

# **RED-m Eye Tracking System Manual**

**Version 3.2**

*September 2012*



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# Introduction

**Chapter**



**1**

# 1. Introduction

## 1.1 About this Manual

Thank you for purchasing the RED-m Eye Tracking System. Please read this manual carefully to ensure all the hardware and software have been set up correctly.

This manual describes:

- How to run the Installation Package, which installs the iView Eye Tracking Server and the iViewRED-m application.
- How to mount the RED-m Eye Tracking Device on a PC monitor or Laptop
- How to set up the iViewRED-m application.

This manual serves as both an Online Help system and as a printed document. The software version covered in this document is: 3.2

You can use this manual in one of two ways:

- As a User Guide by reading through each chapter to learn how to use the program.
- As a Reference Manual to locate and learn about specific details of the product. You can locate a topic using the table of contents, the index, or in the Online Version, the full-text search feature.

## 1.2 Symbols and Acronyms

**SMI**      SensoMotoric Instruments GmbH



Indicates a hint or additional information.



Indicates a reference to a related topic.

## 1.3 Warnings

Read the following before using this product:

- The RED-m Eye Tracking Device is a sophisticated measurement device. Please handle it with care in order not to damage any of its internal components.
- When not in use, the RED-m Eye Tracking Device should be unplugged from the USB port and safely stored in the case.
- When in use, do not unplug the device from the USB port.
- Do not scratch the shield (the front face) of the RED-m Eye Tracking Device.
- No part of the product may be modified or rebuilt.
- Any usage other than described in this manual is not permitted.



Note: Read the section [Optimal User Conditions](#) before you permit a user to start a Eye Tracking session.

## 1.4 Safety Information Regarding Magnets

The RED-m Eye Tracking Device contains Neodymium magnets (Rare Earth magnets) to conveniently connect the RED-m Eye Tracking Device to

a mounting bracket attached to the PC monitor. However, this type of magnet is extremely strong and must, therefore, be handled with extreme care.

### Handling Warning



#### Finger Pinch Warning

- Do not confuse Neodymium magnets with standard "fridge magnets". This type of magnet can cause injury if not used properly.
- Do not place your fingers between the two magnets while connecting the RED-m Eye Tracking Device to the mounting bracket. The two attracting magnets have enormous strength and can severely pinch your fingers if they come between the magnets when they are connecting together.
- Do not let the RED-m Eye Tracking Device freely connect to the mounting bracket. Although the Neodymium Magnets have high strength, they are also very brittle and prone to cracking and chipping. If connected too quickly, or if the RED-m Eye Tracking Device is dropped, the magnets may shatter and scatter shards of the magnet, possibly even towards the user's eyes.
- Neodymium magnets have strong magnetic fields and likely to cause damage to magnetic media devices. Therefore, keep the RED-m Eye Tracking Device away from magnetic media such as hard drives, memory sticks, credit cards, magnetic I.D. cards, or other magnetic media. **KEEP THE DEVICE IN THE STORAGE CASE WHEN NOT IN USE.**
- Do not place metal items near the magnets on the RED-m Eye Tracking Device. The metal items, such as keys, knives, or tools may cause the



magnet to shatter.

- Do not leave the RED-m Eye Tracking Device near an open flame or a heat source. Aside from destroying the device, the neodymium magnets will ignite, burn and create toxic fumes.

## HEALTH WARNING



### Pacemaker Warning

- Neodymium magnets should NEVER be used near a person who uses medical aids such as a pacemaker. The magnet can cause the medical aid to malfunction. Individuals with pacemakers or internal medical devices should use caution when handling the RED-m Eye Tracking Device and the mounting bracket. Magnetic fields may affect the operation of these devices. Consult your physician and the manufacturer of your medical device to determine its susceptibility to static magnetic fields prior to handling the RED-m Eye Tracking Device and the mounting bracket. All of our magnetic products should be kept at a safe distance from individuals with these devices.
- Do not handle the RED-m Eye Tracking Device when eating. The metal compounds in the magnets may be toxic when ingested after handling food.

## WARNING FOR CHILDREN

**NEODYMIUM MAGNETS (RARE-EARTH) MAGNETS SHOULD BE KEPT OUT OF REACH OF CHILDREN. RARE-EARTH MAGNETS ARE NOT TOYS.**

Children should not be allowed to handle or play with rare-earth magnets. Small magnets pose a choking hazard. Children and adults should not

ingest magnets or place magnets in any body orifice such the ear, nose or mouth. Ingestion of magnets is very hazardous. If magnets are ingested or aspirated to the lungs, immediate medical attention is required. Swallowed magnets can stick together across intestines causing serious infections and death. Seek immediate medical attention if magnets are swallowed or inhaled. Children under 3 should not handle magnets, in any case.

## Transportation

The International Air Transport Association (IATA) Dangerous Goods Regulations provide guidelines for the identification, classification, and testing of potentially hazardous materials offered for transports by air. IATA Packing Instruction 902 defines the acceptance criteria and provides packaging guidelines for magnetized material. These instructions should be consulted prior to transporting magnetic material by air. These regulations also apply to magnets built in to products such as the RED-m Eye Tracking Device and mounting bracket.

## 1.5 Liability

**SensoMotoric Instruments GmbH (SMI) does not assume liability for resultant damages to property or personal injury if the product has been misused in any way or damaged by improper use or failure to observe these operating instructions. In addition, any unauthorized modifications or repairs of the device will render the warranty null and void!**

**Make sure the presented visual stimuli or the environment in which you conduct your study do not harm or injure your participants. SensoMotoric Instruments GmbH (SMI) is in no way responsible for the experiments you develop, execute, and analyze. Do not offend your participant's cultural background, age or psychological condition.**

## 1.6 Maintenance

To keep the RED-m Eye Tracking Device in good working order, we highly recommend that you:

- Regularly clean the shield (the front glass) of the RED-m Eye Tracking Device using the supplied microfiber cloth.
- After using the RED-m Eye Tracking Device, store it safely in the case provided.
- Do not leave the RED-m Eye Tracking Device sitting on the desk in direct sunlight, even when not in use. Store it away.
- Keep liquids and other contaminants away from the RED-m Eye Tracking Device.

Should the RED-m Eye Tracking Device become damaged, we highly recommend that you:

- Immediately unplug it from the USB port.
- Do not use the RED-m Eye Tracking Device until it has been repaired or replaced.



Do not attempt to repair the RED-m Eye Tracking Device by yourself. There are no user-serviceable parts in the device. Servicing, adjustment or repair should only be done by a certified distributor or by SensoMotoric Instruments GmbH (SMI).

# System Overview

**Chapter**



**2**

## 2. System Overview

### 2.1 System Requirements

Ensure that the Desktop PC or Laptop on which the RED-m Eye Tracking System is to be installed has the following **MINIMUM** system requirements:

- Microsoft Windows 7 Operating System (32 or 64 bit)
- Microsoft Windows XP Operating System



Do not use Microsoft Vista, or an older operating system than Microsoft Windows XP.

- Microsoft .NET 4.0 Framework
- Intel i5 2.6GHz CPU or faster



Do not use a PC or Laptop with an AMD chip.

- Minimum 1 GB RAM
- A free USB 2.0 Port



Do not use a USB 3.0 Port as the RED-m Eye Tracking System is currently not compatible with USB 3.0.

- If using a Desktop PC, use a 10" to 22" monitor

Note: The Laptop supplied by SMI meets all the system requirements and has all the required software preinstalled.

## 2.2 RED-m Eye Tracking System Components

The RED-m Eye Tracking System includes all the required components to quickly set up the RED-m Eye Tracking Device and eye tracking software.



The RED-m Eye Tracking Device is a sophisticated electronic device with sensitive cameras. A sturdy protective carrying case is provided to protect the RED-m Eye Tracking Device and the components of the RED-m Eye Tracking System.



**Carrying case with Laptop**

The carrying case includes a Laptop pre-configured with all the required software to get you up and running immediately. The required software is described in [Required and Additional Software](#).

The contents of the carrying case include:

- Laptop and power supply cord
- USB card pre-inserted into the Laptop
- Protective case for the RED-m Eye Tracking Device and accessories
- Soft carrying case for the RED-m Eye Tracking Device



**Case contents**

The following shows the RED-m Eye Tracking Device in the soft case.



**Soft case**

The following shows the components stored in the protective case.





### Protective case

The protective case includes the following components:

- RED-m Eye Tracking Device with an integrated USB Cable
- Rubber pads to use the RED-m Eye Tracking Device with a Laptop
- Mounting bracket to use RED-m Eye Tracking Device with a monitor
- Positioning triangle to determine the height and distance of the RED-m Eye Tracking Device relative to the plane of the computer screen
- Ruler to locate the center of the computer screen and to measure the screen's width and height
- Microfibre cleaning cloth to clean the face of the RED-m Eye Tracking Device

## 2.3 Quick Start

The following is a summary of the steps required to set up the RED-m Eye Tracking System.

### Preparation:

1. Run the Installation Package. See [Running the Installation Package](#).
2. If you are using a Desktop PC, attach the RED-m Eye Tracking Device to the mounting bracket which you attach to the bottom edge of the monitor. See [Attaching the Mounting Bracket to a PC Monitor](#).
3. If you are using a Laptop, place the device in the hinge area. See [Placing the Eye Tracking Device on a Laptop](#).

### Setup:

4. Start the iViewRED-m application, which will also start the iView Eye Tracking Server. See [Running iViewRED](#)
5. Select or create a user profile. See [Creating a User Profile](#).
6. Ensure the user is sitting in a comfortable position of approximately 65 cm (approx. 26 inches) from the screen. See [Optimal User Conditions](#).
7. Orient/tilt the RED-m Eye Tracking Device towards the eyes of the user.
8. Set the measurement values in the **Geometry Settings** area of the iViewRED-m application. These values are critical for accurately tracking the user's eyes. The iViewRED-m application needs to know precisely where the RED-m Eye Tracking Device is located relative to the screen. This is done by:
  - Measuring the height and distance of the RED-m Eye Tracking Device to the PC Desktop monitor or Laptop screen.
  - Measuring the width and height of the PC Desktop Monitor screen

(not including the frame), or if using a Laptop, the Laptop screen width and height.

- Measuring the angle between the face of the RED-m Eye Tracking Device and the PC monitor or Laptop screen.

See [Geometry Settings for Desktop PCs](#), [Geometry Settings for Laptops](#) and [Setting Angle Measurements](#).

9. You may need to adjust the sitting position of the user. See [Using the Eye Tracking Monitor](#).
10. The RED-m Eye Tracking Device needs to be calibrated and validated with the user who will be using the Eye Tracking System. This ensures the RED-m Eye Tracking Device is accurately tracking where the user is looking on the screen. See [Calibration Settings](#).

The RED-m Eye Tracking System is now ready for Eye Tracking experiments.

# Preparation

**Chapter**



**3**

## 3. Preparation

### 3.1 Overview

This section describes how to install the software for the RED-m Eye Tracking System and how to mount the RED-m Eye Tracking Device on a Desktop PC monitor or Laptop. This section includes the following topics:

- **Installing the Software**
  - [Required and Additional Software](#)
  - [RED-m Software Structure](#)
  - [Running the Installation Package](#)
- **Mounting the RED-m Eye Tracking Device**
  - [Overview](#)
  - [Attaching the Mounting Bracket to a PC Monitor](#)
  - [Attaching the Device to the Mounting Bracket](#)
  - [Placing the Eye Tracking on a Laptop](#)

### 3.2 Installing the Software

#### 3.2.1 Required and Additional Software

##### Required Software


The required software included in the RED-m Eye Tracking System includes the following:

- Driver for the RED-m Eye Tracking Device
- iView Eye Tracking Server
- iViewRED-m
- SDK (Software Development Kit)

### **Additional Software**

A number of additional products are available from SMI.

- *SMI Experiment Suite 360°*
- *SMI Experiment Center & SMI BeGaze*
- *SMI Plug-in for Techsmith Morae 3.3*

 For more information about the additional software, please contact your local SMI sales representative at [sales@smi.de](mailto:sales@smi.de).

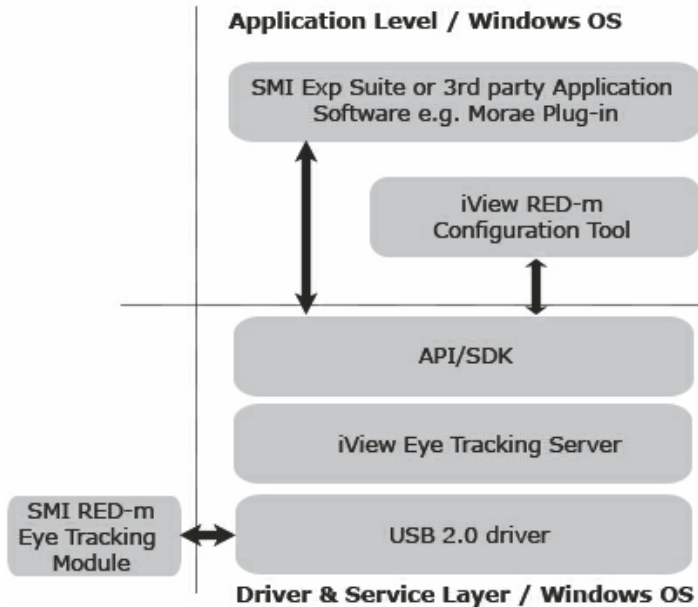
### **3.2.2 RED-m Software Structure**

The RED-m Eye Tracking System consists of the iView Eye Tracking Server and the iViewRED-m application and any required drivers.



As the USB port provides a power supply to the RED-m Eye Tracking Device, a separate power cable and power source is not needed.

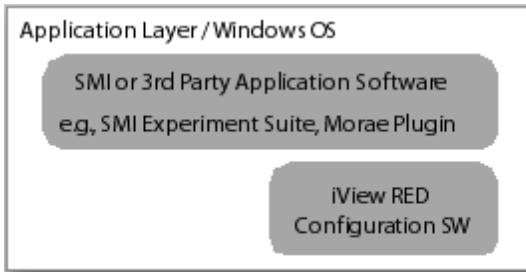
The following shows an overview of the structure of the RED-m Eye Tracking System:



This structure consists of an Application Layer, a Driver and Service Layer, and a Physical Layer. Each layer provides status messages to the Windows operating system. These layers are described in the following sections.

### Application Layer

The top layer is the Application Layer. It consists of the iViewRED-m application and any additional application software such as the *SMI Experiment Suite*, the *Morae* plugin, or a 3rd party application. Application software accesses the RED-m Eye Tracking Device through an exposed API (Application Programming Interface) provided in the Driver and Service Layer.



### Application Layer

The application layer provides status indicators through the use of icons in the Windows Taskbar and in the title bar of the iViewRED-m application. The status indicators includes the following states:

- Not Connected 
- Connecting.... 
- Running 

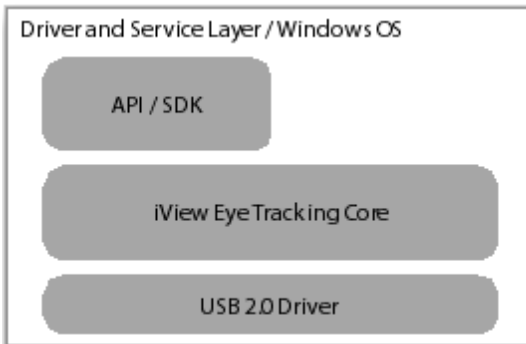
The same status indicator, for example the Running status icon  is shown in the Windows taskbar.

### Driver and Service Layer

The Driver and Service Layer consists of the iView Eye Tracking Server and the USB 2.0 Driver provided by the Windows operating system. This layer also provides the API through which applications in the top layer communicate with the RED-m Eye Tracking Device. The iView Eye Tracking Server provides the Kernel which processes information from the RED-m Eye Tracking Device and sends the resulting coordinates to the application



layer via an API.



**Driver and Service Layer**

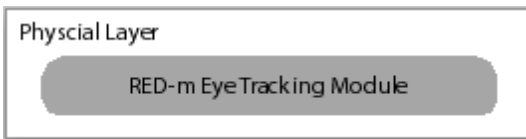
When the iView Eye Tracking Server is running, a status indicator icon



is provided in the Windows taskbar.

### **Physical Layer**

The Physical Layer consists primarily of the RED-m Eye Tracking Device and other required hardware. It communicates with the iView Eye Tracking Server over a USB cable connected to a USB 2.0 port.



**Physical Layer**

The Windows operating system provides a standard status indicator that informs the user the RED-m Eye Tracking Device is now connected. The standard method of disconnecting from USB devices is also used with the RED-m Eye Tracking Device.

### 3.2.3 Running the Installation Package



The following procedure is valid for both a **New Installation** or a **software Update**. For updating the software, see [Update Tab](#).

The **Installation Package** includes the necessary driver for RED-m Eye Tracking Device, the iView Eye Tracking Server, and the iViewRED-m application. This Installation Package needs to be run first to install all the required software before the RED-m Eye Tracking Device is connected to the PC or Laptop.



You will need an internet connection for part of the installation process described below.

**To run the Installation Package, do the following:**



**IMPORTANT:** Before starting the following procedures, ensure the RED-m Eye Tracking Device is NOT plugged in to the USB port on the PC or Laptop.

1. Copy the iView Eye Tracking Server Installation package to the computer and double-click the file to begin installing the software.
2. If your PC or Laptop does not have the .NET Framework 4.0 Client installed, you will be asked to install this software before continuing.
3. If the .NET Framework 4.0 Client needs to be installed, the Installation Wizard will send an internet request to install the .NET Framework 4.0 Client. Depending on the internet connection speed, this may take some minutes before this software has been downloaded and installed.
  1. In the .NET Framework setup dialog, accept the terms and conditions and click **Install** to continue.

2. The .NET Framework 4.0 Client will be installed.
3. When the Installation has completed, click **Finish**.
4. The **Installation Wizard** will launch.
5. On the **Welcome** page, click **Next** to continue.
6. On the **Licence Agreement** page, read carefully, and accept the Licence Agreement and click **Next** to continue.
7. On the **Installation** page, click **Install** to begin the installation.

The Installation Package will now begin to install the required software.

8. A warning dialog will appear to verify that the RED-m Eye Tracking Device is not plugged into any USB port. After ensuring compliance with the request, click **OK** to continue.

The installation can now continue.

9. A warning message from the Windows Operating System may appear to request your permission to install the required driver for the RED-m Eye Tracking Device. As the driver can be safely installed, choose the option that allows the driver to be installed.
10. When the Installation Wizard completes the installation of the drivers and software, a **Completion** page will appear. click **Finish** to close the Installation Wizard.

## 3.3 Mounting the Eye Tracking Device

### 3.3.1 Overview

The RED-m Eye Tracking Device is designed to be mounted on either a

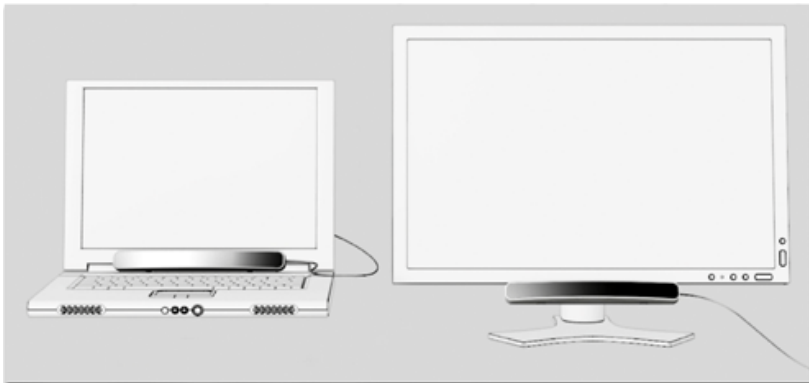
Desktop PC monitor or placed in the hinge area of a Laptop.



The RED-m Eye Tracking Device can only be used with a monitor between 10" to 22".

### Completed Setup

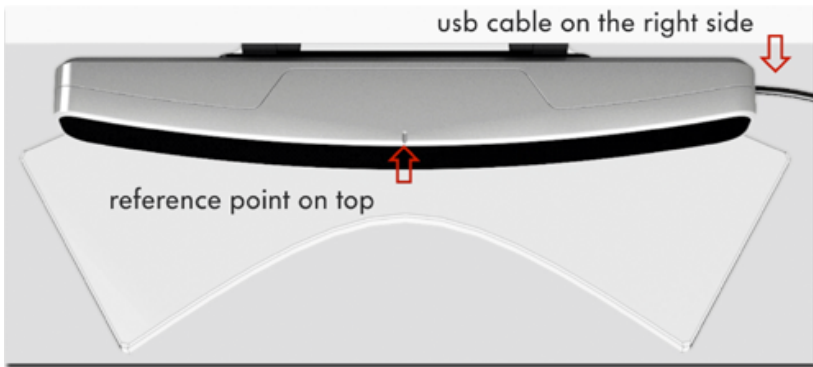
The following shows a completed setup showing the RED-m Eye Tracking Device laying in the hinge area of a Laptop and attached to a monitor with the included mounting bracket.



**Completed Setup with a Laptop and a Monitor**

### Reference Point

A reference point has been provided on the top side of the RED-m Eye Tracking Device. This point is used to assist in configuring the iViewRED-m application. It also ensures the device is mounted correctly.

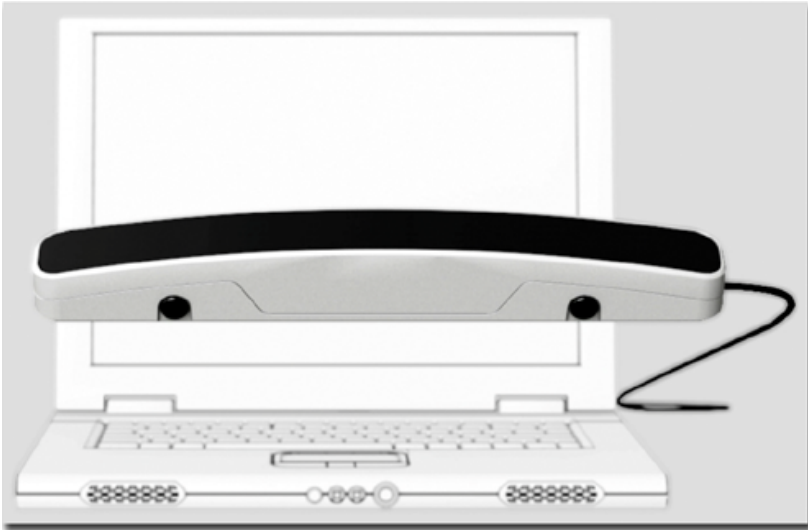


### Reference Point

» See [Attaching the Mounting Bracket to a PC Monitor and Connecting the RED-m Eye Tracking Device to the Mounting Bracket](#).

### Rubber Pads For Use with Laptops

To use the RED-m Eye Tracking Device with a Laptop, rubber pads are provided which are attached to the indentations on the bottom side of the device.



**Attached rubber pads for use with a Laptop**

» See [Using the RED-m Eye Tracking Device With a Laptop](#).

### 3.3.2 Attaching the Mounting Bracket

A mounting bracket is provided to attach the RED-m Eye Tracking Device to the bottom edge of a PC monitor. When using a Laptop, this bracket is not required.

Attaching the bracket to the monitor takes only a few minutes. Before beginning, you will need the mounting bracket and the ruler provided in the case.



The **RED-m Eye Tracking Device** is not designed to be attached to the front side of the PC monitor frame, neither on the upper nor lower areas of the frame. The bracket is positioned at the center point of the monitor and is attached to the **Bottom Side** of the monitor frame. Clean the monitor frame

before mounting the bracket to ensure good adhesion.

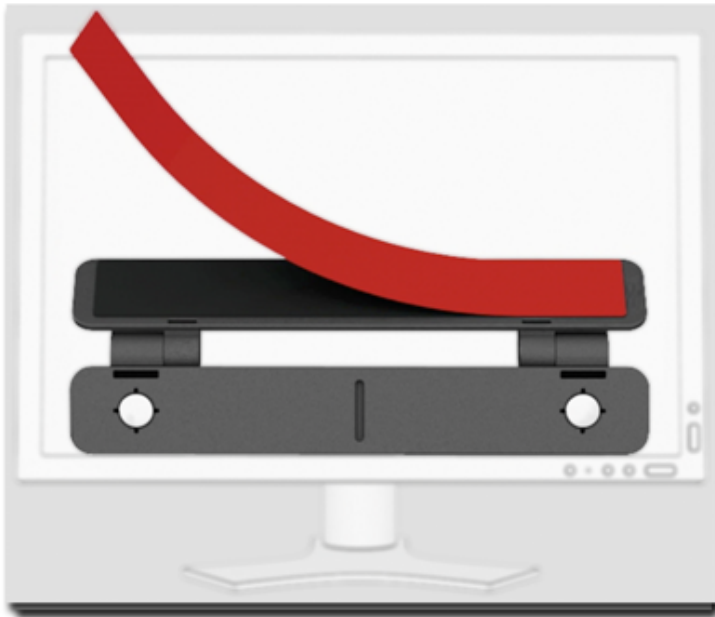
**To mount the bracket on a PC Desktop Monitor:**

1. Locate the horizontal center point of the monitor (including the frame).



**Locating the Center Point**

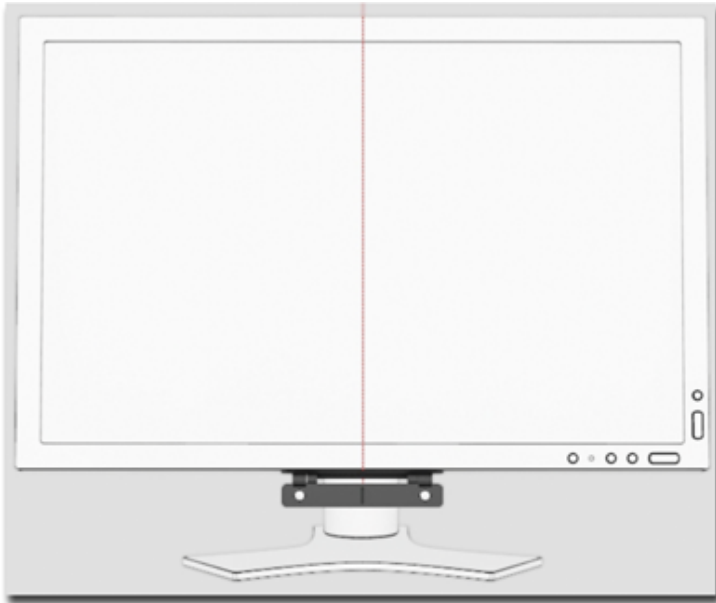
2. Remove the protective cover from the adhesive strip on the bracket.



### Removing the Adhesion Strip Cover

3. Attach the mounting bracket at the center point (located in step 1 above) and on the bottom side of the monitor using the adhesive strip. Press and hold the bracket for a few moments to ensure adhesion to the frame.





**Mounting Bracket attached**

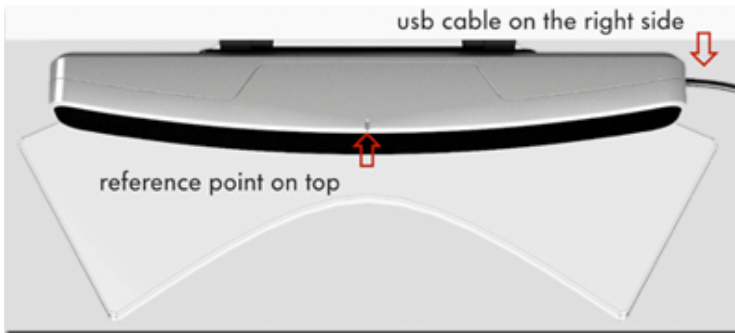
4. See [Connecting the RED-m Eye Tracking Device to the Mounting Bracket](#) to continue.

### **3.3.3 Attaching the Device to the Mounting Bracket**

High-strength magnets on the mounting bracket securely attach the **RED-m Eye Tracking Device** to the bracket.

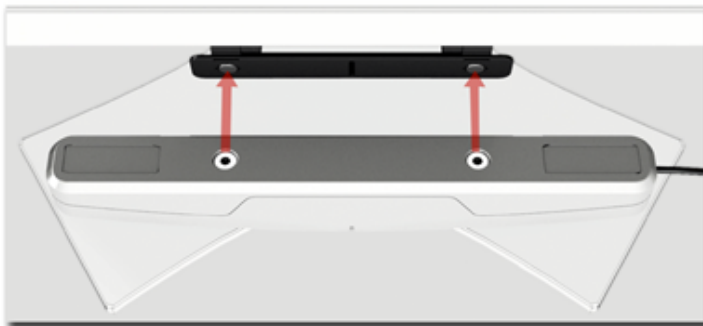
**To connect the RED-m Eye Tracking Device to the mounting bracket:**

1. Ensure the USB cable is to the right and the Reference Point is on top, as shown below.



**RED-m Device showing correct orientation**

2. Attach the RED-m Eye Tracking Device to the mounting bracket using the magnetic connectors, as shown below.



**Magnetic connectors**

3. Angle the RED-m Eye Tracking Device upwards towards the eyes of the user, as shown below.



**Eye Tracking Device installed on a monitor**

**i** Before the RED-m Eye Tracking Device is connected to an available USB 2.0 port, the iView Eye Tracking Server software must first be installed. If not, see [Running the Installation Package](#).

### **3.3.4 Placing the RED-m Eye Tracking Device on a Laptop**

When the RED-m Eye Tracking Device is used with a Laptop, it simply rests in the hinge area. Rubber pads are attached to the bottom side of the device to securely hold it in place.

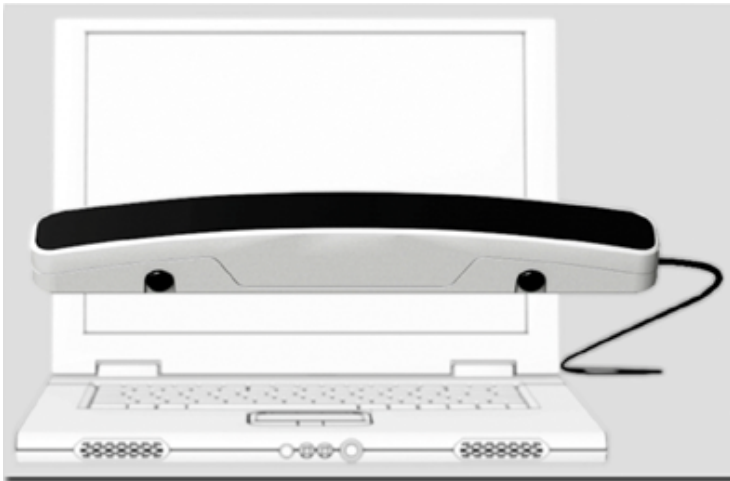
Placing the RED-m Eye Tracking Device takes only a few minutes. Before beginning, you will need the rubber pads and the ruler provided in the case.

**i** Because the RED-m Eye Tracking Device rests in the hinge area of the Laptop, it is possible that the RED-m Eye Tracking Device can obscure a small portion of the Laptop screen. This must be taken into account when making settings in the iViewRED-m application. See [Geometry Settings for](#)

### Laptops.

#### **To place the RED-m Eye Tracking Device on a Laptop:**

1. Locate the horizontal center point of the laptop screen (including the frame) using the supplied ruler.
2. Remove the rubber pads from the containers.
3. Attach the rubber pads to the attachment points on the bottom side of the RED-m Eye Tracking Device, as shown below.



**Attached rubber pads**

4. With the USB cable to the right and the Reference Point on top, place the RED-m Eye Tracking Device in the hinge area of the laptop.
5. Place the RED-m Eye Tracking Device at the center point (located in step 1 above) and in the hinge area of the laptop.



**Device centered and resting in hinge area of Laptop**

6. Angle the RED-m Eye Tracking Device upwards towards the eyes of the user. You may have to angle back the Laptop screen to achieve this.



Before the RED-m Eye Tracking Device is connected to an available USB 2.0 port, the iView Eye Tracking Server software must first be installed. If not, see [Running the Installation Package](#).

# Setting Up the System

**Chapter**



**4**

## 4. Setting Up the System

### 4.1 Overview

This section describes how to set up the RED-m Eye Tracking System using the iViewRED-m application. The section includes the following topics:

- [Optimal User Conditions](#)
- [Running iViewRED](#)
- [Changing the Sampling Rate](#)
- User Profiles
  - [Creating a User Profile](#)
  - [Selecting a User Profile](#)
  - [Deleting a User Profile](#)
- [Eye Tracking Monitor](#)
- Geometry Measurements
  - [Setting Geometry Measurements for PC Monitors](#)
  - [Setting Geometry Measurements for Laptops](#)
  - [Using the Eye Tracking Monitor](#)
  - [Obtaining the RED Angle Measurement](#)
- Calibration

- [About Calibration](#)
  - [Calibration Tab](#)
  - [Running a Calibration Test](#)
  - [Advanced Calibration](#)
- 
- [Update Tab](#)
  - [Advanced Tab](#)
  - [Shutting Down the System](#)

## 4.2 Optimal User Conditions

The RED-m Eye Tracking Device is an optical camera system based on infrared technology. Therefore, to ensure the RED-m Eye Tracking Device is operated under optimal conditions, do the following:

- The user should sit at a distance of between 50cm and 75cm from the Desktop PC monitor or Laptop screen.
- Minimize any interference from direct sunlight on the RED-m Eye Tracking Device.
- Do not use the RED-m Eye Tracking Device in conditions where the user's pupils would dilate and contract frequently, such as bright lights switching on and off.
- Do not cover or block the RED-m Eye Tracking Device when it is powered up and is connected to the iViewRED-m application.
- When a user is wearing glasses, make sure the glasses are clean and free of streaks so that light does not reflect off the glasses and become



visible. These reflections will be visible in the Eye Image Monitor in the iViewRED-m application.

- Do not use a PC monitor larger than 22 inches.
- For best results, the brightness of the background color of the calibration test should be similar to the mean brightness of the stimuli shown during the experiment. This is important as to avoid large variations in the pupils of the user's eyes during the experiment, to achieve best data accuracy. See [Calibration Tab](#).


### 4.3 Running iViewRED-m

The iViewRED-m application provides the iView Eye Tracking Server with the exact position of the RED-m Eye Tracking Device with respect to a Laptop screen or PC monitor.

The following procedure assumes the RED-m Eye Tracking Device has been mounted properly on either a Desktop PC monitor or in the hinge area of the Laptop. If not, see [Connecting the RED-m Eye Tracking Device to the Mounting Bracket](#) or [Using the RED-m Eye Tracking Device With a Laptop](#).

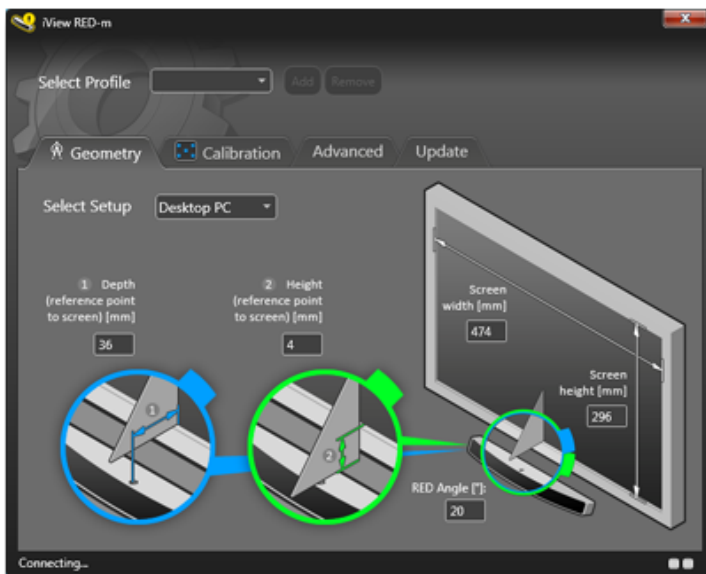


The operating status of the RED-m Eye Tracking System is indicated through the use of icons in the Windows Taskbar and in the title bar of the iViewRED-m application. The status indicators includes the following states:

- Not Connected 
- Connecting.... 
- Running 


**To run the iViewRED-m application, do the following:**

1. Plug in the RED-m Eye Tracking Device to an available USB 2.0 port on your Laptop or PC.
2. Start the iViewRED-m application. This will also start the iView Eye Tracking Server which will begin immediately attempting to connect to the RED-m Eye Tracking Device.
3. The iViewRED-m icon and iView Eye Tracking Server icon will also appear in the Windows Taskbar.


**Connecting to RED-m Eye Tracking Device**

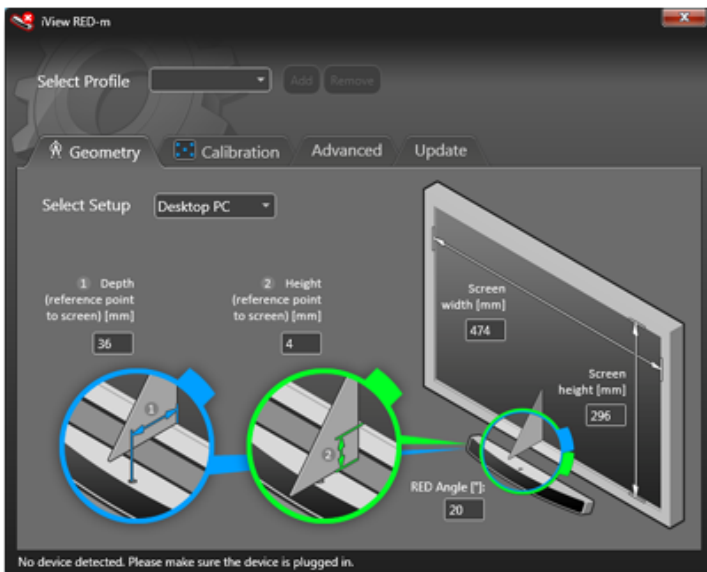
4. A set of dim red lights will illuminate on the left and right side of the front panel of the device to indicate the cameras are switched on and attempting to sending data to the iView Eye Tracking Server.

5. The status of the iViewRED-m application will show "**Connecting...**" The icon in the title bar and Windows Taskbar will show the **Connecting**

status indicator .

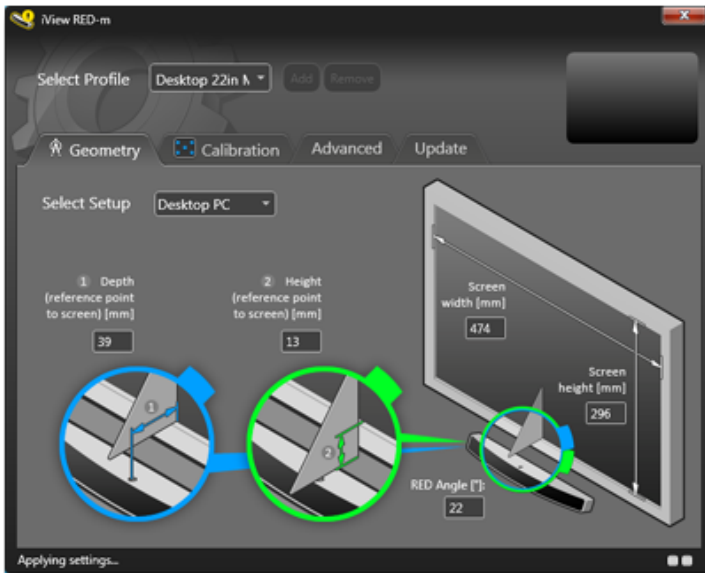
6. If the iViewRED-m application could not find the RED-m Eye Tracking Device (for instance, it was not connected to a USB 2.0 port), it will indicate this by a warning message "**No device detected. Please make sure the device is plugged in**". The icon in the title bar and Windows

Taskbar will show the **Not Connected** status indicator . Check to make sure the device is properly connected to the USB port.



**No device is detected**

7. When the iView Eye Tracking Server has found the RED-m Eye Tracking Device, the the iViewRED-m application will begin applying settings to the application.

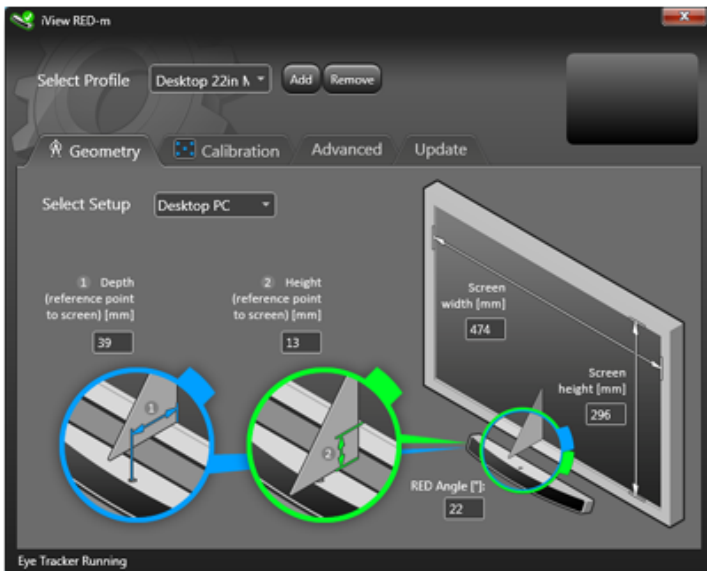


### Applying settings

8. After the stored settings have been applied, the iViewRED-m application will show **"Eye Tracker Running."** The icon in the title bar and Windows

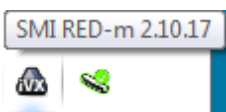
Taskbar will show the **Running** status indicator





**RED-m Configuration Tool Running and Connected to Eye Tracking Device**

9. The iView Eye Tracking Server icon and the iViewRED-m application icons in Windows Taskbar will appear.



**Windows Taskbar icons**

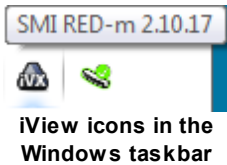
## 4.4 Changing the Sampling Rate

You can change the rate at which the iView Eye Tracking Server samples the images from the RED-m Eye Tracking Device. The settings are either

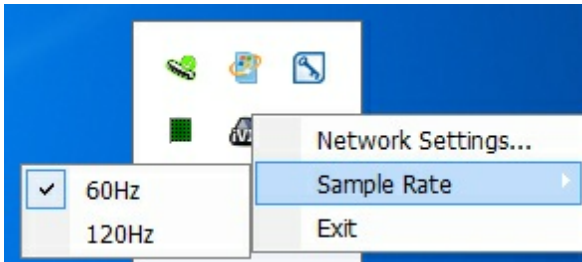
60 Hz or 120 Hz.

**To change the sampling rate, do the following:**

1. Select the iView Eye Tracking Server icon in the Windows taskbar.



2. Right-click the iView Eye Tracking Server icon and select Sampling Rate.



3. Choose from 60Hz or 120Hz.

## 4.5 User Profiles

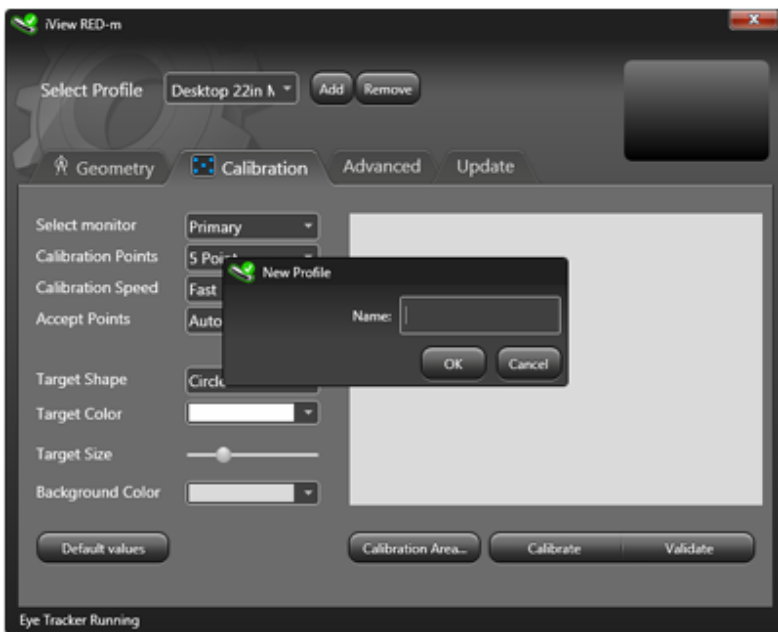
### 4.5.1 Creating a User Profile

The iViewRED-m application provides a set of default user profiles. You can, however, create a unique profile that saves the settings you make for different users or different conditions.

For example, you can save settings for use with a Laptop with a specific user, adjust these settings for a new user and then save the changes in a new user profile. You can easily switch between profiles without having to re-enter the settings.

### To create a user profile:

1. Run the iViewRED-m application.
2. In the **Select Profile** area, click **Add** to open the **New Profile** dialog.



### Add a new profile

3. Enter a profile name in the **Profile** field, and click **OK**.

All settings made during the current session will be saved to this profile.

### 4.5.2 Selecting a User Profile

You can switch between saved profiles through a simple drop-down list in the header area of the iViewRED-m application.

**To select a user profile:**

1. Run the iViewRED-m application.
2. In the **Select Profile** field, click the down-arrow to open a list of available saved profiles.
3. Select one of the saved profiles.
4. The iViewRED-m application will then apply the settings stored in the profile.

### 4.5.3 Deleting a User Profile

User profiles no longer needed can be deleted.

**To delete a user profile:**

1. Run the iViewRED-m application.
2. In the **Select Profile** field, click the down-arrow to open a list of available saved profiles.
3. Select a saved profile from the list and click **Remove**.



## 4.6 Geometry Measurements

### 4.6.1 Device Orientation Using the Eye Tracking Monitor

To reliably track the user's eyes, the user needs to be positioned correctly in front of the RED-m Eye Tracking Device, and the device has to be oriented in a way which allows it to see the user while the user is sitting comfortably in front of it. The iViewRED-m application provides an Eye Tracking monitor to give a visual clue to the user to locate the optimal position from the monitor. The optimal position is a distance of between 50 cm and 75 cm away from the screen and approximately centered facing the screen.



To achieve best accuracy, the RED-m Eye Tracking Device needs to know its position and orientation with respect to the monitor, see also [Geometry Settings for Desktop PCs](#), [Geometry Settings for Laptops](#), and [Calibration](#) for details. Should you feel the need to repeat the following procedure to re-adjust the RED-m Eye Tracking Device orientation, please also redo the geometry setting procedure described in [Geometry Settings for Desktop PCs](#), [Geometry Settings for Laptops](#).

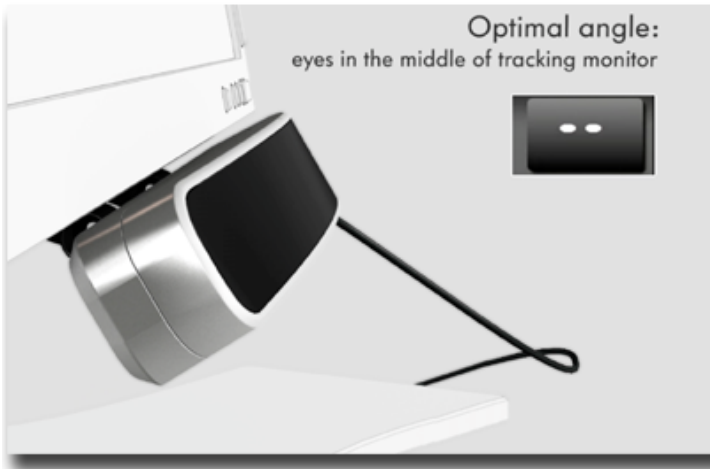
**To orient the device and position the user in an optimal position, do the following:**

1. Have the user sitting comfortably in front of the RED-m Eye Tracking Device, at an optimal distance from the screen within the tracking range of the RED-m Eye Tracking Device: if the user is within the tracking range of the device, the distance will be shown at the lower edge of the Eye Tracking Monitor, otherwise you can assess the distance using the provided ruler.



See also [Optimal User Conditions](#)

2. Adjust the orientation/tilt of the RED-m device / mounting bracket so the user's "eyes" appear in the center of the Eye Tracking monitor.



**Optimal angle for RED-m Device**

### **Left or Right Adjustment**

To assist the user to find the optimal position, the Eye Tracking Monitor provides several visual cues in the form of arrows.



**Left or right adjustment**

In this example, the Eye Tracking Monitor tells the user to move slightly to the right and away from the RED-m Eye Tracking Device.

## Adjust Head Angle

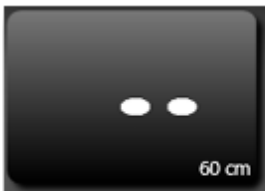
When the user's head angles to the left or right, the RED-m Eye Tracking Device cannot accurately track both eyes. This is shown in the Eye Tracking Monitor by one of the "eye" ovals grayed out.



**Head angle not aligned**

## Optimal Position

When a user is sitting at an optimal position in front of the RED-m Eye Tracking Device, the Eye Tracking Monitor will show the user's eyes as two ovals somewhere near the center. This means the user is at an ideal distance from the monitor and the RED-m Eye Tracking Device can track both of the user's eyes. Distance values are provided in the Eye Tracking Monitor. In the following example, the user is sitting approximately 60 cm from the screen.



**Distance value shown to  
the device**

## 4.6.2 Setting Geometry Measurements for PCs

To accurately track the user's eyes, the iViewRED-m application needs to know precisely where the RED-m Eye Tracking Device is relative to the screen, and the screen dimensions. This is done by entering a set of measurements in the **Geometry** tab.

These settings include:

- **Depth**, which is the horizontal distance from the reference point on the RED-m Eye Tracking Device to the screen.
- **Height**, which is the vertical distance from the bottom edge of the screen (not including the frame) to the top edge of the RED-m Eye Tracking Device at the reference point.
- **Screen Width**, which is, as it implies, the width of the screen not including the frame.
- **Screen Height**, which is, as it implies, the height of the screen not including the frame.
- **Angle**, which is the difference (in degrees) between the angle of the front shield (face) of the RED-m Eye Tracking Device and the angle of the screen.

**Note:** For details on setting the angle measurement, see [Setting Angle Measurements](#).

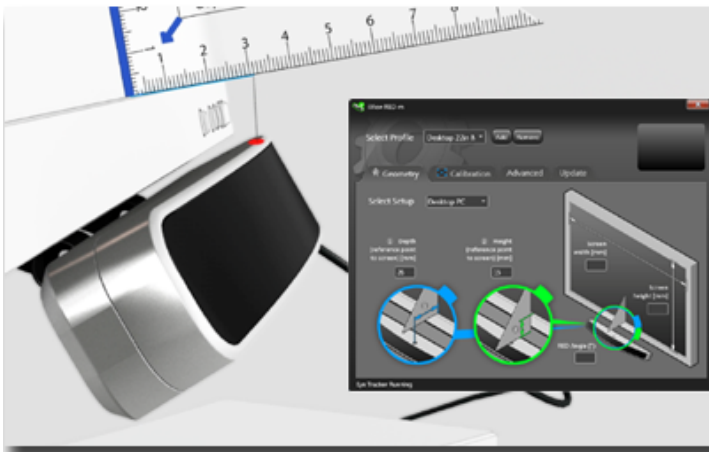


For the following procedure, you will need the measurement triangle and the ruler provided in the case.

**To set geometry measurements for a PC monitor, do the following.**

1. Run the iViewRED-m application as described in [Running the RED Configuration Tool](#).

2. Ensure the RED-m Eye Tracking Device is angled upwards towards the eyes of the user. See also [Optimal User Conditions](#).
3. Select the default Desktop PC profile, or add a new profile. See also [Creating a User Profile](#).
4. Select the **Geometry** tab.
5. Select **Desktop PC** from the **Select Setup** dropdown menu.
6. Use the supplied measurement triangle to measure the distance from the Reference Point on the RED-m Eye Tracking Device to the screen, as shown below.

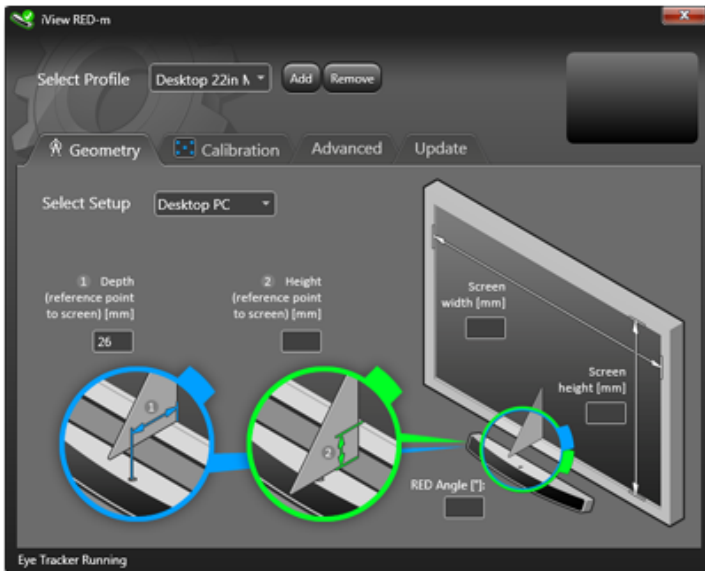


**Measuring depth offset**



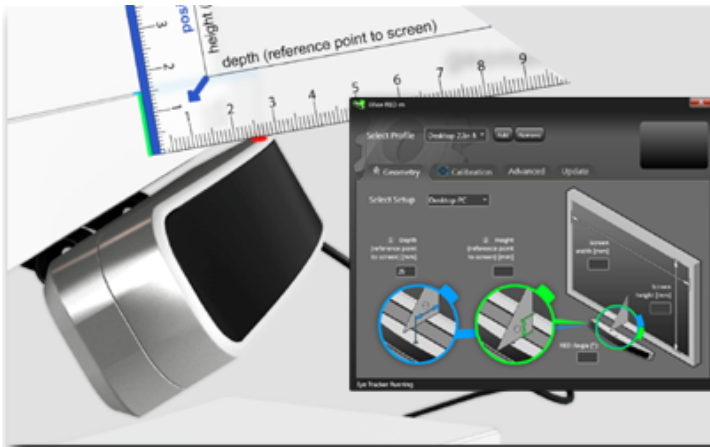
On some monitors the measurement triangle may rest against the frame of the PC monitor rather than the screen. In this case, add the thickness of the frame (typically 2 mm) to the total measurements.

7. Enter this depth measurement in the **Depth** field, as shown below.



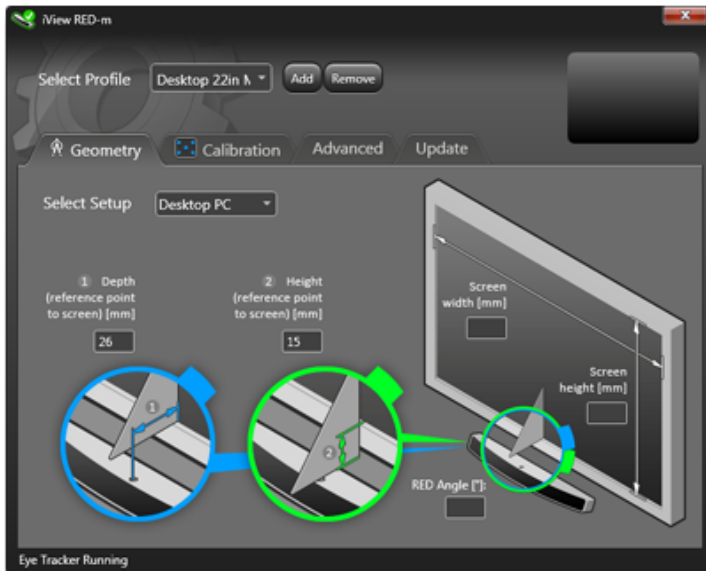
### Depth measurement entered

8. Use the supplied measurement triangle to measure the height from the Reference Point on the RED-m Eye Tracking Device to the bottom edge of the screen, as shown below.



### Measuring height offset

9. Enter this height measurement into the **Height** field, as shown below.



### Height measurement entered

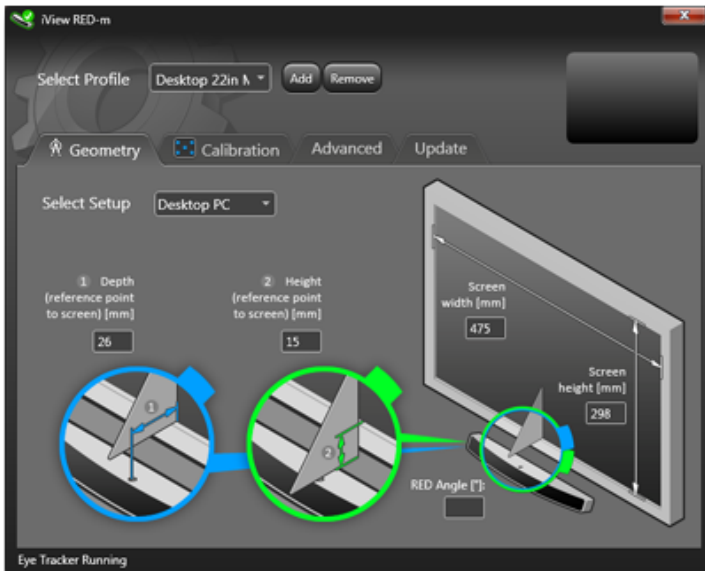
10. Use the supplied ruler to measure the width and height of the screen, excluding the frame, as shown below.





**Measuring screen height and width**

11. Enter these measurements in the **Screen width [mm]** field and the **Screen height [mm]** field.



**Measurements entered, except angle**

12. Determine the RED-m Angle measurement. For details, see [Obtaining the RED Angle Measurement](#).

13. The values are automatically saved to the selected User Profile.

#### 4.6.3 Setting Geometry Measurements for Laptops

Setting the geometry values for Laptop screens is the same as for Desktop PC monitors. To accurately track the user's eyes, the iViewRED-m application needs to know precisely where the RED-m Eye Tracking Device is relative to the screen. This is done by entering a set of measurements in the **Geometry Settings** tab.

These settings include:

- **Depth**, which is the horizontal distance from the reference point on the RED-m Eye Tracking Device to the screen.
- **Height**, which is the vertical distance from the bottom edge of the Laptop screen (not including the frame) to the top edge of the RED-m Eye Tracking Device at the reference point.

**Note:** On some Laptops, the RED-m Eye Tracking Device may obscure a part of the lower edge of the screen. In this case, the Height value will be a negative value.

- **Screen Width**, which is, as it implies, the width of the screen (not including the frame).
- **Screen Height**, which is, as it implies, the height of the screen (not including the frame).
- **Angle**, which is the difference (in degrees) between the angle of the front shield (face) of the RED-m Eye Tracking Device and the angle of the screen.

**Note:** For details on setting the angle measurement, see [Setting Angle Measurements](#).

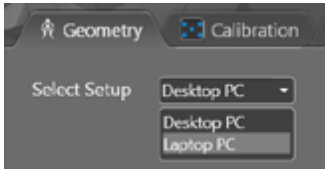


For the following procedure, you will need the measurement triangle and the ruler provided in the case.

#### **To set geometry values for a Laptop:**

1. Run the iViewRED-m application as described in [Running iViewRED](#).
2. Select the default Laptop profile, or add a new profile. See [Creating a User Profile](#).
3. Ensure the RED-m Eye Tracking Device is angled upwards towards the eyes of the user. See [Optimal User Conditions](#).

4. Select the **Geometry** tab.
5. Select **Laptop PC** from the **Select Setup** dropdown menu.



**Select Laptop dropdown**

6. Use the supplied measurement triangle to measure the distance from the Reference Point on the RED-m Eye Tracking Device to the screen of the Laptop, as shown below.



**Measuring depth offset**

7. Enter this depth measurement in the **Depth** field, as shown below.



### Depth measurement entered

8. Use the supplied measurement triangle to measure the height from the Reference Point on the RED-m Eye Tracking Device to the bottom edge of the Laptop screen, as shown below.



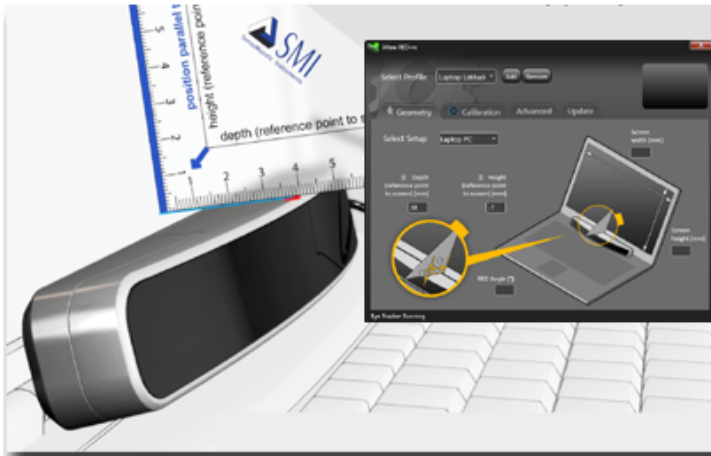
### Measuring height offset

9. Enter this height measurement in the **Height** field, as shown below.



### Height measurement entered

**i** If the RED-m Eye Tracking Device obscures a small part of the screen, measure the height from the Reference Point to the bottom edge of the Laptop as shown below. In this case, The value will be a negative value. You can use the measurement triangle and the ruler to measure down to the bottom edge of the screen.



### Negative height offset

Enter this negative value in the **Height** field, as shown below.





### Negative height measurement entered

10. Measure the width and height of the laptop screen, as shown below using the ruler.



**Measuring width and height of screen**

11. Enter these width and height values in the **Screen width [mm]** field and the **Screen height [mm]** field.



### Geometry Laptop screen width and height

12. Determine the RED angle measurement. For details, see [Obtaining the RED Angle Measurement](#).

13. The values are automatically saved to the selected User Profile.

#### 4.6.4 Obtaining the RED Angle Measurement

The Angle Measurement is the difference (in degrees) between the angle of the front shield (face) of the RED-m Eye Tracking Device and the angle of the screen of either the PC monitor or Laptop. This measurement is needed to provide for the best possible head movement compensation. The iViewRED-m application has a default setting that is adequate for most uses of the RED-m Eye Tracking Device.

The range of possible values are from 0° to 30°. The default setting is

“automatic estimation” where the angle calculation is based on the values entered in the **Depth**, **Height**, **Screen width**, and **Screen height** fields. The estimated value is typically around 20°. Entering 0 resets the measurements back to the default setting.



**Note:** If you need to set the RED Angle measurement, you can obtain several applications for smartphones that perform this measurement using the smartphone. Otherwise, you can use a manual device.

**To set the RED Angle measurement, do the following:**

1. Determine the angle of the front shield RED-m Eye Tracking Device from the vertical.
2. Determine the angle of the screen from the monitor.
3. Determine the difference between these two measurements and enter this value to the **RED Angle** field in the **Geometry** tab.



### Angle measurements

#### Resetting the Angle Measurement to the Default Value

To reset the angle measurement back to "automatic estimation", which is the default value, enter **0** in the **RED Angle** field.

## 4.7 Calibration

### 4.7.1 About Calibration

The Calibration process is used by the RED-m Eye Tracking Device to adapt to the unique characteristics of a user's eyes, to achieve the best possible data accuracy.

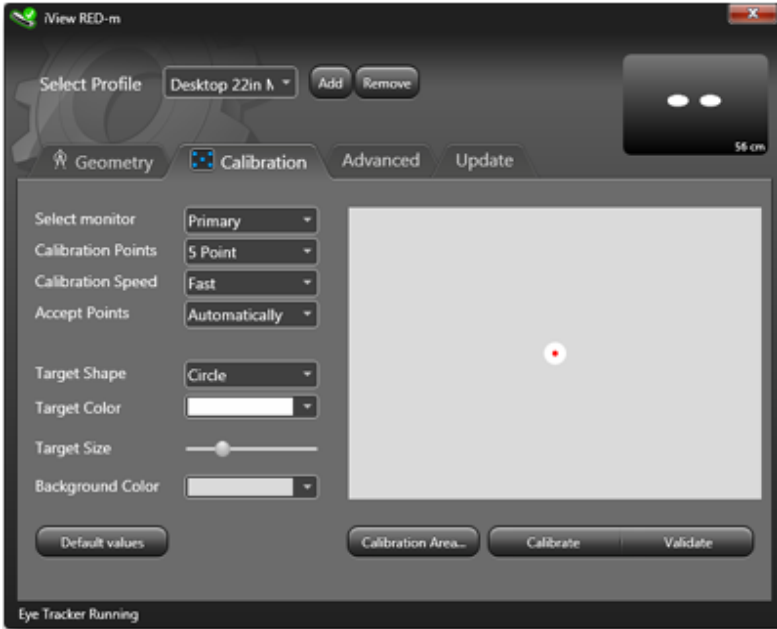
Before any meaningful results can be obtained from the RED-m Eye Tracking Device, the current setup on the RED-m Eye Tracking Device

needs to be calibrated.

Simply put, a successful Calibration ensures that the RED-m Eye Tracking Device is accurately tracking where the user is looking on the screen. For the user, this test simply means observing a series of targets that will be sequentially displayed on the screen. The Calibration is then validated using a similar procedure to ensure the results obtained during the calibration test are valid.

### 4.7.2 Calibrating Settings

The **Calibration** tab provides settings for running Calibration and Validation tests. It also displays the results of the test. The following shows the Calibration tab with the default values of the selected profile loaded.



**Calibration tab**

**i** **Note:** If you have not entered measurement values in the **Geometry** tab, do so now before continuing. See [Geometry Settings for Desktop PCs](#) or [Geometry Settings for Laptops](#).

### Calibration Settings

|                              |   |
|------------------------------|---|
| <p><b>Select Monitor</b></p> | <p>If two monitors are connected to the PC or Laptop, you can select which monitor will be used to perform eye tracking. This should be the monitor under which the RED-m Eye Tracking Device is mounted. The default setting is Primary.</p> |
|------------------------------|---|

|                           |  |
|---------------------------|--|
| <b>Calibration Points</b> | Select from 0 point, 1 point, 2 points, 5 points, or 9 points. This sets the number of points that the user must observe during calibration tests. The default setting is 5 points. A higher accuracy can be achieved using a larger sample of points. See <a href="#">Advanced Calibration</a> .                  |
| <b>Calibration Speed</b>  | Select from Normal or Fast. Users with difficulty performing the calibration test may achieve better results with a slow calibration speed.  |
| <b>Accept Points</b>      | Select Automatically or Manually. This allows the user to accept the points manually by pressing the space bar at each calibration point. Faster tests can be performed with the automatic setting, but users with difficulty performing the calibration test may achieve better results using the manual setting. |
| <b>Target Shape</b>       | Select from Image, Circle, or Cross. When Circle or Cross are selected, the Target Color option appears. When Image is selected, the Target File option appears to select an image from the PC or network drive.   |
| <b>Target Color</b>       | Appears when <b>Target Shape</b> is set to either Circle or Cross. Opens an Available Colors popup window to select from a range of grayscale colors.  |
| <b>Target File</b>        | Appears when <b>Target Shape</b> is set to Image. Browse to an image to load to the Calibration screen.  |



|                         |   |
|-------------------------|---|
| <b>Target Size</b>      | Slider to set the size of the calibration target on the Calibration screen.   |
| <b>Background Color</b> | <p>Select from a set of grayscale colors for the background of the Calibration screen. Default is gray.</p> <p><b>Note:</b> The background color should be similar to the color of the screen to maintain the same level of brightness. Changing the brightness causes the pupils of the user's eyes change which can affect the calibration tests.</p> |
| <b>Default Values</b>   | When clicked, resets all values in the Calibration tab to the default settings.   |
| <b>Calibration Area</b> | <p><b>This settings is for advanced use only. Changes are not normally required to these settings.</b> When clicked, displays the calibration areas, which are blocks of the screen as defined by the number of points selected in the <b>Calibration Points</b> dropdown. See <a href="#">Advanced Calibration</a> for details.</p>                    |
| <b>Calibrate</b>        | When clicked, runs the calibration test. See <a href="#">Running a Calibration Test</a> .   |
| <b>Validate</b>         | When clicked, runs the validation test. This is normally done after the calibration test has been run. See <a href="#">Running a Calibration Test</a> .   |

### 4.7.3 Running a Calibration Test

When you run a Calibration test, the iViewRED-m application goes briefly into full screen mode and a series of target shapes are displayed in succession in each of the areas of the screen as defined by the set number of Calibration points. If the **Calibration Points** was set to 5 Point, five points will be displayed beginning with one point in the center and then four more points in each of the four quadrants of the screen.

**Note:** The test can be canceled at any time by using the Esc (Escape) key.

A calibration test consists of two parts:

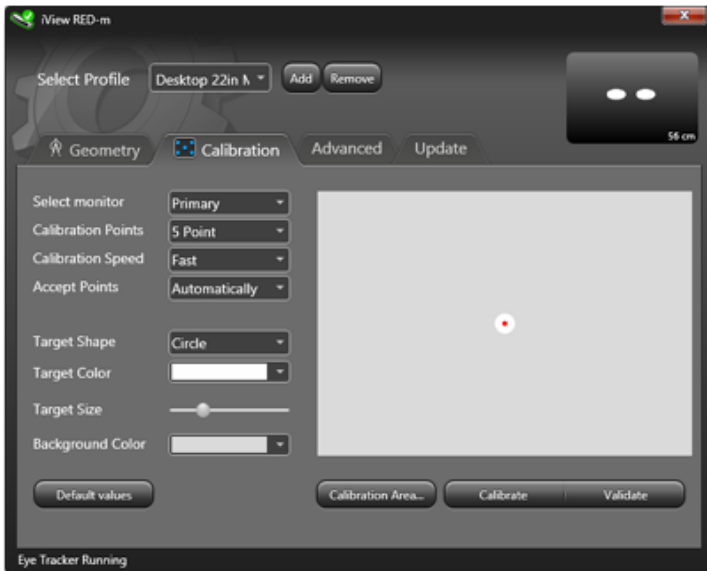
1. Calibrating the current setup of the RED-m Eye Tracking Device with the user.
2. Validating the results of the calibration with the same user.



The robustness of the calibration test depends on the environment of the test. See [Optimal User Conditions](#).

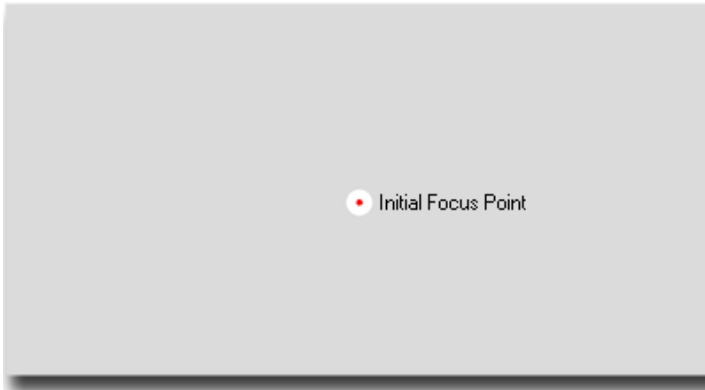
#### **To run a calibration test:**

1. Run the iViewRED-m application as described in [Running iViewRED-m](#).
2. Ensure the measurement values are set in the **Geometry** tab.
3. In the iViewRED-m application, select the **Calibration** tab. The following shows the default settings.



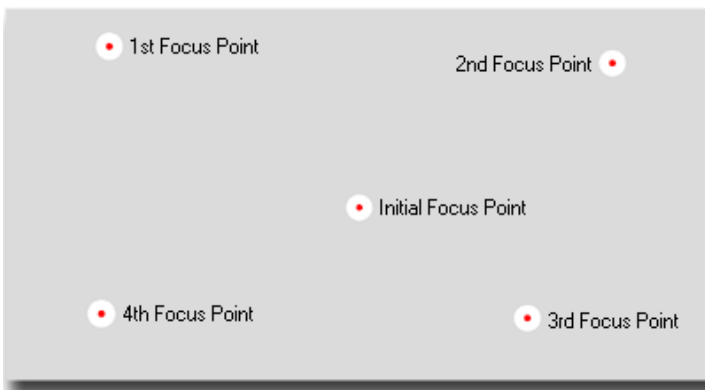
### Calibration tab

4. Make any required calibration settings, as described in [Calibration Settings](#).
5. Click **Calibrate** to begin the test.
6. The iViewRED-m application goes into full screen mode and displays the calibration screen with an initial focus point for the user, as shown below.



**Initial focus point**

7. After several seconds, a series of focus points will be displayed in succession on the screen. The user must focus on each point as it is displayed. The following shows five target points in each of the four quadrants of the screen.



**Focus points**



It is important that the user keeps the eye gaze focused on

these points. If the results are unusual or inadequate, run the calibration test again while ensuring the user keeps a focus on each point as it appears.

8. When the calibration test is completed, the iViewRED-m application exits full screen mode and returns to the **Calibration** tab.
9. The calibration must be then validated, as described in the procedure below.

**To run a validation test, do the following**

1. Click **Validate** to begin the validation.
2. The iViewRED-m application goes into full screen mode and displays the validation screen similar to the calibration screen shown above.
3. Validation will begin immediately without any initial focus point.
4. The user must focus on each of the focus points as they are displayed, as shown below.



**Validation points**

- When the validation is completed, the iViewRED-m application exits full screen mode and returns to the Calibration tab.
- The results of the calibration will be displayed in the **Calibration Monitor**.



### Calibration validated

- In the example above, the accuracy of the RED-m Eye Tracking Device for the X axis is  $0.4^\circ$  while for the Y axis is  $0.4^\circ$ , which is an acceptable result.
- The results of the calibration test are saved in the user profile. See [Creating a User Profile](#) to add a new profile based on these results.



The accuracy of the results depends on the calibration point area and the screen size.

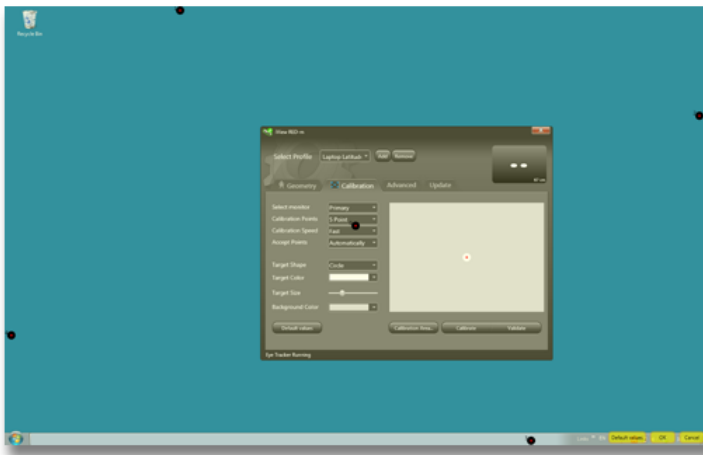
#### 4.7.4 Setting the Calibration Area

Different calibration options are available with the iView Eye Tracking Server. The following information is not normally required to run an eye gazing experiment. However, under certain conditions, increasing the number of points used to define the calibration area may improve the results.

To set the Calibration Area, select **Calibration Area** in the **Calibration** tab of the iViewRED-m application.

To set the calibration area, do the following:

1. Select the number of calibration points from the **Calibration Points** dropdown.
2. Click **Calibration Area**. The iViewRED-m application will go into full screen mode with the target points showing in each quadrant, as shown below.



**Calibration Area showing 5 points**

3. Adjust the position of the Target points and click **OK**. See the sections below for the number of calibration points before making any changes.
4. You can reset the values back to default by clicking **Default values**.



**Note:** 0 Point and 1 Point calibration areas cannot be set as there are not target points to change.

### 0 Point Calibration

The iView Eye Tracking Server can perform a 0 Point Calibration without measuring any physical characteristics of a participant. Therefore, a calibration will be performed automatically without any calibration background showing calibration points, and will start calculating gaze data directly after the calibration button has been pushed. The 0 Point Calibration is not recommended for highest accuracy, but it is suitable for users who have difficulty achieving a successful calibration with 2, 5, or 9 points.

### 1 Point Calibration

The 1 point calibration offers improved accuracy over the 0 Point Calibration. It will show one calibration point directly in the middle of the screen. This calibration is suitable for users who have difficulty achieving a successful calibration with 2, 5 or 9 points.

The calibration point **MUST BE** placed in the middle of the screen, that's why it's not allowed to change the position of the calibration point at all.

### 2 Point Calibration

The 2 Point Calibration is quick and easy to perform and is a good choice for fast, efficient and accurate data recording.

Calibration points **MUST BE** placed on a diagonal axis from the top left



corner to the bottom right corner of the stimulus area. The following shows the correct and incorrect 2 point calibration settings.



*Correct 2-point calibration scheme*



*Wrong 2-point calibration scheme*

### **2 Point Calibration**

## **5 Point Calibration**

The 5 Point Calibration offers excellent accuracy and an easy calibration process.

Calibration points **MUST NOT** be placed on the same horizontal or vertical line. The following shows the correct and incorrect 5 point calibration settings.



*Correct 5-point calibration scheme*



*Wrong 5-point calibration scheme*

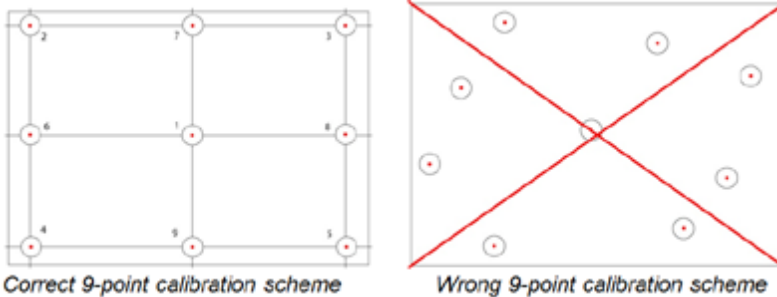
### **5 Point Calibration**

## 9 Point Calibration

The 9 Point Calibration offers the highest accuracy, but the user must be able to stay focused for a longer time compared to the other calibration methods.

If a user has difficulty with this calibration method, a 5 Point Calibration or 2 Point calibration can often give superior results.

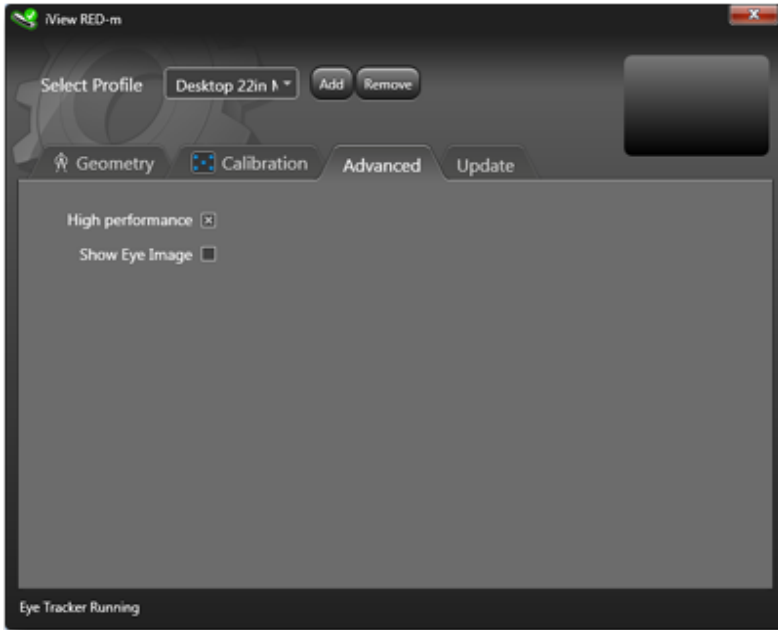
Calibration points **MUST BE** placed on the same horizontal and vertical line of a rectangle. The following shows the correct and incorrect 9 point calibration settings.



**9 Point Calibration**

## 4.8 Advanced Tab

The **Advanced** tab of the iViewRED-m provides two additional options - **High Performance** and **Show Eye Image**.



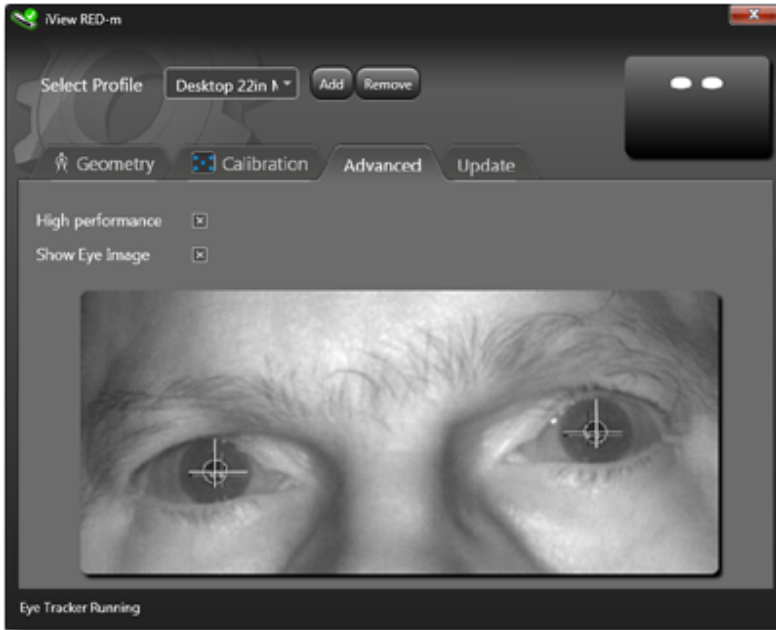
### Advanced tab

#### High Performance

This setting prevents the PC or Laptop from entering low power states and powerdown mode. This ensures the RED-m Eye Tracking Device does not lose any data, such as dropped frames, that can adversely affect the results of the Eye Tracking results under certain conditions. Use this setting if timing accuracy is absolutely vital or you are experiencing excessive dropped frames, otherwise leave it unchecked.

#### Show Eye Image

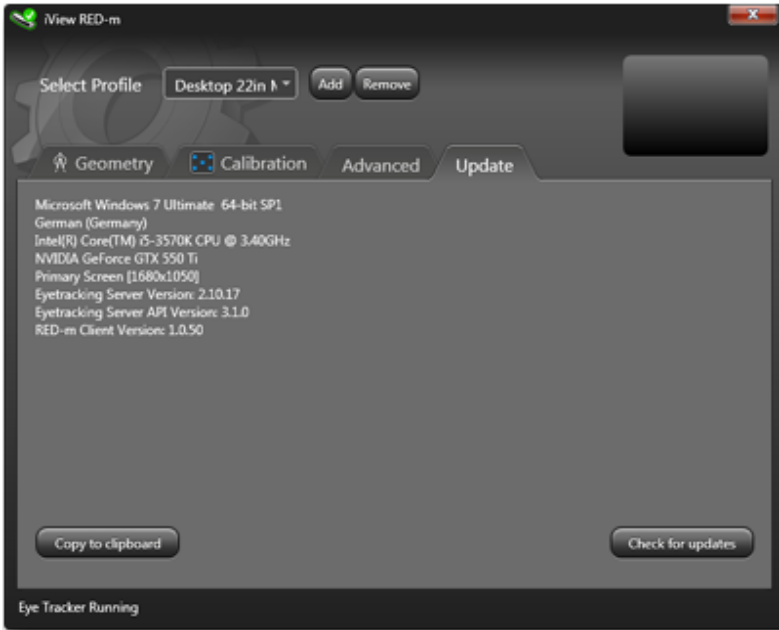
This displays the images from the RED-m Eye Tracking Device as they are received and processed by the iView Eye Tracking Server. This is used to verify the iView Eye Tracking Server is locating and tracking the user's eyes.



Advanced tab showing eye image

## 4.9 Update Tab

The **Update** tab provides two features - **Key system parameters** and **Check for updates**.



**Update tab**

## Key System Parameters

The **Update** tab of the iViewRED-m application provides a list of the key operating parameters of the system. This is useful when requesting technical support. An example list is shown below.

```
Microsoft Windows 7 Ultimate 64-bit SP1
German (Germany)
Intel(R) Core(TM) i5-3570K CPU @ 3.40GHz
NVIDIA GeForce GTX 550 Ti
Primary Screen [1680x1050]
Eyetracking Server Version: 2.11.6
```

Eyetracking Server API Version: 3.1.1  
myGaze Client Version: 1.0.55

Select **Copy to Clipboard** to conveniently copy this data to the clipboard so it can be pasted, for example, into an email to be sent to technical support.

### Checking for Updates

Rather than interrupt an eye tracking experiment with a request to update your software, you are offered a manual process. To update the RED-m Eye Tracking System, do the following:

1. Click **Check for Updates**.
2. If no current updates are available, no executable will download.
3. If a newer version is available, save the new executable to your local drive and then follow the procedures as described in [Running the Installation Package](#) to update to the latest version.

## 4.10 Shutting Down the System

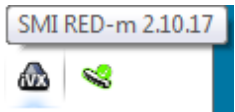
**To shut down the system, do the following:**


1. Close the iViewRED-m application



This does not shut down the iViewRED-m but only minimizes the User Interface.

2. Locate the iViewRED-m icon in the Windows taskbar buttons area



3. Right-click the iViewRED-m application icon  and select **Exit**.
4. Disconnect the RED-m Eye Tracking Device from the USB port and store it safely in the case provided.

# Appendix

**Chapter**



**5**



## 5. Appendix

### 5.1 Technical Specifications

| Item                        | Description   |
|-----------------------------|---|
| Sampling Rate               | 60Hz and 120Hz  |
| Interface Setup             | - Use with Monitor/Tablet (10" to 22")<br>- Use with Laptop |
| PC Interface / Power        | 1x USB 2.0 / Power over USB (2.6W)                          |
| Gaze position accuracy      | 0.5°  |
| Spatial resolution (RMS)    | 0.1°  |
| Eye tracking mode           | Binocular   |
| Operating distance          | 50cm to 75 cm   |
| Tracking range (head box)   | 32cm x 21cm @ 60cm distance                                 |
| Calibration mode            | 0/1/2/5/9 points  |
| Head movement velocity      | 15cm/s@60Hz   |
| System latency (end to end) | < 20ms@60Hz   |
| Blink recovery time         | 16ms@60Hz   |
| Tracking recovery time      | 250ms   |

|                                     |  |
|-------------------------------------|--|
| Dimensions (width x height x depth) | 24cm x 2.5cm x 3.3cm   |
| Weight                              | 130 g (incl. USB cable)  |
| Eyewear compatibility               | Works with most glasses and lenses   |
| Data                                | <ul style="list-style-type: none"> <li>- Timestamp</li> <li>- Gaze data (x/y screen coordinate)</li> <li>- 3D eye position</li> <li>- Pupil diameter</li> </ul>            |
| API/SDK                             | <ul style="list-style-type: none"> <li>- C function call based DLL</li> <li>- (Sample code for C# / C# WPF, C / C++, MATLAB, Python, E-Prime, NBS Presentation)</li> </ul> |
| Software compatibility              | <ul style="list-style-type: none"> <li>- SMI Experiment Suite 360°</li> <li>- NBS Presentation,</li> <li>- PST ePrime</li> <li>- TechSmith Morae 3.3</li> </ul>            |
| Operating System                    | Microsoft Window XP and Microsoft Windows 7 (32 / 64 Bit)  |
| Technology                          | Non-invasive, video-based eye tracking   |
| Operating Conditions                | <ul style="list-style-type: none"> <li>- Temperature 15° - 40° Celsius, 59° - 104° Fahrenheit</li> <li>- Max Humidity 80%</li> </ul>                                       |

## 5.2 Troubleshooting

We would like to help you get the best performance from your RED-m Eye Tracking System. In case of service and support requests, please complete the support request form on our company website at [www.smivision.com](http://www.smivision.com). You can help us accelerate the processing of your request by providing the **serial number** that is located on the back of your RED-m Eye Tracking System.

The most common issues are:

- My tracking experiment is running slow.
- iViewRED-m does not start.
- I am getting an error message.
- Why can I not use USB 3.0?
- Can I use the RED-m Eye Tracking Device with other USB connected devices?

### 1. My eye tracking experiment is running slow

Certain background processes and services require substantial system resources during execution. While this does not affect the system during idle times, those background processes may disturb a running gaze tracking experiment. If you notice a degradation in system responsiveness, you may consider the following points:



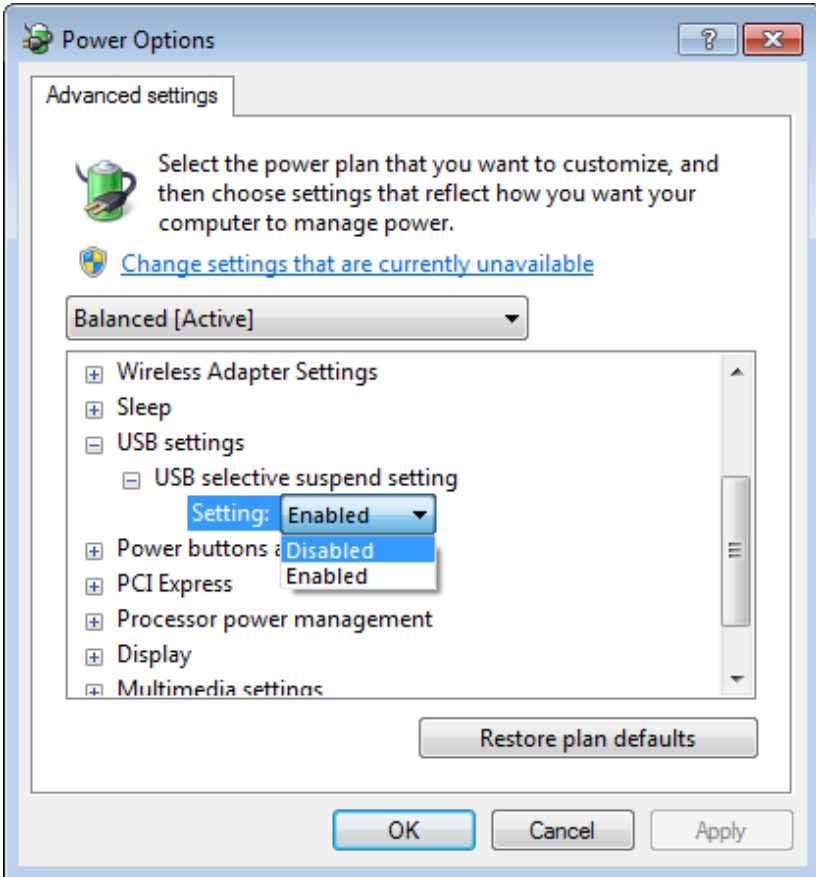
Please verify that your system setup and the experiment setup matches our recommendations (see [System Requirements](#)).

- Disable the background scan function of your virus scanner. This function scans newly started executables and various file formats

while they are read in from the hard disk drive. Use the on-demand virus scan function instead.

- Make sure that no CPU consuming screen saver is automatically activated during a running experiment. It is best to completely switch off the screen saver during an experiment.
- You may also deactivate any auto-update functions. While background downloading of files does not normally use too much system resources, confirmation dialogs and update notices may disturb an experiment.
- Check the power configuration settings when using a Notebook PC, check the power configuration. In the Windows Control Panel, select the **Performance and Maintenance** category. Start the Power Options applet and select the "Presentation" entry in the **Power Schemes** list.
- Disable the USB selective suspend settings on a Desktop PC. This prevents the USB port from suspending during the usage of the RED-m Eye Tracking System. To disable this setting in Windows 7:
  1. Select **Control Panel > Hardware and Sound > Power Options**.
  2. In the **Power Options** window, select **Change Power Settings** from the **Preferred Plan** area, and then select **Change plan settings**.
  3. In the **Changes settings for the plan** window, select **Change Advanced Power Settings**.
  4. In the **Power Options** dialog, click the plus sign next to **USB Settings**, then click the plus sign next to **USB selective suspend setting**.
  5. Click **Setting** and then choose **Disabled** from the dropdown list.

6. Click OK to close the dialog.




## 2. The iViewRED-m application does not start.

It is not sufficient to simply copy the RED-m Eye Tracking System program directory to another PC. Please use the RED-m Eye Tracking System installer. This ensures, for example, that the required Microsoft .NET Framework Version 4.0 or above is installed properly. Note that you cannot

start RED-m Eye Tracking System from a network share / network drive because of .NET security restrictions.

### 3. I am getting an error message.

The iView Eye Tracking Server has several error states:

- **Not Connected**... which is indicated by the  in the application title bar. Ensure that the RED-m Eye Tracking Device is connected to the USB port.

If the RED-m Eye Tracking Device is connected and you are still getting a **Not Connected** status, the USB port may not be functioning. In this case, try another USB port or disconnect any unneeded USB devices.

- **Firmware Outdated**, which indicates you need to download and install the latest version of the software using the **Check for updates** link in the **Update** tab of the iViewRED-m. See [Update Tab](#).

### 4. Why can I not use USB 3.0?

USB 3.0 ports are not currently compatible with as the RED-m Eye Tracking System. Use a USB 2.0 port instead. Future versions of the software will support USB 3.0.

### 5. Can I use the RED-m Eye Tracking Device with other USB connected devices?

The RED-m Eye Tracking Device is a high performance USB device, which requires a certain amount of available bandwidth from the USB port. When other high performance USB devices are plugged into USB ports, for example USB drives, webcams, WIFI adapters, the available bandwidth of USB may become insufficient. The RED-m Eye Tracking Device also draws the power it needs from the USB port, if some other USB device is absorbing current above the USB specification, this may also lead to problems. Try disconnecting unneeded USB devices. See also the description for setting **Power Options** above in this section.

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Teltow, Germany, 2012  
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All SMI eye tracking equipment has been tested and found to comply with the limits for Class B digital devices, pursuant to Part 15 of the FCC Rules and EMC directive 2004/108/EEC, and conforms to the low-voltage directive 2006/95/EEC.

## **5.6 About SMI**

**SensoMotoric Instruments® (SMI)** was founded in 1991 by a group of research scientists, physicians, and engineers in order to pursue the commercial development of measurement and evaluation systems in the field of medicine, psychology, ergonomics, human factors, and virtual reality. SMI specializes in the development and system integration in the field of video and sensor technology, associated with digital image and signal processing. In 1992, SMI was awarded the Innovation Prize of Berlin-Brandenburg for VOG - Video-Oculography, its video-based eye movement technology.

This technology has found widespread use in the medical diagnosis and research of eye movement, psychology research as well as in specific research applications, for example on the space station MIR. For further development SMI collaborates with leading clinical and research laboratories and partners around the world.

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