# Rostock Cornea Module

## Heidelberg Retina Tomograph 3

## Installation Instructions

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HEIDELBERG ENGINEERING

CE 0482

The manufacturer hereby declares that this product conforms to the requirements of Directive 93/42/EEC of the Council of the European Community dated 14 June 1993 regarding medical products (MDD 93/42/EEC).

**Caution!** Do not use the Heidelberg Retina Tomograph 3 / Rostock Cornea Module without reading the Operating Instructions. User errors may result in a false diagnosis!

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# 1 HRT3 / RCM System Setup and Installation

## 1.1 Computer and System Requirements

The Heidelberg Retina Tomagraph 3 / Rostock Cornea Module (HRT 3 / RCM) is both a hardware and a software add-on to the HRT 3. The operation of the RCM requires full hardware installation of the HRT 3. No additional PC or laptop requirements for the HRT 3 are required.

## 1.2 System Components

The HRT 3 / RCM comprises all components listed below. The headrest must be permanently modified to image with the RCM. All other components are detachable and are stored together with the accessory tools in the wooden case.

### 1.2.1 Detachable Components and Accessory

When the HRT 3 is operated in glaucoma or retina mode, the components of the HRT 3 / RCM should be kept in the wooden case provided:



- (1) Rostock Cornea Module objective
- (2) IEEE 1394 CCD camera and camera mount
- (3) Front cap wrench
- (4) Tool for demounting the field lens
- (5) Alignment pin
- (6) Field lens, FOV 300 µm
- (7) Standard cornea gel (Comfort Gel™ , Dr. Mann Pharma, Europe or GenTeal Gel™, Novartis Ophthalmics, US).


### 1.2.2 Camera Mount

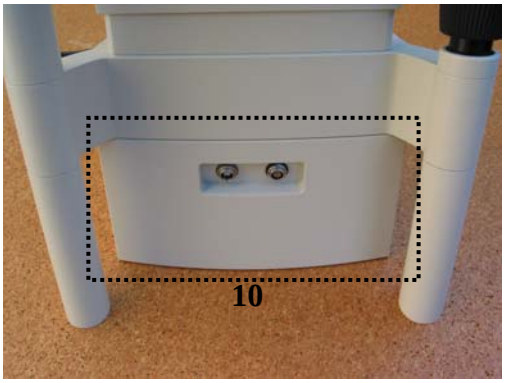
The camera mount of the HRT 3 / RCM differs from the standard HRT 3 camera mount in:

- (8) an adjustable forehead rest

- (9) a telescopic chin rest
- (10) a front panel, internally equipped with the RCM board

These three components replace the original components of the standard HRT 3 camera mount.

If these components are not already installed, please see sections 1.3.1 and 1.3.2 for installation instructions.




### 1.2.3 Additional Components

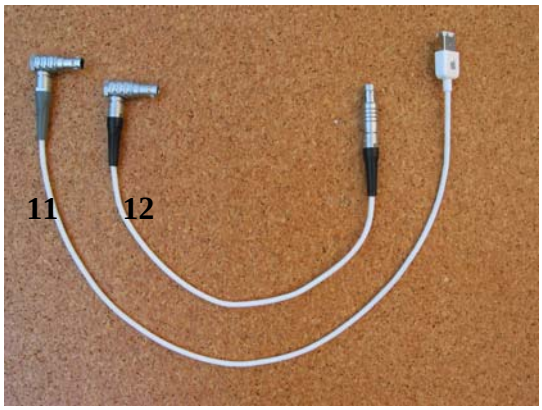
Additional components included in delivery:

- Sterile TomoCaps (50 pcs.)
- HRT / RCM Software Installation CD-ROM
- Operation Instructions Manual
- Installation Instructions Manual

### 1.2.4 Cables

Delivery of the HRT 3 / RCM encloses two interconnection cables:

- (11) IEEE 1394 cable: connects the CCD-Camera to the front panel of headrest
- (12) RCM cable: connects the RCM objective to the front panel of headrest



## 1.3 Installation

Generally, the HRT 3 / RCM will be delivered with the appropriate camera mount. This means the headrest will already be adapted to the HRT 3 / RCM including the RCM chin rest, the RCM forehead rest and the front panel (see 1.2.2). In this case, please proceed to section 1.3.3.

**Note:** The HRT 3 / RCM headrest can be used for *all* exam modes: glaucoma, retina *and* cornea.

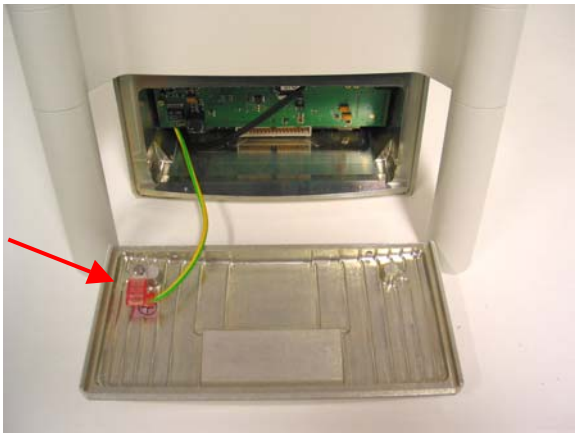
In the case that an existing HRT 3 needs to be upgraded to HRT 3 / RCM, the components mentioned above have to replace the corresponding components of the HRT 3. The mount is described in 1.3.1 and 1.3.2.

### 1.3.1 Replacing the HRT 3 Front Panel

**Detachment of the HRT 3 front panel:**

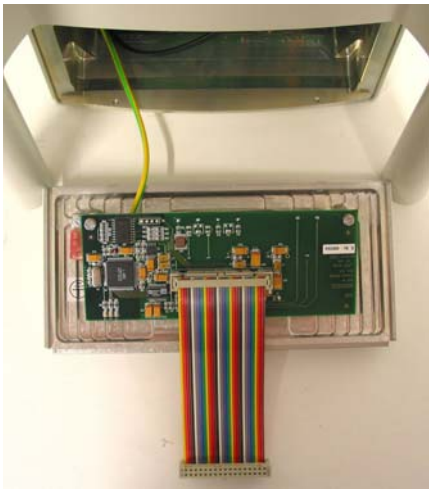
Unscrew the front panel at the bottom of the HRT 3 (see arrows). For this purpose, the HRT 3 can be positioned to *slightly* exceed the edge of a table.

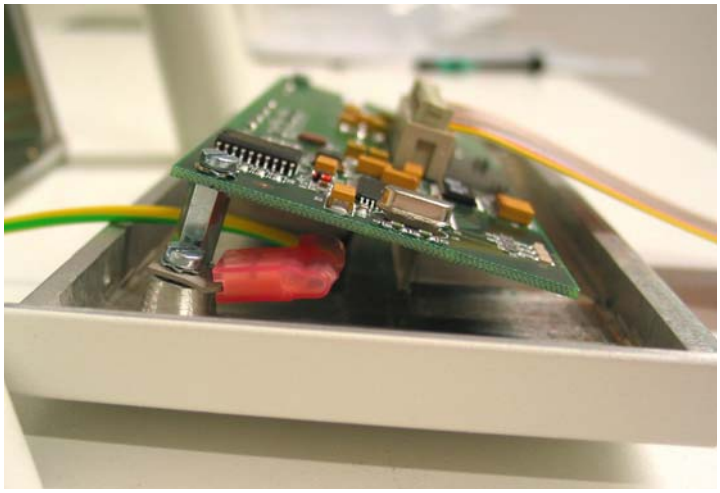

Open the front panel and detach the protective earth, then remove the front panel.



**Installation of the RCM front panel:**

Connect the protective earth exactly as it is shown in the figures. The cable must pass *below* the RCM board.



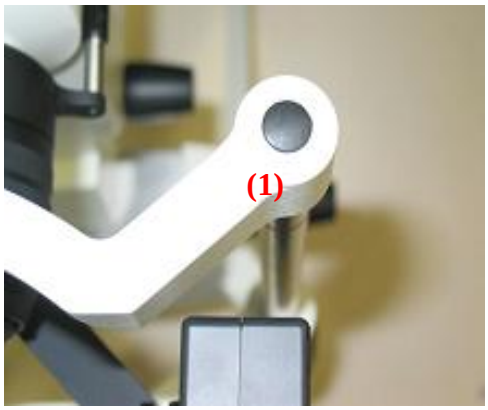


Connect the ribbon cable of the HRT 3 / RCM board to the appropriate port on the carrier board of the HRT 3.

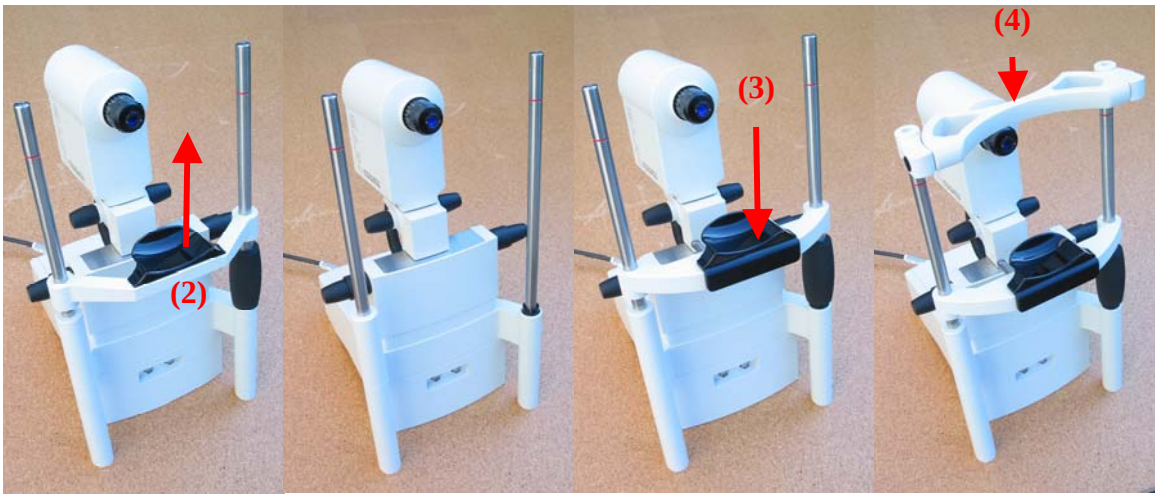
Close the front panel - the ribbon cable should become S-shaped - and tighten the screws.

### 1.3.2 Mounting the Headrest and the Chinrest

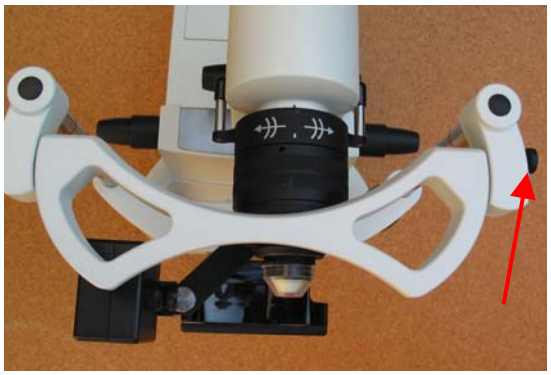
Remove the two small black caps (1) on the top of the HRT 3 mount (using a small screw driver, if required). Then remove the screws.




Detach the headrest, then detach the chin rest (2). Mount the RCM chin rest (3), then mount the RCM headrest (4).



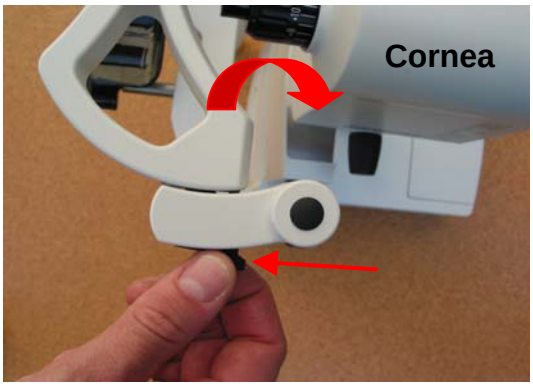

Make sure that you do *NOT* invert the orientation of the headrest! The black screw (see arrow) will be located on the right side seen from the patient's point of view.



Tighten the headrest with the screws as before. Insert the two black caps.

***To switch between Cornea Module and Glaucoma / Retina Module image acquisition:***

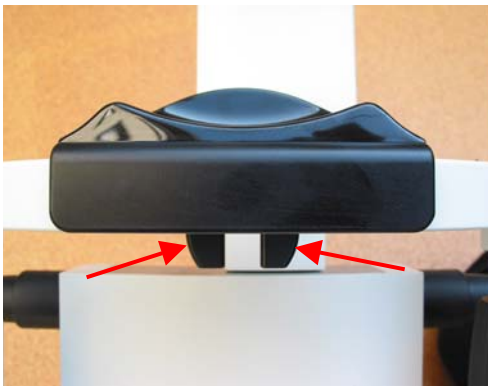
Unblock the black screw, flip the headrest and tighten it again.





Use the telescopic mount to position the chinrest according to image modality.

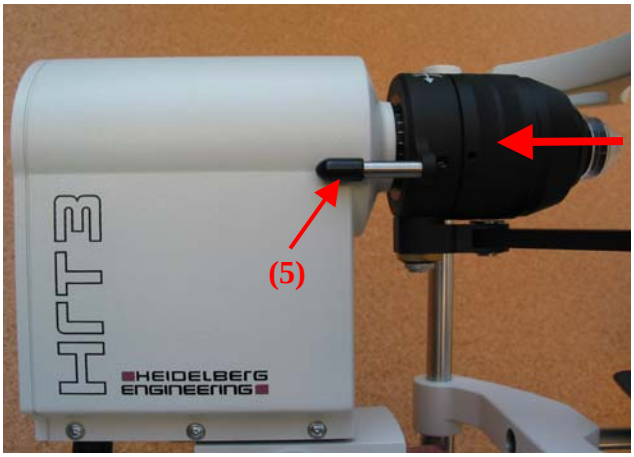
Press the locking together, then pull out the chin rest slightly. Release the locking and pull out the chin rest until it locks in its new position.

### 1.3.3 Mounting the RCM Objective and the CCD Camera

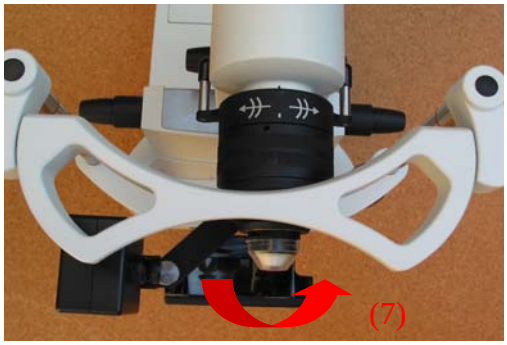
**Note:** Before mounting the RCM on the camera head of the HRT 3, the refraction must be set to **+12 diopters**. Refraction settings other than +12 diopters will lead to poor image quality!

Push the Rostock Cornea Module objective onto the HRT 3 objective as far back as possible. Avoid rotating the objective and note the position of its holders (5). The port for the RCM cable should be pointed downward. The white arrows on the objective should be apparent from the top of the mounted objective.




Attach the CCD camera by pushing the camera pins into the connection port on the RCM objective. Make sure that it is tightly connected to the module. The pins (6) should not be visible after mounting.


The CCD camera should be positioned laterally to the examined eye and perpendicularly to the optical axis of the RCM objective. For example, when imaging the patient's right eye, the camera should be on the patient's right side pointing at the lateral side of the eye. The positioning of the CCD camera is defined by the raster. By moving the mount of the CCD camera (7) and rotating the camera (8) it will lock in the appropriate positions.

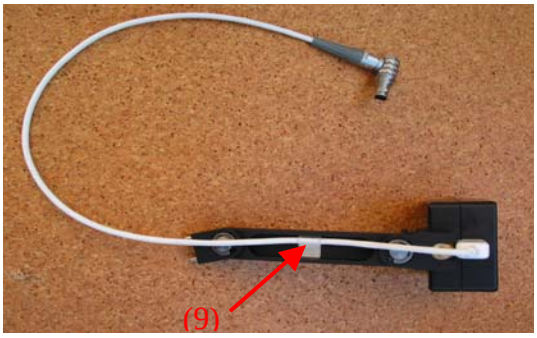



### 1.3.4 Attachment of the cables

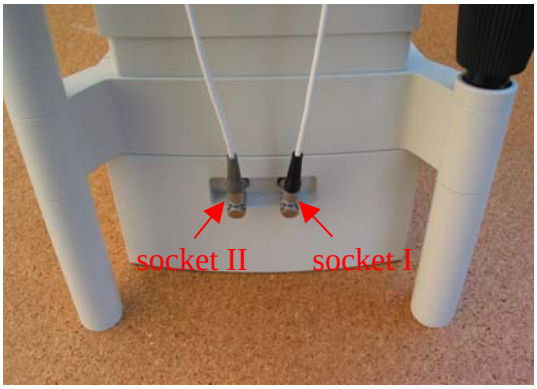
***To connect the RCM cables, proceed as follows:***

1. Connect the Rostock Cornea Module objective to the appropriate port of the RCM front panel (socket I, black) using the RCM cable (12).

2. Attach the IEEE 1394 cable (11) to the CCD camera. Use the clip (9) to fix the cable to the camera mount.




3. ***Important:*** ***If*** the Cornea Module operating software is already installed, attach the IEEE 1394 cable (11) to the appropriate port of the RCM front panel (socket II, grey) and proceed with the CCD camera driver installation (see chapter 2.2). ***Else***, proceed with the software installation **before** connecting the CCD camera to the HRT 3.




| | |
|---|---|
| ***Important***: | The HRT 3 / RCM front panel (including the RCM board) and the RCM objective are one unit and must not be separated. Different RCM objectives cannot be used interchangeably with the same RCM board! Please, contact Heidelberg Engineering Technical Support for support of any different configuration! |

| | |
|---|---|
| ***Important***: | The connectors of the RCM cable and the IEEE 1394 cable are plugged into their connections! To prevent any damage, do not twist or unscrew the cables in order to connect or disconnect them from the front panel sockets or the RCM objective. |

If the HRT 3 is to be used in the glaucoma or retina mode, disconnect the RCM cable from the socket I and disconnect the IEEE 1394 cable from the socket II of the front panel. The RCM objective and the CCD camera can be stored together with the cables in the case provided.

# 2 Software Installation

The software installation consists of:

- The installation of the RCM operating software → refer to chapter 2.1
- The installation of the CCD camera drivers → refer to chapter 2.2
- The execution of a Microsoft patch program in case your operating system is WindowsXP SP2 → refer to chapter 2.2, section *Windows XP*.

## 2.1 RCM Operating Software Installation

Please note the following:

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|---|---|
| ***Important***: | Do **not** connect the CCD camera before installing the RCM operating software. Windows will install a device driver that is **not suitable** for the CCD camera! Refer to chapter 2.2 for more information. |

The **very first installation of any HRT 3 operating software** is described in the *HRT 3 Installation Manual.* Please refer to this manual for your appropriate system configuration during installation.

Chapter 2.1.1 describes the very **first installation of Cornea Module Software** provided that the Glaucoma Module and/or Retina Module Software have already been installed.

Chapter 2.1.2 describes the **update of Cornea Module Software** to a higher version number.

### 2.1.1 Software Upgrade

If you upgrade an existing installation of a HRT 3 / Glaucoma Module and/or Retina Module, it is necessary that the software protector (dongle) is updated before you start to install the HRT 3 / RCM operation software. The RCM package provides an additional License Update disk containing the appropriate update program for your dongle.

#### 2.1.1.1 Updating the Software Protector

Insert the provided disk (*License Update for H2E-0xxxx;* xxxx is a unique number) into the suitable disk drive and proceed as follows:

1. Double-click on the icon *My Computer* on your desktop.
2. Double-click the drive containing the License Update disk.
3. Double-click the file *xxxx.exe* (xxxx stands for the license number of the dongle). Execution of the update will be accomplished.

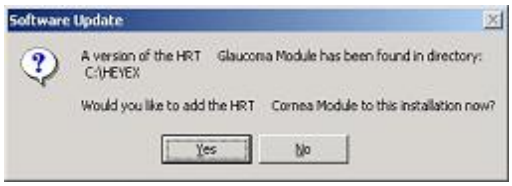
***Note***: If any error message appears on the screen, contact Heidelberg Engineering Technical Support. Do not continue software installation.

#### 2.1.1.2 Installing the HRT 3 / RCM Software

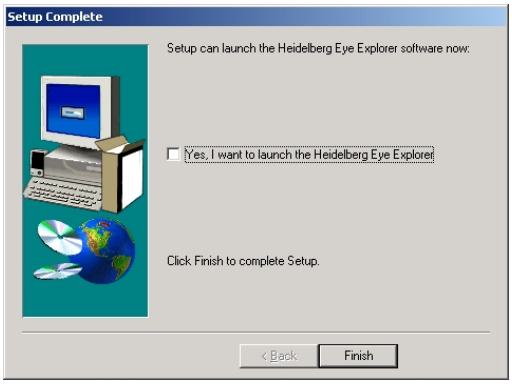
After the dongle has been updated, the HRT 3 / RCM software can be installed from the CD provided:

1. Make sure that you exit all Windows programs (including Heidelberg Eye Explorer) before installing the software.
2. Insert the CD *HRT Rostock Cornea Module* (software version 1.3.1 or higher) into the CD-drive and wait for the automatic startup of the installation program, or manually run the *Setup.exe* program from the root directory of the CD.
3. Select your language from the drop down list of the installation program dialog and click *OK*.


4. The dialog box *Software Update* appears on the screen. Click *Yes* to continue installation.




5. After the software installation has been finished, you can optionally launch the Heidelberg Eye Explorer by checking the box *"Yes, I want to launch the Heidelberg Eye Explorer"*.
Click *Finish* to complete the software installation.



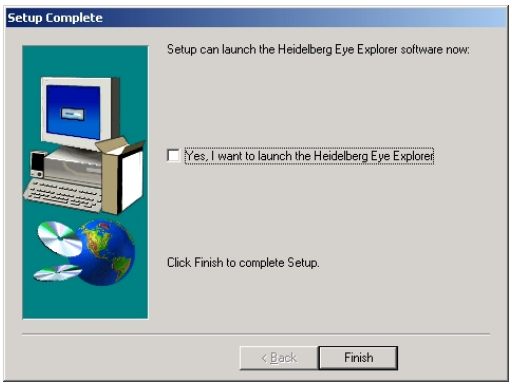

### 2.1.2 Software Update

If you update an existing installation of a HRT 3 / RCM operating software, follow these steps:

1. Make sure that you exit all Windows programs (including Heidelberg Eye Explorer) before installing the software.
2. Insert the CD *HRT Rostock Cornea Module* into the CD-drive and wait for the automatic startup of the installation program, or manually run the *Setup.exe* program from the root directory of the CD.
3. Select your language from the drop down list of the installation program dialog and click *OK*.


4. The *Software Update* dialog box appears on the screen. Click *Yes* to continue installation.

5. After the software installation is finished, you can optionally launch the Heidelberg Eye Explorer by checking the box *"Yes, I want to launch the Heidelberg Eye Explorer"*.
   Click *Finish* to complete the software installation.




## 2.2 CCD Camera Driver Installation

***After*** the installation of the HRT 3 / RCM operating software has been completed, the driver of the CCD camera can be installed.

### Hardware Installation

Connect the IEEE-1394 cable (12) of the CCD Camera to the appropriate socket of the front panel. Endure that the HRT 3 device is powered on.

### Software Installation

For a very **first installation of the CCD camera driver** (i.e. no Cornea Module Software had been installed prior to the actual one) proceed with chapter 2.2.1.

**If your previous Cornea Module Software version was equal to or lower than 1.3.0, the CCD camera driver needs to be updated.** In this case, proceed with chapter 2.2.2.

### 2.2.1 Very first Camera Driver Installation

Because the CCD camera is a plug & play device, the Windows hardware installation wizard will be started automatically.

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|---|---|
| ***Important***: | If you have not installed the HRT 3 / RCM operation software **before**, "Windows Hardware Wizard" **will not** appear on the screen. Instead, a driver that is **not suitable** for the CCD camera will automatically be installed. In this case, proceed as described in chapter 3.1. |

The following section describes the procedure to install the device driver for Windows 2000 and for Windows XP, respectively.

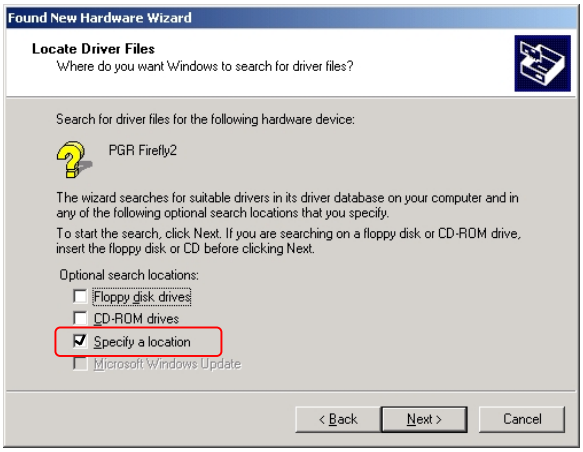
### Windows 2000

1. If not yet done, connect the IEEE-1394 cable (12) to the CCD camera and the appropriate socket of the front panel. Ensure that the HRT 3 device is powered on.

2. The *Found New Hardware Wizard* will appear to help you install the camera driver. Click *Next*.

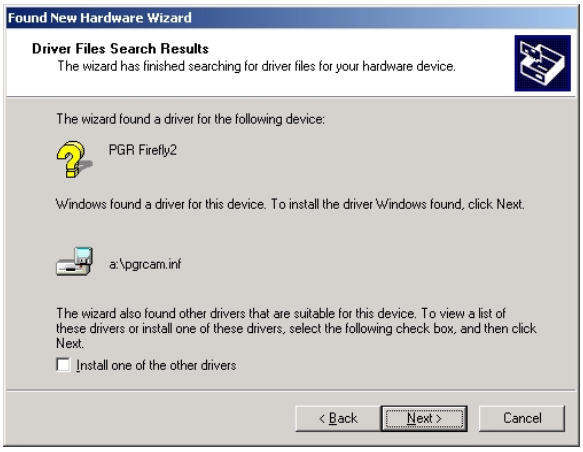

3. Select *Search for a suitable driver…* and click *Next*.


4. Select the option *Specify a location* and click *Next*.

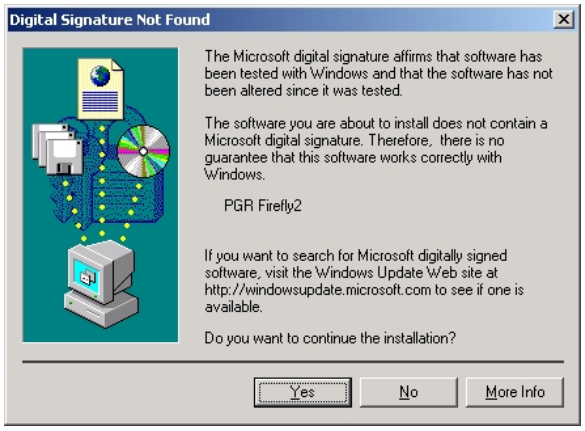


5. Browse to the folder *C:\Program Files\CCDCamera*, select the *file pgrcam.inf*, then click *Open*.

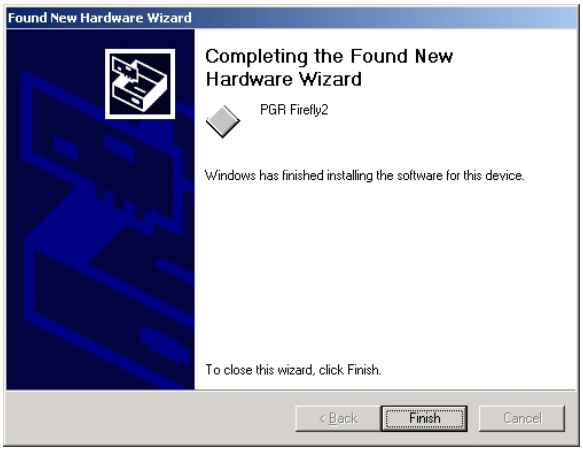

6. The hardware wizard will now copy the appropriate files from the folder *C:\Program Files\CCDCamera* to the hard disk. Click *Next*.



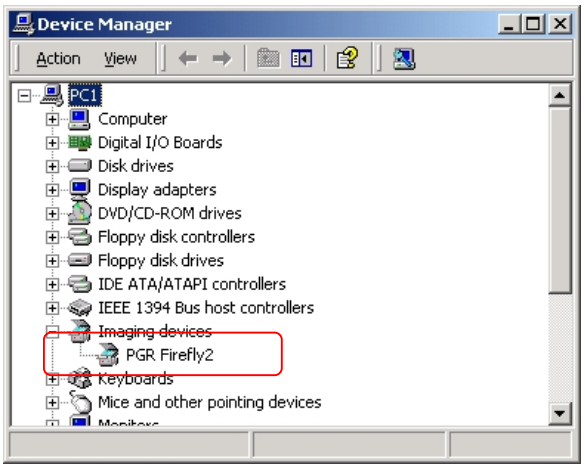

7. The *Digital Signature Not Found* window will appear. Click *Yes*.




8. To finish the installation click on *Finish*.



After a successful driver installation you will find the driver “**PGR Firefly2**” in the Windows Device Manager under “Imaging Devices” or alternatively under “PGR Camera Driver”.

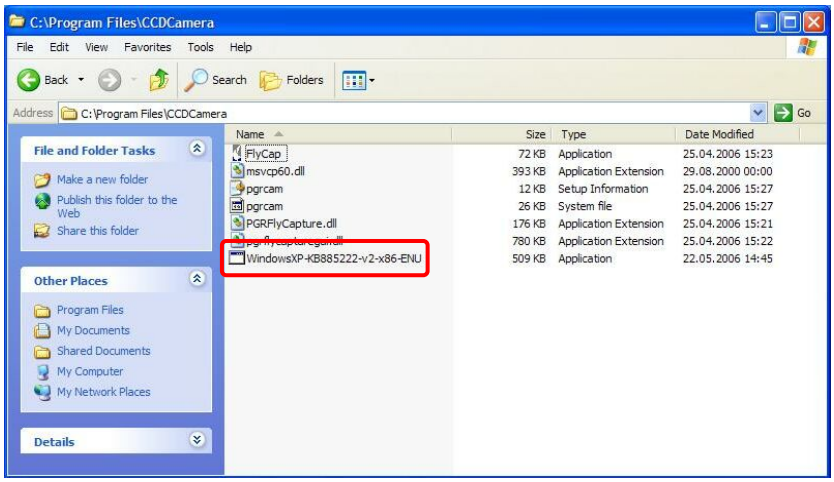



## Windows XP

If your operating system is **WindowsXP Service Pack 2,** you have to execute a Microsoft patch file on your computer. **Otherwise the CCD camera will not work properly!** To check your operating system, right-click *My Computer*, select *Properties*, navigate to the *General* tab. WindowxXP Service Pack 1 does not require the execution of the patch file!

### *Executing the Microsoft Hotfix KB885222*

Open the folder *c:\program files\CCDCamera.* Select the file *WindowsXP-KB885222-v2-x86-xxx*, where the abbreviation *–xxx* stands for the language of your operating system (e.g. ENU for English-US).




This file is provided by the Cornea Module Software installation only for the most common languages. If the file with the appropriate *–xxx* is not available in this folder, you have to download it (Hotfix KB885222) from the Microsoft homepage:

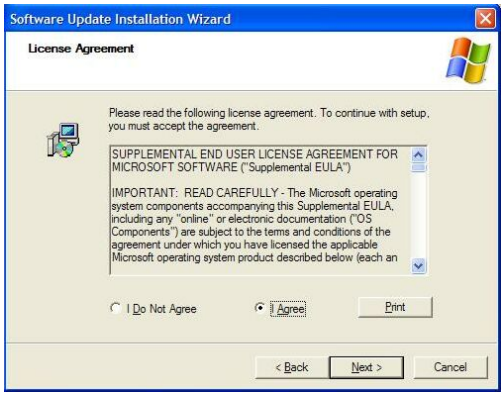
Navigate to http://support.microsoft.com/kb/885222/EN-US/ and follow the instructions for downloading. Select the appropriate language.

Then, double-click on the file for execution.

1. The Software Update Installation Wizard will appear. Click *Next*.


2. You will be asked for license agreement. Check *I Agree* and click *Next*.

   The updating will take a few seconds.

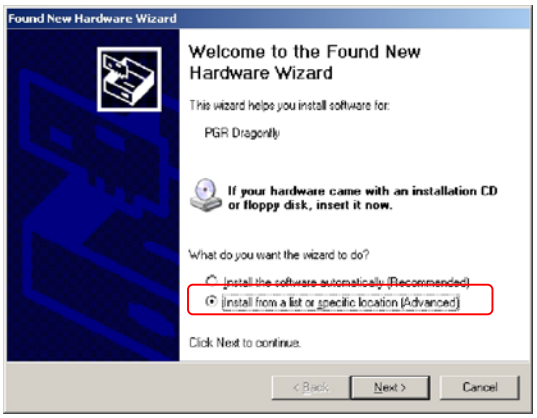



3. For completing the hotfix you should restart the system: Do not check the button and click *Finish*.

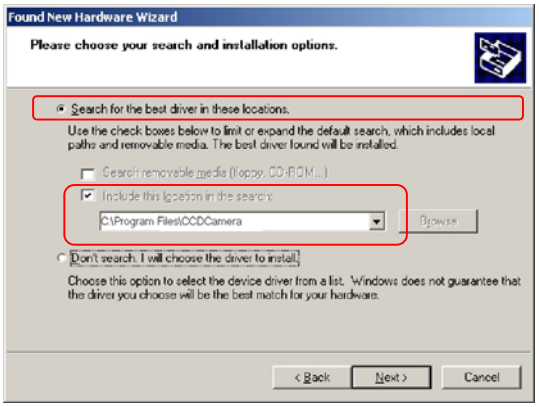
*Installing the CCD camera drivers*

1. If not yet done, connect the IEEE-1394 cable (12) to the CCD camera and the appropriate socket of the front panel. Ensure that the HRT 3 is powered on.

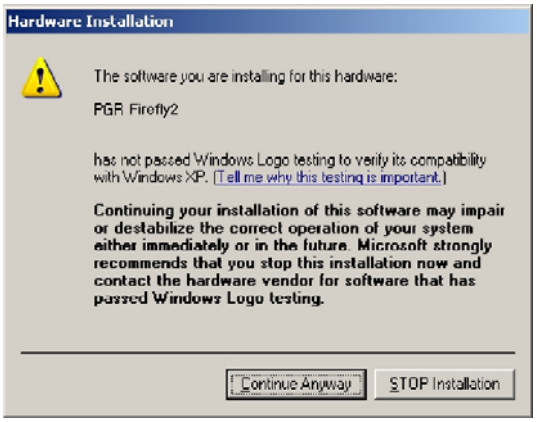
2. The *Found New Hardware Wizard* will appear to help you install the camera driver. Select *Install from a list or specific location (Advanced)* and click *Next*.



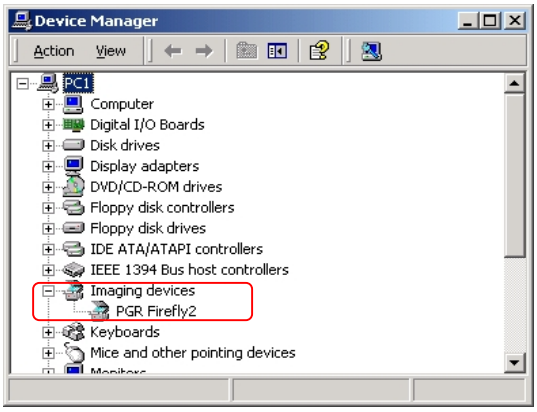

3. Select *Search for best drivers in these locations* and select the option *Include this location in the search* and click the *Browse* button. Browse to the folder *C:\Program Files\CCDCamera* and click *Open.* Click *Next* to continue.




4. When you are prompted to continue installation, click *Continue Anyway*.




5. Click *Finish* to complete the driver installation. After a successful driver installation you will find the driver "**PGR Firefly2**" in Windows Device Manager under "Imaging Devices" or alternatively under "PGR Camera Driver".



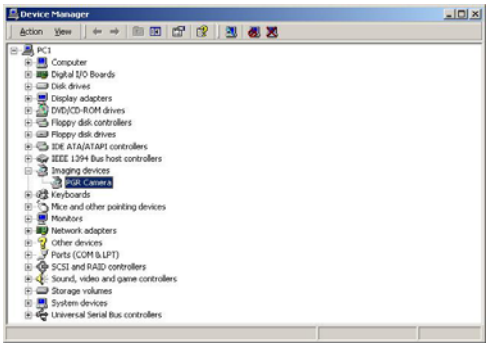
### 2.2.2 Update of the Camera Driver

If your previous Cornea Module Software version was equal to or lower than 1.3.0, the CCD camera driver needs to be updated.

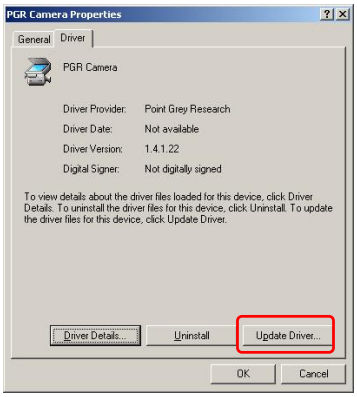
#### Windows 2000

1. If not yet done, connect the IEEE-1394 cable (12) to the CCD camera and the appropriate socket of the front panel. Ensure that the HRT 3 device is powered on.
2. The driver "**PGR Firefly2**" (or "PGR Camera") can be found in the Windows Device Manager under "Imaging Devices" or alternatively under "PGR Camera Driver".

   Doubleclick *PGR Firefly2 (*or *PGR Camera).*

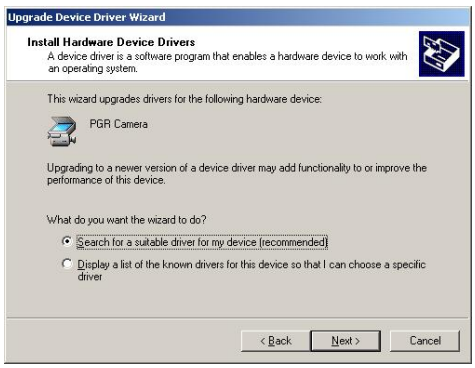



3. Select the *Driver* tab, then click *Update Driver.*

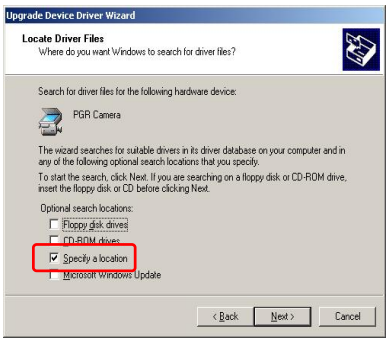



4. The Upgrade Device Driver Wizard will appear. Click Next.


5. Select *Search for a suitable driver for my device*. Click *Next*.



6. Select *Specify a location*. Click *Next*.

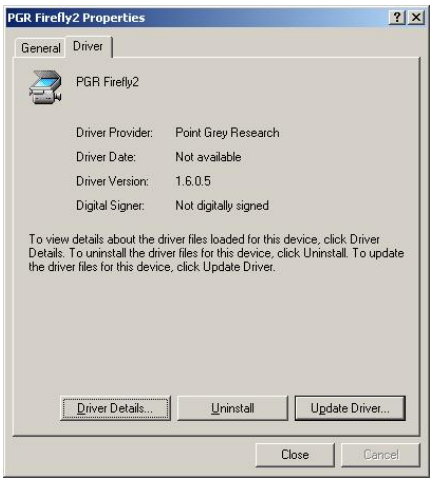



7. Browse to the folder *c:\programfiles\CCDCamera*. Click *OK*.

   The drivers will be updated.


8. Click *Finish*.


9. If the camera driver has been successfully updated, the new driver version should now read 1.6.0.5. Close the window .



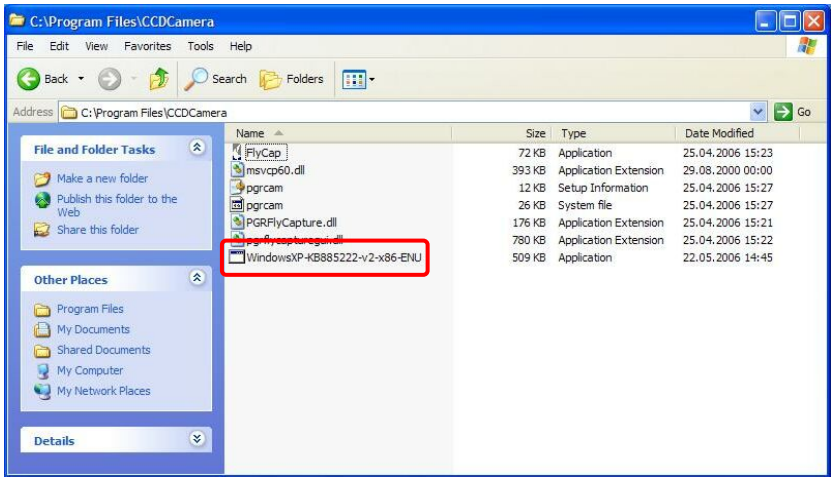

We recommend to restart the system after the driver update has been completed.

## Windows XP

If your operating system is **WindowsXP Service Pack 2,** you have to execute a Microsoft patch file on your computer. **Otherwise the CCD camera will not work properly!** To check your operating system, right-click *My Computer*, select *Properties*, navigate to the *General* tab. WindowxXP Service Pack 1 does not require the execution of the patch file!

### *Executing the Microsoft Hotfix KB885222*

Open the folder *c:\program files\CCDCamera.* Select the file *WindowsXP-KB885222-v2-x86-xxx*, where the abbreviation *–xxx* stands for the language of your operating system (e.g. ENU for English-US).




This file is provided by the Cornea Module Software installation only for the most common languages. If the file with the appropriate *–xxx* is not available in this folder, you have to download it (Hotfix KB885222) from the Microsoft homepage:

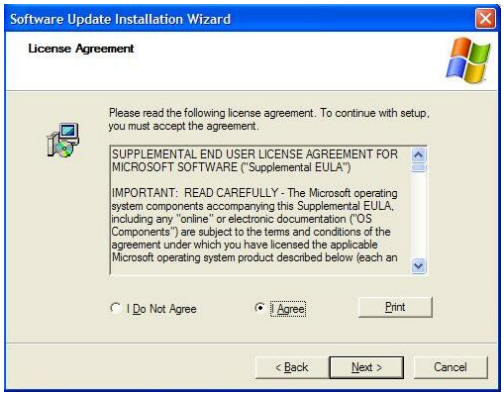
Navigate to http://support.microsoft.com/kb/885222/EN-US/ and follow the instructions for downloading. Select the appropriate language.

Then, double-click on the file for execution.

1. The Software Update Installation Wizard will appear. Click *Next*.

2. You will be asked for license agreement. Check *I Agree* and click *Next*.

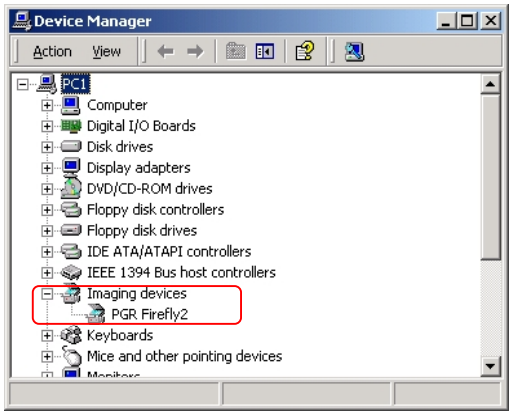
   The update will take a few seconds.




3. For completing the hotfix you should restart the system: Do not check the button and click *Finish*.


### *Updating the CCD Camera driver*

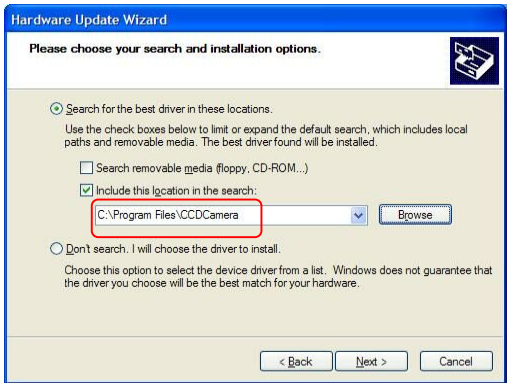
1. If not yet done, connect the IEEE-1394 cable (12) to the CCD camera and the appropriate socket of the front panel. Ensure that the HRT 3 is powered on.
2. The driver "**PGR Firefly2**" can be found in the Windows Device Manager under "Imaging Devices" or alternatively under "PGR Camera Driver". Doubleclick *PGR Firefly2*.




3. Select the *Driver* tab, then click *Update Driver*.

4. The *Hardware Update Wizard* will appear. Select *No, not this time*, then click *next.*


5. Select *Search for the best driver in these locations*. Check *Include this location in the search* and browse to the directory *c:\program files\CCDCamera*. Then, click *Next*.




6. If the camera driver has been successfully updated, the new driver version now should read 1.6.0.5. Close the window.


Probably you will be asked to re-boot your computer. In any case, we recommend the re-start of the system after the driver update has been completed.

## 2.3 HRTC.INI Settings

The text file “HRTC.INI” is the main configuration file for the HRT 3 / RCM software. By default, it is located in the directory “C:\HEYEX\plugins”. The following is a description of all important configuration keys.

### 2.3.1 Section [BoardType]

**Model**

Model=1 ME-14 Meilhaus Digital I/O board, ISA (default)
Model=2 “PCard” Digital I/O, PCMCIA
Model=3 ME-1400 Meilhaus Digital I/O board, PCI
Model=4 Heidelberg Engineering IEEE1394 hardware (HRT 3)

This specifies the installed digital I/O hardware. If the configured board type does not match to the installed hardware, an error message will appear at startup of the Heidelberg Eye Explorer software.

**FGModel**

FGModel=1 Matrix Vision frame grabber PCimage-SGVS (PCI) (default)
FGModel=2 Data Translation frame grabber DT3152
FGModel=3 Heidelberg Engineering IEEE1394 hardware (HRT 3)

This specifies the installed frame grabber hardware. If the configured board type does not match to the installed hardware, an error message will appear at startup of the Heidelberg Eye Explorer software.

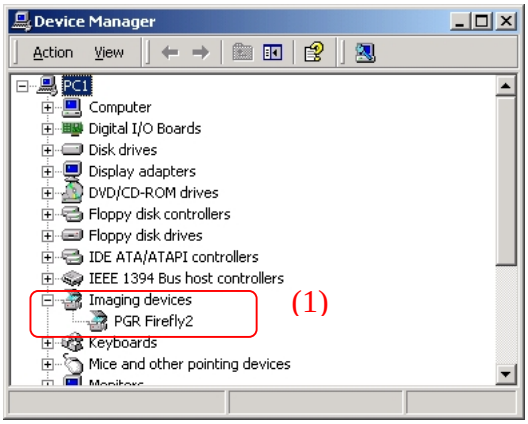
# 3 Troubleshooting

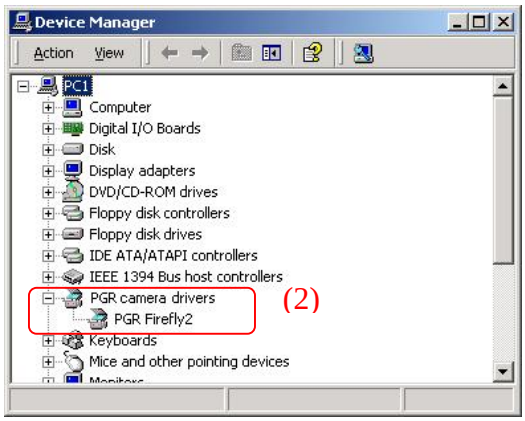
## 3.1 No CCD Image is Displayed During Image Acquisition.

- Check 1394 cable connections between CCD camera and socket II (gray) on the front panel of the HRT 3.
- Check the installation of the CCD camera driver “pgrcam.sys” (see sections below). It should say “PGR Firefly 2”:

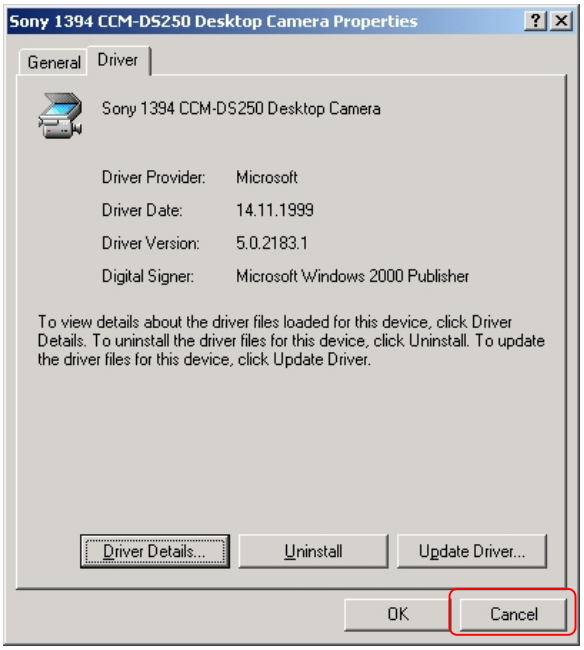
### 3.1.1 Windows 2000

1. Make sure that the CCD camera is properly connected to the socket on the front panel of the HRT 3.
2. Open the *Windows Device Manager*. To access the Windows Device Manager, right-click *My Computer*, select *Properties*, navigate to the *Hardware* tab and click *Device Manager*. If the device driver for the CCD camera is *properly installed*, you will find the driver **“PGR Firefly2”** either under “Imaging devices” (1) or under “PGR camera drivers” (2):



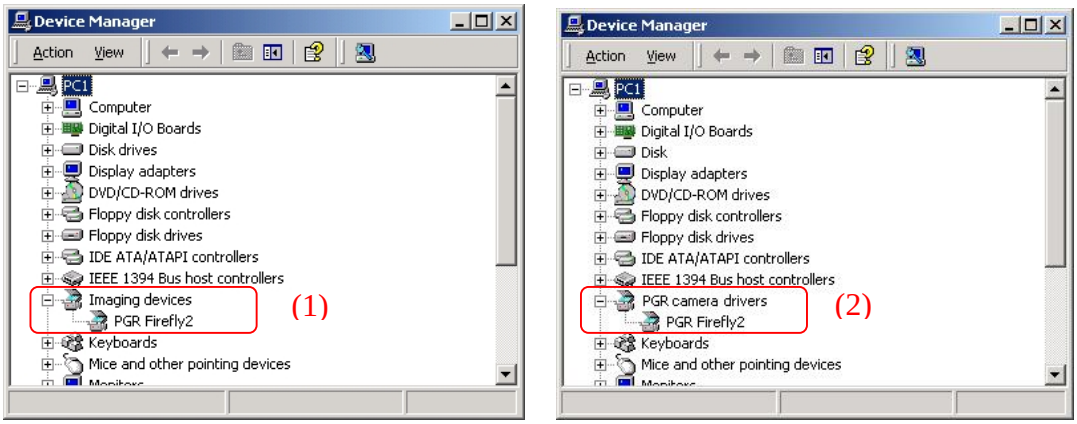

If instead drivers like “*Generic 1394 Desktop Camera*” or “*Sony 1394 CCM-DS250 Desktop Camera*” are specified under *Imaging Devices*, you need to update these drivers manually with the correct PGR driver.



3. ***To update the driver*** double-click on the entry "*Generic 1394 Desktop Camera"* or "*Sony 1394 CCM-DS250 Desktop Camera"*, click on the ***Driver*** tab and select ***Update Driver.*** Proceed as described in chapter 2.2.2. "Update of the Camera Driver".

### 3.1.2 Windows XP

1. Make sure that the CCD camera is properly connected to the socket on the front panel of the HRT 3.
2. Open the *Windows Device Manager*. To access the Windows Device Manager, right-click *My Computer*, select *Properties*, navigate to the *Hardware* tab and click *Device Manager*. If the device driver for the CCD camera is *properly installed*, you will find the driver "**PGR Firefly2**" either under "Imaging devices" (1) or under "PGR camera drivers" (2):




If instead drivers like "*Generic 1394 Desktop Camera*" or "*Sony 1394 CCM-DS250 Desktop Camera*" are specified under *Imaging Devices*, you need to update these drivers manually with the correct PGR driver.

3. ***To update the driver***, double-click on the entry "*Generic 1394 Desktop Camera"* or "*Sony 1394 CCM-DS250 Desktop Camera"*, click on the *Driver* tab and select *Update Driver*. Proceed as described in chapter 2.2.2. "Update of the Camera Driver".

## 3.2 Wrong or Missing Display of Focus Position.

- Check cable connection between RCM objective and socket I (black) of the front panel of the HRT 3.

If the connection is established, consider the following:

- In the case that the focus position window does not display any value but a series of grey bars instead, it is most likely that no connection between cornea board and carrier board has been established.

  Close the Acquisition Window and exit the HeidelbergEyeExplorer. Turn off the HRT 3 device using the device main switch, then, turn it on again. Restart the Heidelberg Eye Explorer and the Cornea acquisition software. If there is still no focus position being displayed, check the cable connections of the RCM board: Cable connection must be established as is described in 1.3.1 *Installation of the*

*RCM front panel*. Please verify a proper installation or contact Heidelberg Engineering Technical Support.

- In the case that the focus position window does display a value (possibly fluctuating at random) but does not respond upon turning the RCM objective, a defect of the RCM cable is most likely. Replace the RCM cable or call Heidelberg Engineering Technical Support for replacement.

If either measure has no effect, it is possible that there is a defect of the RCM board and/or the RCM objective. In this case you need to send the entire RCM unit (RCM front panel including the RCM board *and* RCM objective) to Heidelberg Engineering. Please call Heidelberg Engineering Technical Support. Uninstalling the RCM front panel (including the RCM board) can be performed according to 1.3.1.

| | |
|---|---|
| ***Note:*** | The connectors of the RCM cable and the IEEE 1394 cable are plugged into their connections! To prevent any damage, do not twist or unscrew the cables in order to connect or disconnect them from the front panel sockets or the RCM objective! |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