Contents

Introduction

The PowerVR™ accelerator card uses the revolutionary PowerVR architecture to provide the ultimate in realistic, real-time 3D rendering. It brings arcade-level performance to a growing range of games, and comes with PowerSGL™, PowerSGL Direct® and Direct3D™ drivers.

System Requirements

To run the PowerVR card you need:

- an IBM or fully compatible Pentium PC (P133 minimum, P166 recommended)
- Microsoft Windows™ 95 running in a 16-bit or 24-bit display mode
- a spare bus-mastering PCI bus slot
- a minimum of 24 MB of RAM (some games require 32 MB or more)
- a 2 MB PCI graphics card with 32-bit display drivers supporting DirectX™

Readme file

Make sure you read the latest product information in the readme file on the CD-ROM.

Identifying the card

To identify whether your card uses the NEC PCX1 or PCX2 chip, refer to the chip number printed on the chip itself. The PCX1 chip is identified as D62010GD001, and the PCX2 chip as D62011GD001. The correct drivers are automatically installed for the chip you are running.

Identifying your Windows build

Software installation varies slightly depending on which build of Windows 95 you are running. Follow these instructions to identify your build before installing the card:

1. Click the Start button, point to Settings and click Control Panel.
2. Double-click the System icon to open the System Properties Window.
3. Click the General tab. The build number is located in the System section, under the ‘Microsoft Windows 95’ line.

Using the card with other 3D accelerators

Using more than one 3D accelerator in one system is not recommended, but may be possible. If other cards use a Hardware Interface Layer (HAL), we suggest that you turn them off to ensure that PowerVR is accelerating your 3D.

For systems using a 3Dfx-based card, you can download a utility called tweekj.zip from http://www.dimension3d.com/linksmain.html, which allows you to disable your 3Dfx card. Using this, it should be possible to disable the D3D functions of the 3Dfx card, and thus ensure that PowerVR takes over when required.

Note that although this setup has been tested successfully, we cannot be held responsible for any damage caused by the use or misuse of unsupported utilities such as tweekj.

Handling the card

Follow these guidelines to minimize the risk of electrostatic charges damaging the card:

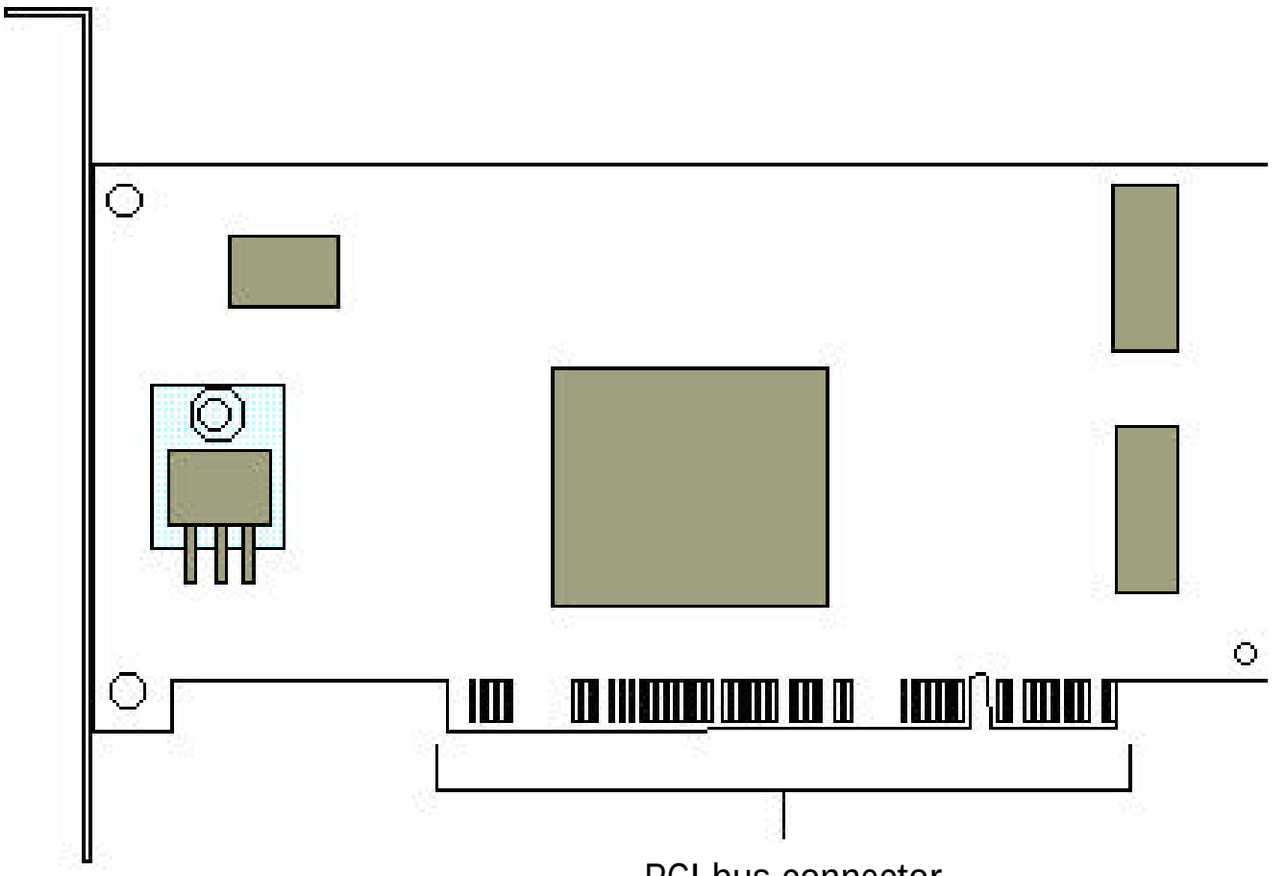
- Keep the card in its protective packaging until you are ready to install it.
- Just before handling the card, touch the metal frame of your PC with the back of your hand to discharge any static electricity which may have built up on you or your clothes.
- Hold the card by the adapter bracket or by its edges; do not touch the circuit board.
- Do not place the card on top of your computer or on any other metal surface.
- Make sure that the card is not accidentally touched by anyone else.
- Handle the card with care to avoid damage to the components on the circuit board.

Installing the card

Installing the hardware

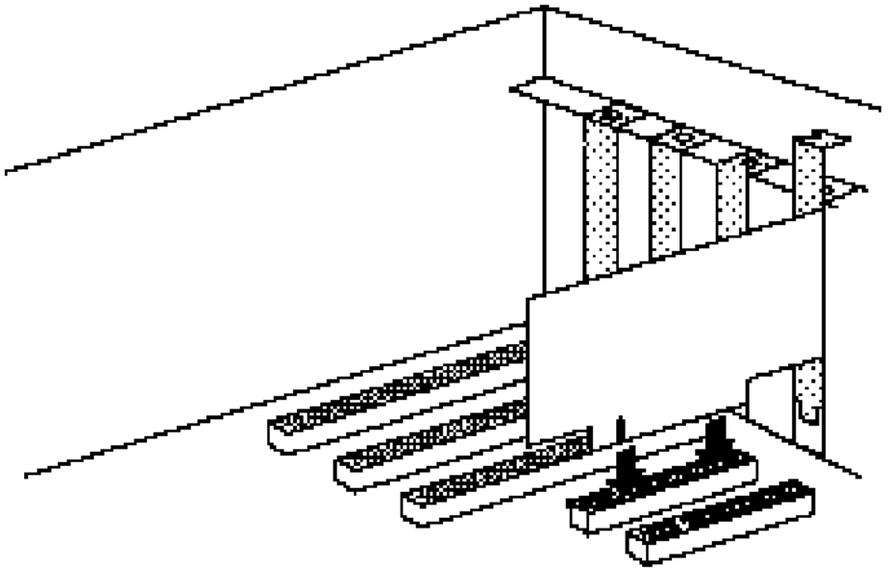
Warning: Always switch off your computer before removing the cover and observe the warnings specified in the manufacturer's documentation.

The diagram below shows the connector on the card.



PCI bus connector

1. Switch off your computer, monitor, and any hardware devices such as printers connected to your computer. Leave the power cable connected to the power outlet so that your computer is grounded.
2. Remove the computer's cover. You may need to refer to the documentation supplied with your computer for instructions on how to do this.
3. Locate an empty bus-mastering PCI bus expansion slot and remove the slot cover. Keep the screw, you will need it later to secure the card.
4. Touch the bare metal chassis of your computer with the back of your hand to discharge any static that may have built up on you or your clothes.
5. Align the PowerVR card with the slot you have chosen. Firmly press it into the slot, as shown in the diagram below. You will need to use some pressure to push the card into position, but do not use excessive force.



6. Secure the card using the screw that you removed previously.
7. Replace the cover of your computer and switch on your computer and your monitor.

Installing the software

Software installation varies slightly depending on which build of Windows 95 you are running. Identifying which build you are running is described on page 2, and should be carried out before installing the card.

Software installation for Windows 95 build 4.00.950 or 4.00.950a

1. When your computer has restarted, a window is displayed saying that Windows has found new hardware, and asking how you want to install the drivers. Select Driver from Disk provided by Hardware Manufacturer, and click OK.
2. Insert the PowerVR CD-ROM into your CD-ROM drive.
3. A window is displayed asking for the location of the software. Browse to the drivers directory of the CD-ROM. After browsing, click OK.
4. Click OK to install the drivers.
5. When the drivers have been installed, a message is displayed asking whether you want to restart Windows. Click Yes.

   When your computer has restarted, the card is ready to use.

Software installation for Windows 95 build 4.00.950b (otherwise known as OSR2)

1. When your computer has restarted, the Update Device Driver Wizard is displayed, saying that a PCI Multimedia Device has been detected, and asking whether you want Windows to search for the drivers. Click Cancel.
2. Click the Start button, point to Settings and click Control Panel.
3. Double-click the Add New Hardware icon.
4. The Add New Hardware Wizard is displayed. Click Next.
5. You are asked if you want Windows to search for the drivers. Select No, and click Next.
6. From the list of devices, click Sound, game and video controllers, and click Next.
7. Insert the PowerVR CD-ROM into your CD-ROM drive.
8. To locate the drivers, click Have Disk, and browse to the drivers folder on the CD-ROM. When you have browsed, click OK.
9. At the Select Device window, click OK.
10. At the Add New Hardware Wizard, click Next.
11. Click Finish.
12. Restart your computer.
13. When your computer has restarted, a message is displayed saying that Windows has detected the PowerVR card.

    The System Settings Change window is displayed asking whether you want to restart your computer. Click Yes.

    When your computer has restarted, the card is ready to use.

Upgrading the drivers

World Wide Web

The latest drivers are available in the developer section of the PowerVR web site at http://www.powervr.com/pvrdev

Upgrading from a disk

If you are upgrading the drivers from a floppy disk, a CD-ROM, or your hard disk, or after downloading the files from a web site, follow the instructions on page 6 to find out which build of Windows you are using, then follow the instructions for that version below.

Upgrading from a disk for Windows 95 build 4.00.950 or 4.00.950a

To upgrade the drivers from a disk in Windows 95 build 4.00.950 or 4.00.950a:

1. Click the Start button, point to Settings and click Control Panel.
2. From the Control Panel, double-click the System icon.
3. In the System Properties dialog box, click the Device Manager tab. A list of devices available on your computer is displayed.
4. From the list, double-click Sound, video and game controllers.
5. From the Sound, video and game controllers list, double-click the PowerVR entry.
6. In the PCI Properties dialog box, click the Driver tab.
7. From the list of driver files, click Change driver.
8. In the Select Device dialog box, click Have Disk.
9. In the Install from Disk dialog box, browse to the directory of the disk containing the updates. When you have browsed, click OK.
10. At the Install from Disk dialog box, click OK.
11. At the Select Device dialog box, click OK.
12. At the PCI Properties dialog box, click OK. The drivers are upgraded on your computer.

13. When the drivers have been upgraded, a message is displayed asking whether you want to restart Windows. Click Yes.

    When your computer has restarted the card is ready to use.

Upgrading from a disk for Windows 95 build 4.00.950b (otherwise known as OSR2)

Upgrading is much easier if the drivers are in the root directory of a floppy disk or CD-ROM, rather than in a folder, or on your hard disk. We recommend copying the driver updates onto the root directory of a floppy disk before you upgrade in OSR2.

To upgrade the drivers from a disk in OSR2:

1. Click the Start button, point to Settings and click Control Panel.
2. From the Control Panel, double-click the System icon.
3. In the System Properties dialog box, click the Device Manager tab. A list of devices available on your computer is displayed.
4. From the list, double-click Sound, video and game controllers.
5. From the Sound, video and game controllers list, double-click the PowerVR entry.
6. In the PowerVR dialog box, click the Driver tab.
7. Click the Update Drivers button. This starts the Update Device Driver Wizard.
8. You are asked whether you want Windows to search for the drivers. If installing from a floppy disk or CD-ROM, insert the disk into the drive. Select Yes, and click Next.
   - If the drivers are located in the root directory of the floppy disk or CD-ROM, they are automatically upgraded, and you are asked whether you want to restart your PC. Click Yes, and when your computer has restarted, the card is ready to use.
   - If the drivers are not located in the root directory of the floppy disk or CD-ROM, continue from step 9 below.
9. A window is displayed asking you to give the location of the drivers.
   Click Other Locations.

10. In the Select Other Locations window, browse to the folder on the disk containing the updates. When you have browsed, click OK.

    If you are already running the latest drivers, a message is displayed saying that the location you have browsed to does not contain updated drivers. Click Cancel to quit upgrading the drivers.
11. Click OK.
12. Click Finish.
13. A window is displayed asking you to insert the disk. Click OK.
14. At the Copying Files window, browse to the folder on the disk containing the updates. When you have browsed, click OK.
15. The System Settings Change window is displayed, asking whether you want to restart your computer. Click Yes.

    When your computer has restarted, the card is ready to use.

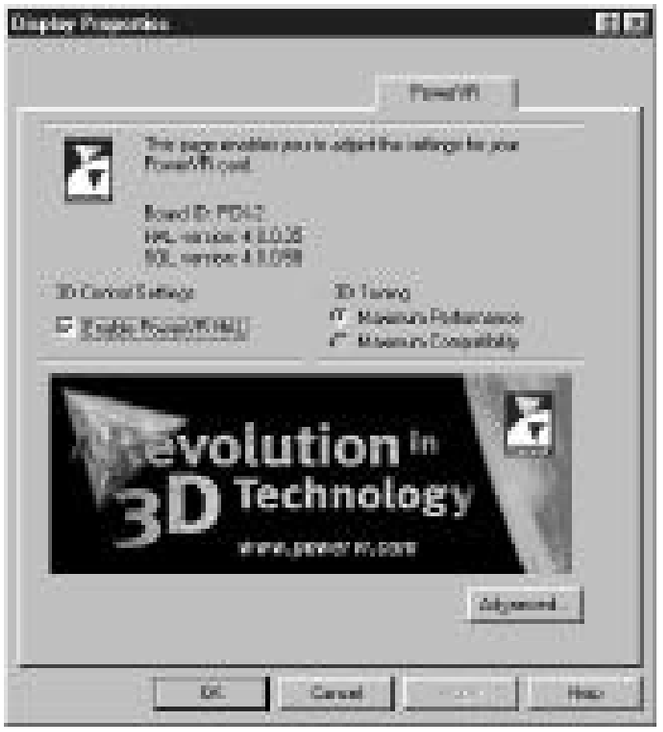
The PowerVR Property page

After installing the PowerVR drivers, a new page is added to your Display Properties control panel, called PowerVR. The PowerVR Property page provides options for turning Direct3D acceleration on and off, and for tuning PowerVR behavior.

To access the PowerVR Property page:

1. Click the Start button, point to Settings and click Control Panel.
2. Double-click the Display icon.

3. Click the PowerVR tab. The following window is displayed.



Enable PowerVR HAL

This is used to turn on and off the PowerVR Hardware Abstraction Layer (HAL). The HAL provides the interface between the PowerVR hardware, and the Direct3D software it is running. Turning off the PowerVR HAL temporarily switches off the Direct3D acceleration from your system, allowing you to run Direct3D applications or games through software, or through another 3D accelerator.

Maximum Performance and Maximum Compatibility

This switches between maximizing PowerVR acceleration, which you would use for most modern systems, and ensuring that the card works with older 2D accelerators. If you want to take full advantage of PowerVR acceleration, select Maximum Performance.

The Advanced page

The PowerVR Advanced page enables you to optimize PowerVR performance and quality for specific applications. It overrides the equivalent settings made by the application when run, and, although most applications do not require any advanced settings, you can add, edit or remove your own settings according to the descriptions given on page 13.

At the PowerVR Display Properties page, click the Advanced button. The following window is displayed:

Adding an entry

To add an entry to the application list:

1. Click Add. The Add Application dialog box is displayed.
2. Type in the description of the game or application you want to add.
3. Type in or browse to the file that this game or application runs.
4. Click OK.
5. Change the settings you want according to the descriptions on page 13.
6. Click OK.

Render Overlap - controls the way in which the hardware and software interact when rendering 3D. Without render overlap, the hardware and software render at different times, the hardware waiting for the software to finish before it starts rendering, and the software then waiting for the hardware to finish. With Render Overlap selected, the hardware can begin rendering before the software starts, and vice versa.

Turn Render Overlap off if your screen is updating slowly, with symptoms such as menus or dialog boxes not appearing, otherwise leave it on for performance enhancement.

Allow Quads - enables PowerVR to process sets of triangles as single, four-sided objects.

Turn Allow Quads off if there are distorted objects on the screen, otherwise leave it on for performance enhancement.

Render Timeout - defines the maximum time, in seconds, that the software waits for the hardware to complete 3D rendering.

Increase the Render Timeout time if the display shows incomplete rendering of scenes or objects. Decrease the time if there are pauses between frames.

Bilinear Mode - enables PowerVR to interpolate between pixels horizontally and vertically, to produce a more realistic display when rendering 3D. You can leave bilinear filtering on constantly (Enabled), only use it for objects ‘close’ to the screen (Adaptive), or turn it off (Disabled).

Generally you will get a better display with bilinear filtering on, but this may reduce frame rates in games that do not require bilinear filtering. Some games that are not compatible with bilinear filtering might show ‘joins’ between textures, in which case selecting Adaptive or Disabled might improve the display.

Automatic MIP Mapping - takes place when a texture is in the distance, and is very small on the screen. It averages the attributes of the pixels within the texture, so that the small texture has a uniform appearance. Automatic MIP Mapping improves the PowerVR image quality, but may reduce frame rates in games that do not require automatic MIP mapping.

If textures are missing or corrupted, turn Automatic MIP Mapping off. You can turn it on for image quality enhancement, but this may reduce frame rates in some games.

Editing an entry

To edit an entry on the application list:

1. Select the game or application you want to edit, and click Edit. The Edit Application Details dialog box is displayed.
2. Edit the description of the game or application.
3. Edit or browse to the program that the game or application runs, and click OK.
4. Change the settings you want according to the descriptions on page 13.
5. Click OK.

Deleting an entry

Deleting an entry from the list removes its PowerVR Display Properties settings, so that the game or application's own settings are used. To delete an entry from the application list:

1. Select the game or application you want to delete, and click delete. A message is displayed asking whether you're sure you want to delete it.
2. Click Yes.

Resetting an entry

You can reset an entry to its default PowerVR settings. If you want remove an application's settings completely, delete them by following the steps given above. To reset an entry on the list:

1. Select the game or application you want to reset, and click Reset. A message is displayed asking whether you want to reset just the current game or application, or all of them.
2. Click Current.

Resetting all of the entries

You can reset all of the entries on the list to their default PowerVR settings. To reset all entries:

1. Cick Reset. A message is displayed asking whether you want to reset just the current game or application, or all of them.
2. Click All.

Troubleshooting

This section provides solutions to problems that may happen when installing or using the PowerVR card. For more detailed information, refer to the readme file on the CD-ROM.

Problem: The application display is corrupted.

Solution: Your graphics system may not support DirectX.

Reinstall DirectX.

If the problem persists, contact your graphics card vendor.

Problem: The Start menu and Windows menus contain corrupted text, or text is missing.

Solution: After playing a game in 8-bit display mode, your computer has changed from 8-bit to 16-bit display mode automatically, which your display driver may not be able to support.

Restart your computer in 16-bit mode. Refer to the documentation supplied with your graphics card if you need help with this.

To avoid this problem in future, make sure you are in a 16-bit display mode before playing a game.

Problem: When running an application that uses PowerSGL or Direct3D, the system freezes or restarts.

Solution: You may have installed the card into a PCI bus slot that does not have bus-mastering capability.

Install the card into a slot that supports bus-mastering.

Problem: I am not given the D3D Hal option with the D3D demos.

Solution: When runnng the demos, make sure that your computer is in a display mode greater or equal to 16 bits per pixel (65,536 colors).

If the problem persists, you may not be running the required DirectX version. Reinstall DirectX.

Problem: When running an application that uses PowerSGL the system restarts.

Solution: The display driver may not support buffer flipping. To support flipping the amount of free off-screen memory must be greater than the current on-screen memory.

A lower screen resolution may free up sufficient memory, however, due to other graphics memory requirements (e.g. hardware cursors), 1 MB cards may not support flipping even in a resolution of 640 x 480 pixels with 16-bit (65,536) colors. This is why we recommend a minimum graphics memory of 2 MB.

Problem: The application display is corrupted, textures are corrupted or missing, rendering is corrupted, the machine crashes.

Solution: These are general 3D rendering problems that might be solved by using the PowerVR Display Property page, as described on pages 10 to 14 of this guide.

Problem: The Use Hardware Accelerator option within an application is grayed out.

Solution: The application is currently set to run in a graphics resolution that cannot be accelerated by the PCI card. Setting the application's graphics mode to a lower resolution mode makes the check-box available.

Solution: The card is not being recognised by the system. If you have sufficient technical knowledge, check that it is in System Properties, and check the BIOS and IRQ allocations. Otherwise, contact one of the representatives listed on page 17.

Technical support

If you have problems while installing or using the card, contact one of the following:

In the US

NEC Electronics Inc.
c/o PowerVR Support
2880 Scott Blvd.
M/S SC2403
Santa Clara
CA 95050-8062

Tel: +1 408 588 5558
Fax: +1 408 588 6077
e-mail: powervrsupport@el.nec.com

In Europe

VideoLogic Ltd.
c/o PowerVR Support
Home Park Estate
Kings Langley
Herts WD4 8LZ, UK

Tel: + 44 (0)1923 260 511
Fax: +44 (0)1923 271313
e-mail: pvrcae@videologic.com

In Japan/Asia-Pacific

NEC Corporation
c/o Tadayoshi Saito
484 Tsukagoshi 3-chome
Saiwai-Ku, Kawasaki
Kanagawa, Japan 210

Tel: +81 44 548 8886
Fax: +81 44 548 8887
e-mail: saitoh@saed.tmg.nec.co.jp

Index