

Magic Leap 2

Operations Manual

Last Revised: April 10, 2023

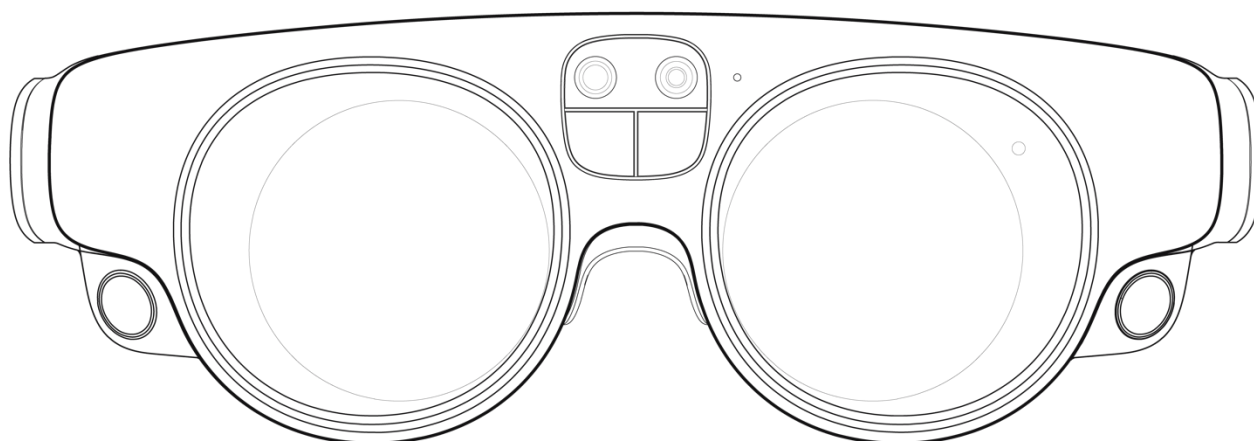
Version: English 1.1

This “Operations Manual” contains all the information related to the use of the Magic Leap 2 device.

NOTE: The Magic Leap 2 Operations Manual (the “Manual”) is intended to aid Magic Leap’s healthcare partners (each, a “MLHP” and, collectively, “MLHPs”) in the development of its own instructions for use (IFUs) for applications developed by such MLHP for use on the Magic Leap 2 device. This Manual is solely for the benefit of MLHPs and should not be shared with any MLHP customer(s) in its current form.

MLHPs are expected to create their own instructions for use (IFUs) to be shared with its customers, which should only include portions of the Magic Leap 2 Operations Manual that are relevant to its specific use cases.

Magic Leap 2 device users should only rely on documentation specific to your healthcare-related use case.



Rev # B

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Change Log

Purpose of this table is to serve as a reference for the changes made to the operations manual from version 1.0 to version 1.1. Changes will be detailed below with their respective location in the manual.

Section Title	Description Of Change
1.3 Magic Leap 2 Components , Table 1.3.1	Addition of part number “90000022-000” for power supply
1.8 LED Notifications, Table 1.8.1	Action name changed from “boot up” to “powering up” . Action description was revised.
1.8 LED Notifications, Table 1.8.1	Action name changed from “Shut Down” to “Powering Down”
1.8 LED Notifications, Table 1.8.1	Actions and descriptions added: “Device On” , “Standby”
1.8 LED Notifications, Table 1.8.1	Action name changed from “incompatible charger” to “non-compliant charger”
1.8 LED Notifications, Table 1.8.1	Action names & respective descriptions removed: “Sleep” , & “Battery Status”
1.8 LED Notifications, Table 1.8.2	Description change for “Unsuccessful pairing”
1.8 LED Notifications Table 1.8.3	Description change for “Fastboot Mode”
1.8 LED Notifications Table 1.8.5	Description change for “Updating” , “Generic Failure” , “Firmware Mismatch”
1.8 LED Notifications Table 1.8.6	Action and description added: “Depth Camera”
1.9 Audible Tones, Table 1.9.1	Tone name changed from “connection” to “controller connection” .Tone description was revised.

1.9 Audible Tones, Table 1.9.1	Tone name changed from “ disconnection ” to “ controller disconnection ”. Tone description was revised.
1.9 Audible Tones, Table 1.9.1	Tones & respective descriptions that were removed: “ Charging ”, “ Stopped Charging ”, “ Battery Low (25%) ”, “ Battery Critical (5%) ”, “ Battery Critical (Below 5% battery power) ”
5.2 System Communications Table, Notifications	Message Description / Dialog, Cause, Possible action by operator, added for: “ Controller connected ”, “ If Controller is out of range ”, “ If Controller is powered off ”, “ Controller disconnected ”, “ Home+Bumper+Trigger ”, “ BT or USB device connected ”, “ BT or USB device disconnected ”, “ 2 Media devices ”, “ A device ”, “ HP TrackingLost_ (occurs during Mapping / Scanning session) ”
5.2 System Communications Table, Notifications	Message Description / Dialog, Cause, Possible action by operator, removed for: “ If no controller detected ”
5.2 System Communications Table, Notifications	Cause revised for: HPTrackingLost_Texture , HPTrackingLost_LowLight , HPTrackingLost_Motion , HPTrackingLost .
5.2 System Communications Table, Dialogues	Message Description / Dialog, Cause, Possible action by operator, added for: “ Device Temperature (Headset) ”, “ Sound Level Warning ”

Chapter 1: Introduction

Trademark and Copyright Information

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Contact Information

Magic Leap, Inc.
7500 W. Sunrise Blvd
Plantation, Florida 33322
USA
magicleap.com/contactus

1.1 Intended Uses

Magic Leap 2 is an augmented reality device that enables simultaneous interaction between the user, digital information and their physical surroundings (hereinafter “Magic Leap 2” or the “Device”). Magic Leap 2 is classified as a general-purpose computing platform (GpCP) and is not considered a medical device. Magic Leap 2 is a platform upon which applications and immersive augmented reality experiences are created using spatial computing technology. The platform is certified as a recognized component to IEC 60601-1 for operator use to enable integration into systems designed for end usage in a medical environment.

Operating the Device: Magic Leap 2 is intended to provide a safe augmented reality experience. This intended use requires you to have an unimpaired sense of balance and motion. Do not use Magic Leap 2 while you are fatigued, ill, experiencing symptoms of illness, are under emotional or physical stress, or are under the influence of alcohol or drugs. Such unintended use of your Magic Leap 2 increases the likelihood of injury and property damage. Never use Magic Leap 2 while driving, cycling, operating heavy machinery, or operating any other moving vehicle. Do not use Magic Leap 2 if you have experienced discomfort while using other virtual and augmented reality devices.

Virtual Objects. Remember that some objects you see in your augmented reality environment do not exist in the physical world. Do not attempt to sit or stand on such objects or use them for support.

Environment. Use Magic Leap 2 only in a comfortable, safe environment. Magic Leap 2 should not be utilized within a dusty / dirty environment. Magic Leap 2 is designed for indoor use only. For environmental requirements, the Magic Leap 2 is intended for use only in a professional healthcare facility environment. To reduce the risk of fire or shock, do not use Magic Leap 2 near water or liquid. Keep devices and components dry and avoid water or liquid intrusion. Even after the Device dries off after coming into contact with water, the battery could corrode and increase the risks stated within this Operations Manual. Also, do not touch the battery, chargers, or cables with wet hands. Magic Leap 2 should only be used in environments where the ambient temperature is between 10 °C and 25°C (50 °F and 77 °F).

Obstructions. Magic Leap 2 produces an immersive augmented reality experience that may distract you from and partially block your view of your actual, physical surroundings. Always be aware of your surroundings when using Magic Leap 2 and ensure you have enough space around you to safely use the Device. To reduce the risk of injury, property damage, or damage to the Device, only use Magic Leap 2 in indoor areas that are free of obstructions.

Malfunction. Failure to use Magic Leap 2 as intended may cause the Device to malfunction and potentially result in physical injury or property damage.

WARNING

WARNING: Use of this equipment adjacent to or stacked with other equipment should be avoided because it could result in improper operation. If such use is necessary, this equipment and the other equipment should be observed to verify that they are operating normally.

1.2

Product Description

The main components of the Magic Leap 2 consist of the Headset (a goggle-like device worn on the head), the Compute Pack (a portable computer and battery), and a Controller (handheld device with a touchpad and buttons). See Figures 1-3. Magic Leap 2 is classified as a general purpose computing platform (GpCP), and is not considered a medical device.

Magic Leap 2 allows users to execute immersive augmented reality applications as well as communicate with other Magic Leap 2 users and external computing devices through the integrated microphones, speakers, Bluetooth, and WiFi components. The Magic Leap 2 platform enables the creation of applications that can enable features such as the overlay of digital content on the user's view of the real world, digital content anchoring to real world objects, remote support, work collaboration, and personal communication. The external computing interfaces and application framework enable the device to serve as a unifying platform for the presentation of information from connected devices and connected data sources.

1.3 Magic Leap 2 Components

Table 1.3.1

Main Components

Model or Part Number	Description
M1104XXXX	Headset + Compute Pack
M2104XXX	Controller
70007784-000 or 90000022-000	Power Supply - Manufacturer: Shenzhen Megmeet Electrical Co., Ltd, - Manufacturer Model #: - MANGO60s-USB-PDB
90000005-000	(US/CA Only) AC Power Cord - Type A Manufacturer: Volex
90000005-001	(EU Only) AC Power Cord - Type C Manufacturer: Volex
90000005-002	AE,IE,SA,SG Only) AC Power Cord - Type G - Manufacturer: Volex - Sales Model
90000005-006	(AE,IE,SA,SG Only) AC Power Cord - Type G - Manufacturer: Volex - Sold as an Accessory
90000005-003	(JP Only) AC Power Cord - Type A Manufacturer: Volex
90000004-001	USB-C Cable Manufacturer: JAE

*Where XXX are regional variances with only difference being regulatory markings and AC power cord

1.3.2 Component Functions

Headset





Table 1.3.2 Headset Feature Functions

Feature	Function
Picture Camera	Magic Leap 2 devices also have a picture (or “RGB”) camera that you can use to take pictures or videos of the world around you. Apps and certain Magic Leap platform features with your permission may also access the picture camera.
World Sensing Cameras	Outward-facing cameras on Magic Leap 2 devices collect wide view images of your surroundings in grayscale, which can be used, for example, to help determine the position of your head and refine spatial maps of your environment.

Eye Tracking Cameras	Magic Leap 2 devices also have inward-facing cameras, which can be used, for example, to compute where you are looking.
Depth Sensors	Depth sensors collect depth images of your surroundings, which can be used, for example, to build spatial maps of your environment (by identifying the relative distance of nearby objects), as well as to identify gestures made by your hands.
Ambient Light Sensors	Ambient light sensors measure the light intensity around you.
Inertial Measurement Unit (IMU) Sensors	IMU sensors in your Magic Leap 2 Headset, Compute Pack, and Controller measure the relative position, orientation, and motion of these devices over time.
Altimeters	Barometric pressure sensors collect air pressure readings of your surroundings, which can be used, for example, to determine changes in your altitude above ground and improve audio playback quality.
Back Band	Securely fits the device to the user's head.
Forehead Pads	Allows comfortable contact and adjustment of device fit for best viewing and comfort, by swapping pads.
Nose Pads	Allows adjustment of device fit for best viewing and comfort, by swapping pads.
Speakers	Enables audio and communication features.
Display	Enables content visualization.
Microphones	Microphones on Magic Leap 2 devices can capture audio of your voice during video recordings, calls, and when you use Voice Commands. The microphones can also collect acoustic sound from the world around you, which can be used to help improve the spatial maps of your surroundings and create realistic digital sound effects.
LED	Conveys device state.
Spatial Mapping	Spatial maps are a critical part of the Magic Leap ecosystem and help Magic Leap's platform enable interactions between digital content and your actual physical surroundings.

Voice Commands	Magic Leap 2 devices offer Voice Commands, a speech-driven input methodology for performing system actions, such as changing the volume of audio, exiting an application or taking a camera capture, in place of using your Controller.
Gestures	Gestures allow you to take system actions with your hands, like moving an app without using your Controller.

1.3.3 Component Functions

Compute Pack





Table 1.3.3

Compute Pack
Feature Functions

Feature	Function
Volume Up and Down	Raises and lowers speaker volume.
Power Button	3.0s press - power up / power down.
LEDs	Convey device state and battery charge levels.
Air Exhaust	Opening for the device's active cooling mechanism to expel internally heated air.
Air Inlets	Opening for the device's active cooling mechanism to intake external air.
USB-C Port	Used to connect to a power supply. Used to communicate with Controller during paring/flashing
Bluetooth	Allows for the wireless connection of Bluetooth devices.

1.3.4

Component Functions

Controller



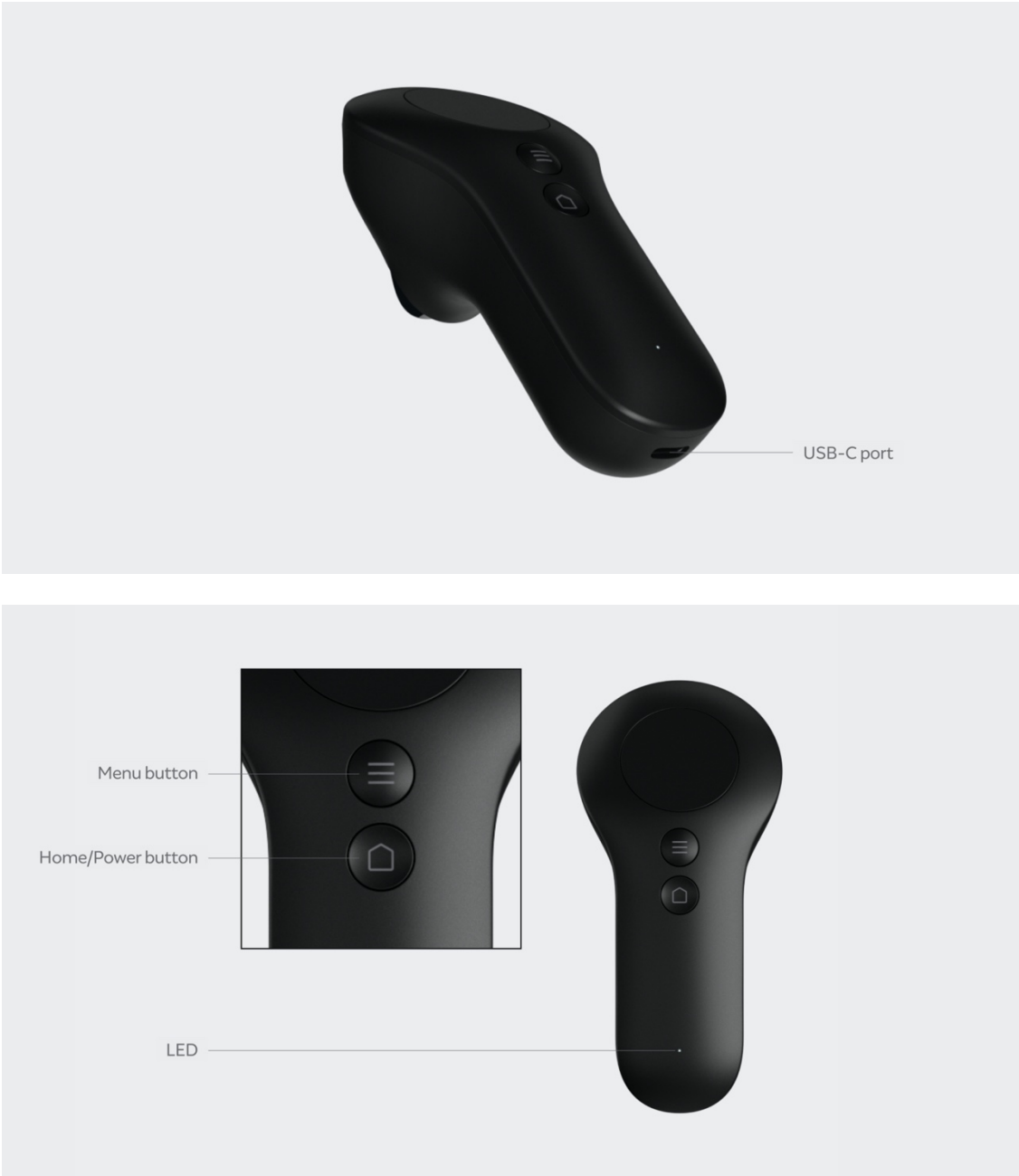


Table 1.3.4

Controller
Feature Functions

Feature	Function
Home Button	Tap - Home Menu (outside of application re-center home menu) (within application will bring up home menu) Hold - Power on/off.
Menu Button	Back and/or Application Menu.

Touch Pad	Swipe/Scroll
Bumper Button	Secondary select.
Trigger	Click - Select Hold - Grab Hold Release - Grab release
USB-C Port	Used as input interface to connect to power supply. Use to connect to Compute Pack for initial pairing and firmware updates.
LED	Conveys device state and battery charge level.

1.4 Accessories

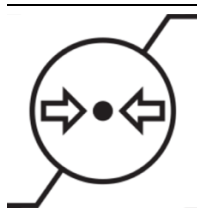
Table 1.4.1 Accessories Function

Model Number	Description	Function
70008416-000	Carry Case	Facilitates the storage and transport of the Magic Leap 2.
70008407-000	Fit Kit	Nose pads and forehead pads allow adjustment of the device fit for best viewing and comfort.
70008409-000	Shoulder Strap	Enables the Compute Pack to be worn adjacent to the body.
70003205-001	Wrist Strap	Enables the Controller to be hung from the user's wrist.
70008413-000	Overhead Strap	Counters accidental slippage of Magic Leap 2.
70008442-000	Frame Insert	Improves Magic Leap 2 display image quality.

1.5 Standard symbols

Table 1.5.1 Standard symbols

Symbol	Symbol Title	Symbol Description	Standard Reference
	Consult Operations Manual	Indicates the needs for the user to consult the Operations Manual	ISO 7000-1641
	Electrostatic Device Label	Warning symbol denoting a device's susceptibility to electrostatic discharge	IEC 60417-5134
	WEEE (Waste electrical and electronic equipment)	Separate collection for electrical and electronic equipment	EC Directive 2012/19/EU DIN EN 50419:2006-06
	Serial Number	Indicates the manufacturer's serial # so that a specific device can be identified	ISO 7000-2498
	Warning	Indicates the need for the user to consult the Operations Manual for important cautionary information such as warnings and precautions that cannot, for a variety of reasons, be presented on the device itself	ISO 7000-0434A
	Humidity limitation	Indicates the acceptable upper and lower limits of relative humidity for transport and storage	ISO 7000:2620

	Atmospheric pressure limitation	Indicates the acceptable upper and lower limits of atmospheric pressure for transport and storage.	ISO 7000:2621
	Temperature limit	Indicates the maximum and minimum temperature limits at which the item shall be stored, transported or used.	ISO 7000:0632

1.6

Interface symbols

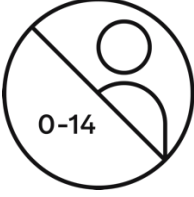
Table 1.6.1

Interface symbols

Symbol	Symbol Title	Symbol Description
	QR Code	The QR code directs you to the manual's landing page.
	Compute Pack Power Button	Long press on/off
	Compute Pack Volume	Volume up and down
	Controller - Menu Button	No system behavior, up to developer
	Controller - Home Button	Single press Home Button Long press on/off

Table 1.6.2

Additional symbols

Symbol	Symbol Title	Symbol Description
	Cables and Cords	Cables attached to the device may become a choking hazard.
	Excessive Heat	Excessive heat may be present in or around these areas of the device.
	Not for Children	Device is not suitable for use by children under the age of 14.
	Discomfort	Discomfort may be present while using the device.

1.7 General Warnings, Precautions and Safety Information



Disposal information. For European Union Residents: This symbol on the product means that when the Device (and the batteries inside it) reach their end of life, they should be disposed of separately from household waste. Instead, please dispose of them in compliance with local laws and guidelines. For more information on disposal and recycling of the Device, please visit <https://www.magicleap.com/en-us/> -> Legal & Regulatory -> Environmental Information.

WARNING



Cables and cords. Keep all cables and cords away from children. The Cable attaching the Device to the Compute Pack may be a choking or a tripping hazard. To reduce the risk of injury, do not wrap any Cables, cords, or wires around your neck; do not get entangled with them; and do not chew, braid, or cut any of them.

WARNING



Excessive heat. Magic Leap 2 may become warm during normal use. Comply with any thermal warnings and advisory messages that may appear on your Magic Leap 2. To reduce the risk of personal injury, if any part of your Magic Leap 2 becomes uncomfortably warm, or overheats, immediately remove your Headset, stop use, and let it cool down before you continue. To reduce the risk of discomfort and injury (including minor burns) ensure that the inside corners of your Headset (as pictured above in this section) do not come into contact with your skin during use and place the Forehead Pad and Nose Pad on your Headset before using it. Visit our Customer Care page at care.magicleap.com for steps you can take if your Magic Leap 2 overheats.

WARNING



Not for children. Magic Leap 2 is not a toy and should not be used by children under the age of 14. The Device is not sized for children, and improper sizing can lead to pain, discomfort, or negative health effects. Adults should ensure the Device is kept out of reach from children under the age of 14.

Magic Leap 2 has not been tested on teenagers under the age of 18, meaning there may be an increased risk that the Device does not properly fit teenagers between 14 and 17 years old.

A parent or guardian should read this Operations Manual and all other documentation provided online and with Magic Leap 2 with teenagers aged 14 and older. A parent or guardian should also monitor teenagers aged 14 and older during and after use of Magic Leap 2 to ensure they only use Magic Leap 2 as recommended and do not experience any pain or discomfort, spend limited time using the Device, and take breaks during use to decrease the risk of discomfort or pain (including the types of discomfort stated in the section below titled "Discomfort"), or other adverse symptoms. Prolonged use by teenagers should be avoided.

To further reduce the risk of discomfort, pain, or injury, teenagers over the age of 14 should:

- First, complete the Custom Fit app on your device.
- If you need help, go to care.magicleap.com for support.
- Immediately discontinue use if the teenager does not successfully complete the Custom Fit app or feels any pain or discomfort while completing the Custom Fit app.
- Immediately discontinue use if any discomfort (including eye aches) is experienced during use of the Device.

⚠ WARNING

Discomfort. You may experience some discomfort while using Magic Leap 2 including but not limited to: visual discomfort, eye-strain, dizziness, nausea, impaired eye-hand coordination, lightheadedness, impaired balance, excessive sweating, headache, fatigue, tingling, burning or stiffness, or numbness.

- If you are having trouble with the Headset slipping in the back, or excessive nose or forehead pressure discomfort, use the Overhead Strap.
- If you experience discomfort, immediately stop using Magic Leap 2. If you decide to resume use of the Device, before doing so, take a break and make sure you have properly set it up, to reduce your risk of discomfort
- Your risk of discomfort may be heightened if: (i) you have never used Magic Leap 2 before; (ii) the Device is not properly set up prior to use; (iii) you use Magic Leap 2 for extended periods of time without a break; (iv) the device is used to view content that has a high likelihood of inducing motion sickness or nausea (e.g. AR applications where you are moving through open areas or viewing heights); or (v) you have a history of motion sickness, nausea, dizziness, eye strain, or headaches.
- To minimize discomfort, consider slowly acclimating yourself to an augmented reality environment by: initially limiting your use of Magic Leap 2 to shorter sessions and taking breaks during use of the Device. Be mindful of the nature of the content that you were viewing if you experience discomfort. You may re-experience discomfort if you view that content again or view similar content, and persistent discomfort may increase the chance of an injury.
- If you have serious or persistent discomfort, please consult with your physician. Until you have fully recovered, do not drive, operate machinery, or participate in activities that are physically or visually demanding or require unimpaired balance or coordination.

⚠ WARNING

Seizures. Light flashes or patterns on Magic Leap 2 may trigger seizures, loss of awareness, involuntary movements, disorientation, altered vision, eye or muscle twitching, other muscular or visual abnormalities, severe dizziness, or other conditions causing blackouts or loss of consciousness, even if the user has never had a seizure or has no history of seizures or epilepsy.

Immediately stop using the Magic Leap 2 if you experience any of these symptoms, and consult your physician before resuming use of the Device.

If you have a history of, or have been diagnosed with symptoms linked to an epileptic condition, consult your physician prior to using Magic Leap 2.

⚠ WARNING

Repetitive motions. Using the Controller can make your muscles or joints hurt. If any part of your body becomes tired or sore while using Magic Leap 2, or if you feel symptoms such as tingling, numbness, burning, or stiffness, stop and rest for several hours before using the Device again.

If you continue to have any of the above symptoms or other discomfort during or after use, stop using the Device and see your physician.

⚠ WARNING

No eye protection. Magic Leap 2 is not intended to provide eye protection against impact, debris, chemicals, UV light, or other harmful lights, particles, projectiles, or other physical hazards.

 WARNING**California Proposition 65.**

WARNING: Magic Leap 2 can expose you to carbon black, which is known to the State of California to cause cancer. For more information, go to www.P65Warnings.ca.gov.

 WARNING

Medical Device radio interference. Magic Leap 2 contains magnets or electronic components that emit radio waves, which could affect the operation of nearby electronics, including cardiac pacemakers, hearing aids, defibrillators, and other medical devices. If you have a pacemaker or other implanted medical device, do not use Magic Leap 2 without first consulting your physician or the manufacturer of your medical device.

 WARNING

Radio frequency (RF) energy. Magic Leap 2 contains radio transmitters and has been designed, manufactured, and tested to meet the Federal Communications Commission (FCC) and Innovation, the Science and Economic Development (ISED) Canada RF exposure and Specific Absorption Rate (SAR) regulatory requirements. To ensure that your exposure to RF energy generated by the Wi-Fi and Bluetooth radios does not exceed the exposure limits set forth by these guidelines, orient the Device according to our Quick Start Setup within this Operations Manual.

1.8 LED Notifications

Each of the Magic Leap 2 device components uses LED lights to communicate different system states to the user. Figure 4 below, shows the location of the LEDs for each of the components. Table 8 describes the different LED states and their respect patterns.

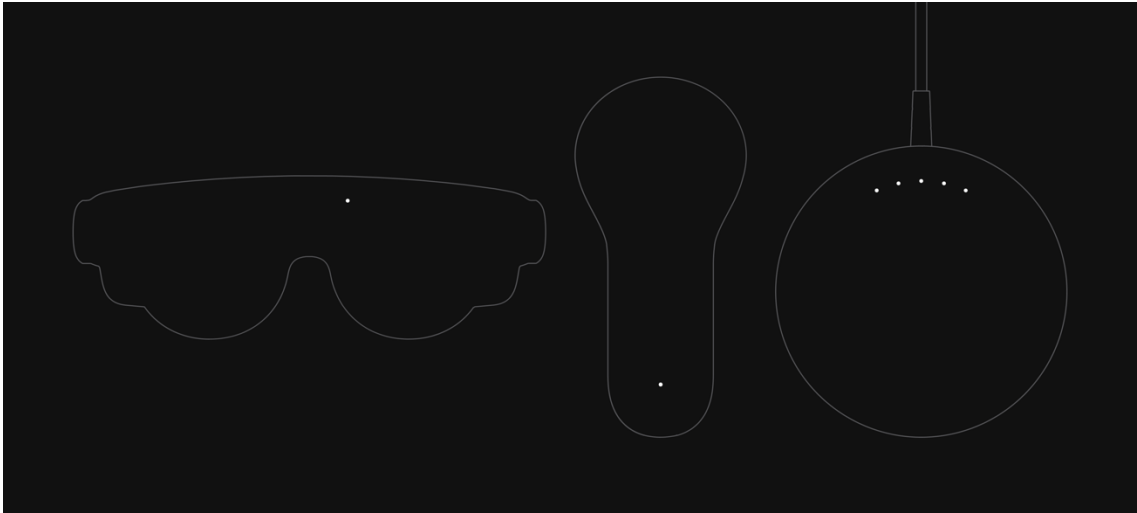


Figure 4: LED locations in Headset, Controller and Compute Pack

Table 1.8.1

Additional symbols

Action	LEDs	Description
Powering up		LEDs 1-4 will be all turned on sequentially. LED 1 will turn off, LED 5 will turn on. LEDs 2-5 will turn off sequentially. *Will loop until the icon grid comes up on the wearable.
Powering Down		LEDs 1-5 will all be on white. LED 5 will turn off, followed by LED 4, then 3 through 1 sequentially. *Occurs when a user shuts down the system by long pressing the power button.
Device On		While unplugged, LED 3 will be static green.

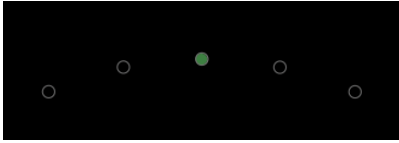
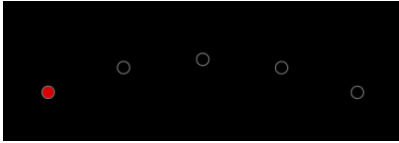
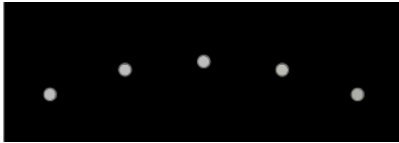
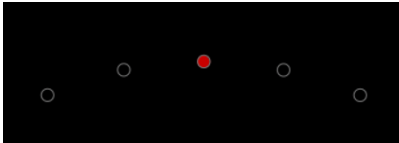
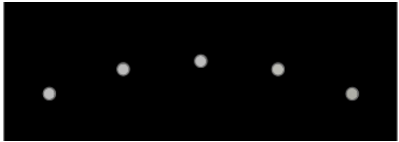
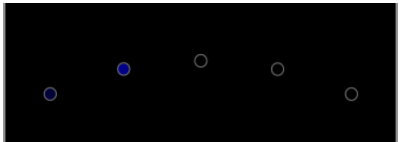
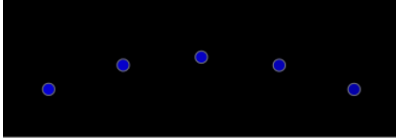
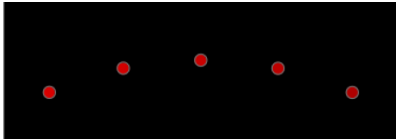
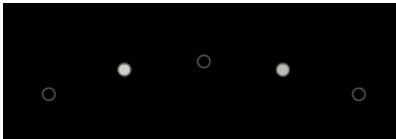
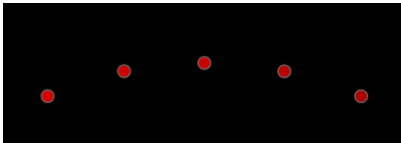
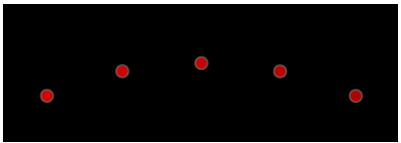
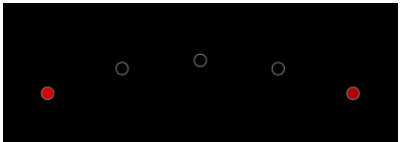
Standby		When in Standby mode, while unplugged, LED 3 will breathe green
Critical Battery		5-0%: LED 1 will blink red *Pattern appears when the battery is at 5% or less. The user will also get a notification.
Charging while On/ Off		0-5%: LED 1 will blink white and red alternatively 6-20%: LED 1 will breathe white, then off for 3 sec 21-40%: LED 1, 2 will breathe white, then off for 3 sec 41-60%: LED 1-3 will breathe white, then off for 3 sec 61-80%: LED 1-4 will breathe white, then off for 3 sec 81-99%: LED 1-5 will breathe white, then off for 3 sec
Non-compliant Charger		LED 3 will blink red thrice, then off for 6 sec. The cycle repeats * Displays when an un-approved charger has been connected.
Charging complete		All 5 LEDs will blink three times, then off for 3 sec - repeated. Charging is complete.
Controller Pairing LEDs Compute Pack symbols		
Action	LEDs	Description
Bluetooth Pairing		Simultaneously pair of 2 LEDs will turn on blue and will be executed sequentially back and forth:

Table 1.8.2

		LEDs 1 & 2, then LEDs 2 & 3, then LEDs 3 & 4, then LEDs 4 & 5. Thereafter, the sequence will get reversed: LEDs 4 & 3, then LEDs 3 & 2, then LEDs 2 & 1. *Compute pack and controller are pairing
Success Pairing		Blue color All 5 LEDs will be blue and on for 5 seconds. *Compute pack and controller have successfully paired.
Unsuccessful Pairing		All 5 LEDs will blink blue and red thrice. *Compute pack and controller have not paired.
Table 1.8.3	Update LEDs Compute Pack	
Action	LEDs	Description
Successfully Updating		White color LED 3 will turn on. LEDs 2 and 4 will turn on and LED 3 will turn off simultaneously. LEDs 1 and 5 will turn on while LEDs 2 and 4 turn off simultaneously. LED 3 will turn on while LEDs 1 and 5 turn off simultaneously. *Update is in progress. Pattern is followed by either a generic success or failure pattern.
Fastboot Mode		LEDs 1-4 will be all turned on sequentially. LED 1 will turn off, LED 5 will turn on. LEDs

		2-5 will turn off sequentially. *Will loop until the icon grid comes up on the wearable. *Device is in Fastboot
Generic Success		White color. All 5 LEDs will simultaneously blink white slowly thrice. After the three blinks, there is a gap of 1 second with all 5 LEDs remaining on. *Pattern occurs after the update pattern, if it is successful.
Generic Failure		Red Color All 5 LEDs will simultaneously blink red three times. After the three blinks, there is a gap of 1 second with all 5 LEDs remaining off. *Pattern occurs after the update pattern, if there is a failure or for any other generic failure.
Table 1.8.4 Warning LEDs		
Action	LEDs	Description
Thermal Warning		Red Color All 5 LEDs will simultaneously blink red slowly three times. After the three blinks, there is a gap of 1 second with all 5 LEDs remaining off. *Device needs to cool down.
Thermal Fault		LED 1 & 5 will blink red repeatedly

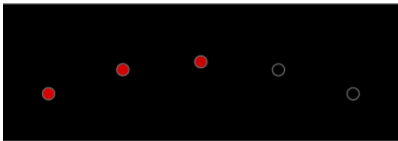
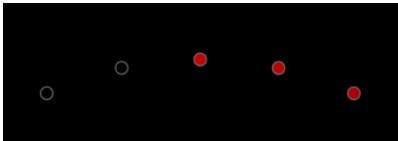
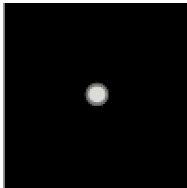
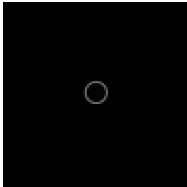
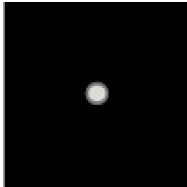
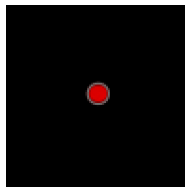
		*Overheating has caused a fault.
Software Failure		LED 1 through 3 will blink red repeatedly *A software failure has occurred
Hardware Failure		LED 3 through 5 will blink red repeatedly * A hardware failure has occurred.
Recovery Mode		LED 2 through 4 will blink red repeatedly *Device is in recovery mode.

Table 1.8.5

Controller LED
Pattern
Descriptions

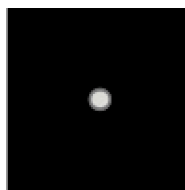
Action	LEDs	Description
Boot Up		The LED will slowly fade in with the color white.
Shut Down		The LED will slowly fade out.
Sleep		The LED will very slowly turn on and off and repeat with the color white.

Critical Battery



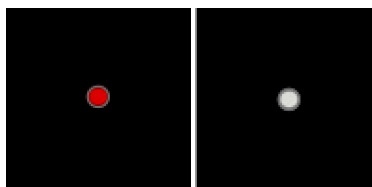
The LED will slowly turn on and off while in the color red.

Charging while On/Off



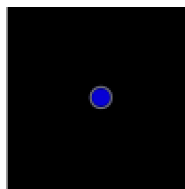
The LED will quickly turn on and off with the color white.

Charging at critical battery level



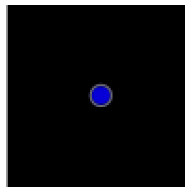
The LED color will slowly transition from red to white then jump back to red.

Bluetooth Pairing



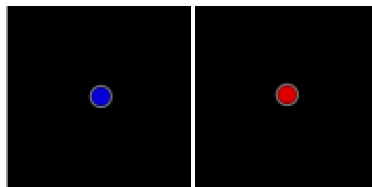
The LED will slowly turn on and off with the color blue.

Successful Pairing



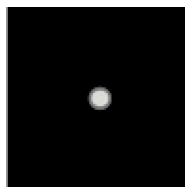
The LED will remain the color blue without blinking.

Unsuccessful Pairing



The LED will alternate between blue and red colors.

Updating



The LED will blink at a fast rate the color white.

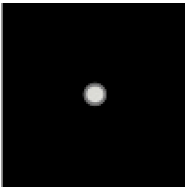
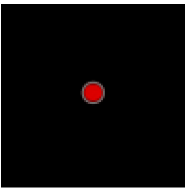
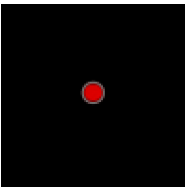
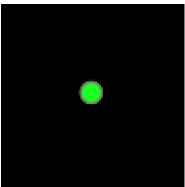
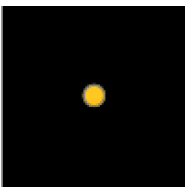
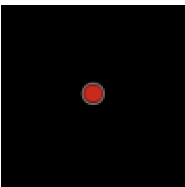
Generic Success		The LED will blink white slowly three times. After the three blinks, there is a gap of 1 second with the LED remaining on.
Generic Failure		The LED will blink repeatedly with the color red
Firmware Mismatch		The LED will blink repeatedly with the color red *This is a controller only event for a firmware mismatch. A dialogue should alert the user on device.

Table 1.8.6

Wearable LED
Pattern
Descriptions

Action	LEDs	Description
RGB Camera		The green LED will be on during all uses of the RGB Camera including Capture, remote assist, barcode reading, and other CV applications
Audio Recording		The orange LED will be on when only audio is recording.
Depth Camera		This light may be visible when the Depth Camera is running.

1.9 Audible Tones

The Magic Leap 2 emits different audible tones to indicate to the user different events. Some tones are embedded in the platform and some tones can be application specific, set by the application developers. The description of each platform tone is explained in Table 9 below.

Table 1.9.1

Tone Descriptions

Tone Name	Tone Description
Boot sound	The Magic Leap 2 headset has an audible sign of life that is heard in the Headset shortly after turning the device on via the Compute Pack Power Button. It consists of a quick 3-note sequence as low, med, and high pitches, to indicate the boot process is in progress.
Controller Connection	The Magic Leap 2 Headset provides audible feedback when a Controller is connected to the Compute Pack. The same sequence of tones is also heard on the Controller itself via audible Controller haptics when connected. The tone consists of a short fast sequence of 4 notes, with a confirmatory ascending pitch and a double high note at the beginning.
Controller Disconnection	The design is the inverse of connected, containing a descending pitch sequence (high to low), heard on the controller via audible controller haptics when: • The Controller is disconnected via Bluetooth • The Device is shut down via the Power Button on the Compute Pack. • The Controller shuts down after a period of inactivity (with the Power-Off sound). The sound ends with 2 of the same tone notes.
Default Notification Sound	Magic Leap 2 has an audible notification whenever a dialog is presented in the UI to direct attention to the text displayed. The default tone uses a generic design, as a single short percussive note containing low and high frequencies to quickly and politely attract attention.
Warning Notification Sound	The warning notification tone is played when the user must be made aware of something or take action with a notification—such as dismissing a popup/toast in the UI. The design is a gentle ascending flourish of tones with a slightly longer length than the other system sounds on the device.
Taking a photo	When the photo capture feature is activated, the Headset plays a quick branded camera shutter sound as confirmation. The design combines a mechanical shutter sound with futuristic tones of data being captured.
Video Record Start	When video recording begins, a short single beep is heard in the Headset. The design encompasses a single beep with a

	medium high pitch, and common sound language shared by many video recording devices.
Video Record Stop	When video recording stops, two fast beeps are heard in the Headset. The design encompasses a simple double beep at a higher pitch than starting recording, with common sound language shared by many video recording devices.
Changing the Volume Setting	When raising or lowering the volume—either by the hardware buttons on the Compute Pack, or in the UI—a single tone with a short medium-low pitch is heard at the new volume level.
Maximum Volume Reached	When the volume reaches full volume, two quick tones of a medium pitch are heard to indicate that the volume is set to maximum.

Chapter 2: Getting Started

Overview

This chapter contains information on how to get started with your Magic Leap 2.

To safely power up or power down the device, hold the Compute Pack Home Button for three seconds or hold the Controller Home Button for three seconds.

2.1 Unpacking and inspecting

Check the exterior of all components for damage that could have occurred during shipping and handling before use.

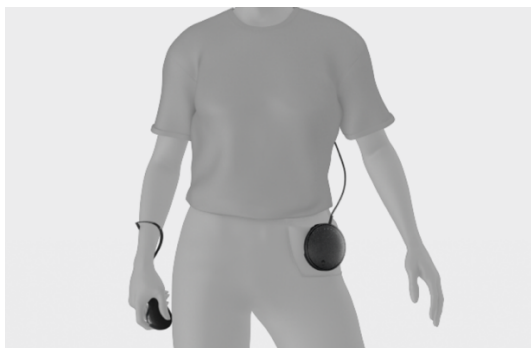
Table 2.1.1 In the Box Components

Component	Quantity
Headset (assembled with Forehead Pad, Nose Pad and Frame Insert)	1
Compute Pack	1
Controller	1
60W USB-C Chargers	2
AC Power Cords	2
USB-C Cables (for Compute Pack and Controller)	1
Fit Kit (with additional Nose Pads and Forehead Pads)	1
Overhead Strap (for Headset)	1
Shoulder Strap (for Compute Pack)	1
Wrist Strap (for Controller)	1
Cleaning Cloth	1
Carry Case	1

2.2 Wearing & Starting the Device

Step 1 Wear the Compute Pack

Option 1: Pocket



With the Power button on the outside, slide the back-half of the Compute Pack into a pocket or waistband until it's fixed and secure.

Option 2: Shoulder Strap



Clip the Shoulder Strap hooks to the Compute Pack posts. Wear the strap over your shoulder, just like a messenger bag. Adjust the strap length for optimal positioning and comfort.

WARNING



CAUTION: Do not block the Compute Pack air intake or air exhaust while in use.

Step 2 Turn on the Compute Pack



Press and hold the Power Button on the Compute Pack until the LED lights begin to illuminate.

Step 3 Put on the Headset

Step 3.1 To get the best fit, remove any head or hair accessories (e.g. headbands or hair bands) that may obstruct the Headset from sitting flush all around the head.



WARNING

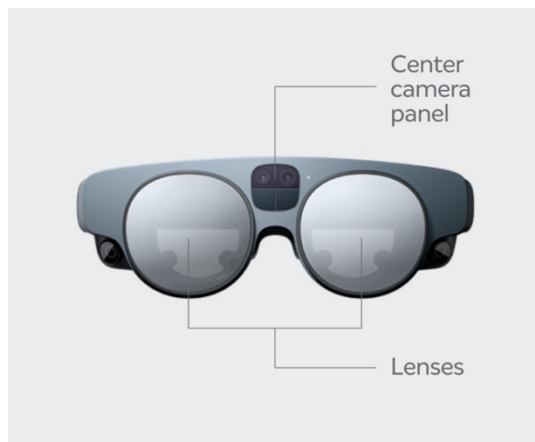
Remove the protective covers from the outer lens and camera prior to use. Failure to do so may result in issues while using the device

Step 3.2
Optional
Prescription
Inserts



Pull back firmly to remove the Frame Insert, then replace it with your Prescription Insert.

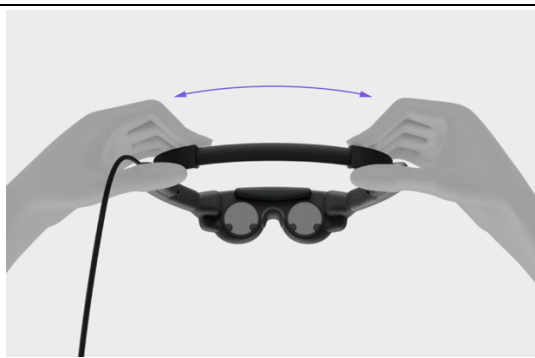
Step 3.3



Before wearing, remove the clear film covers from the Headset.

Using the tab extensions, gently remove the film covers from each lens and the center camera panel.

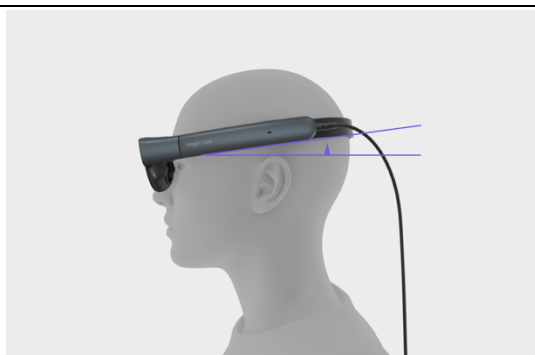
Step 3.4



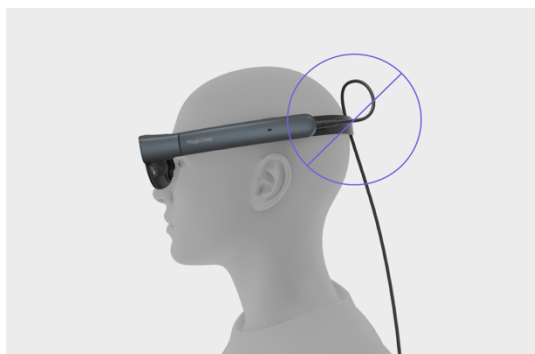
Open the Headset like a pair of headphones by pulling apart the Back Band until it fits over your head.

Caution: Carry and transport the Headset only by the Back Band. Be careful not to over expand the Back Band.

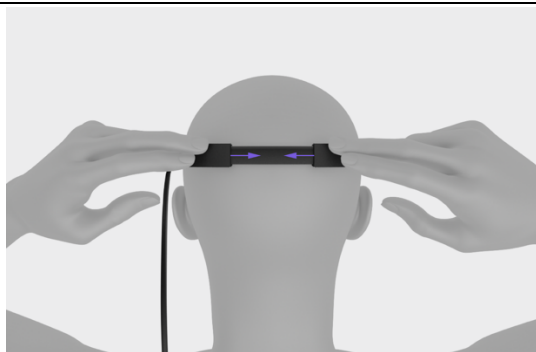
Step 3.5



Unlike a pair of glasses, the Headset is not meant to sit directly on your ears. For the best experience, rest the front of the Headset on the bridge of your nose, with the Sidearms angled slightly above your ears.



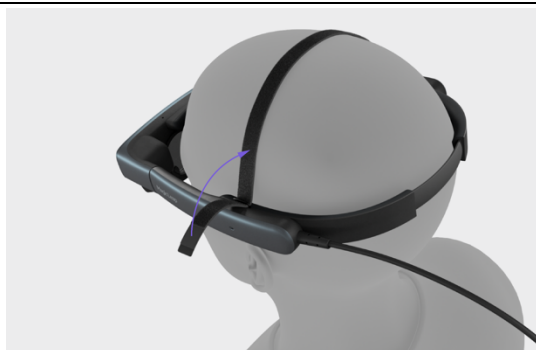
Caution: Make sure the Cable is free and not tangled up in the back of the Headset.

Step 3.6

Secure the Headset by pushing the Back Band together with both hands.

Step 3.7

Optional
Overhead Strap



If the back of the Headset slips while wearing the device, simply add the Overhead Strap.

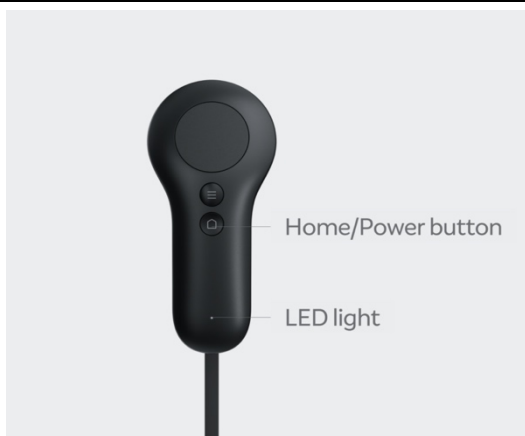
With the velcro side of the strap facing upwards thread both ends through the Eyelets on either side of the Headset.



Place the Headset back on your head, continue adjusting the Overhead Strap until it's secure and comfortable, then fasten the velcro.

Step 4

Connect the Controller



To power on, press and hold the Home Button until you hear the tone and see the LED light. If the LED light is blue, the Controller is not paired. To fix this, directly connect the Controller to the Compute Pack by using the USB-C to USB-C cable included in the box.

Caution: Do not disconnect the Controller until you've fully updated and paired it with your Magic Leap 2.

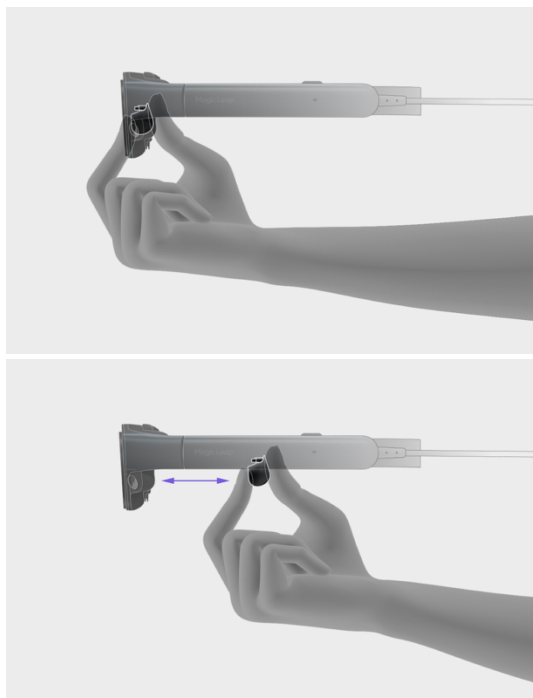
Step 5

Fit and Eye Calibration

Custom Fit. Make sure you're wearing your Headset and the device is powered on. From the home menu, open the Custom Fit application and follow the steps to ensure: Comfortable wear over longer periods of time

- Largest field of view
- Clearest content
- Most accurate dimming

Note: Have your Fit Kit ready. Based on your customization needs, the app may recommend different Nose Pads and Forehead Pads.

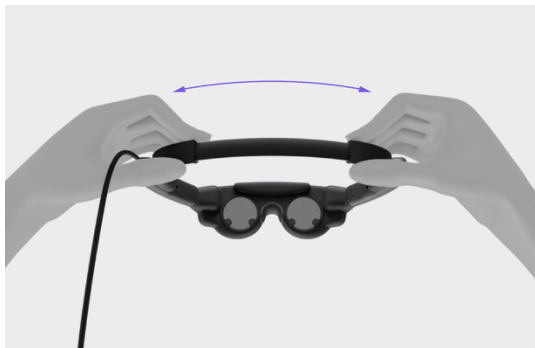


Caution: To replace the Nose Pad, grip between fingers and pull straight out of headset, not down.

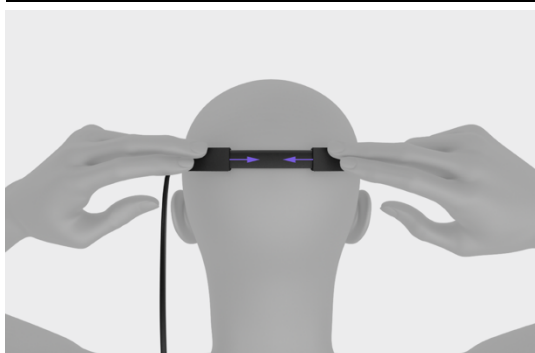


Caution: Do not remove silicone sock from plastic Nose Pad Stems.

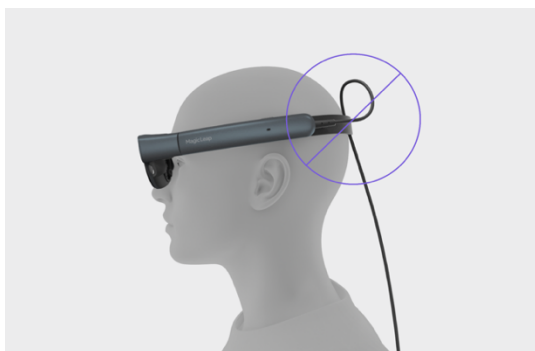
Fit Calibration



First, pull apart the Back Band, then place the device on your head.

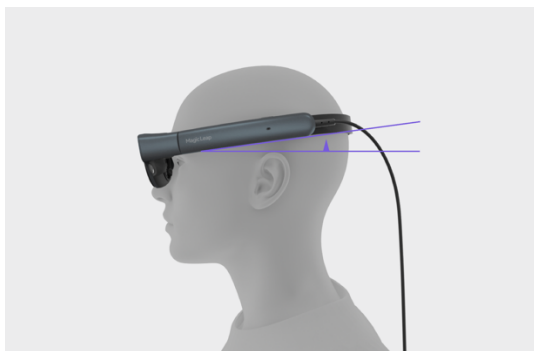


Push the Back Band together until you find a snug fit.

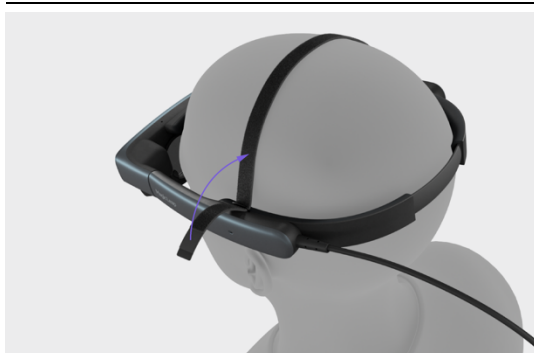


Watch your cable position.

Make sure the cable is free of the Back Band



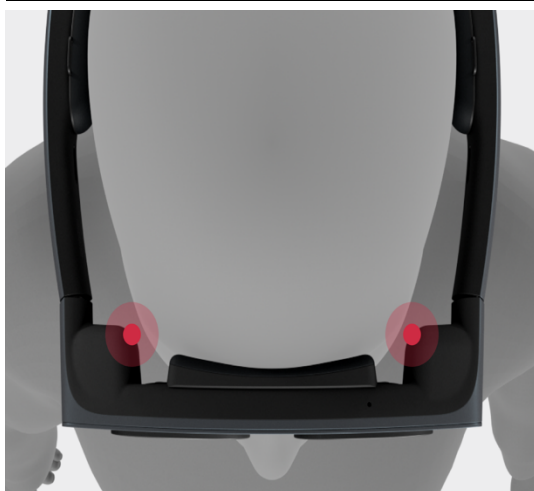
To find the right viewing angle, raise or lower the Headset until you can see all 4 corners of the animation at the same time. Then secure in position by pushing the Back Band together.



Shake your head vigorously in all directions, to ensure the Headset is fixed in your desired position.

If the Headset is slipping, thread both ends of the Overhead Strap through the slots. Use the velcro to secure your fit.

Reminder. Use the Overhead Strap if your Headset slips or becomes uncomfortable.



For long-term comfort, make sure these areas aren't touching your skin.

If the projector corners are still touching your skin, try a thicker Forehead Pad. If they're still touching, remove the Headset and go to care.magicleap.com for next steps.

Fit Scan



Look at the center of
the button and click

Note: The next steps take you through an eye scan to make sure you're using the right pads from the Fit Kit.

Look at the center of the button and click

Keep looking at the center of the button until scan results are complete.

If completed, your fit has been successful. You can move onto Eye calibration.

If failed, scan again.

The scan may recommend switching to better fit pieces (Nose Pad / Forehead Pad) if the Headset is not placed correctly.

If continued failure, go to care.magicleap.com

Eye Calibration

Note: Eye Calibration unlocks your Headset's advanced features.

When ready to begin, focus on the center of the target as it moves around your screen.

If eye calibration is completed successfully, exiting the app will direct you to your previous third-party app or Home Menu.

If eye calibration has failed, proceed to scan again.

If eye calibration has failed after two tries, please go to care.magicleap.com

Fit and Eye Calibration

Please ensure that you have completed the “Fit” and “Eye” sections of the Custom Fit app on Device. When completing the “Fit” section in the Custom Fit app, pay special attention to following these instructions:

- Adjusting the height of the Back Band of the Headset from your ears so that you can see the full display.
- Pushing the Back Band together to ensure that the Headset fits secure, OR adding the Overhead Strap if the Back Band slips down.
- Exchanging the Nose Pads and/or Forehead Pads if instructed by the Custom Fit App.

If when using the Custom Fit App you receive a message that reads “**Sorry, something went wrong. You can use your Headset with reduced functionality....**”, please visit the Customer Care page at care.magicleap.com for steps on how to resolve this.

For an optimal experience, we recommend that Magic Leap 2 is used by people with an interpupillary distance (the distance between your pupils, also known as “IPD”) between 54-76 millimeters. If you have an IPD outside that range, you may have a greater chance of experiencing visual pain or discomfort while using the Magic Leap 2, and you may not have full visibility of the Magic Leap 2 display. For information on how to determine your IPD, please visit care.magicleap.com

WARNING

Unsuccessful Eye Calibration. You may have an increased chance of experiencing visual discomfort if you do not successfully complete Eye Calibration. Magic Leap 2 relies on eye tracking to render content in a way that is designed to be comfortable for your eyes. Upon completing the “Eye” section in the Custom Fit app on Device, the Device will let you know if you were successful. If your Eye Calibration process is unsuccessful, visit care.magicleap.com for further support

WARNING

If any of the following occur while wearing the Device, the user should remove it immediately:

- The Device becomes too hot
 - The Device causes discomfort
 - If you think the Device may have been damaged
 - Any dizziness or lightheadedness occurs
-

2.3

Volume Control

Volume. Magic Leap 2 includes spatial audio features that enable audio playback. When you first use Magic Leap 2, start with the volume at a low level and increase it until you can hear sounds clearly and comfortably. Avoid turning the volume up rapidly, especially if it becomes uncomfortable. Background noise, as well as continued exposure to high volume levels, can make sounds seem quieter than they actually are. Do not listen at high volume for long periods. High sound pressure may damage your hearing. Due to the immersive nature of the mixed reality experience, do not use the Device with the sound at high volume so that you can maintain awareness of your surroundings and reduce the risk of hearing damage.

The Magic Leap 2 device has volume Controls on the Compute Pack are shown in figure 7 below.



Figure 7: Volume Controls

Touch the minus symbol to decrease or silence the volume and touch the plus symbol to increase the volume.

2.4

Charger and Battery

Charger and battery safety. The Compute Pack and Controller each contain a Lithium-Ion battery and come with battery chargers. Failure to follow these instructions may result in a hazard (such as a fire, explosion, battery leakage, or electrical hazard), and may cause damage to the Device or other property.

- Do not try to change the battery inside the Device or open the Device to access the battery, it is not user replaceable or serviceable. There is a risk of explosion if the battery is replaced with an incorrect type.
- Only use the chargers and Power Cables we provide you to power Magic Leap 2. Do not substitute them with other power sources (such as other power adapters or external battery packs), as other power sources may not be compatible with the Magic Leap 2.
- Do not use the chargers we provide you to power the Magic Leap 2 with any other products.
- Periodically inspect your connection cords and chargers for damage or signs of wear. Do not use your chargers if the prong(s), enclosure, connector port, or connector cable is damaged, cracked, or exposed.
- Do not try to charge or use the Device if: (i) it does not turn on after attempted charging; (ii) it overheats when it is used or charged; or (iii) the battery compartment is swollen, leaking liquid, or smoking.
- Keep chargers dry and avoid water or liquid intrusion. Even after the Device dries off after coming into contact with water, the battery could corrode and increase the risks stated in the Magic Leap 2 Safety Guide and this Operations Manual. Also, do not touch the battery, chargers, or Cables with wet hands.
- To reduce the risk of leakage or an internal short-circuit in the battery, do not disassemble, pierce, crush, deform, drop, or put a high degree of pressure on the Compute Pack and Controller. To reduce the risk of injury to you or others, If the battery or chargers leak, please do not allow the liquid to come into contact with your skin or eyes. If there is contact, thoroughly wash the area that came into contact with water and seek immediate medical attention.

⚠ WARNING

WARNING: Magic Leap requires using only the Compute Pack and Controller charger sold or provided by Magic Leap with the Device. Magic Leap 2 is not designed for use with any unauthorized charger, accessories, or equipment. Use of an unauthorized charger, accessory, or equipment may result in injury to you or others, cause performance issues, or damage the Device and other property.

⚠ WARNING

WARNING: Use of accessories, transducers and cables other than those specified or provided by the manufacturer of this equipment could result in increased electromagnetic emissions or decreased electromagnetic immunity of this equipment and result in improper operation.

! WARNING

WARNING: Portable RF communications equipment (including peripherals such as antenna cables and external antennas) should be used no closer than 30 cm (12 inches) to any part of the Magic Leap 2 Device, including cables specified by the manufacturer. Otherwise, degradation of the performance of this equipment could result.

! WARNING

WARNING: The Magic Leap 2 should not be used while charging. If the Device is connected to the charger, it will enter a charge-only (standby mode). The power supply may be disconnected by unplugging the power cord from the wall outlet.

! WARNING

WARNING: Magic Leap 2 is not permitted to be connected to any third-party equipment via the USB-C port on the Compute Pack. Connecting to a third-party device could result in injury to you and others, cause performance issues, or damage the Device and other property.

Chapter 3: Maintenance

Overview

The Magic Leap 2 contains no parts requiring preventive inspection and no parts requiring maintenance to be performed by service personnel.

The Magic Leap 2's internal components contain no interchangeable or detachable parts. Magic Leap 2's external components such as the Nose Pads, Forehead Pads etc. contain interchangeable or detachable parts.

Magic Leap will not be providing any technical descriptions or service manuals to assist partners in repair.

If a repair is needed on the Magic Leap 2, return the Magic Leap 2 to Magic Leap for maintenance. Do not attempt to service the equipment yourself.

Only authorized personnel are permitted to establish physical data connection through the USB-C interface to the Magic Leap 2 Device.

⚠ WARNING

Repair, Risk of Shock. Do not use the Magic Leap 2 if it is damaged or not functioning properly. Do not attempt to open or repair any part of the Device yourself. Opening, disassembling, or altering the Device may lead to electrical shock, and may result in personal injury or death. Repairs should be made only by Magic Leap.

3.1 Visual Inspections

 WARNING

Before each use or in the event the unit is dropped or impacted, please visually inspect the unit for the following;

- Fraying or separation of cords or connectors.
- Chips, cracks or separation of the enclosure (casing).
- Unintentional blockage of any vents or openings.
- Stress or physical damage to any component.

If any items from the list above are discovered during the inspection, immediately remove the Device from the patient environment and discontinue service.

3.2 Cleaning



WARNING

Care. Ensure that your Magic Leap 2 is cleaned before each use. Buildup of dirt, oils, makeup, and other debris can damage the Device and diminish your experience. In caring for your Device, **DO NOT:**

- Use flammable or abrasive cleaning agents on the Device.
- Steam or autoclave the Device.
- Submerge the Device in liquids or pour cleaning liquids over, into, or on the Device.
- Spill any liquid into, or oversaturate any system seams, ports, or perimeter of the lenses.
- Use abrasive products such as paper towels.

Cleaning Instructions

Step 1	Power Down: Ensure the Device is powered off and cooled down.
Step 2	Remove Fit Kit accessories: Remove the Nose Pad, Forehead Pad, and Lens Insert if applicable.
Step 3	Using a wipe from these compatible products: Super Sani Cloth or CaviWipes to perform step 4. Note: Prior to using each new wipe, squeeze the excess fluid out so that it is damp but not dripping. Caution: Do not spill or oversaturate any system seams, ports, or perimeter of the lenses. Caution: Do not use abrasive products such as paper towels
Step 4	Cleaning: Wipe all surfaces of the Device (including disassembled pieces) to remove any dirt, debris, or residue. Note: Use additional wipes as needed, remember to squeeze the excess fluid out of the wipe so that it is damp but not dripping.
Step 5	Wipe the Device: Wipe the Device with an isopropyl alcohol wipe or clean lint free cloth dampened (not dripping) with isopropyl alcohol. Ensure to gently wipe over the cameras and display lenses of the Headset and cameras of the Controller.
Step 6	Dry the Device: Wipe the device dry with a lint free cloth.

3.3 Storage

When the Device is not in use, store it in the Magic Leap Carry Case or another storage case to minimize unintentional damage or exposure, in a room with temperatures between -20 °C to 45 °C (-4°F to 113°F).

 WARNING

Do not leave your Magic Leap 2 in direct sunlight; direct sunlight can cause excessive heat which can damage the Device or other property. To reduce the risk of injury, keep the fan exhaust ports and all other vents on your Compute Pack free and clear of dust and other foreign objects. Covering the Device with materials that affect airflow may affect its performance and increase the chances of a fire or damage.

Chapter 4: Technical Specifications

4.1 Magic Leap 2 Device Specifications

Table 4.1.1 Magic Leap 2 Device Specifications

Description	Specification
Protection against electric shock	Class II equipment
Model Number	Compute Pack/Headset: M1104XXX Controller: M2104XXX
Power	Charger: MAINS input: 100-240V~, 50-60Hz, 1.5A DC Input (via Type C USB): 5VDC, 3A or 9VDC, 3A or 10.4VDC, 3A, or 15VDC, 3A or 20VDC, 3A; 60W MAX
Mode of operation	Continuous Operation
Wireless Functionality	Compute Pack: WiFi 6 - 2.4 GHz (20MHz) and 5 GHz (20/40/80/160MHz), Bluetooth 5.0 + BLE 2 Mbps Controller: BT Low Energy 5.1
Operating Frequency Range	2.4 to 5 GHz
Modulation	GFSK (Gaussian Frequency Shift Keying)
Bandwidth of Receiving Section	2.4 – 2.4835 GHz Bandwidth of each channel is 2 MHz
Connectivity	Compute Pack: Bluetooth 5.0 + BLE 2 Mbps Controller: BT Low Energy 5.1
Weight	Headset: 260 g Compute Pack: 430 g Controller: 137 g
Power cable length	~ 4 feet
Interconnecting Cable length	~ 4 feet

Applied Parts Protection	N/A
--------------------------	-----

Protection against ingress of fluids or particulate matter	N/A
--	-----

4.2

Magic Leap 2 Device Classification

Table 4.2.1

Magic Leap 2 Device Classification

Description	Specification
60601-1 Ed. 3.1 SC 6.2 - Protection against electric shock	Internally powered operation, Class 2 while charging
60601-1 Ed. 3.1 SC 6.3 - Protection against harmful ingress of water or particulate matter	Ordinary
60601-1 Ed. 3.1 SC 6.4 - Method(s) of sterilization	Not intended to be sterilized
60601-1 Ed. 3.1 SC 6.5 - Suitability for use in an oxygen rich environment	Not intended for oxygen rich environments
60601-1 Ed. 3.1 SC 6.6 - Mode of operation	Continuous operation

Note: 60601-1 Ed.3.1 applies to operator use only

4.3 Operating, Storage, and Transportation Specifications

Table 4.3.1

Environmental requirements

Environment	Requirement
Operating Conditions	Temperature: (10° to 25°C) Humidity: 5%-95% Atmospheric Pressure: 80 to 106 kPa
Storage Conditions	Temperature: (-20° to 45°C) (-4 °F to 113 °F) Humidity: 5%-95% Atmospheric Pressure: 26.5 to 106 kPa
Transportation	Temperature: (-25° to 65°C) Humidity: 5%-95% Atmospheric Pressure: 26.5 to 106 kPa

4.4

Electromagnetic Compatibility Guidance and Manufacturer's Declaration

Magic Leap 2 complies with the applicable EMC and telecommunication standards.

Emissions	EN 60601-1-2 (CISPR 11) EN 55032 (CISPR 32) EN 61000-3-2:2014 EN 61000-3-3:2013 ETSI/EN 301 489-1 ETSI/EN 301 489-17
Immunity	EN 60601-1-2 (CISPR 11) EN 55035 ETSI/EN 301 489-1 ETSI/EN 301 489-17

Table 4.4.1

Electromagnetic Emissions

Guidance and manufacturer's declaration - electromagnetic emissions

The Magic Leap 2 is intended for use in the electromagnetic environment specified below. The user must assure that it is used in such an environment.

Electromagnetic Emissions

Emissions test	Compliance	Electromagnetic Environment - Guidance
RF emissions CISPR 11 60601-1-2	Group 1 Class A	The EMISSIONS characteristics of this equipment make it suitable for use in industrial areas and hospitals (CISPR 11 class A). The Bluetooth module must transmit RF energy in order to communicate with the Controller (intended function). Nearby electric equipment may be affected.

RF emissions	Class B	The EMISSIONS characteristics of this equipment make it suitable for use in industrial areas and hospitals (CISPR 11 class A) TBD. The Bluetooth module must transmit RF energy in order to communicate with the Controller (intended function). Nearby electric equipment may be affected.	
CISPR 32 EN 55032 EN 61000-3-2 EN 61000-3-3 ETSI/EN 301 489-1 ETSI/EN 301 489-17			
Harmonics Emissions	Class A	Magic Leap 2 is suitable for use in professional healthcare facility environments but not in home healthcare or special environments.	
IEC 61000-3-2			
Voltage Fluctuations / Flicker Emissions	Complies	Magic Leap 2 is suitable for use in professional healthcare facility environments but not in home healthcare or special environments.	
IEC 61000-3-3			
Electromagnetic Immunity			
Immunity test	Test Level	Compliance Level	Electromagnetic Environment - Guidance
Electrostatic discharge (ESD)	±8 kV (Contact) ±2, ±4, ±8, ±15 kV (Air)	In compliance	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%
IEC/EN 60601-1-2 IEC 61000-4-2			
Electrostatic discharge (ESD)	±2, ±4, (Contact) ±2, ±4, ±8 (Air)	In compliance	The device is suitable for use in a light industrial environment.
ETSI/ EN 301 489-1 ETSI/ EN 301 489-17			
Electrostatic discharge (ESD)	±8 kV, (Contact) ±2, ±4, ±8, ±15 kV (Air)	In compliance	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%
IEC/EN 60601-1-2 IEC 61000-4-2			

Table 4.4.2

IEC 61000-4-2

Electrical fast
transient/burst
immunity

± 2 kV for
power supply
lines

In compliance

Mains power quality
should be that of a
typical professional
healthcare facility
environment.

IEC/EN 60601-1-2

IEC 61000-4-4

Radiated RF

3 V/m across
80 MHz -
2.7GHz, 1%
step size

In compliance

The device is suitable
for use in a professional
healthcare facility
environment.

IEC/EN 60601-1-2

IEC 61000-4-3

Radiated RF

3 V/m across
80 MHz -
6GHz, 1% step
size

In compliance

The device is suitable
for use in a light
industrial environment.

ETSI/ EN 301 489-1

ETSI/ EN 301 489-17

IEC 61000-4-3

Electrostatic
discharge (ESD)

± 8 kV,
(Contact)
 ± 2 , ± 4 , ± 8 , ± 15
kV (Air)

In compliance

Floors should be wood,
concrete or ceramic
tile. If floors are
covered with synthetic
material, the relative
humidity should be at
least 30%

IEC/EN 60601-1-2

IEC 61000-4-2

Proximity Field from
RF Wireless
Communication

Freq (MHz)	Modulation	Test Level (V/m)
385	PM, 18Hz, 50%	27
450	PM, 18Hz, 50%	28
710	PM, 217Hz, 50%	9
745	PM, 217Hz, 50%	9
780	PM, 217Hz, 50%	9
810	PM, 18Hz, 50%	28
870	PM, 18Hz, 50%	28
930	PM, 18Hz, 50%	28
1720	PM, 217Hz, 50%	28
1845	PM, 217Hz, 50%	28
1970	PM, 217Hz, 50%	28
2450	PM, 217Hz, 50%	28
5240	PM, 217Hz, 50%	9
5500	PM, 217Hz, 50%	9
5785	PM, 217Hz, 50%	9

In compliance

Portable and mobile RF
communications
equipment should be
used no closer to the
device, than the
recommended
separation distance of
30 cm

IEC/EN 60601-1-2

IEC 61000-4-3

Surges, Line to Line

± 0.5 kV
 ± 1 kV

In compliance

Mains power quality
should be that of a
typical professional
healthcare facility
environment.

IEC/EN 60601-1-2

IEC 61000-4-5

Power Frequency Magnetic field	30 A/m 50 Hz	In compliance	Power frequency magnetic fields should be at levels characteristic of a typical professional healthcare facility environment.
IEC/EN 60601-1-2 IEC 61000-4-8			
Voltage dips and interruptions immunity	0% of U_N for 0.5 cycles @ 45° increments, U_T = 0V 0% of U_N for 1 cycle @ 0°, U_T = 0V 70% of U_N for 25 / 30 cycles @ 0°, U_T = 168 / 70V 0% of U_N for 250 / 300 cycles, U_T = 0V	In compliance	Mains power quality should be that of a typical professional healthcare facility environment.
IEC/EN 60601-1-2 IEC 61000-4-11			
Conducted Disturbances induced by RF	3 Vrms 0.15 MHz to 80 MHz	In compliance	Portable and mobile communicatio ns equipment should be used no closer to any part of the device including cables than the recommended 30 cm separation distance.
IEC/EN 60601-1-2 IEC 61000-4-6	6 Vrms Amateur Radio & ISM Bands between 0.15 MHz and 80 MHz		
Proximity Magnetic Fields	134.2 kHz, Pulse Modulation 2.1 kHz, Test Level 65 A/m 13.56 MHz, Pulse Modulation 50 kHz, 7.5 A/m	In compliance	The device is suitable for use in a professional healthcare facility environment.
IEC/EN 60601-1-2			

Exposure to Radio Frequency Identification Readers	134.2 kHz @65 A/m	In compliance	The device is suitable for use no closer than 20cm from typical RFID equipment broadcasting common RFID frequencies.
AIM 7351731	13.56 MHz @7.5 A/m (Type A)		
	13.56 MHz @7.5 A/m (Type B)		
	13.56 MHz @5 A/m		
	433 MHz @3 A/m		
	890-960 MHz @54 A/m		
	2.45 GHz @54 A/m		

Note: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflections from structures, objects and people.

Table 4.4.3

Electromagnetic Emissions - Separation Distance

Recommended separation distances between portable and mobile RF communications equipment and Magic Leap 2.

The Magic Leap 2 is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the Magic Leap 2 can help prevent electromagnetic interference by maintaining a minimum distance of 30cm between portable and mobile RF communications equipment (transmitters) and the Magic Leap 2.

Chapter 5: Troubleshooting

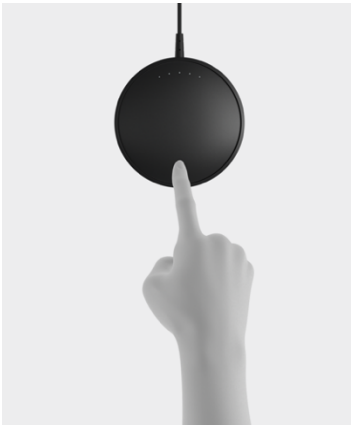
Overview

Troubleshooting steps, error message description, error message table, and how to obtain technical assistance are contained in this chapter. For more documentation and troubleshooting tips, please visit care.magicleap.com.

5.1 Troubleshooting Steps

Table 5.1.1

Troubleshooting

Issue	Troubleshooting steps	Images
The devices feels uncomfortably warm or is overheating	Magic Leap 2 may become uncomfortably warm during normal use. Magic Leap 2 has an automatic warning message and shut off feature when the temperature gets too warm. To adjust for comfort, try the following: • Power off the device and allow the device to cool down before continuing use. • Ensure the inside corners of your Headset (as pictured right) do not come into contact with your skin. • Having some space between the device and your skin on those corners helps improve air flow, which is needed to keep the device cool. • If contact is detected, a thicker (#2) Forehead Pad (located in your Fit Kit) can be used.	
There is no image in the display or the colors are off?	Reboot the device by holding the Compute Pack Power Button for 3 seconds to power down. Hold the Compute Pack Power Button for 3 seconds again to power up until you see LEDs 1-5 turn on sequentially from left to right	

The Controller connection drops or won't pair

Connect the Controller to the Compute Pack using the USB-C cable



The image in the display is blurry

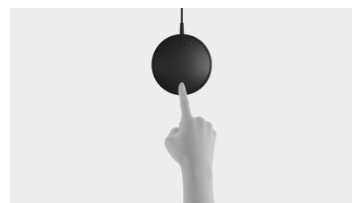
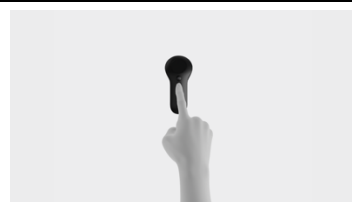
Run calibration while on the device by navigating to Settings/Device and run 'Fit Calibration', 'Eye Calibration' and / or 'Display Calibration'

Reboot.

The Controller positioning is off/not tracking properly

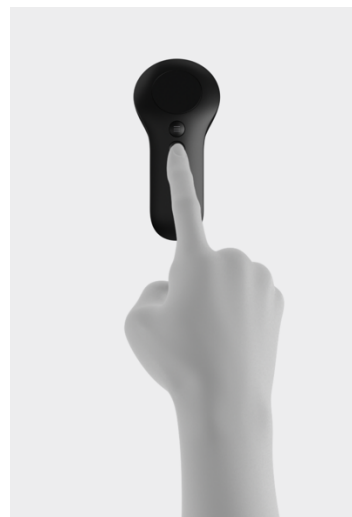
Reboot the Controller by holding the Home Button for about 11 seconds

Reboot the Compute Pack by holding the Power Button for about 11 seconds



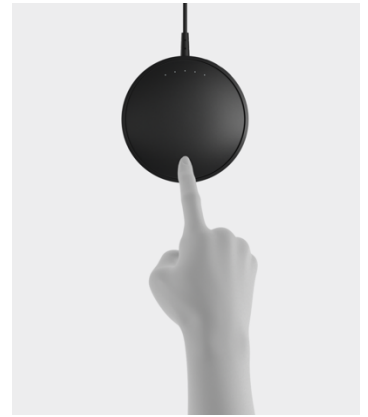
The Controller is unresponsive. Software is locked up.

Hold the Home Button for about 11 seconds to perform a hard reset.



The Compute Pack is unresponsive. Software is locked up

Hold the Power Button for about 20 seconds to perform an immediate SW initiated reset / shutdown.



5.2

System Communications Table

Notifications

Message Description / Dialog	Cause	Possible Action by Operator
SystemNetworkDisconnected - Wi-Fi is disconnected unintentionally	WiFi disconnected	Try reconnecting to the network.
SystemBatteryLow - The Compute Pack battery is low (25%)	Compute Pack at 25%	Charge soon to keep using.
SystemStorageVeryLow - occurs once when data partition is below 10% free.	Storage low	Delete files to create space.
MultipleBTDevicesConnected - A notification for when there are more than 2 (including Controller) Bluetooth devices connected	Multiple connections	If you experience performance issues, try disconnecting a Bluetooth device.
ControllerDisconnected - Controller becomes disconnected wirelessly	Controller off	Controller has lost its connection to the Compute Pack.
Controller not connected	Controller not found	Press the Power Button to turn on, or plug it into the Compute Pack.
ControllerBatteryLow - The controller battery is low (25%)	Controller at 25%	Charge soon to keep using.
ControllerPoweredOffInactivity - Control powered off due to inactivity. Shows up when Compute Pack comes out of sleep mode, after Compute Pack w/ paired Controller goes to sleep due to inactivity, and Controller eventually powers off.	Controller powered off	Controller has turned off due to inactivity.
Controller Connected	Controller Connecting	Wait a few seconds until it connects. Tip: Look at the controller to speed up the process.

Control Flash Success - Control flash was a success	Controller update complete	Keep the Controller connected until pairing is complete.
Controller is up to date	Controller is up to date	No updates needed right now.
Controller not paired	Controller not paired	Use the USB cable to connect the Compute Pack and Controller.
If Controller is out of range	Controller disconnected	Keep the Controller close to maintain the connection
If Controller is powered off by user or user keeps controller on table for 6 minutes	Controller disconnected	Press and hold the Home button to power up the Controller
Controller disconnected due to unknown error or situation	Controller disconnected	N/A
Home + Bumper + Trigger	Pairing Erased	Re-pair the Controller by connecting it to the compute pack via USB
BT or USB device connected	[Device Name] connected	N/A
BT or USB device connected	[Device Name] disconnected	N/A
2 Media devices connecting in the same time (not possible scenario)	Unable to connect	Only one media device can be connected at one time
A device is unable to connect for an unknown reason	Unable to connect	N/A
Volume	Volume Level	N/A
Bluetooth Volume	Volume Level	N/A
HPTrackingLost_(occurs during Mapping / Scanning Session)	Headset tracking lost	The device will continue to try and regain tracking. A reset will cause all progress to be lost.
HPTrackingLost_LowLight	Low Light	Try turning on the lights.
HPTrackingLost_Texture	Distinct features not in view	Try moving and looking around your space.

HPTrackingLost_Motion	Excessive Motion	Excessive motion. Try slowing down.
HPTrackingLost	Localizing still in progress	Try moving and looking around your space.

Dialogues

Message Description / Dialog	Cause	Possible Action by Operator
ControllerBatteryCriticallyLow – The Controller battery is critically low (5%)	Controller at 5%	Charge now to avoid shut down.
Control Firmware Mismatch	Controller update needed	To update, connect the Controller to the Compute Pack via USB.
Control System Insufficient Charge To Flash – System needs to be over 35% charge to flash Control. Compute Pack must be charging if this is attempted when its battery is less than 35%, so would not work if done via USB cable to Control in that case – it jumps directly to pairing, for which no minimum charge is required.	Controller update stopped	Compute Pack needs to be charged up to 35% for software update.
Control Flash Failure - Control flash failed	Controller update failed	To reset the Controller: Disconnect the USB, hold down the Home Button for 11 seconds, then reconnect the USB.
Control firmware update progress, " Control Update Starting "	Controller updating	Please don't disconnect the Controller until the update is complete.
Controller Temperature	High temperature	Stop using the Controller until it cools down.

SystemChargeTemperatureHot - Charge temperature is too hot on Compute Pack, so the device will be running off the battery until that component has cooled down.	Battery temperature high	Charging has paused temporarily until the Compute Pack cools down.
SystemBatteryCriticallyLow - The Compute Pack battery is critically low (5%)	Compute Pack at 5%	Charge now to avoid shut down.
SystemStorageCriticallyLow - occurs once when data partition is below 5% free. If storage is increased to below 10% free, we do not see that notification.	Storage critically low	5% storage available. Delete files to create space.
Device Temperature	High temperature	To avoid a shutdown, please allow the Compute Pack to cool down.
Device Temperature	High temperature	To avoid a shutdown, please allow the Headset to cool down.
Out of Memory	System memory critical	Too many services are running at the same time. Please close some apps to create space.
Sound Level Warning	High Volume Warning	High sound pressure may damage your hearing. Do not listen at high volumes for long periods. Do you want to raise the volume or stay at the current level.
Health 60601 Specific		
Message Description / Dialog	Cause	Possible Action by Operator
Incompatible Charger - Controller	Controller charging	Controller can't be used while charging. Unplug to use.

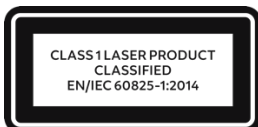
Incompatible Charger - Device	Incompatible charger	Please use a Magic Leap approved charger.
Compatible Charger - Device	Compute Pack charging	Compute Pack can't be used while charging. Unplug to use.
SIP/SOP	Connection risk	WARNING: USB connections can create a shock hazard. See manual for more info. Are you authorized to proceed?
Incompatible Controller	Incompatible Controller	Please use a medical approved Controller.

5.3 Laser Product



WARNING

WARNING: Contains a Laser



Laser - Use of Controls. Use of controls, adjustments, or performance of procedures other than those specified herein or in the Magic Leap 2 Safety Guide may result in hazardous radiation exposure. The Magic Leap 2 contains a Laser.

Manufacturer information:

Magic Leap, Inc., 7500 W. Sunrise Blvd. Plantation, FL 33322 USA

Applicable standards and procedures:

EN/IEC 60825-1:2014 Safety of Laser Products
CLASS 1 LASER PRODUCT

Laser specifications:

This laser product is designated as Class 1.

Laser parameters:

- Wavelength 850nm
- Laser Power for classification <2.45 mW
- Mode of operation: Pulsed
- Pulse Width 3.49 and 4.98 nSec
- Pulse Frequency 80.32 and 60.24 MHz
- Peak Power 600mW
- Illumination cone 59 H x 45 V.

Labels and label placement:

The Certification label is located on the Headset's inner right temple. It reads as follows: Class 1 Laser Product EN/IEC 60825-1:2014. Complies with FDA performance standards for laser products except for deviations pursuant to Laser Notice No. 56, dated May 8, 2019.

Note: Explanatory label does not appear on Device. Full label reproduction appears in this Operations Manual.

The Manufacturer Identification label is located on the back of the Compute Pack clip. Turn your Compute Pack over to see it.

It reads as follows:

- 7500 W. Sunrise Blvd., Plantation, FL 33322, USA, Assembled in Mexico.

Note: the date of manufacture is traceable by unique serial number. The serial number and model number are located under the rear fit pad on the inside of the Headset adjustment band.

5.4 Regulatory Information

REGULATORY MARKS. Regulatory information, certification, and compliance marks for the Magic Leap are available on the Device itself and packaging.

FEDERAL COMMUNICATION COMMISSION COMPLIANCE STATEMENT. Magic Leap 2 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. The Device 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 use or installation. If the Device does cause harmful interference to radio or television reception, which can be determined by turning the Device off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the Device and applicable receiver.
- Connect the Device into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio or television technician for help.

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

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.

INDUSTRY CANADA COMPLIANCE STATEMENT. 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: (i) this device may not cause interference, and (ii) the Device must accept any interference, including interference that may cause undesired operation of the Device. This Class B digital apparatus complies with CAN ICES-3(B)/NMB-3(B). The operation in the band 5150–5250MHz is only for indoor use to reduce the potential for harmful interference to co-channel mobile satellite systems. Le présent appareil est conforme aux CNR d'Industrie 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, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement." Cet appareil numérique de la classe B est conforme à la norme CAN ICES-3(B)/NMB-3. La bande 5150 – 5250MHz est réservée uniquement pour une utilisation à l'intérieur afin de réduire les risques de brouillage préjudiciable aux systèmes de satellites mobiles utilisant les mêmes canaux.

EUROPEAN UNION IMMUNITY STATEMENT. In the event of an Electrostatic discharge (ESD), Magnetic and Electric field disturbance, the user may experience a momentary loss of operation. In the unlikely event that an ESD, Magnetic and Electric field disturbance event results in prolonged loss of operation, a system reset of the Device may be required.

EUROPEAN UNION COMPLIANCE STATEMENT. Magic Leap hereby declares that this product is in compliance with Directive 2014/53/EU. For Magic Leap's full declaration of conformity, see www.magicleap.com/legal.

5.5

Obtaining Technical Assistance

For technical information and assistance, contact:

Magic Leap, Inc.
7500 W. Sunrise Blvd
Plantation, Florida 33322USA
magicleap.com/contactus

Quick Start Guide

In the Box

- Headset assembled with Forehead Pad, Nose Pad and Frame Insert
- Compute Pack
- Controller
- 2x 60W USB-C Chargers
- 1x USB-C Cables for Compute Pack and Controller
- 2x Power plug cables
- Fit Kit with additional Nose Pads and Forehead Pads
Use with Custom Fit App on device to customize the Headset fit
- Overhead Strap for Headset
- Shoulder Strap for Compute Pack
- Wrist Strap for Controller
- Cleaning Cloth
- Carry Case

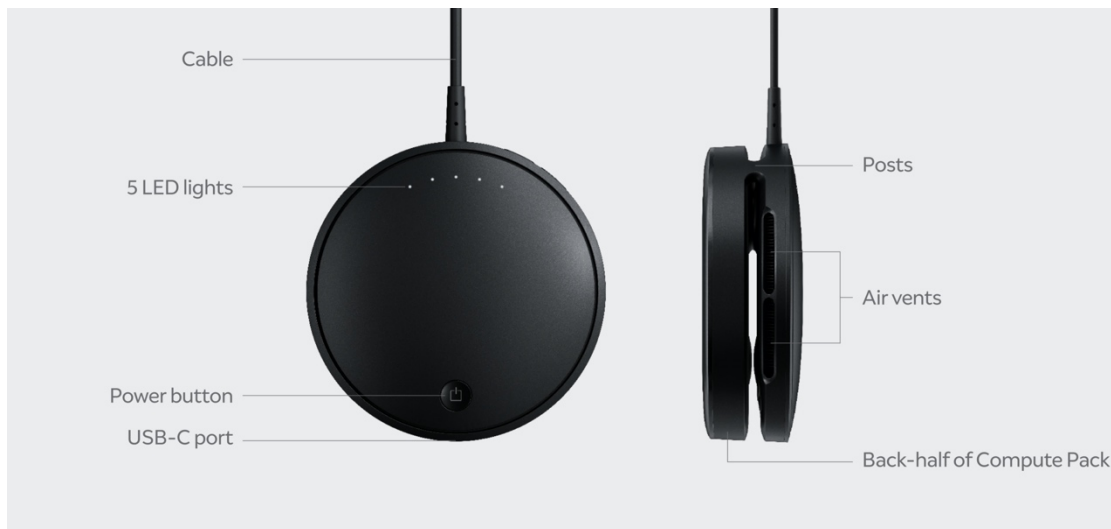
Headset



Headset with Fit Kit contents



Compute Pack



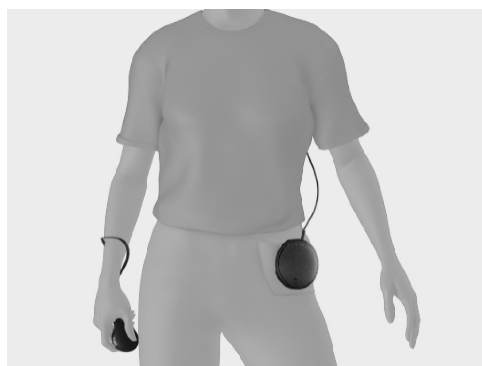
Controller



Step 1

Wear the Compute Pack

Option 1: Pocket



With the Power button on the outside, slide the back-half of the Compute Pack into a pocket or waistband until it's fixed and secure.

Option 2: Shoulder Strap



Clip the Shoulder Strap hooks to the Compute Pack posts. Wear the strap over your shoulder, just like a messenger bag. Adjust the strap length for optimal positioning and comfort.



CAUTION: Do not block the Compute Pack air vents while in use.

Step 2

Turn on the Compute Pack



Press and hold the power button on the Compute Pack until the LED lights begin to illuminate.

Step 3 Put on Headset

Step 3.1

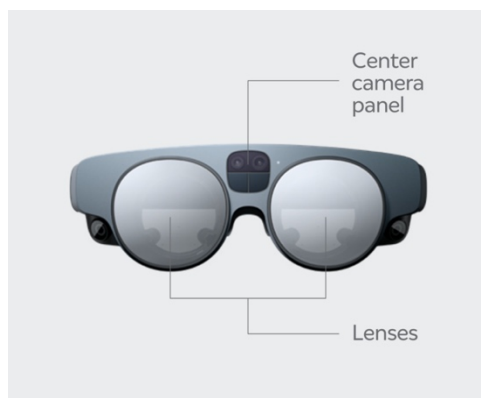
To get the best fit, remove any head or hair accessories (e.g. headbands or hair bands) that may obstruct the Headset from sitting flush around the head.

Step 3.2 Optional Prescription Inserts



Pull back firmly to remove the Frame Insert, then replace it with your Prescription Insert.

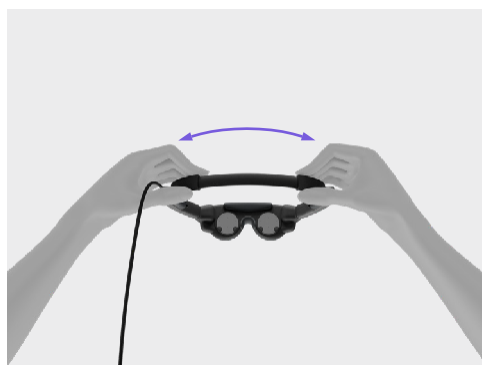
Step 3.3



Before wearing, remove the clear film covers from the Headset.

Using the tab extensions, gently remove the film covers from each lens and the center camera panel.

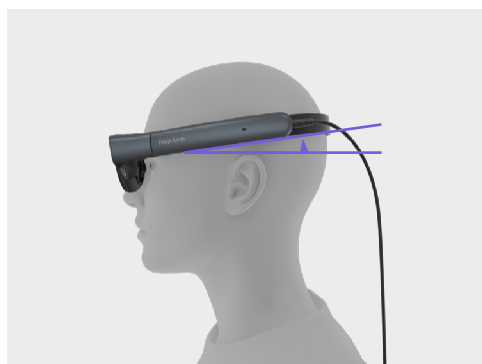
Step 3.4



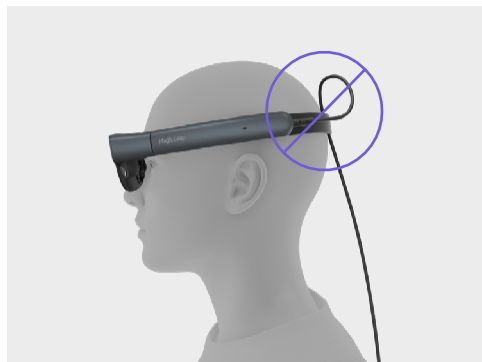
Open the Headset like a pair of headphones by pulling apart the Back Band until it fits over your head.

CAUTION: Be careful not to over expand the Back Band.

Step 3.5

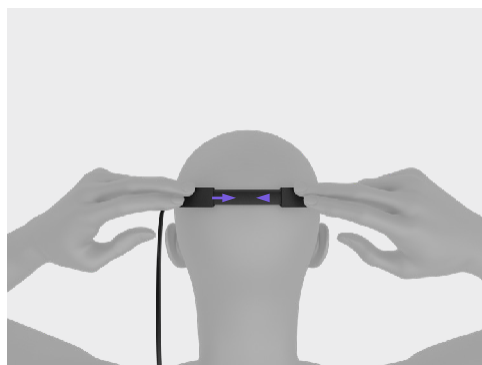


Unlike a pair of glasses, the Headset is not meant to sit directly on your ears. For the best experience, rest the front of the Headset on the bridge of your nose, with the Sidearms angled slightly above your ears.



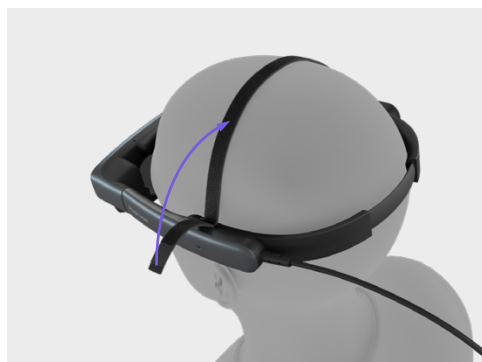
CAUTION: Make sure the Cable is free and not tangled up in the back of the Headset.

Step 3.6



Secure the Headset by pushing the Back Band together with both hands.

Step 3.7 Optional Overhead Strap



If the back of the Headset slips while wearing the device, simply add the Overhead Strap.

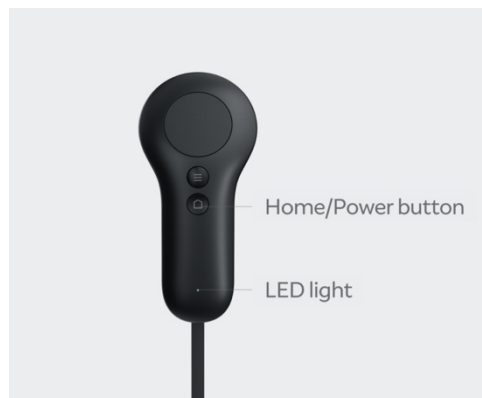
With the velcro side of the strap facing upwards, thread both ends through the Eyelets on either side of the Headset.



Place the Headset back on your head, continue adjusting the Overhead Strap until it's secure and comfortable, then fasten the velcro.

Step 4

Connect the Controller



To power on, press and hold the Home button until you hear the tone and see the LED light.

If the LED light is blue, it isn't paired. To fix this, directly connect the Controller to the Compute Pack by using the USB-C to USB-C cable included in the box.

CAUTION: Do not disconnect the Controller until you've fully updated and paired it with your device.

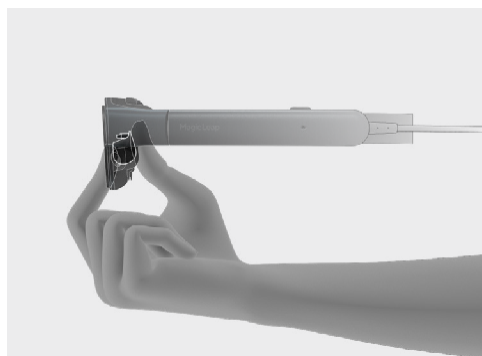
Step 5

Custom Fit Application

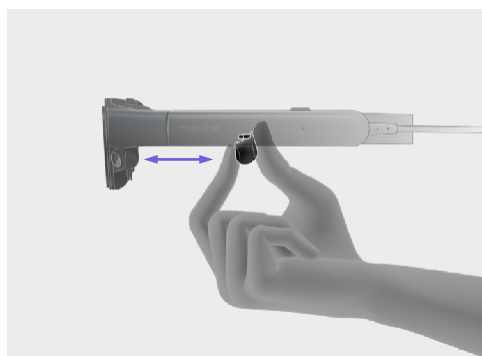
Make sure you're wearing your Headset and the device is powered on. From the home menu, open the Custom Fit application and follow the steps to ensure:

- Comfortable wear over longer periods of time
- Largest field of view
- Clearest content
- Most accurate dimming

Note: Have your Fit Kit ready. Based on your customization needs, the app may recommend different Nose Pads and Forehead Pads.



CAUTION: To replace Nose Pad, grip between fingers and pull straight out of headset, not down.





CAUTION: Do not remove silicon sock from plastic Nose Pad stems.

For more resources to help you get started, visit:

developer.magicleap.cloud

care.magicleap.com

For full safety and care instructions, see the [Magic Leap 2 Safety Guide](#).

Safety Guide

Carefully read our Quick Start Guide at magicleap.com/ml2-quick-start-guide and this Safety Guide at magicleap.com/ml2-safety-guide before using Magic Leap 2. Failure to do so and follow the instructions in this Safety Guide can result in serious injury, property damage, or damage to Magic Leap 2.

This Magic Leap 2 Safety Guide (our “**Safety Guide**”) is provided to reduce the risk of personal injury, physical discomfort, pain, health issues, and property damage relating to use of the Magic Leap 2 Headset, Compute Pack, or Controller (collectively “**Magic Leap 2**” or “**Device**”), as well as the Compute Pack charger, Controller charger, and other Magic Leap branded accessories sold by Magic Leap or its authorized resellers. Please ensure that all Magic Leap 2 users read and understand this Safety Guide before using the Device.

For a full description of our products (including the Device), user agreements, policies, and more, please visit magicleap.com.

Changes

Magic Leap may change or modify this Safety Guide from time to time to keep it accurate and complete. If we issue a new version of the Safety Guide, please only use the latest version available. We encourage you to review this Safety Guide and related information at magicleap.com/ml2-safety-guide from time to time to ensure you are utilizing the latest version. Each version of the Safety Guide will include the revision date at the top of the document, to help you identify the most up-to-date version.

Setting up your device before use

Instructions. Prior to using Magic Leap 2, you should read and follow all setup and operating instructions provided with the Device and on the Device. For example, before using Magic Leap 2 for the first time, be sure to go through the Custom Fit flow, which can be found in the home menu via the applications or in the Perception Modal.

Fit and Eye Calibration. Please ensure that you have completed the “Fit” and “Eye” sections of the Custom Fit app on Device. When completing the “Fit” section in the Custom Fit app, pay special attention to following these instructions:

1. Adjusting the height of the Back Band of the Headset from your ears so that you can see the full display.
2. Pushing the Back Band together to ensure that the Headset fits secure, OR adding the Overhead Strap if the Back Band slips down.
3. Exchanging the Nose Pads and/or Forehead Pads if instructed by the Custom Fit App.

If when using Custom Fit App you receive a message that reads “**Sorry, something went wrong. You can use your Headset with reduced functionality...**”, please visit the Customer Care page at care.magicleap.com for steps on how to resolve this.

For an optimal experience, we recommend that Magic Leap 2 is used by people with an interpupillary distance (the distance between your pupils, also known as “IPD”) between 54–76 millimeters. If you have an IPD outside that range, you may have a greater chance of experiencing visual pain or discomfort while using the Magic Leap 2, and you may not have full visibility of the Magic Leap 2 display. For information on how to determine your IPD, please visit care.magicleap.com.

Volume. Magic Leap 2 includes spatial audio features that enable audio playback. When you first use Magic Leap 2, start with the volume at a low level and increase it until you can hear sounds clearly and comfortably. Avoid turning the volume up rapidly, especially if it becomes uncomfortable. Background noise, as well as continued exposure to high volume levels, can make sounds seem quieter than they actually are. Do not listen at high volume for long periods. High sound pressure may damage your hearing. Due to the immersive nature of the mixed reality experience, do not use the Device with the sound at a high volume so that you can maintain awareness of your surroundings and reduce the risk of hearing damage.

! WARNING

Unsuccessful eye calibration

You may have an increased chance of experiencing visual discomfort if you do not successfully complete Eye Calibration. Magic Leap 2 relies on eye tracking to render content in a way that is designed to be comfortable for your eyes. Upon completing the “Eye” section in the Custom Fit app on Device, the Device will let you know if you were successful. If your Eye Calibration process is unsuccessful, visit care.magicleap.com for further support.

! WARNING

Reasons to see a doctor before use

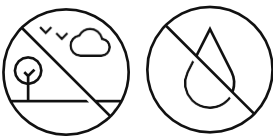
Consult with a physician before using Magic Leap 2 if you: have any conditions that impair your vision (e.g., binocular vision disorder); have mobility issues; are pregnant or elderly; or have a heart condition or other serious medical condition such as seizures or migraines.

! WARNING

Intended uses

Operating the Device. Magic Leap 2 is intended to provide a safe augmented reality experience. This intended use requires you to have an unimpaired sense of balance and motion. Do not use Magic Leap 2 while you are fatigued, ill, experiencing symptoms of illness, are under emotional or physical stress, or are under the influence of alcohol or drugs. Such unintended use of your Magic Leap 2 increases the likelihood of injury and property damage. Never use Magic Leap 2 while driving, cycling, operating heavy machinery, or operating any other moving vehicle. Do not use Magic Leap 2 if you have experienced discomfort while using other virtual and augmented reality devices.

Virtual Objects. Remember that some objects you see in your augmented reality environment do not exist in the physical world. Do not attempt to sit or stand on such objects or use them for support.



Environment. Use Magic Leap 2 only in a comfortable, safe environment. Magic Leap 2 is designed for indoor use only. To reduce the risk of fire or shock, do not use Magic Leap 2 near water or liquid. Magic Leap 2 should only be used in environments where the ambient temperature is between 10 °C and 25°C (50 °F and 77 °F).

Obstructions. Magic Leap 2 produces an immersive augmented reality experience that may distract you from and partially block your view of your actual, physical surroundings. Some Device features may also specifically enhance your ability to see Device-generated AR content more clearly or easily by decreasing light and decreasing your visibility of the visible world in whole or in part. Always be aware of your surroundings when using your Magic Leap 2 and ensure you have enough space around you to safely use the Device. To reduce the risk of injury, property damage, or damage to the Device, only use Magic Leap 2 in indoor areas that are free of obstructions.

Malfunction. Failure to use Magic Leap 2 as intended may cause the Device to malfunction and potentially result in physical injury or property damage.

NOTICE

Care instructions

Care. Ensure that your Magic Leap 2 is cleaned before each use. Buildup of dirt, oils, makeup, and other debris can damage the Device and diminish your experience. In caring for your Device, **DO NOT:**

- Use flammable or abrasive cleaning agents on the Device.
- Steam or autoclave the Device.
- Submerge the Device in liquids or pour cleaning liquids over, into, or on the Device.
- Spill any liquid into, or oversaturate any system seams, ports, or perimeter of the lenses.
- Use abrasive products such as paper towels.

Cleaning Instructions. To clean your Device, follow these step-by-step instructions:

Step 1 - Power Down: Ensure the Device is powered off and cooled down.

Step 2 - Remove Fit Kit accessories: Remove the Nose Pad, Forehead Pad, and lens insert, if applicable.

Step 3 - Using a wipe from these compatible products: Super Sani Cloth or Cavi Wipes to perform step 4.

Note: Prior to using each new wipe, squeeze the excess fluid out of the wipe so that it is damp but not dripping.

Caution: Do not spill or oversaturate any system seams, ports, or perimeter of the lenses.

Caution: Do not use abrasive products such as paper towels.

Step 4 - Cleaning: Wipe all surfaces of the Device (including disassembled pieces and cables) to remove any dirt, debris, or residue.

Note: Use additional wipes as needed, remember to squeeze the excess fluid out of the wipe so that it is damp but not dripping.

Step 5 - Wipe the Device: Wipe the Device with an isopropyl alcohol wipe or clean lint free cloth dampened (not dripping) with isopropyl alcohol. Ensure to gently wipe over the cameras and display lenses of the Headset and cameras of the Controller.

Step 6 - Dry the Device: Wipe the Device dry with a lint free cloth.

Storage. When the Device is not in use, store it in the Magic Leap Carry Case or another storage case to minimize unintentional damage or exposure, in a room with temperatures between -20 °C to 45 °C (-4 °F to 113 °F). Do not leave your Magic Leap 2 in direct sunlight; direct sunlight can cause excessive heat which can damage the Device or other property. To reduce the risk of injury, keep the fan exhaust ports and all other vents on your Compute Pack free and clear of dust and other foreign objects. Covering the Device with materials that affect airflow may affect its performance and increase the chance of a fire or damage.

Repair, Risk of Shock. Do not use the Magic Leap 2 if it is damaged or not functioning properly. Do not attempt to open or repair any part of the Device yourself. Opening, disassembling, or altering the Device may lead to electrical shock, and may result in personal injury or death. Repairs should be made only by Magic Leap or its authorized service providers.

⚠ WARNING

Cables and cords



Keep all Cables and cords away from children. The Cable attaching the Device to the Compute Pack may be a choking or tripping hazard. To reduce the risk of injury, do not wrap any Cables, cords, or wires around your neck; do not get entangled with them; and do not chew, abraid, or cut any of them.

⚠ WARNING

Unauthorized equipment

Magic Leap recommends using only the Compute Pack charger and Controller charger sold or provided by Magic Leap with the Device. Magic Leap 2 is not designed for use with any unauthorized charger, accessory, software, or equipment. Use of an unauthorized charger, accessory, software, or equipment may result in injury to you or others, cause performance issues, or damage the device and other property.

⚠ WARNING

Excessive heat



Magic Leap 2 may become warm during normal use. Comply with any thermal warnings and advisory messages that may appear on your Magic Leap 2. To reduce the risk of personal injury, if any part of your Magic Leap 2 becomes uncomfortably warm, or overheats, immediately remove your Headset, stop use, and let it cool down before you continue. To reduce the risk of discomfort and injury (including minor burns) ensure that the inside corners of your Headset (as pictured above in this section) do not come into contact with your skin during use and place the Forehead Pad and Nose Pad on your Headset before using it. Visit our Customer Care page at care.magicleap.com for steps you can take if your Magic Leap 2 overheats.

⚠ WARNING

Not for children



Magic Leap 2 is not a toy and should not be used by children under the age of 14. The Device is not sized for children, and improper sizing can lead to pain, discomfort, or negative health effects. Adults should ensure the Device is kept out of reach from children under the age of 14.

Magic Leap 2 has not been tested on teenagers under the age of 18, meaning there may be an increased risk that the Device does not properly fit teenagers between 14 and 17 years old.

A parent or guardian should read this Safety Guide and all other documentation provided online and with Magic Leap 2 with teenagers aged 14 and older. A parent or guardian should also monitor teenagers aged 14 and older during and after use of Magic Leap 2 to ensure they only use Magic Leap 2 as recommended and do not experience any pain or discomfort, spend limited time using the Device, and take breaks during use to decrease the risk of discomfort or pain (including the types of discomfort stated in the section below titled “Warning: Discomfort”), or other adverse symptoms. Prolonged use by teenagers should be avoided.

To further reduce the risk of discomfort, pain, or injury, teenagers over the age of 14 should:

- First, complete the Custom Fit app on your device.
If you need help, go to care.magicleap.com for support.
- Immediately discontinue use if the teenager does not successfully complete the Custom Fit app or feels any pain or discomfort while completing the Custom Fit app.
- Immediately discontinue use if any discomfort (including eye aches) is experienced during use of the Device.

⚠ WARNING

Discomfort

You may experience some discomfort while using Magic Leap 2 including but not limited to: visual discomfort, eye-strain, dizziness, nausea, impaired eye-hand coordination, lightheadedness, impaired balance, excessive sweating, headache, fatigue, tingling, burning or stiffness, or numbness.

- If you are having trouble with the Headset slipping in the back, or excessive nose or forehead pressure discomfort, use the Overhead Strap.
- If you experience discomfort, immediately stop using Magic Leap 2. If you decide to resume use of the Device, before doing so, take a break and make sure you have properly set it up, to reduce your risk of discomfort.
- Your risk of discomfort may be heightened if: (i) you have never used Magic Leap 2 before;
- (ii) the Device is not properly set up prior to use; (iii) you use Magic Leap 2 for extended periods of time without a break; (iv) the Device is used to view content that has a high likelihood of inducing motion sickness or nausea (e.g., AR applications where you are moving through open areas or viewing heights); or (v) you have a history of motion sickness, nausea, dizziness, eye strain, or headaches.
- To minimize discomfort, consider slowly acclimating yourself to an augmented reality environment by: initially limiting your use of Magic Leap 2 to shorter sessions and taking breaks during use of the Device. Be mindful of the nature of the content that you were viewing if you experience discomfort. You may re-experience discomfort if you view that content again or view similar content, and persistent discomfort may increase the chance of an injury.
- If you have serious or persistent discomfort, please consult with your physician. Until you have fully recovered, do not drive, operate machinery, or participate in activities that are physically or visually demanding or require unimpaired balance or coordination.

⚠ WARNING

Charger and battery safety

The Compute Pack and Controller each contain a Lithium-Ion battery and come with battery chargers. Please follow the instructions in this section to reduce the risk of injury to you or others and to prevent damage to the Device and property. Failure to follow these instructions may result in a hazard (such as a fire, explosion, battery leakage, or electrical hazard), and may cause damage to the Device or other property:

- Do not try to change the battery inside the Device or open the Device to access the battery, it is not user replaceable or serviceable. There is a risk of explosion if the battery is replaced with an incorrect type.
- Only use the batteries, chargers, and Power Cables, we provide you to power Magic Leap
- 2. Do not substitute them with other power sources (such as other power adapters or external battery packs), as other power sources may not be compatible with the Magic Leap 2.
- Do not use the batteries and chargers we provide you to power the Magic Leap 2 with any other products.

- Periodically inspect your connection cords and chargers for damage or signs of wear. Do not use your chargers if the prong(s), enclosure, connector port, or connector cable is damaged, cracked, or exposed.
- Do not try to charge or use the Device if: (i) it does not turn on after attempted charging.
- (ii) it overheats when it is used or charged; or (iii) the battery compartment is swollen, leaking liquid, or smoking.
- Keep chargers dry and avoid water or liquid intrusion. Even after the Device dries off after coming into contact with water, the battery could corrode and increase the risks stated in this Safety Guide. Also, do not touch the battery, chargers, or Cables with wet hands.
- To reduce the risk of leakage or an internal short-circuit in the battery, do not disassemble, pierce, crush, deform, drop, or put a high degree of pressure on the Compute Pack and Controller.

To reduce the risk of injury to you or others, if the battery or chargers leak, please do not allow the liquid to come into contact with your skin or eyes. If there is contact, thoroughly wash the area that came into contact with water and seek immediate medical attention.

Magic Leap 2 can only be charged using the Compute Pack and Controller charger provided by Magic Leap with the Device. The Device is not designed for use with any unauthorized charger, accessories, software, or equipment. Use of an unauthorized charger, accessory, software, or equipment may result in injury to you or others, cause performance issues, or damage the Device and other property.

WARNING



Disposal information

For European Union residents: This symbol on the product means that when the Device (and the batteries inside it) reach their end of life, they should be disposed of separately from household waste. Instead, please dispose of them in compliance with local laws and guidelines. For more information on disposal and recycling of the Device, please visit magicleap.com/recycle.

WARNING

Seizures

Light flashes or patterns on Magic Leap 2 may trigger seizures, loss of awareness, involuntary movements, disorientation, altered vision, eye or muscle twitching, other muscular or visual abnormalities, severe dizziness, or other conditions causing blackouts or loss of consciousness, even if the user has never had a seizure or has no history of seizures or epilepsy.

Immediately stop using Magic Leap 2 if you experience any of these symptoms, and consult your physician before resuming use of the Device.

If you have a history of, or have been diagnosed with symptoms linked to an epileptic condition, consult your physician prior to using Magic Leap 2.

⚠ WARNING

Repetitive motions

Using the Controller can make your muscles or joints hurt. If any part of your body becomes tired or sore while using Magic Leap 2, or if you feel symptoms such as tingling, numbness, burning, or stiffness, stop and rest for several hours before using the Device again.

If you continue to have any of the above symptoms or other discomfort during or after use, stop using the Device and see your physician.

⚠ WARNING

No eye protection

Magic Leap 2 is not intended to provide eye protection against impact, debris, chemicals, UV light, or other harmful lights, particles, projectiles, or other physical hazards.

⚠ WARNING

California Proposition 65

WARNING: Magic Leap 2 can expose you to carbon black, which is known to the State of California to cause cancer. For more information go to www.P65Warnings.ca.gov.

⚠ WARNING

Medical device radio interference

Magic Leap 2 contains magnets or electronic components that emit radio waves, which could affect the operation of nearby electronics, including cardiac pacemakers, hearing aids, defibrillators, and other medical devices. If you have a pacemaker or other implanted medical device, do not use Magic Leap 2 without first consulting your physician or the manufacturer of your medical device.

⚠ WARNING

Radio frequency (RF) energy

Magic Leap 2 contains radio transmitters and has been designed, manufactured, and tested to meet the Federal Communications Commission (FCC) and Innovation, the Science and Economic Development (ISED) Canada RF exposure and Specific Absorption Rate (SAR) regulatory requirements.

To ensure that your exposure to RF energy generated by the Wi-Fi and Bluetooth radios does not exceed the exposure limits set forth by these guidelines, orient the Device according to our Quick Start Guide available at magicleap.com/ml2-quick-start-guide and any other instructions Magic Leap makes available.

⚠ WARNING

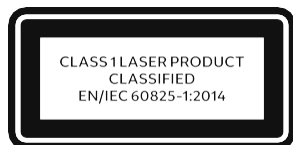
Laser - use of controls

Use of controls, adjustments, or performance of procedures other than those specified herein may result in hazardous radiation exposure.



Contains a laser

Magic Leap 2 contains a laser.



Manufacturer information

Magic Leap, Inc., 7500 W. Sunrise Blvd. Plantation, FL 33322 USA

Applicable standards and procedures

EN/IEC 60825-1:2014 Safety of Laser Products
CLASS 1 LASER PRODUCT

Laser specifications

This laser product is designated as Class 1 during all procedures of intended use and operation.

Laser parameters

Wavelength: 850nm
Laser Power for classification: <2.45 mW
Mode of operation: Pulsed
Pulse Width: 3.49 and 4.98 nSec
Pulse Frequency: 80.32 and 60.24 MHz
Peak Power: 600mW
Illumination Cone: 59 H x 45 V

Labels and label placement

The Certification label is located on the Headset's inner right temple. It reads as follows:

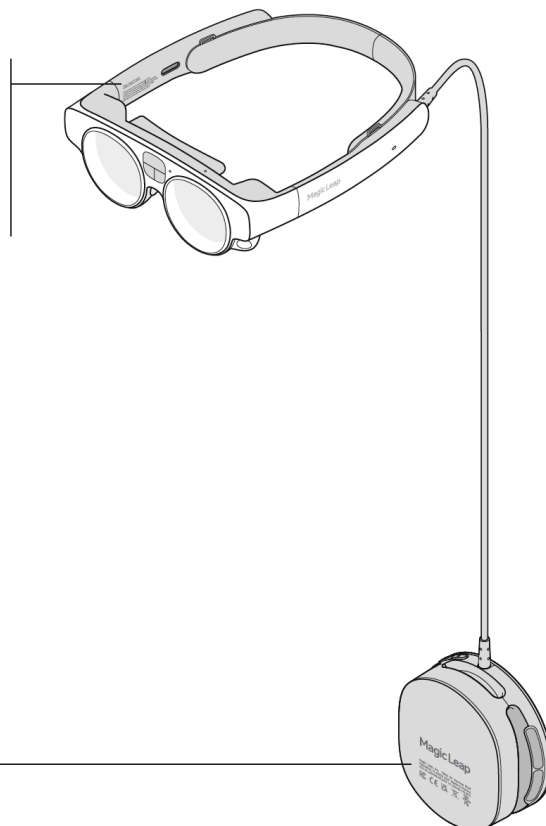
- Class 1 Laser Product

EN/IEC 60825-1:2014. Complies with FDA performance standards for laser products except for deviations pursuant to Laser Notice No. 56, dated May 8, 2019.

Note: Explanatory label does not appear on Device. Full label reproduction appears in this Safety Guide.

Class 1 Laser Product
EN/IEC 60825-1:2014

Complies with FDA performance standards for laser products except for deviations pursuant to Laser Notice No. 56, dated May 8, 2019



Magic Leap, Inc. FL USA Made in Mexico

The Manufacturer Identification label is located on the back of the Compute Pack clip. Turn your Compute Pack over to see it. It reads as follows:

- 7500 W. Sunrise Blvd., Plantation, FL 33322, USA, Assembled in Mexico.

Note: the date of manufacture is traceable by unique serial number. The serial number and model number are located under the rear fit pad on the inside of the Headset adjustment band.

Magic Leap 2

Regulatory Information

REGULATORY MARKS

Regulatory information, certification, and compliance marks for Magic Leap 2 are available on the Device itself and/or its packaging.

FEDERAL COMMUNICATION COMMISSION COMPLIANCE STATEMENT

Magic Leap 2 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. The Device 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 use or installation. If the Device does cause harmful interference to radio or television reception, which can be determined by turning the Device off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the Device and applicable receiver.
- Connect the Device into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio or television technician for help.

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

The Device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (i) the Device may not cause harmful interference, and (ii) this Device must accept any interference received, including interference that may cause unintended use or operation.

INDUSTRY CANADA COMPLIANCE STATEMENT

The Device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (i) this Device may not cause interference, and (ii) the Device must accept any interference, including interference that may cause undesired operation of the Device. This Class B digital apparatus complies with CAN ICES-3(B)/NMB-3(B). The operation in the band 5150–5250MHz is only for indoor use to reduce the potential for harmful interference to co-channel mobile satellite systems. Le présent appareil est conforme aux CNR d'Industrie 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, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement." Cet appareil numérique de la classe B est conforme à la norme CAN ICES-3(B)/NMB-3. La bande 5150 – 5250MHz est réservée uniquement pour une utilisation à l'intérieur afin de réduire les risques de brouillage préjudiciable aux systèmes de satellites mobiles utilisant les mêmes canaux.

EUROPEAN UNION IMMUNITY STATEMENT

In the event of an Electrostatic discharge (ESD), Magnetic and Electric field disturbance, the user may experience a momentary loss of operation. In the unlikely event that an ESD, Magnetic and Electric field disturbance event results in prolonged loss of operation, a system reset of the Device may be required.

EUROPEAN UNION COMPLIANCE STATEMENT

Magic Leap hereby declares that this product is in compliance with Directive 2014/53/EU. For Magic Leap's full declaration of conformity, see www.magicleap.com/european-union-declarations-of-conformity.