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Tobii Pro Spark

Product Description

Tobii Pro Spark Product Description

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1 Overview of Tobii Pro Spark

Tobii Pro Spark is a compact, high-performance data collection solution that you can take into the field. Use Tobii Pro Spark when your research takes you to locations and to subjects that would otherwise be hard to bring to the lab. You can collect data in classrooms, hospitals, libraries, and other locations where your subjects are easier to recruit.

With sampling frequencies of up to 60 Hz, one eye tracking camera, and two pupil tracking modes (bright and dark pupil), Tobii Pro Spark enables you to adapt your data collection setup to different research populations and scenarios.

Use Tobii Pro Spark for studies on:

- Windows, macOS, and Linux laptop and desktop computers
- 27" (16:9) monitors or smaller
- Real-world setups such as physical objects and social interactions (using the Tripod Stand)
- Projections, simulators, and larger screens (using the Tripod Stand)
- Mobile devices, with our Mobile Testing Accessory

Tobii Pro Spark is primarily designed for use in indoor office environments with adult participants.

1.1 Tobii Pro Spark system requirements

Operating system: Windows 10, Windows 11	
g of eraming of	macOS 10.15 Catalina and 12 Monterey
	Linux Ubuntu 20.04
CPU:	1 GHz, 2 cores
RAM:	2 GB RAM memory*
	*Software for eye tracking research may require higher RAM
Port:	USB port** Type-A or USB Type-C (with included adaptor)
	**The average power consumption during usage is 2.0W, but the eye trackers power consumption can peak up to 5-6W depending on the use case. For example, when the illuminators first turn on, the consumption can briefly spike (a matter of milliseconds) at around 5-6W. The Tobii Pro Spark officially works with USB 2.0 BC1.2 which can handle spikes up to 7.5W.

1.2 Tobii Pro Spark versions

Tobii Pro Spark is available in only one product version: 60 Hz.

1.3 What is in the Tobii Pro Spark box

Tobii Pro Spark ships with the following:



Figure 1. Tobii Pro Spark box and included items

#	Item	Additional information
1	Travel case	Stores, protects, and carries Tobii Pro Spark eye tracker and the included accessories
2	Tobii Pro Spark eye tracker	Used for eye tracking
3	Flex mount	Tobii eye tracker mounting kit for curved monitors or monitors that have very slim bezels
4	USB Type-C male to Type-A female adapter plug	Used when the computer has a USB Type-C port
5	Cleaning cloth	For cleaning the surface of the eye tracker
6	Four mounting brackets with non-permanent adhesive	Attaches Tobii Pro Spark to the screen bezel
7	USB extension cable	USB 2.0 Type-A extension cable (1m)
	Two cleaning wipes	Removes any dust and grease in the area around the screen before attaching a mounting plate
	Safety and Compliance Declaration	Printed versions of important regulatory information

1.4 How to use the USB Type-C male to Type-A female adapter

Tobii Pro Spark is connected to a computer via a standard USB Type-A interface.

If your computer has a USB Type-C interface, you can use the included USB Type-C male to Type-A female adapter.



Figure 2. Tobii Pro Spark cable and adapter

1.5 Tobii accessories

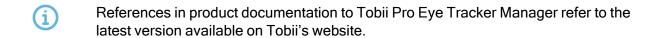
Find out more about Tobii products and accessories on the Tobii product page.

1.6 Tobii Pro Eye Tracker Manager

Tobii Pro Eye Tracker Manager is free software available on Tobii Connect.

Tobii Pro Eye Tracker Manager helps you manage your Tobii Pro eye tracker. It lets you see which eye tracker firmware and software versions you are running and also facilitates updates (where applicable). It provides:

- · Drivers and Firmware installation or updates
- · Display setup
- Eye tracking mode selection
- · Positioning guide
- User calibration
- Gaze visualization¹
- Get diagnostics²



¹Gaze visualization in Tobii Pro Eye Tracker Manager lets you quickly evaluate the quality of the eye tracking data. The Gaze visualization overlaps data only on the Tobii Pro Eye Tracker Manager screen while Tobii Pro Eye Tracker Manager is open.

²Get diagnostics button enables you to collect an encrypted blob file with full frame images and eye tracker logs to send to Customer Care for assistance with troubleshooting.

1.7 Additional software options

Tobii Pro Lab	Tobii 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.
Tobii Pro SDK	Tobii Pro SDK offers a broad set of tools that makes it simple to develop a variety of 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, raw data, pupil data, etc.
Third-party software	This term refers to any application built on Tobii Pro SDK.

2 Technical specifications

For definitions of terms used in the tables below, see the eye tracker glossary on Tobii Connect.

2.1 Eye tracking specifications

The characteristics of the gaze data from an eye tracker are described in terms of accuracy and precision. For more details, take the *Accuracy and precision* course in <u>Tobii Academy</u>.



For more information about output data and the supplementary data stream, please read the Tobii Pro SDK documentation.

Eye tracking technique	Video-based pupil and corneal reflection eye tracking with dark and bright pupil illumination modes. Each data sample is based on a combination of images using both dark and bright pupil illumination.
	One camera captures images of both eyes for accurate measurement of eye gaze and eye position in 3D space, as well as pupil diameter.
Eye tracking mode	N/A (default)
Sampling frequency	60 Hz (default) or 33 Hz
Precision	0.26° RMS in optimal conditions (using built-in filtering)
Accuracy	0.45° in optimal conditions
Binocular eye tracking	Yes
Eye tracker latency	1 frame (immediate)
Blink recovery time	1 frame (immediate)
Gaze recovery time	50 ms
Data sample output	Timestamp, Gaze origin, Gaze point, Pupil diameter
Eye openness data stream	Not available
Eye image data stream	Not available
TTL input stream	Not available
Tracker and client time synchronization	Integrated between the eye tracker time domain and the client computer time domain
User calibration	Binocular
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2.2 Setup

For definitions, see the Tobii eye tracker glossary on Tobii Connect.

Head movement tolerance	Good; One-camera system provides an accurate calculation of the data and a good level of precision.
	More sensitive for head movement than the dual camera systems.
Operating distance (mounted on screen)	45 cm to 95 cm (18" to 37") from the eye tracker
Freedom of head movement (width × height)	Freedom of head movement at 50 cm distance 20 cm × 20 cm (7.9" × 7.9") (At least one eye tracked)
	Freedom of head movement at 65 to 80 cm distance 35 cm × 35 cm (13.8" × 13.8") (At least one eye tracked)
Optimal screen size	Up to 27" (16:9 aspect ratio)
Recommended monitor	N/A
Tracker setup options	Eye tracker mounted on a tripod, allows for even larger screens or physical objects to be tracked.
	The Mobile Testing Accessory enables research or usability tests on a mobile device.
Participant setup	Very simple and easy. Typically, less than 1 minute.

2.3 Software and framework compatibility

Software and framework compatibility	Tobii Pro Lab Tobii Pro Eye Tracker Manager Tobii Pro SDK Any application built on the Tobii Pro SDK
Operating system	Windows, macOS, Linux

2.4 Hardware versions

Single product version: 60 Hz

2.5 Tobii Pro Spark technical specifications

Dimensions	28.5 cm x 1.5 cm x 2.2 cm (11.2" x 0.59" x 0.47")
Weight	97 g (3.4 oz.)
Connectors	USB 2.0 Type-A, 80 cm (31") cable (USB Type-C male to Type-A female adapter included in the package)

Data processing	1 Tobii EyeChip™ ASIC with fully embedded data processing
Eye tracking cameras	1 x Tobii EyeSensor™ modules
Illuminators	Dark pupil illumination modules Bright pupil illumination modules
Power consumption	Typical power consumption < 2.0 W Max. rated power consumption: 6 W
Power options	Directly via USB Type-A connector (with or without the USB Type-C male to Type-A female adapter)

3 Safety declaration

3.1 Mounting warning



Tobii Pro eye trackers should be mounted according to the instructions of the approved mounts used.

The mounting bracket is designed for adhesion to a wide variety of surfaces, such as monitors or laptop screens. It is also designed for clean removability. Failure to follow the recommended removal instructions can result in damage to both the monitor/laptop and the mounting bracket. Do not mount the eye tracker on monitors positioned above the head or face of a user, as it might fall.

3.2 Emergency warning



Tobii Pro eye trackers are designed to be used only for research purposes. Be aware that due to the low, but possible risk of failure or distraction, the eye tracker should not be relied upon or used in dangerous or critical situations.

3.3 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.

3.4 Infrared warning



When activated, the Tobii Pro eye tracker emits pulsed infrared (IR) light. Certain medical devices are susceptible to disturbance by IR light and/or radiation. Do not use the eye tracker in the vicinity of these kinds of susceptible medical devices, as their accuracy or proper functionality could be inhibited. Do not stare into the LED lights at a close distance (<15cm).

3.5 Magnetic field warning



This Tobii Pro eye tracker contains magnets. Magnetic fields may interfere with the function of cardiac pacemakers and implantable cardioverter defibrillators. As a general rule, maintain a minimum distance of 6 inches (15 centimeters) between any item with magnets and your heart device.

3.6 Child safety



A Tobii Pro eye tracker is an advanced computer system and electronic device. As such, it is composed of numerous separate, assembled parts. In the hands of a child, some of these parts have the possibility of being separated from the device, possibly resulting in a choking hazard or other danger to the child.

Young children should not have access to, nor use of the device or its accessories without parental or guardian supervision.

3.7 Electricity



Do not open the casing of the Tobii Pro eye tracker, this could expose you to potentially hazardous electrical voltage. The device contains no user-serviceable parts. Noncompliance will result in loss of warranty! Contact Tobii Customer Care if your eye tracker is not working properly.

3.8 Environment



This eye tracker 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, moisture, rain, sweat or other damp materials and 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 that are 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.

3.9 Power supply



Only use the AC power adapter provided by Tobii AB to power your Tobii Pro eye tracker. If the AC power adapter is damaged, it should be replaced only by Tobii Service Personnel. If damaged, do not use the AC power adapter until it has been replaced. Tobii Pro and its agents are not liable for any damages or injuries to a person or property due to incorrect use of the provided accessories.

3.10 Third party



Any use of a Tobii Pro eye tracker outside the intended use and together with any third-party software or hardware that changes the intended use is a risk, and Tobii AB can not take any responsibility in these situations.

4 Compliance declaration

4.1 EU Compliance

4.1.1 CE statement

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Tobii Pro Spark is CE-marked, certifying compliance with the essential requirements for health, safety, and environmental protection requirements for the European Single Market. Tobii Pro Spark complies with the following directives:

- 2014/30/EU (EMC) Electromagnetic Compatibility Directive.
- 2011/65/EU (RoHS) and (EU)2015/863 Restriction of Hazardous Substances Directive.

4.1.2 Other EU directives and regulations

Tobii AB and Tobii Pro Spark comply with the essential requirements of the following EU directives and regulations:

- 2012/19/EU (WEEE) Waste Electrical and Electronic Equipment Directive.
- 1907/2006 EC (REACH) Registration, Evaluation, Authorization and Restriction of Chemicals.

Furthermore, Tobii AB complies with applicable parts of the Directive 94/62/EC on packaging and packaging waste.

Manufacturer Contact Information

Tobii AB Karlsrovägen 2D S-182 53 Danderyd, Sweden

4.2 UKCA Statement



Tobii Pro Spark is UKCA-marked, certifying compliance with the essential requirements for health, safety, and environmental protection requirements for the GB market. Tobii Pro Spark complies with the following statutory instruments:

- The Electromagnetic Compatibility Regulations 2016. UK Statutory Instruments 2016 No. 1091.
- The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012. UK Statutory Instruments 2012 No. 3032.

4.2.1 Other UK Legislation

Tobii AB and Tobii Pro Spark comply with the essential requirements of the UK regulations regarding WEEE, REACH, packaging and packaging waste.

UK Importer Contact Information

Tobii UK Limited
1st Floor, Advantage House, 87 Castle Street
RG1 7SN Reading, United Kingdom

4.3 FCC interference statement

Tobii Pro Spark has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. Tobii Pro Spark generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If Tobii Pro Spark does cause harmful interference to radio or television reception, which can be determined by turning Tobii Pro Spark off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- · Reorient or relocate the receiving antenna.
- Increase the separation between Tobii Pro Spark and receiver.
- Connect Tobii Pro Spark into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Modifications not expressly approved by Tobii AB could void the user's authority to operate Tobii Pro Spark under FCC rules.

U.S. Responsible Party Contact Information

Tobii Technology, Inc. 12007 Sunrise Valley Dr # 400 Reston, VA 20191, USA

4.4 ISED statement

This Class B digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

4.5 Australia and New Zealand compliance



Tobii Pro Spark is registered in the Australian National Equipment Registration System.

Tobii Pro Spark is RCM-marked which signifies compliance with the Australian and New Zealand product safety requirement for electrical and electronic equipment according to EESS and radio communication and electromagnetic compatibility according to ACMA.

4.6 Japan compliance

Tobii Pro Spark is VCCI-marked which signifies Tobii Pro Spark is compliant with emission (interference) standards in Japan.



この装置は、クラスB機器です。この装置は、住宅環境で使用することを目的 としていますが、この装置がラジオやテレビジョン受信機に近接して使用され ると、受信障害を引き起こすことがあります。

取扱説明書に従って正しい取り扱いをして下さい。

VCCI - B

4.7 Korea compliance



Tobii Pro Glasses 3 is KC-marked which signifies compliance with Korea's product safety requirements for electrical and electronic equipment.

Certificate number:

R-R-TBI-ET5

4.8 Safety compliance

Tobii Pro Spark complies with the following standards:

- EN IEC 62471:2008, Photobiological safety of lamps and lamp systems.
- EN 62368-1:2014 +A11, Audio/video, information and communication technology equipment Part 1: Safety requirements.
- IEC 62368-1:2018, Audio/video, information and communication technology equipment -Part 1: Safety requirements.

Including national deviations for European Group, Australia, New Zealand, China, Japan, USA, and Canada.

4.9 EMC compliance

Tobii Pro Spark complies with the following standards:

- EN 55032:2015/A11, Electromagnetic compatibility of multimedia equipment Emission requirements.
- EN 55035:2017/A11, Electromagnetic compatibility of multimedia equipment Immunity requirements.
- FCC 47 CFR Part 15, Subpart B, Class B.
- ICES-003 Issue 7 Class B, Information Technology Equipment (including Digital Apparatus).
- CISPR32:2015, Electromagnetic compatibility of multimedia equipment Emission requirements (International standard accepted in AS/NZS and Japan).
- KN32, Electromagnetic interference prevention test for multimedia equipment.
- KN35, Electromagnetic wave immunity test for multimedia devices.

4.10 RoHS compliance

RoHS compliance for Tobii Pro Spark is achieved by following the standard:

• EN IEC 63000: 2018, Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances.

4.11 Waste disposal and recycling

Tobii AB is committed to reducing the environmental impact of our products throughout their life-cycle, from manufacturing to use and disposal. We are a member of various compliance schemes for collection, recycling and re-using of electronic waste, batteries, and packaging of our products.



Tobii Pro Spark is marked with the crossed-out wheeled bin symbol, which indicates that it must not be disposed of with household waste. You can return your used Tobii Pro Spark to one of the municipality's recycling centers free of charge.

For more information about the WEEE directive and recycling at Tobii AB, please visit: <u>How we run our business</u>

or



5 Product care

5.1 Operational environment

The recommended range for temperature and humidity during operations is:

• Temperature: 10°C to 35°C (50°F to 95°F)

Humidity: Max 20% to 95% (no condensation on the device)

5.2 Transportation and storage

Use the provided case when traveling with the eye tracker. For shipping and storage, use the original packing.

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)



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

5.3 Cleaning

- Before cleaning your Tobii Pro eye tracker, unplug its USB cable and electrical cable if there is one.
- Use the included cleaning cloth and clean the eye tracker's front gently.
- · Avoid getting moisture in openings on the device.
- Do not use window cleaners, household cleaners, aerosol sprays, solvents, alcohol, ammonia, or abrasives.



Scratches on the front surface of the eye tracker may impair its performance.

5.4 Disposal of the eye tracker

Do not dispose of your Tobii Pro eye tracker in general household or office garbage receptacles. Follow your local regulations for the proper disposal of electrical and electronic equipment.

5.5 Limitation of liability

Except where prohibited by law, Tobii AB is not liable for any loss or damage arising from the use or misuse of a Tobii eye tracker or the mounting plate, whether direct, indirect, special,

incidental or consequential, regardless of the legal theory asserted, including warranty, contract, negligence, or strict liability.

Appendix A Customer Care, training, and warranty

A1 Customer Care

For technical issues, please contact Tobii Customer Care via <u>Tobii Connect</u>. To receive assistance as quickly as possible, make sure you have access to your eye tracker and, if possible, to an internet connection. You should also be able to supply the serial number of the eye tracker, which you can find on the back or bottom of the device.

A1.1 Get help

Many questions can be answered by visiting Tobii Connect. It contains the latest information about contacting Customer Care, helpful articles and FAQs, links to downloads, and much more. Log in or register to see information about your account and to reach Customer Care on Tobii Connect.

A2 Training and education services

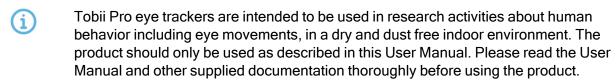
If you are new to eye tracking, or want to extend your knowledge about eye tracking research, sign up for one of our online sessions, onsite trainings, Tobii Academy, and more on <u>Training and education services</u>.

A3 Warranty information

Read more online about Tobii limited warranty and Tobii Care (PDF download).

Appendix B Limitations and considerations

B1 Intended use



B2 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. This 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.

B3 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.

B4 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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Support for your Tobii product

Get help

Visit Tobii Connect for help with your Tobii device. It contains the latest information about contacting Customer Care, documentation, courses, articles, and more.

Contact your solution consultant or reseller

For questions or issues with your product, contact your Tobii sales representative or authorized reseller for assistance. They are most familiar with your personal setup and can help you with tips and product training.