AVI

Audio **V**ideo **I**nterleaved. AVI files are the standard format for digital video films on PCs.

Bandwidth

The required capacity for the data volume and transmission rate.

BIOS

Stands for Basic Input-Output System. Code in your computer's ROM (Read Only Memory) that provides the power-on self test and other operating functions.

BitBLT

Bit Block Transfer refers to the ability of a system to move pixel blocks (in a rectangular area, e.g. in a window) very quickly. The contents of the rectangular area are rapidly refilled with the original contents.

BMP (Windows Bitmap)

This format enables Microsoft Windows to display images on devices with similar capabilities in a consistent way. Save pictures in this format if you wish to continue to process them later under Windows.

Booting/Booting Up

Starting the computer. There are two types. Warm Booting is accomplished by simultaneously pressing the CTRL/ALT/DEL keys and can occur only when the computer is running. A cold boot requires activation of the ON/OFF switch.

Brightness

The brightness of an image is determined by the amount of light emitted by it. No light (black) therefore means 'no brightness', whereas pure white light means 'maximum brightness'.

CD-I

Compact Disc Interactive. A technique developed by Philips in order to playback games, films and music videos on a CDI player.

CD-ROM

High-density medium to store digital data. CD-ROMs have read-only status.

There are different CD-ROM formats:

YellowBook: conventional CD-ROM format

GreenBook: used for linear video, this is typical for CD-I's (see below)

WhiteBook: used for Digital Video VideoCDs.

CGA

The IBM Color Graphics Adapter.

Channel Number

A MIDI device can have three connections - MIDI-In, MIDI-Out and MIDI-Through. The last is used to pass on data group information without changing it. This enables the user to cascade several devices. To select a particular device, the MIDI information is passed on to an identifying channel number from 1 to 16.

Cinepak

Software-Codec. Makes fast decoding possible. Good image quality possible as long as the image dimensions are not increased. The video encoding process is time-consuming.

CODEC

Compressor / Decompressor, responsible for the compression and decompression of image data.

Color Display

A type of monitor capable of displaying information in color. It is often called an RGB (red, green, blue) monitor, referring to the signals needed to drive it.

Color Palette Conversion

Conversion of video data from the YUV color model into the RGB color model, or v.v.

CONFIG.SYS

An ASCII file that is created to provide the computer with special information about applications and hardware.

Contrast

The contrast of an image is the difference between light and dark. A contrast-intensive image is one in which contains strong transitions from light to dark. A contrast-weak image contains transitions that are hardly noticeable.

Data Transfer Rate

The data transfer rate describes the amount of data transferred to or from the storage medium (e.g. hard disk) per second. Each data storage medium has a specific data transfer rate which it can handle. Typical values are:

- old hard disks 300 KB/s
- new hard disks 600 KB/s
- standard CD-ROM drives 150 KB/s
- DoubleSpeed CD-ROM drives 300 KB/s

DCI

Display Control Interface. An interface defined by the Intel and Microsoft corporations, which enables enhanced graphics performance due to direct access to the video memory.

Default Mode

The capabilities, resolutions and display mode the system operates with when you start your computer.

Digital Display

Also called TTL. A type of monitor that switches signals ON or OFF to determine display color. Types of digital displays include the IBM Enhanced Color Display or Monochrome Display.

Digital Video

Digital videos contain optical information bitwise in a file.

DIP Switch

Dual Inline Package switch; a series of tiny, two position switches which allow users to select and change options on computer boards, printers, and other peripherals.

Driver

Part of a software program that interacts with a particular piece of equipment in your computer system (i.e. video boards, printers, and keyboards). Drivers are often loaded by your config.sys at system boot.

Dropped Frames

The images of a video which are not displayed or recorded when replaying (resp. recording).

EEPROM

Electrically erasable programmable read only memory; used to replace DIP switches and jumpers on new graphics boards like yours.

EGA

The IBM Enhanced Graphics Adapter.

EMS

Enhanced Memory Specification. Originally developed to break the DOS 640K limit, it is now used as a general term for types of add-in memory.

Enhanced Color Display (ECD)

The IBM Enhanced Color Display capable of 640 x 350 resolution.

EPS (Encapsulated PostScript)

EPS is a device-independent file format, which contains all the information required to reproduce an image directly on a PostScript printer or to use it in suitable applications. A small header section contains the data of the image as a TIFF-format file so that applications that can not display PostScript data directly can still obtain an impression of the file contents.

Expansion Board

A device used to expand a computer's capability.

Expansion Slot

An electrical connection within the computer used for the addition of Expansion Boards.

Fill-in Images

When video data is being saved onto a CD-ROM (during manufacturing) the images are normally 'polstered' with fill-in images so that each video file completely uses the assigned 2KB area. This ensures a constant data rate and a smoother playback appearance. The file size is not changed by doing this.

Fixed Frequency Monitor

An analog monitor which can only sync to a very narrow range of scan frequencies.

fps

frames per second. Measurement unit for the frame rate.

Frame

Single video image.

Frame Rate

Number of images shown per time unit. Software videos have a fixed frame rate. When playing back the actual frame rate achieved can differ to the rate defined in the video considerably.

Framegrabber

If an overlay board (see below) also contains a realtime video digitizer (= frame grabber), then the user can capture a random frame from the video sequence being replayed and can save this onto his hard disk.

General MIDI

The MIDI Association's MIDI Song File standard has established itself as the General MIDI standard for the exchange of MIDI music data between different PC systems.

GIF (Graphics Interchange Format)

A graphics file format developed by CompuServe to enable the device-independent exchange of images between systems. GIF-format files can be up to 64MB in size with color information up to 256 colors (8 bits). GIF files do not contain information about the image resolution.

Greyscales

A greyscale image consists of different shades of grey (like a black-and-white photograph). This normally means that 254 different greyscales plus black and white (= 256) are used.

Hardware Cursor

The cursor's movements and display are controlled by the accelerator chip. This means that the CPU only has to pass the mouse co-ordinates to the graphics board, reducing the CPU's workload.

Hercules Graphics Card (HGC)

A video adapter that provides bit mapped single color graphics.

Hexadecimal Notation

A base-16 numbering system that uses numbers and letters. The hexadecimal sequence begins: 1 2 3 4 5 6 7 8 9 A B C D E F, then 10, 11 etc.

Horizontal Frequency

The rate at which a monitor displays each scan line. Usually measured in kilohertz (kHz).

I/O Port

Input/Output port. An address used to access a hardware device.

Image Compression

Technique used to reduce the volume of data in digital image and video files.

INDEO

Intel Video. Compression technique developed by Intel. Gives good quality but requires a high level of processing work to decompress.

Indexed 16 and 256 Color Images

Indexed color images contain a color table in the file. This table lists all the colors that could be used in the file. An indexed 16-colour image contains a table with 16 colour entries (4 bits) whereas an indexed 256 colour image 256 colours are listed (8 bits).

Other colors can be simulated in a way similar to using greyscales in a black-and-white image, by simply positioning the pixels in varying densities. The eye then sees color mixtures that are not actually in the color table. You can transform images into indexed color images in order to load them into programs such as Windows Paintbrush, or just to see them on monitors that can only display 256 or 16 colors.

Interlaced Display

A monitor that refreshes every other scan line every other pass of the screen. A non- interlaced monitor refreshes the entire screen (every scan line) every pass of the screen.

Interleave

A technique used to organize audio and video data so that every audio data segment is followed by video data, e.g. AVAVAV.....

Interrupt Request (IRQ)

Signal used by a device, such as a mouse, to inform the CPU that it is present and functioning.

JPEG

A new compressed file format industry standard developed by the Joint Photographic Experts Group. It enables compression ratios up to 100:1 (original file size to compressed file size). A new feature of this standard is that it is device-independent. These files can be replayed using any application that supports this format. JPEG differs from the LZW compression method in that it works without quality loss. This means that some of the original data is lost during the compression phase. In order to surpass this visual effect JPEG compression attempts to 'lose' information which is less important to the human eye. Use this format if you don't have much memory space available or if you are processing very large image files.

Jumper

A small plastic plug that fits over a pair of pins. When the plug straddles two pins it makes an electrical connection. The computer makes decisions based on whether the connection is made or not. A group of jumper pins is called a jumper block.

Keyframe

Technique used to compress video data whereby certain frames are defined as 'keyframes' and are fully saved during compression. The video data of the frames between two keyframes are only partially stored. During decompression the 'partial frames' use the information stored in the keyframes.

Line Drawing

This is a hardware function of the graphics processor chip. Only the starting and ending co-ordinates of a line are supplied by the CPU. The rest of the work drawing the line is then done by the graphics processor.

M-JPEG

Motion JPEG. A codec (see above), which is especially suited to video processing. Hardware decompression is strongly recommendable for this.

MDA

The IBM Monochrome Display Adapter.

MIDI

Musical Instrument Digital Interface. A serial interface used to link computers, synthesizers and other electronic sound generating devices.

Monochrome Display

Monitor that displays information in one color only; sometimes called a black & white display.

MPC

Multimedia PC. This trademark is intended to help consumers when purchasing hardware and software (similar to the VHS symbol used in the video product market).

MPEG

Motion Picture Expert Group. The compression method known as MPEG 1 is suited to digital video playback. A hardware decompressor is necessary.

MPEG

MPEG stands for Motion Pictures Experts Group, a group of the ISO committee for standards. With the MPEG format an international standard

for the display of 25 images per second and a transmission rate of between 150 and 300 KByte per second is defined. Through a highly sophisticated compression method MPEG is a way to display full screen and full motion video with CD sound quality using little memory.

This way, MPEG files can be played back as well as Video CDs, interactive programs and presentations.

MT-32

The MIDI module MT-32 created by Roland.

Multi-frequency Monitor

A type of monitor that supports a wide range of horizontal scanning frequencies and vertical refresh frequencies. This type of monitor accepts inputs from many different video display adapters.

NTSC

National Television Standards Committee. The committee responsible for the definition of the north american television standard (with the same name). NTSC creates 30 images per second.

Overlay Boards

Overlay boards are able to digitize video images being input in realtime, to synchronize the data with the random segment of the screen and to show both images (incoming video signal and background screen image) simultaneously on the PC's monitor. The result is a window showing a video film which is placed over a background (e.g. a Windows application).

PAL

Phase Alternation Line. PAL is the television standard used in Germany and Great Britain. The video signals are transformed into 25 images per second.

Palette

A selection of colors from which to choose. Your board provides as many as 16.7 million simultaneous colors from a palette of 16.7 million. This capability is sometimes referred to as TrueColor. It is believed that the human eye can discern no more than 16.7 million colors.

PCX (PC Paintbrush)

This file format was developed by Zsoft Corporation for PC Paintbrush, one of the first computer drawing programs. It is the standard format for many scanners and drawing programs. Some versions of the PCX format don't contain any information about the resolution of the image.

Peripheral Equipment

Auxiliary equipment connected to a computer (e.g. monitor, printer, keyboard, etc.).

Pixel

Short for picture element; the smallest field displayed on the monitor; could be compared to the dots which form images in photos printed in newspapers. Also called pel.

Polygon Fill

A special hardware (chip) routine used to fill polygons with pixel information.

Primary Display

The monitor that is active when you power on your system.

PS/2 Display Adapter

The IBM VGA board for Industry Standard Architecture (AT bus) computers.

RAM

Random Access Memory; memory that can be read from and written to.

Resolution

The number of pixels (from picture cells) in both horizontal and vertical directions.

Resolution

Number of pixels displayed on the monitor. The higher the resolution, the crisper and sharper the images appear.

RGB 8Color

RGB8 color file types are 3 bit types in which each pixel can have one of 8 colors. The RGB8 color images are automatically transformed into indexed 16 color images whereby the 8 colors are retained but space for further 8 colors is created. It is not possible to transform an existing file into an RGB8 color file type.

RGB Color Model

Monitors use additive mixing of the three basic colors red, green and blue to create images on the screen with an infinite number of colors. Image data is therefore processed via data for RGB color combinations. The combinations of the three basic colors create a color model whose origin is the colour black and the opposite value is the color white.

RGB True Color

RGB stands for red - green - blue. All the colors that are used in this file are created additively mixing parts of the three basic colors. The parts of the three basic colors can be varied in 256 steps. If you mix all these colors together a total of 16.7 million possible color combinations is attainable ($3 \times 8 \text{ bits} = 24 \text{ bits}$, $2 \text{ to the power of } 24 = 16.7 \text{ million}$). As the human eye can not tell the differences between color hues from about this level, such an image is termed 'True Color', i.e. 'as in real life'.

ROM

Read Only Memory; memory space in your computer for storing permanent operating instructions.

Sample Frequency

If the data bandwidth is fixed then the incoming signal to a processing unit can be assigned to a whole number (value). The quantity of such values (samples) that can be taken per second is referred to as the sample rate or frequency.

Sampling Depth

Describes the number of bits used for each sampled value of the sound input. 8 bits are suitable for microphone recordings, 16 bits give higher quality but require twice the memory storage space.

Sampling Rate

Analogue acoustic signals are digitized by the analogue/digital converter (ADC) on your sound or video board. The ADC component samples the audio signal in extremely short time intervals and stores the measured values. The number of sampled values per second is the 'sampling rate'. The usual rate for a low-quality recording of speech is 11.025 kHz. Better quality speech recordings or low-quality music recordings are sampled at 22.05 kHz. CD quality is attained at 44.1 kHz.

Saturation

The saturation refers to the purity of a color. A color with a high saturation value is optically very intensive. A color with a low saturation value appears weak (i.e. with less color content).

Scaling

Transformation of image data to different sizes.

Secondary Display

The monitor connected to the graphics card that is co-resident with another card/monitor in your computer system. Is not active upon booting your system.

Sound Files

The most common file type for sound files under Windows are WAV files.

Sync

The stable condition that exists when two repetitive events maintain a

constant time relationship; your monitor is in sync with the signals from your board when the display is correct and stable.

Terminate and Stay Resident (TSR)

Programs that are run once then remain in memory in order to be activated by a sequence of key strokes or a 'hotkey.' It is possible that a TSR may take up too much memory and cause conflicts with other programs.

TGA (Targa)

Developed by the company True Vision especially for its true color video boards (especially the Targa board), this is a format preferred by many specialists.

TIFF (Tagged Image File Format)

This format was developed by Aldus and Microsoft in order to promote the use of desktop scanners and DTP systems. Uncompressed TIFF files are hardware and software-dependant, however there are different incompatible compression methods. Select this format for the maximum compatibility with other applications and to improve the compression level.

TrueColor

The ability to display 16.7 million simultaneous colors. It is believed that the human eye can discern no more than 16.7 million colors. See 'palette'.

Variable Frequency Display (VFD)

A monitor that is capable of displaying a wide range of resolutions through its ability to sync to a wide range of horizontal and vertical scan frequencies.

Vertical Frequency

The rate at which the monitor screen is refreshed. Usually measured in hertz (Hz).

VGA

The IBM Video Graphics Adapter.

Video CD

The VideoCD specification was published in 1993 by JVC, Matsushita, Sony and Philips as the so-called 'Whitebook' standard. Using this up to 74 minutes of digital video compressed with the MPEG 1 technique can be stored on a CD. The image resolution is 352 x 240 pixels and 30 frames per second for the NTSC standard and 532 x 288 pixels at 25 fps for PAL.

Video Connector

The standard 15-pin monitor output connector located on the board.

Video Electronics Standards Association (VESA)

industry-wide consortium organized to standardize graphic modes. Your board supports the VESA standards.

Video Keying

This term refers to the process of mixing two video and computer graphics signals.

YUV Color Palette

The image information of individual frames is comprised of a brightness part and 2 color parts. The color part is calculated by evaluating the difference to the brightness value. This method was first utilized in television technology.

YUV Signal

A video signal that is comprised of a brightness part (luminescence Y) and two color parts (chrominance U and V). Due to the characteristics of the human eye, it is enough to transfer the color parts with a lower resolution. This mixture is technically achieved by only evaluating 2 chrominance signals U and V compared with the 4 values calculated for the

luminescence. This results in statements in the format 4:2:2. Other constellations are possible.

Zooming

Increased display of an image section.

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