



ThermalGlass PMN (Mixed reality goggles) User Manual



Warning! Important Safety Precautions! Read Before First Use!

- Do not use and/or charge the device in/under water or in rainy weather!
- Do not expose the device to strong physical impacts, do not drop the device!
- Do not try to remove the batteries yourself! If there is any problem with the batteries, please contact your local service center: www.thermal.glass/contact
- Always put on the glasses from the front with caution to protect your eyes!
- If you experience serious overheating or electric malfunction with the device, stop using it by removing it from your head immediately, turn it off and contact your local service center: www.thermal.glass/contact. Please note that while working at confined spaces, airflow around the device maybe reduced, which may cause increased temperature of the device!
- Do not expose the device to heavy dust and direct water!
- Do not use the device outside the environmental temperature of -10°C to $+45^{\circ}\text{C}$!
- Keep the device out of reach of children and pets!
- Do not disassemble or attempt to repair the device yourself. Refer servicing to qualified personnel.
- Use the device in accordance with local regulations and guidelines regarding privacy and data usage.



- Always store the device in the dedicated ThermalGlass case! Make sure to completely turn off the device before putting it in the case!
- Never insert anything metallic into the open parts of the device!
- Do not look into direct sunlight or welding light!
- To reduce the risk of eye, neck and shoulder strain, consider keeping regular breaks during the usage of the device!

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Device overview

Thank you for choosing ThermalGlass! Please read the User Manual carefully to learn everything about your new device. If you have any questions, please visit www.thermal.glass for more information! Enjoy the new reality of vision!



Package Contents



- 1 ThermalGlass device
- Prescription inserts
- Pouch
- ThermalGlass protector case
- Wiping cloth for visor cleaning
- Cable
- Visor: Clean, Photochromic, Tinted
- User manual
- Warranty card
- Quick-Start guide
- Head Strap

Technical parameters

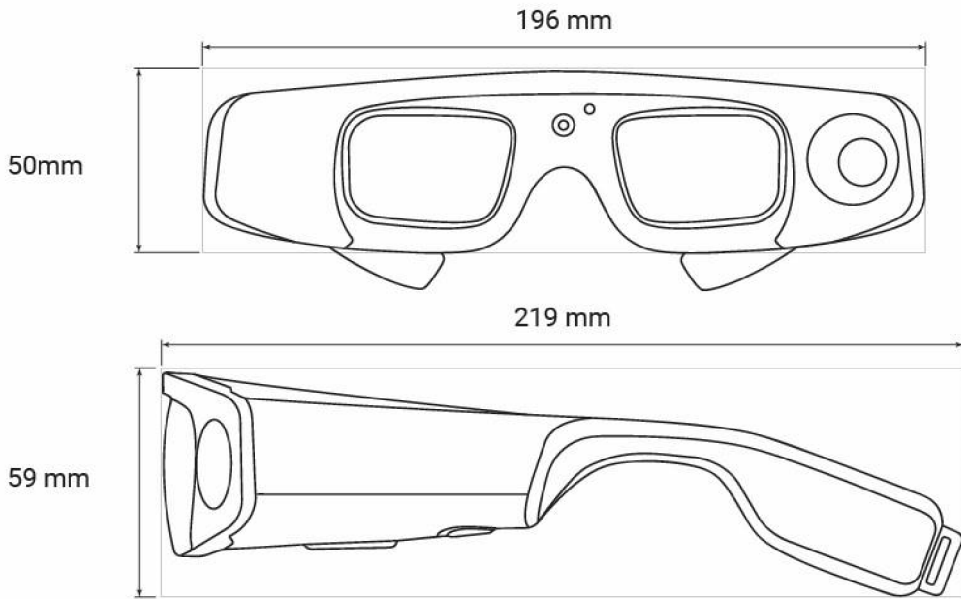
Thermal camera	
Frame rate	Up to 27Hz
Resolution	240 × 320
Microbolometer	Uncooled Vanadium Oxide
Pixel Size	12 μm
Spectral Response	7.8 - 14 Microns
Imaging range	-40°C - 330°C



HFOV	18°
VFOV	24°
RGB camera	
Frame rate	30Hz
Resolution	4224 × 3136
Sensor size	1/3.06"
Pixel Size	1.12 μm
EFL	3.81mm, 650nm with IR cut and auto-focus
DFOV	74,4°
HFOV	62,7°
VFOV	48,7°
See-through Display	
Resolution	640x480
Brightness	> 2000 nits
Color depth	24-bit color
Configuration	Right eye display
Device	
Processor	Qualcomm QCS610 Octa-core processor
RAM	2GB
Storage	32GB
Operating system	Yocto Linux
Language Supported	English
Wireless Connectivity	2.4GHz Wi-Fi and Bluetooth
Port	USB 3.0 Type-C
Sensors	Ambient light sensor
Power	
Battery Capacity	2 × 500mAh
Battery Life	Up to 2 hours

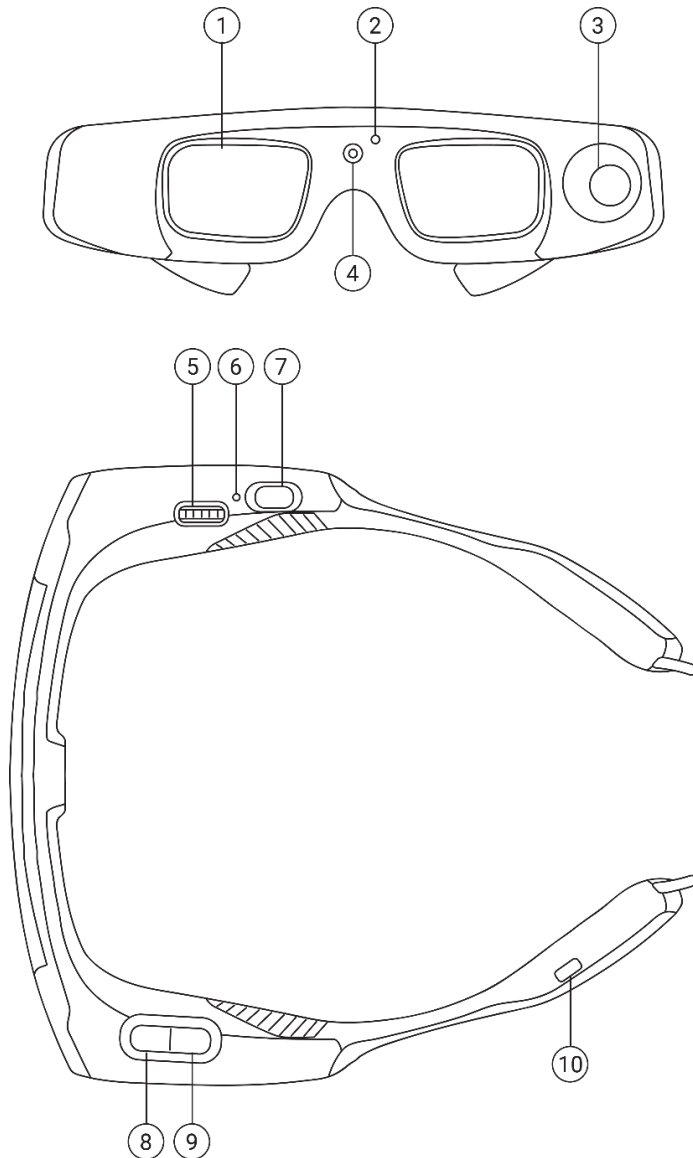


Charging	5-12 V, 1 A
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Physical Specifications	
Weight	200g
Dimensions	196 × 219 × 50mm
	
Material	Polycarbonate, Aluminum Alloy
Package Contents	
ThermalGlass Device	1 piece
Carrying Case	1 piece
Cable	USB 3.0 Type-C
Cable length	1.2 m
Visor	3 pieces (Clean, Photochromic, Tinted)
Prescription inserts, pouch	1 piece
User manual	1 piece
Warranty card	1 piece
Quick-Start guide	1 piece
Head Strap	1 piece



Device properties



1. See Trough Display
2. Illumination Sensor
3. Thermal Camera
4. RGB Camera
5. Offset Dial
6. Power Led
7. Power Button
8. Up Button
9. Down Button
10. Type-C Port



User Input Table



Device on/off

Long press Power Button for 2 seconds



Thermal image display on/off

Short press Power Button



Hard reset

Press and hold Power Button for 10 seconds



Bluetooth discoverable

Short press Power Button + Down button simultaneously



Brightness

Press Up Button to increase Brightness

Press Down Button to decrease Brightness



Thermal image alignment

Rotate the Offset Dial to align the heat map with the environment.

Charging

To ensure proper charging of the ThermalGlass device, follow these steps:

- Connect to Power Source: ○ Use the included USB-C charge cable to connect the device to a power source.
- Charger Mode Confirmation:
 - Check if the device has entered charger mode. ThermalGlass will automatically enter charger mode when connected to a USB power source. The indicator light on the ThermalGlass will show yellow while charging and turn green once fully charged.
- Full Charge Recommendation:



- For optimal performance, it is recommended to fully charge the device before use.

By following these instructions, you can ensure that your ThermalGlass device is properly charged and ready for use.

Connecting your mobile

To enjoy the full capabilities of your ThermalGlass device, install the ThermalGlass mobile application. 

After installing the application, grant the requested permissions on your mobile device. On the first launch, read and accept the Terms of Service. Ensure Bluetooth is enabled on your mobile device to connect whenever you use the application.

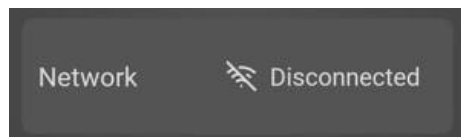
On startup, the ThermalGlass automatically activates Bluetooth discoverable mode, indicated by the LED indicator blinking blue.



Open the ThermalGlass mobile application and select “My device”. Search for “ThermalGlass” and tap on it, to start the connection process. After successful pairing, the application's Bluetooth functionalities become

accessible.

Connect to Wi-Fi

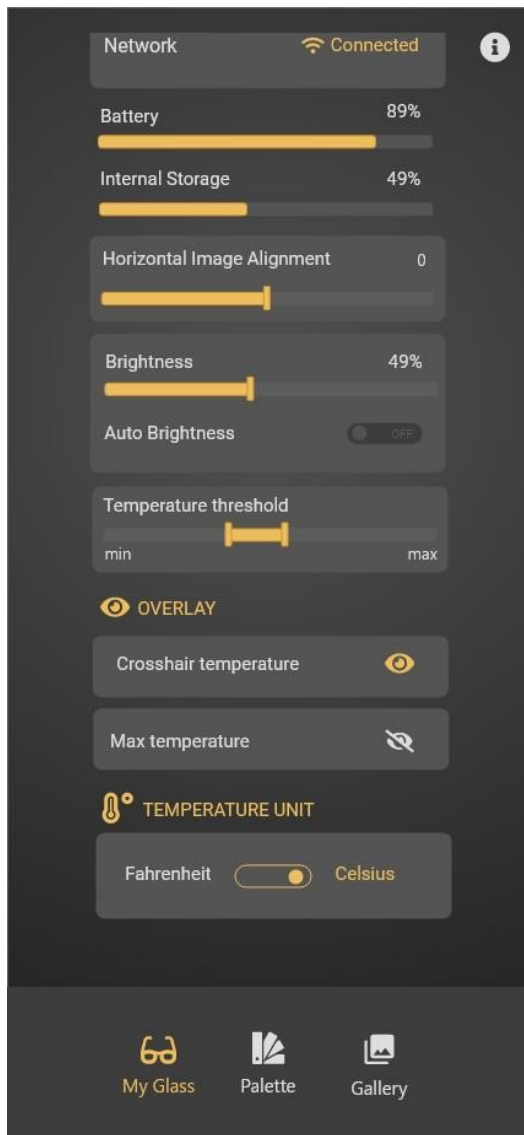


Access all features by connecting your mobile device to ThermalGlass. Turn on Wi-Fi on your mobile, open the ThermalGlass app, and click the Wi-Fi icon in the “Network” section of the “My Glass” menu.

The connection is established automatically for Android phones. When using an iOS phone, a manual menu appears where you can enter the network name and password.



Basic settings



In the “My Glass” section of the ThermalGlass application, you have full control to finetune your projected image.

The *Battery* slider displays the live battery status, while the *Internal Storage* indicator shows the percentage of used storage.

Horizontal Image Alignment slider helps synchronize the thermal image with the real world.

Adjust the *Brightness* manually or activate *Auto Brightness* for optimal level.

Customize the *Temperature Threshold* to meet your exact requirements.

Toggle the *Crosshair* and *Max temperature* indicators on or off, and select your preferred unit of measure, whether *Fahrenheit* or *Celsius*.

Enjoy a tailored experience that fits your unique needs.

Palette settings

On the Palette menu you can choose from 7 different palettes for your thermal image visualization depending on the method of use. The 7 palettes are:



Firefighting



Hunting Outdoors Tyrian



HVAC Iron



Police and Border Control Sepia



Edge Detection



Building Thermography Spectra



Electrical Engineering Prism



These palettes were created to meet specific needs in various fields. They ensure that only the necessary information reaches you, without any excess, facilitating data processing and quick response.



Gallery



Upon opening the gallery, you will find two submenus: "Glass" and "App." The "Glass" submenu displays files stored on the ThermalGlass, while the "App" submenu shows content already downloaded to your mobile device. From this page, you can select images and videos you've taken, save these captured moments to your phone, and even share them on social media platforms.

On the "Glass" tab, select one or more items and save them to your phone by tapping the download button that appears at the bottom.

In contrast, selecting content on the "App" tab brings up the sharing option, allowing you to share the moments captured with your ThermalGlass with others.



Maintenance

DO NOT TRY TO REMOVE THE BATTERIES! Unprofessional handling of the batteries can cause damage to the device or even can affect human health. Do not disassemble or attempt to repair the device yourself. If you have any problems, contact the ThermalGlass customer support team on the following address: support@thermal.glass

Keep the device clean and free from dust and debris.

Keep the device from direct contact with water and liquids.

Avoid exposing the device to extreme temperatures, moisture, or direct sunlight.

Periodically update the mobile application to ensure compatibility and access to the latest features.

For cleaning the visors use only the ThermalGlass visor wiping cloth.

For cleaning the plastic parts use soft cloth or wet wipes (if using wet wipes be especially careful around the USB connector and the buttons).

Troubleshooting

Common issues and solutions:

Not able to switch on

- Start charging the product, does the led lights up?
 - NO ⑦ Product is in deep drain ⑦ Wait 15 minutes, if the led not lights up, send back the product
 - YES ⑦ Hard reset, push power button for 5 sec, if it still not switches on send back the product

Not able to switch off

- Does the power button work?
 - NO ⑦ send back the product
 - YES ⑦ Hard reset, push power button for 5 sec, if it is a continuous issue start self-diagnostic on the product
 - ✦ In case of result of self-test send back the product

Projector doesn't work

- Run self-test ○ In case of result of self-test send back the product



Thermal camera doesn't work

- Run self-test ○ In case of result of self-test send back the product

Brightness buttons doesn't work

- Run self-test ○ In case of result of self-test send back the product

Not able to connect to Wi-Fi

- Run self-test ○ In case of result of self-test send back the product

Not able to connect to Bluetooth

- Send back the product

Battery doesn't charge

- Send back the product

Camera doesn't work

- Run self-test ○ In case of result of self-test send back the product

Light sensor doesn't work

- Run self-test ○ In case of result of self-test send back the product

Streaming doesn't work

- Run self-test ○ In case of result of self-test send back the product

Vision change doesn't work

- Run self-test ○ In case of result of self-test send back the product

Camera adjustment button doesn't work

- Send back the product

Contact customer support for further assistance if needed: thermal.glass/contact

Warranty information

For warranty information please visit: thermal.glass/warranty



Disclaimer

The ThermalGlass is a state of the art Augmented Reality (AR) device. AR is an immersive experience and can affect everyone differently. Please read the following disclaimer about how it may affect you.

Motion Sickness

People who are prone to motion sickness have a risk of experiencing discomfort when using Augmented Reality. Do not use when you are sleep deprived, are under the influence of drugs or alcohol, or have digestive problems.

Health

Taking into account the development of children's eyes, the ThermalGlass should be used only in a very limited way by children under 12 years old. Parents please supervise their child when using the AR glasses. If you are sensitive to flashes of light or patterns that may cause epilepsy, or have health concerns about using AR glasses, please consult a doctor before using our product and refrain from using them at this time. If you become dizzy or nauseous during use, remove the AR glasses immediately, sit down, and ask for help.

Pre-existing Medical Conditions

People who have previous medical conditions such as severe headaches, ear-aches, or psychiatric disorders, should see a doctor before using our headsets. Some people may experience seizures triggered by flashing lights or patterns while experiencing augmented reality, even if they have never had a seizure before, or have no history of epilepsy or seizures. Anyone who knows or believes they may have previously experienced a seizure or other symptom linked to an epileptic condition should see a doctor prior to using our headsets.

Use of AR glasses

To avoid accidents, do not walk while wearing the ThermalGlass until you are confident navigating yourself while using it. Do not run! Liability claims for personal injury and property damage due to movement during the use of the ThermalGlass are excluded! The lenses of the AR goggles must not be held directly in the sun, otherwise the respective device may be damaged!

Hygiene

If the ThermalGlass device is used by multiple users, to reduce the possible risk of transmission of infections, the device should be cleaned after use. Please do not use any kind of solvents or liquids while cleaning the projector lens, use only the cleaning cloth included in the package.

Personal injury and property damage

The use and application of the ThermalGlass and the necessary devices (smartphone, powerbank, etc.) is at your own risk. The technology provided is to be handled with due care. Each user is fully liable for all damages and losses caused by him/her while using the provided technology. In the event of damage, Holoindustry does NOT assume any liability for physical, mental and material damages and/or consequential damages resulting from the use of the equipment. Furthermore,



Holoindustry assumes no liability in case of improper use of the product or failure to observe the warnings listed above. By actively using (putting on the AR glasses, etc.) the ThermalGlass, you acknowledge the rules of use, confirm that you have understood them, and release Holoindustry from liability for any damages resulting from the use of the ThermalGlass and associated equipment provided.

Intellectual property

Holoindustry is pleased that you are visiting this website and is pleased to provide you with information regarding this server. We recommend that you print a copy of the information for your personal use, save the files to your computer and create a link to this server from your own documents. However, there are some legal restrictions and limitations that we impose on all visitors to this and other related websites. We ask that you observe the rules described below. This website contains information that is proprietary to Holoindustry. Holoindustry has invested money, time and effort to develop this information. This property includes, but is not limited to, copyrights, trademarks and information about technology. This information is provided in the form of text, images, audio, video, downloads, links or source codes ("Services and Materials"). Holoindustry reserves all rights to such Services and Materials. Services and Materials are intended solely for ThermalGlass customers and are provided solely for your convenience.

Holoindustry does not grant you any license or ownership rights in such Services and Materials.

Furthermore, you are prohibited from collecting or using any information or data from our websites or systems without Holoindustry's permission, including but not limited to crawling, scraping, mining or other similar extraction or automated methods, or attempting to decipher any transmissions to or from servers relevant to our websites.

FCC Cautions

15.19

This device complies with part 15 of the FCC Rules. 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.

15.21

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.



15.105

Note:

This equipment 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. This equipment 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 this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment 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 the equipment and receiver.
- Connect the equipment 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.

SAR

Specific Absorption Rate (SAR) information: The SAR limit of USA (FCC) is 1.6 W/kg averaged over one gram of tissue. This model (FCC ID: 2BL9D-THERMALGLASS0) has also been tested against this SAR limited. The highest SAR value reported under this standard during product certification for use at the body (0 mm separation distance) is 1.323W/kg.

ISED Caution

RSS-Gen Issue 5

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

- (1) This device may not cause interference.
- (2) This device must accept any interference, including interference that may cause undesired operation of the device.

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence.

L'exploitation est autorisée aux deux conditions suivantes:

- (1) l'appareil ne doit pas produire de brouillage;
- (2) l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

RSS-102 Issue 6: ISED Radiation Exposure Statement

Specific Absorption Rate (SAR) information: The SAR limit of Canada (ISED) is 1.6 W/kg averaged over one gram of tissue. This model (IC: 34837-TGEXPLORER1) has also been tested against this SAR limited.



The highest SAR value reported under this standard during product certification for use at the body (0 mm separation distance) is 1.323 W/kg.

Information sur le débit d'absorption spécifique (das) : la limite du das du Canada (dsi) est de 1,6 W/kg en moyenne sur un gramme de tissu. Ce modèle (IC: 34837-TGEXPLORER1) a également été testé contre ce SAR limité. La valeur de das la plus élevée déclarée en vertu de cette norme lors de la certification du produit pour une utilisation au corps (distance de séparation de 0 mm) est de 1.323 W/kg.