

Tobii Pro Spectrum Eye Tracker

User Manual

tobii pro

User manual Tobii Pro Spectrum Eye Tracker

Version 1.0.3

05/2017

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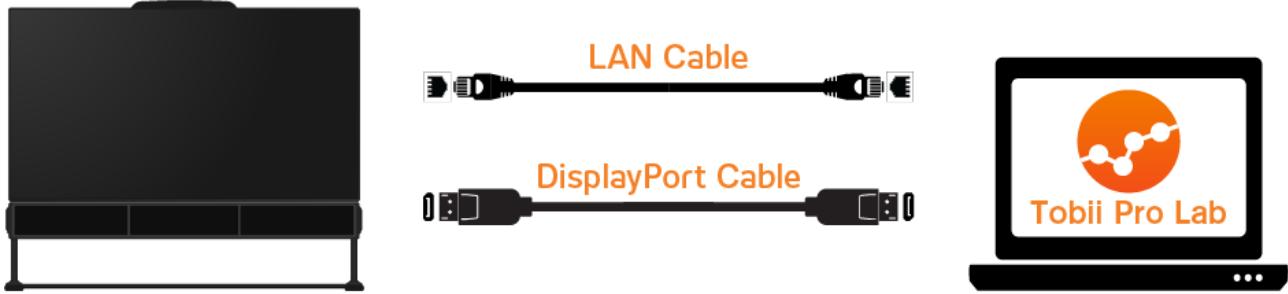
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1 Introduction

1.1 Overview

This user manual describes the features and functionality of the Tobii Pro Spectrum eye tracker. The Pro Spectrum can be used in various setups, either with an attached monitor or in standalone form in order to perform eye tracking with physical objects. The typical setup is the Pro Spectrum connected to a PC running Tobii Pro Lab, as you see in the image below.

The design allows the subject to move naturally during recording while still obtaining high accuracy and precision.



1.2 Basic operating principles

The Tobii Pro Spectrum use infrared illuminators to generate reflection patterns on the corneas of the subject's eyes. These reflection patterns, together with other visual data about the subject, are collected by image sensors. Sophisticated image-processing algorithms identify relevant features, including the eyes and the corneal reflection patterns. Complex mathematics is used to calculate the 3D position of each eyeball and the gaze point on the screen (or when you don't use a screen, for the gaze point on the object); in other words, it tells you where the subject is looking.

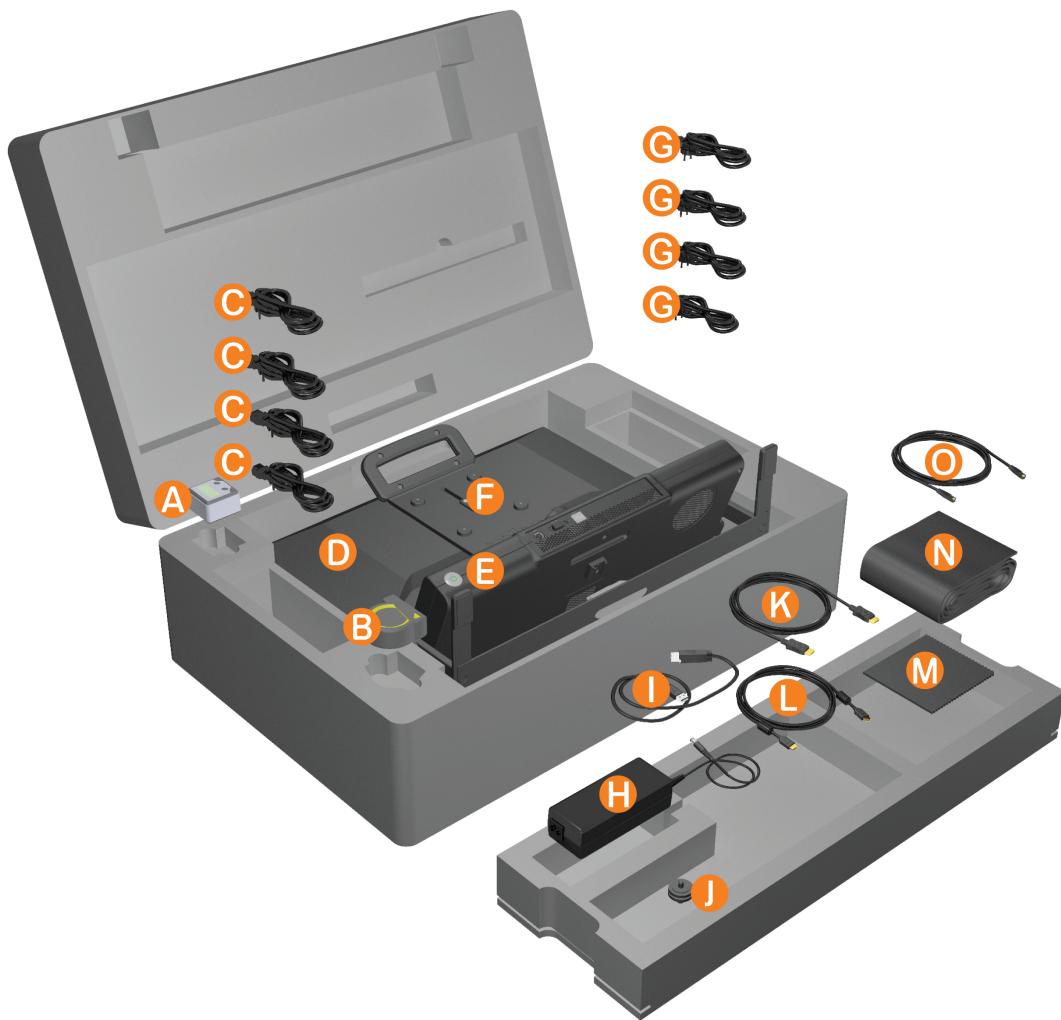


Eye trackers from Tobii Pro are designed for use in indoor office environments and tracking on humans.

1.3 Product Versions

The Pro Spectrum is available in three different product versions: 600 Hz, 300 Hz and 150 Hz. This is the eye tracker's maximum sampling frequency, but the eye tracker can be used with lower frequencies as well. The 300 Hz and 150 Hz versions can be upgraded to a faster version. Contact your sales representative or [Tobii Pro](#) for more information.

2 Hardware Package Content



A. Angle meter	I. USB cable for connection between the PC and the monitor's integrated USB hub
B. Measuring tape	J. Cold shoe for mounting of a user camera
C. Power cables for monitor (UK, US, EU and Aus/China)	K. DisplayPort cable
D. Monitor	L. HDMI cable
E. Eye tracker	M. Cleaning cloth
F. Monitor mounting bracket	N. Fabric cord sleeve for collecting the cables
G. Power cables for eye tracker (UK, US, EU and Aus/China)	O. Ethernet cable
H. Power adaptor for eye tracker	

3 Product Care

3.1 Transportation and storage

For transportation and storage, the recommended range for temperature and humidity for the device is as follows:

- **Temperature:** -40°C to 70°C (-40°F to 158°F)
- **Humidity:** 20% to 95% (no condensation on the device)



The Pro Spectrum is not waterproof or water resistant. The device should not be kept in excessively humid, damp or wet conditions. Do not submerge the device in water or in any other liquid. Be careful not to spill liquids on the device.

3.2 Cleaning

Before cleaning the Pro Spectrum, unplug all cables. Use a soft, slightly damp, lint-free cloth. Avoid getting moisture in openings on the device. Don't use window cleaners, household cleaners, aerosol sprays, solvents, alcohol, ammonia, or abrasives to clean the device.



Please be aware that scratches on the front surface of the eye tracker may result in impaired eye tracking performance.

3.3 Transporting the Pro Spectrum

Before storage or shipping, disconnect all cables and use the travel case and packaging materials provided.

3.4 Disposing of the Pro Spectrum

Do not dispose of Pro Spectrum in general household or office waste. Follow your local regulations for disposal of electronic equipment.

4 Setting up the Tobii Pro Spectrum

4.1 Prerequisites

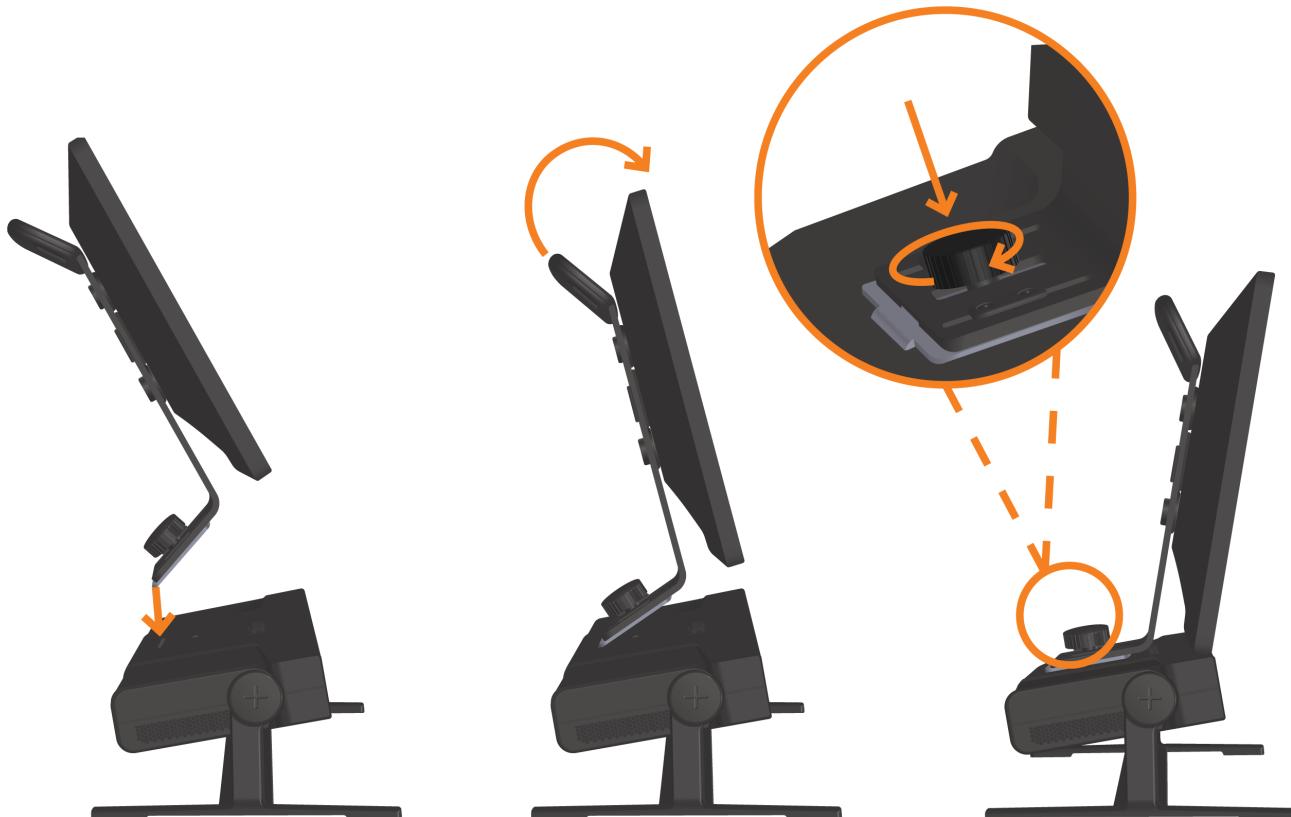
As with most electronic devices, the Pro Spectrum generates heat during use and needs adequate ventilation. Allow for free air flow around the unit and never cover it as this will restrict the air flow and lead to overheating.

4.2 General use

The Pro Spectrum is best kept in dry conditions at room temperature. The recommended range for temperature and humidity during operation is as follows:

- **Temperature:** 15°C to 30°C (59°F to 86°F)
- **Humidity:** Max 20% to 95% (no condensation on the device)

4.3 Mounting the monitor to the eye tracker unit

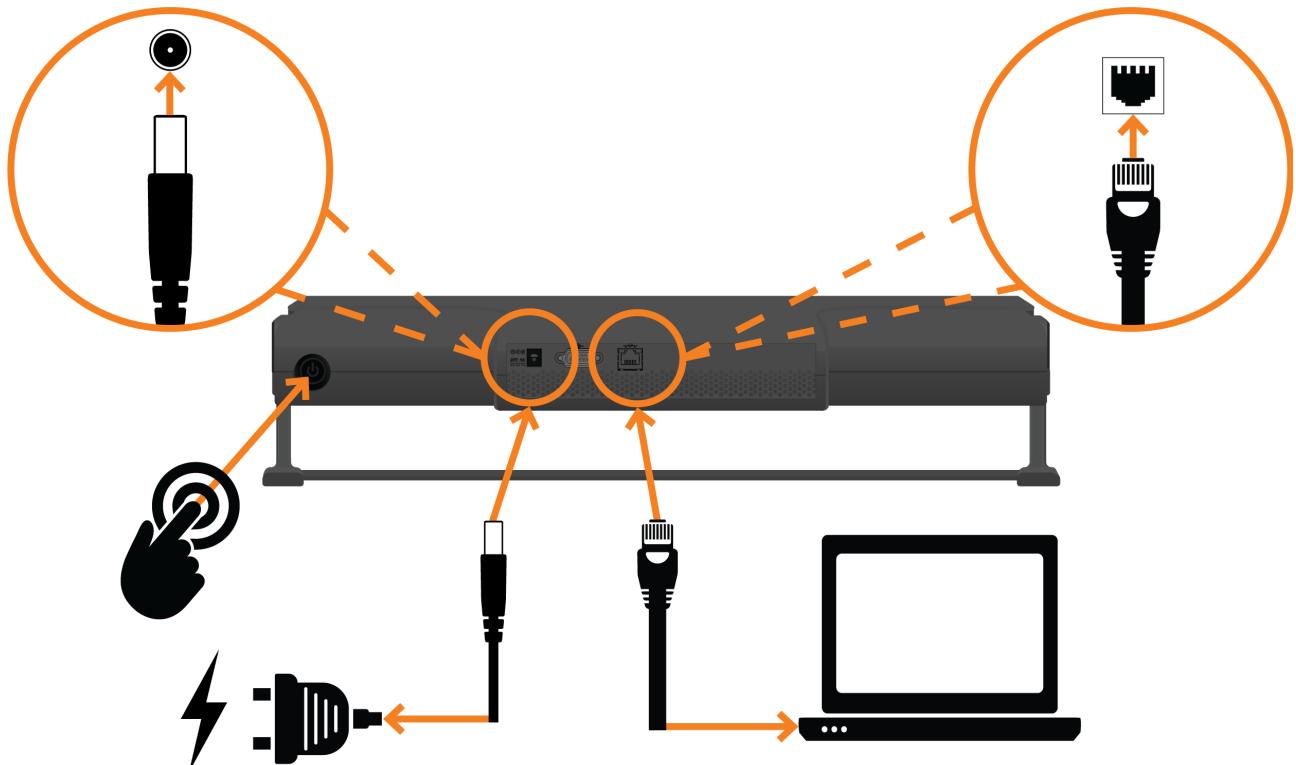


The Pro Spectrum is delivered with the monitor already mounted. If this for any reason is not the case, e.g. someone has been using the unit as a standalone eye tracker, you will have to attach the monitor to the base again. The mounting and removal of the monitor is very quick due to its one-screw fastening.

1. Make sure the eye tracker is placed on an even and steady surface.
2. Hold the monitor firmly and insert the lower end of the mounting bracket into the slot on the top of the eye tracker.
3. When the lower end of the mounting bracket is fully inserted into the slot, gently tilt the screen forward.
4. When the mounting bracket is in place, secure it by pushing the lock knob downwards and turning it until it is firmly in place.

If you need to remove the monitor, repeat the above steps in the reverse order.

4.4 Connecting the eye tracker



The Pro Spectrum is connected to a standard Ethernet network with a RJ-45 connector.

1. Attach the supplied Ethernet cable to the corresponding Ethernet socket on the eye tracker.
2. Attach the other end of the Ethernet cable to the Ethernet socket on your PC. It is also possible to connect the eye tracker to a switch connected to your LAN.
3. Attach the supplied power adapter cable to the corresponding outlet on the eye tracker.
 - a. Choose the power cable with the power plug suited for the electrical outlet and connect the other end to the AC adapter.
 - b. If neither of the power plugs suits your needs, please contact your sales representative or Tobii Pro Support for assistance.
 - c. Insert the power cable plug to a mains power outlet.

4.4.1 Powering on the Pro Spectrum

The Pro Spectrum has one power switch located on its back side. Use it to turn on or switch off the eye tracker. We recommend that you shut off the unit after the workday or for longer periods of inactivity.

Approximately 20 seconds after you power on, a short beep will be heard. This means that the processor module has loaded the BIOS and has begun to load the operating system.

After another 20 seconds you should hear two long beeps. This means that the system is ready for use.

If anything goes wrong (no matter the cause), you will hear three short beeps approximately 40 to 50 seconds after the powering-on sequence, followed by a short pause and then another three short beeps.

To turn off the eye tracker, press the power switch. During the shut off phase, the power switch indicator lamp will flash. Depending on the internal state, the powering down could take up to 20 seconds.



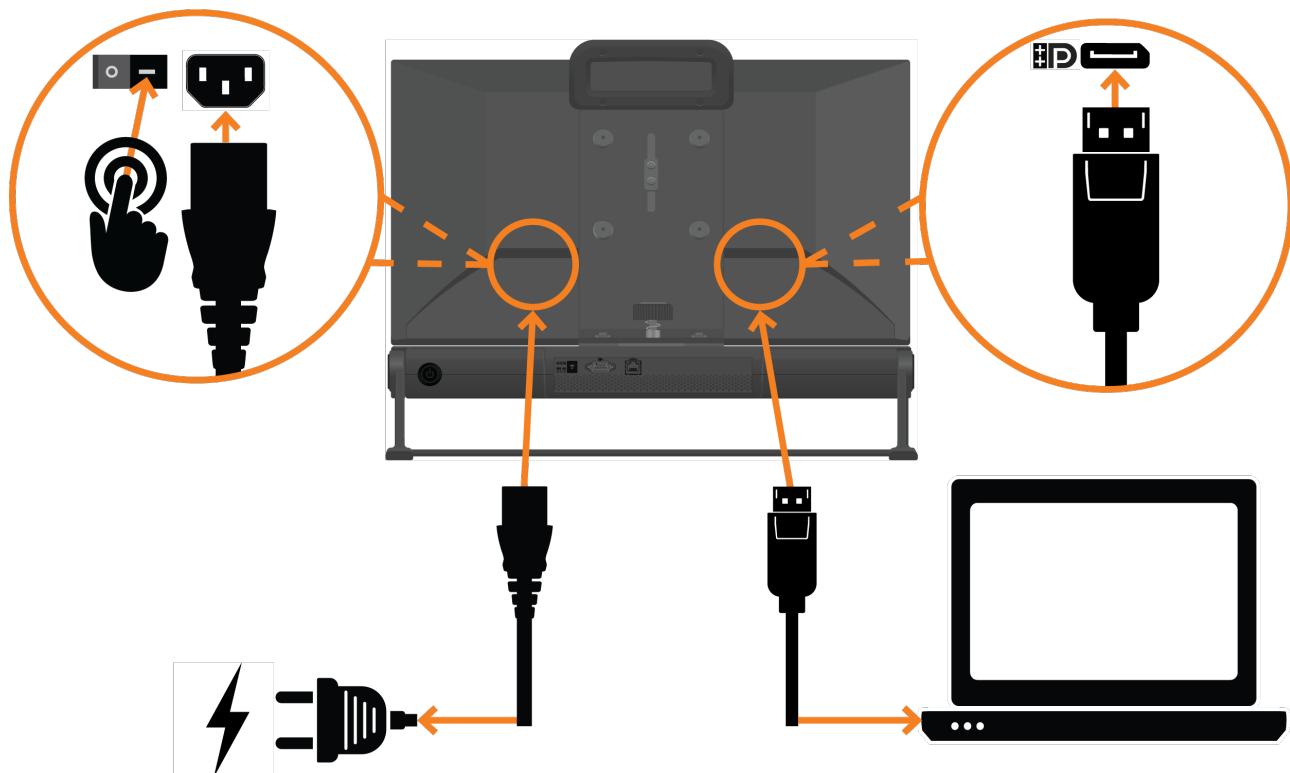
To force the shutdown of the Pro Spectrum, hold the power switch depressed for at least 5 seconds.

4.5 Monitor setting

The Pro Spectrum is supplied with a pre-mounted 23.8" monitor.



Please note that the monitor has two power switches, one main power switch on the backside and one ON/OFF switch on the front. Make sure the main switch is ON before you try to start the monitor with the front placed ON/OFF switch.



1. Attach the supplied DisplayPort or HDMI cable to the corresponding connector on your computer.



It is possible to use any of the other display interfaces on the monitor as well. However, for the best performance we recommend DisplayPort or HDMI, depending on what your PC is equipped for.

2. Choose the power cable with the plug suited for the wall outlet and connect the other end to the corresponding outlet on the monitor.
3. Insert the power cable plug to a power outlet.
4. If neither of the plugs works with your power outlet, please contact your sales representative or Tobii Pro Support for assistance.

5 Setup Options



1. This represents the Pro Spectrum As delivered with monitor mounted on the eye tracker
2. The Pro spectrum as a standalone eye tracker without monitor
3. Eye tracker and monitor together on a VESA 100x100 mount.
(For instructions of how to remove the stand and mount the eye tracker and monitor on the VESA mount, see the section below.)
4. Standalone with monitor

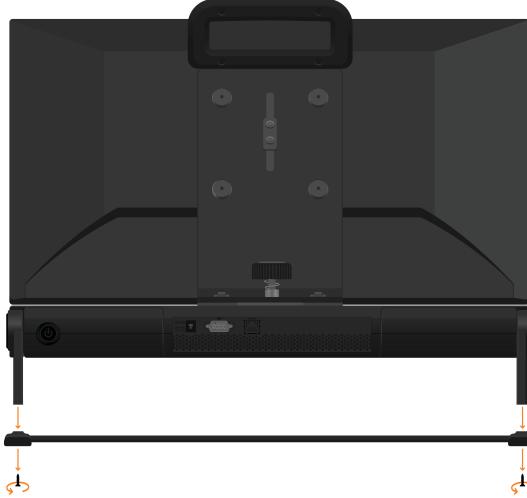


It is possible to use the eye tracker with another monitor but that is not recommended (see Appendix B).

5.1 Mounting the Pro Spectrum on a VESA mount (setup 3 in the image above)

The Pro Spectrum can be mounted on a standard VESA 100x100 mount. Proceed in the following way:

1. Remove the stand by unscrewing the two screws from the underside (see image below).



2. Fold the two legs upwards so they lie neat against the eye tracker's side panels (as in setup 3 in the Setup Options-image above). Make sure they don't cover the ventilation holes on the side panel.
3. Attach the VESA mount to the bracket with four screws suitable for your VESA mount and the bracket.

When you no longer need to have the eye tracker mounted on a VESA mount, perform the above procedure in reverse order to attach the stand again.

5.2 Mounting a scene camera

Beneath the eye tracker there is a mount used for attaching a user scene camera (purchased separately). Begin by attaching the enclosed mounting bracket onto your camera unit. Then slide the assembly into the scene camera mount and tighten the screw.

6 Eye tracker configuration

6.1 Configuration and settings

The Pro Spectrum is configured via Tobii Pro Eye Tracker Manager; a configuration and setting utility available online free of charge. This utility allows you to configure different settings for all of your connected eye trackers, like sampling frequency, stand alone usage and more. In the Pro Eye Tracker Manager you can also upgrade and downgrade your eye tracker firmware. Pro Lab (see Appendix A4) offers a limited set of eye tracker configuration settings. Please see the documentation for the software you are using for more information.

6.2 Installing the Tobii Pro Eye Tracker Manager

1. Download and install Pro Eye Tracker Manager from <http://www.tobiipro.com/learn-and-support>

6.3 Updating the eye tracker's firmware

From time to time, Tobii Pro will release updates for the eye tracker firmware that will improve its performance and/or introduce new functionality. The latest firmware can be downloaded from the Tobii Pro Support website <http://www.tobiipro.com/learn-and-support>. Make sure to regularly check for and update to the latest version of the software and firmware.

This is how you update the firmware:

1. Download the firmware update file from the above website and save it on your computer.
2. Start the Pro Eye Tracker Manager on your computer. After a short network scanning period, available eye trackers will show up in the "Connected Eye Trackers" pane.
3. Select the Pro Spectrum eye tracker for which you want to upgrade the firmware.
4. In the "Eye Tracker Information" pane, you will now see information about the selected eye tracker. If the stated firmware version is lower than the downloaded one, click 'Browse' to open the "Choose firmware update package" dialog.
5. Browse to the directory containing the firmware file you downloaded in step 1.
6. Select the downloaded firmware file and click 'Open'.
7. During the firmware update a "Work in Progress" indicator appears in the "Eye Tracker Information" pane. (Pro Spectrum may restart several times. This is not an error.)
8. When the update is done the new firmware version is reflected in the eye tracker information. There is no need to restart your Pro Spectrum.



It is possible to downgrade the firmware. Before downgrading you need to reset the eye tracker to factory defaults. You can do this by pressing the recessed reset button (located between the power connector and the data port on the connector panel at the back of the eye tracker) with a pointy device, (i.e. a straightened paper clip), until you hear a beep. Then release the button. The unit is now rebooted (your Pro Spectrum may restart several times. This is not an error.). After a while, your eye tracker will appear in the Pro Eye Tracker Manager again. You can now upgrade the firmware to your desired version by following the steps above.

6.4 Configuring the Pro Spectrum in the Pro Eye Tracker Manager

In the Pro Eye Tracker Manager you can change some settings for your Pro Spectrum. For instance, you can create and recall setups for using the eye tracker in standalone mode and change the eye tracker's frequency.

6.4.1 Changing the Pro Spectrum's frequency setting

1. Start the Pro Eye Tracker Manager on your computer. All available eye trackers will show up in the "Connected Eye Trackers" pane.
2. Select the eye tracker for which you want to change the frequency setting.
3. The right pane expands to show different settings for the eye tracker. Under "Tracker Specific Settings," you will see the name of the eye tracker with the available frequency options.
4. Choose the desired frequency setting among the available options.

6.4.2 Configuring the Pro Spectrum for standalone use

1. Start the Pro Eye Tracker Manager on your computer. All available eye trackers shows up in the "Connected Eye Trackers" pane.
2. Select the eye tracker you want to configure for standalone use.
3. Under "Physical Eye Tracker Setup", click on the drop down list called 'Preset' and choose 'Create new preset'.
4. In the next window, called "Stimuli Area," enter the necessary setting values for your configuration and click on 'Next' when you are done.
5. In the "Eye Tracker" window, you can set the eye tracker's different physical angle values. Click on 'Next' when you are done.
6. Finally, in the last window called "Name your setting", you can give your new preset a name. Choose a descriptive name and press 'Finish'.
7. You are then returned to the Pro Eye Tracker Manager main window and your new preset will be the chosen one. If you want to go back to the standard preset, choose it in the drop down list box.

6.5 Using the TTL input port for external event recording

The Pro Spectrum is equipped with a digital data input port that records events in up to 8 parallel TTL signals. The events are recorded with a time stamp accuracy better than 50 µs. The detected events are available in decimal format (0–255) through either Pro Lab or the Tobii Pro SDK. The TTL signal can be combined to obtain up to 256 different events.

Any digital signal source fulfilling the electrical specification can be connected to the tracker. One example of such a device is the Cedrus Stimtracker.

6.5.1 TTL data port specification

Interface: 8 bit parallel TTL input (DBc9)

TTL levels: Vin < 0.8 V => Logical 0; Vin > 2 V => Logical 1

Pinning: pin 1-8: inputs; pin 9: GND

Input voltage interval: 0–5 V

Connector shielding: connected to system chassis ground

Input configuration: inputs (pin 1-8) are connected to pull up resistors and are opto-isolated.

Appendix A Tobii Pro Spectrum – Specifications

A1 Eye tracking specifications

The characteristics of the gaze data from an eye tracker can be described in terms of accuracy and precision. Accuracy describes the angular average distance from the actual gaze point to the one measured by the eye tracker. Gaze precision describes the spatial variation between successive samples collected when the subject fixates at a specific point on a stimuli.

Eye tracking technique	Binocular bright and dark pupil tracking Two cameras capture stereo images of both eyes for the accurate measurement of eye gaze and eye position in 3D space, as well as pupil diameter
Sampling frequency	60, 120, 150, 300 or 600 Hz (max. frequency depends on product version)
Sampling frequency variability	Less than 0.3% of selected sampling frequency
Accuracy*	Approx. 0,4° at 65 cm
Precision*	Approx. 0,1° at 65 cm
Maximum gaze angle	30°
Freedom of head movement	Width x height: 34 cm x 26 cm (13.5" x 10") at 65 cm (at least one eye tracked).
Operating distance	55 to 75 cm (22" and 30") from the eye tracker reference point
Total system latency	Less than 5 ms at 600 Hz
Blink recovery time	1 frame (immediate)
Gaze recovery time	Less than 150 ms
Recommended monitor	Supplied 23.8" monitor (see note below)
Data output (for each eye)	Timestamp Gaze origin Gaze point Pupil diameter
Eye image data stream	Eye image stream frequency is approximately 30 Hz Zoomed-in eye images are available in tracking mode Full-frame camera images available in gaze recovery mode
TTL input stream	8-bit timestamped data (256 event codes) Event driven detection with a timestamp accuracy of 50 µs
Tracker and client time synchronization	Integrated synchronization between the eye tracker time domain and the client computer time domain, with an accuracy of 100 µs.



*Tobii Pro uses an extensive test method to measure and report performance and quality of data. These accuracy and precision numbers are preliminary. Final numbers will be published when available.



For more information about output data and the supplementary data stream, see the Pro SDK documentation here:
<http://www.tobiipro.com/product-listing/tobii-pro-sdk/>.

A2 Unit specifications

The Pro Spectrum is an integrated eye tracker with a removable 23.8" monitor. Removing the monitor transforms the integrated eye tracker into a standalone eye tracker.

Eye tracker

Dimensions	55 cm x 18 cm x 6 cm (22" x 7" x 2") The eye tracker is mounted on a stand which raises it from the surface 9 cm (approximately 4")
Weight	5.1 kg (11.4 lbs.) With the power supply unit, the weight is 5.7 kg (12.9 lbs.)
Eye tracker processing	Integrated in the eye tracker unit
User camera mount	Standard 1/4" thread
Connectors	TTL input: 8-bit (DB-9 connector) Communication: Ethernet (RJ-45 connector) Power supply: 24 VDC (5.5 mm connector)
Power	Maximum rated power consumption: 96 W Typical power consumption: 60 W
External power supply	Input: 100-240 VAC 50/60 Hz Maximum rated power consumption: 120 W No load power consumption: <0.15 W Energy efficiency level: VI Complies with EISA 2007/DoE, NRCan, AU/NZ MEPS, EU ErP and CoC Version 5

Monitor

Monitor model name	EIZO FlexScan EV2451
Panel type	IPS, LED backlight
Screen size (diagonal)	23.8"
Weight	3.8 kg (8.4 lbs.) (including mounting materials)
Aspect ratio	16:9
Resolution	1920 x 1080 pixels
Response time	5 ms (Gray-to-gray)
Connectors	DVI VGA HDMI Display port 1 port for monitor control (USB 3.0) 2-port USB hub (USB 3.0) C13 power connector Audio input connector: 3.5 mm Headphone jack: 3.5 mm
Built in speakers	1.0 W + 1.0 W

Power supply	100-240 VAC 50/60 Hz
Power	Maximum rated power consumption: 42 W Typical power consumption: 13 W Power Save Mode: 0.5 W Power Management: Power Save (VESA DPM, DisplayPort Rev 1.1a, and DVI DMPM)

A3 Certifications

A3.1 Compliance and Certification

The certification and compliance statements in this section are only valid for the eye tracker unit. For compliance and certification of the monitor and external power supply, please see the separate compliance documentation of those.

Safety

Safety standards:	IEC 60950-1:2005 (Second Edition) + Am 1:2009 + Am 2:2013 EN 60950-1:2006/A11:2009/A1:2010/A12:2011/A2:2013 UL 60950-1 Edition 2 +A1 +A2 CSA 60950-1 Edition 2 + A1 + A2 J60950-1(H22) National differences for Australia to IEC 60950-1, 2nd Edition National differences for Korea to IEC 60950-1, 2nd edition IEC 62471:2006 (First Edition)
Certification and declaration of conformance	ETL Listed (US & Canada), CB Certificate, CE.

EMC

EMC standards:	EN 55032: 2015, Class B EN 55024: 2010 + A1 EN 61000-6-1: 2007 EN 61000-6-3: 2007 + A1 FCC 47 CFR Part 15 (2015): Class B ICES-003 Issue 6: Class B CISPR 32: 2015, Class B CISPR 35: 2016
Certification and declaration of conformance:	FCC, CAN ICES-3 (B)/NMB-3(B), ACMA (RCM), CE.

See ETL and CB certificates for details.

Sustainability

Directives:	RoHS Directive 2011/65/EU REACH Directive EC 1907/2006
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This product is exempt from CCC.

A4 Software Options

Software applications can be connected over TCP/IP (Ethernet connector) as clients to the eye tracker (e.g. perform user calibrations and gather eye gaze data in real-time). Examples of applications include Pro Lab or any applications built on the Pro SDK.

Pro Lab is a comprehensive research software platform for eye tracking designed to meet the highest demands on different research scenarios with exact timing accuracy. This software offers an efficient workflow, making it easy to design experiments, record data, analyze and visualize eye tracking data, and to sync this data with other biometric data streams.

The Pro SDK offers a broad set of tools in order to make it simple to develop a niche applications or scripts across multiple platforms, using a wide range of programming languages. This SDK gives the researcher access to the full set of relevant gaze data streams, such as 3D eye coordinates, 3D and 2D gaze coordinates, pupil data, etc.

Download links

- Tobii Pro Lab: <http://www.tobiipro.com/product-listing/tobii-pro-lab/>
- Tobii Pro SDK: <http://www.tobiipro.com/product-listing/tobii-pro-sdk/>
- Tobii Pro Eye Tracker Manager: <http://www.tobiipro.com/product-listing/tobii-pro-spectrum/>



The Pro Spectrum is not compatible with the Tobii Pro Analytics SDK version 3.0 or older or with Tobii Pro Studio.

Appendix B Recommended monitor

The Pro Spectrum is supplied with a thoroughly tested and approved 23.8" 16:9 LCD monitor. Our recommendation is to use this monitor, which has been tested for weight, dimension and center of gravity for the system set up with the eye tracker unit and screen mounting solution. If you need to use a different monitor, we recommend that you choose a black monitor without any colored décor elements and that the screen bezel is as slim/thin as possible. No connections or buttons should be located underneath the monitor as this could interfere with the mounting of the eye tracker. The monitor must be equipped with a standard 100 x 100 mm VESA mounting interface on the back and it should not weigh more than the supplied monitor.



The eye tracker has undergone tipping tests with the supplied monitor attached. If you choose to use a different monitor, we can not guarantee the safety of such a combination and you will use it at your own risk.

Appendix C Glossary

Binocular eye tracking	Tracks and reports data for both left and right eye.
Gaze precision	Describes the spatial angular variation between individual and consecutive gaze samples.
Gaze accuracy	Describes the angular average distance from the actual gaze point to the one measured by the eye tracker.
Sampling rate	This is the number of data samples per second. The Pro Spectrum has a stable data rate of 60, 120, 150, 300 or 600 Hz; which indicates that 60, 120, 150, 300 or 600 data samples per second are collected for each eye.
Gaze data output frequency	The number of data samples per second output for each eye.
Sampling variability	Sampling variability specifies the maximum difference between the stated sampling rate and the actual sampling rate that can occur during an eye tracking test.
Processing Latency	Describes the time required by the eye tracker processor to perform image processing and eye gaze computations.
Total system latency	This is the duration from the mid-point of the eye image exposure, to when a sample is available via the API on the client computer (assuming there is a dedicated Gigabit Ethernet connection). It includes half of the image exposure time, image read-out and transfer time, processing time and the time to transfer the data sample to a client computer.
Timestamp precision as specified in each data sample	This is the temporal deviation of the timestamp in the data sample received by the client application. This includes any offset in the clock sync between the eye tracker processing unit and a typical client computer.
Blink recovery time (time to tracking recovery for blinks)	When a subject blinks, the eye tracker loses the ability to track eye gaze because the eye is covered by the eyelid. If the pupil is occluded for only a short period (a few hundred milliseconds), the system will regain tracking immediately when the pupil becomes visible again, but only if the subject has maintained approximately the same head position during the blink. Data during blinks are only lost when the pupil is occluded, (i.e. during the eye lid movement itself or when the eye is closed).
Gaze recovery time (time to tracking recovery after lost tracking)	An eye tracker working in a natural user environment may occasionally lose track of the subject's eyes, (e.g., when the subject completely turns away from the tracker). If a period of a few hundred milliseconds elapses during which the eye tracker is unable to detect the eyes in close proximity to where they were last detected, the eye tracker will start searching for the eyes within the entire head movement box. The stated measurement is the typical time to tracking recovery in such a situation.
Freedom of head movement	Describes the region in space where the participant may move his/her head and still have at least one eye within the eye tracker's field of view.
Operating distance	Describes the minimum and maximum distances between the subject's eyes and the surface covering the eye tracker sensors at which eye tracking can be done while maintaining robust tracking.
Max head movement speed	Describes the maximum head movement speed allowed while maintaining robust tracking — the specified number is for sideways head movement.

Max gaze angles	This is the maximum gaze angle for which the eye tracker can perform robust and accurate tracking on both eyes. The gaze angle is the angle ABC with A = center of the eye tracker (midpoint between the two eye tracking sensors), B = eye position (midpoint between the left and the right eye) and C = stimuli point.
Eye tracking technique	Eye Trackers from Tobii Pro use two different techniques to determine eye position: 1. Bright pupil eye tracking, where an illuminator is placed close to the optical axis of the imaging device, causing the pupil to appear lit up (the same phenomenon that causes red eyes in photos). 2. Dark pupil eye tracking where the illuminator is placed away from the optical axis, causing the pupil to appear black.
Eye tracking processing unit	This is the CPU where the processing and calculations of gaze is made. Eye trackers from Tobii Pro either have an embedded CPU in the eye tracker or an external processing unit.

Appendix D Safety and compliance

D1 Safety



The Tobii Pro Spectrum should be mounted according to the instructions of the approved mounts used. Tobii AB or its agents are not liable for damage or injuries to a person or its property due to the Tobii Pro Spectrum falling from a mounted configuration. The mounting of the Tobii Pro Spectrum is done entirely at the user's own risk.

D1.1 Emergency Warning



The Tobii Pro Spectrum system is to be used for research purposes only. Be aware that due to the low, but possible risk of failure or distraction, the Tobii Pro Spectrum should not be relied upon or used in dangerous or otherwise critical situations.

D1.2 Infrared Warning



When activated, the Tobii Pro Spectrum emits pulsed infrared (IR) light. Certain medical devices are susceptible to disturbance by IR light and/or radiation. Do not use the Tobii Pro Spectrum when in the vicinity of such susceptible medical devices as their accuracy or proper functionality could be inhibited.

D1.3 Epilepsy Warning



Some people with **Photosensitive Epilepsy** are susceptible to epileptic seizures or loss of consciousness when exposed to certain flashing lights or light patterns in everyday life. This may happen even if the person has no medical history of epilepsy or has never had any epileptic seizures.

A person with Photosensitive Epilepsy would also be likely to have problems with TV screens, some arcade games, and flickering fluorescent bulbs. Such people may have a seizure while watching certain images or patterns on a monitor, or even when exposed to the light sources of an eye tracker. It is estimated that about 3-5% of people with epilepsy have this type of Photosensitive Epilepsy. Many people with Photosensitive Epilepsy experience an "aura" or feel odd sensations before the seizure occurs. If you feel odd during use, move your eyes away from the eye tracker.

D1.4 Child Safety



The Tobii Pro Spectrum is an advanced computer system and electronic device. As such it is composed of numerous separate, assembled parts. In the hands of a child certain of these parts have the possibility of being separated from the device, possibly constituting a choking hazard or another danger to the child.

Young children should not have access to, or use, the device without parental or guardian supervision.

D1.5 Do not open Tobii Pro Spectrum



Non-compliance will result in loss of Warranty! There are no user serviceable components inside. Contact Tobii Pro Support if your Tobii Pro Spectrum is not working properly.

D1.6 Environment



The Tobii Pro Spectrum system is designed for use in dry indoor environments. Avoid any exposure to direct sunlight as this will affect eye tracking quality and longer exposure can overheat the equipment. Avoid exposure to any liquids, gels, moist, rain, sweat or other damp materials or environments. Do not use the eye tracker near water – the device is not water resistant.

Keep the eye tracker in a clean and dust free environment. When using the equipment take adequate precautions against dust and dirt.

Do not place or use the equipment in places subject to extreme temperatures and humidity, such as on top of and or near a heating element, in a hot or damp room, or in a hot automobile in the sun.

D2 Other limitations and considerations

D2.1 Intended use



The Tobii Pro Spectrum is intended to be used in research activities about human behavior including eye movements, in a dry and dust free indoor environment. The product should only be used as described in the User Manual. Please read the User Manual and other supplied documentation thoroughly before using the product.

D2.2 Light conditions



We recommend that eye tracking studies be performed in a controlled environment. Sunlight should be avoided since it contains high levels of infrared light which will interfere with the eye tracker system. Sunlight affects eye tracking performance severely and longer exposure can overheat the eye tracker. The eye tracker is not designed for exposure to (direct) sunlight. Eye tracking generally does not work in strong direct sunlight. Shielding the eye tracker adequately from the sun may prevent sunlight from interfering with eye tracking.

D2.3 Eyelashes



Long eyelashes can be obstructive when the participant's eyes are less open, especially if the participant is wearing mascara. In rare cases, eyelashes may completely block the view of the participant's pupils, making eye tracking impossible.

D2.4 Droopy eyelids



Droopy eyelids or otherwise obstructive eyelids can block the view of the participant's pupils. In rare cases, such eyelids may completely block the view of the participant's pupils, making eye tracking impossible.



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