



Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



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MU User Manual

Introduction

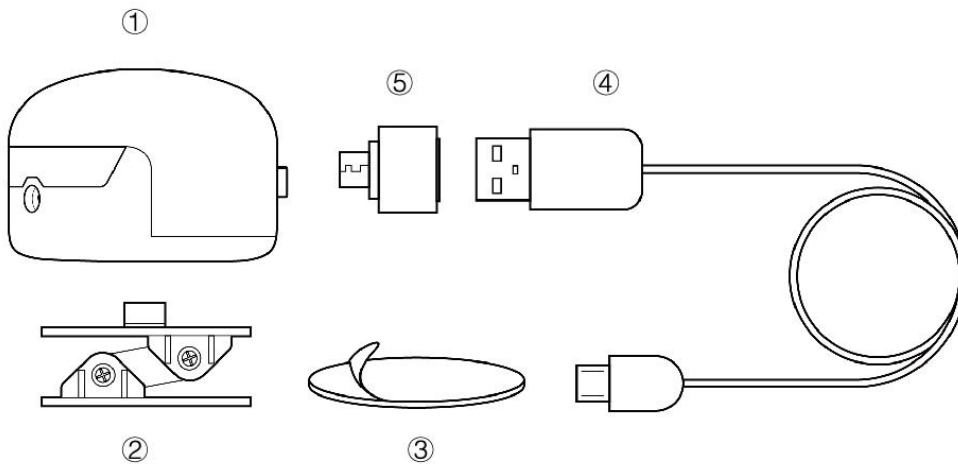
Thank you for purchasing MU by Morpx and join our journey to bring vision and AI to all toys and educational robots! MU is started from the simple idea of replacing remote controls with a more natural ways of interaction. Today, with MU, your toys are no longer dummies controlled using buttons or screens, but robots that can sense the environment and have their own minds of “playing”, based on a set of rules programmed in their software.

MU is our first milestone in this direction and you are invited to experience what we've created. To get you started quickly, MU is pre-loaded with models that can detect faces, people silhouettes, lines, balls, fingers, and many remote-control codes of popular robotic kits. Take a few minutes to look through this user manual and enjoy your robot building time with MU!

*This guide is for information purpose only and may be modified. The latest version of this guide can be found at www.morpx.com/manuals.

What's inside a MU package?

- ① MU robotic head with vision and AI on board.
- ② Universal mount for MU.
- ③ Double-sided foam stickers ×2.
- ④ Micro-USB cable for charging and data transferring.
- ⑤ OTG plug for data transferring with Android based devices.



Warning

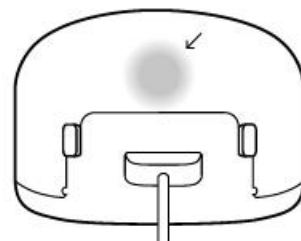
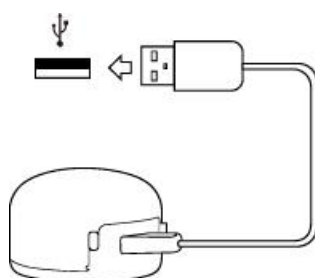
- **DO NOT** immerse MU or other parts in the water or any kind of liquid.
- **DO NOT** drop MU as this may damage the camera and the PCB assembly.
- Small parts, not for children under 3 years old.

Battery

•How to charge the battery

MU uses rechargeable Lithium Polymer battery.

To charge it, insert the USB cable to the micro-USB port on the back of MU. Insert the other side of the cable to a standard USB port.

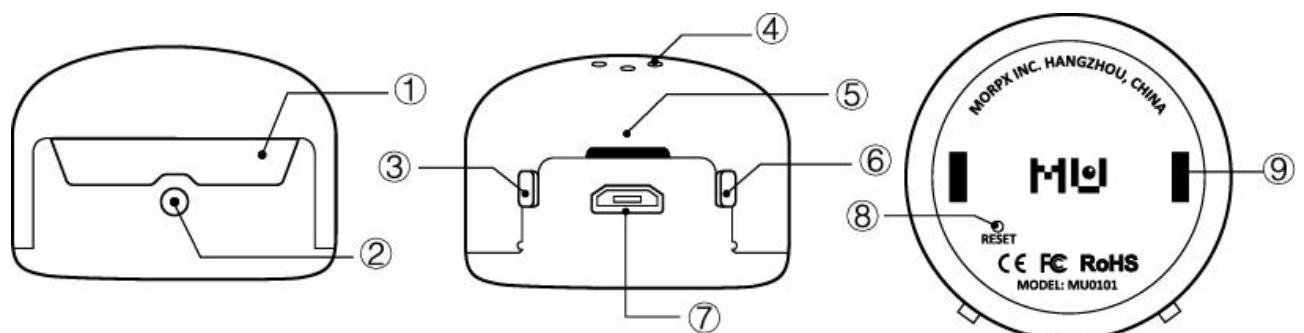


- When MU is charging, the charging light is on.
- When MU is fully charged, the charging light will automatically shut off.

•Battery Safety

1. Battery is a small object.
2. Battery **CAN NOT** be replaced. **DO NOT** replace the batteries.
3. **DO NOT** dispose of batteries in fire, as batteries may explode or leak.
4. Use only the batteries provided by the manufacturer.
5. **DO NOT** heat, dismantle or deform batteries.
6. **DO NOT** disassemble or modify, or for any other purpose.
7. **DO NOT** short-circuit the battery.
8. When the battery is accidentally ballooning or having effluent, or smoke, please stop using MU immediately and contact Morpx.
9. MU has a battery management chip inside. Please use a computer USB port to charge. Using mobile phone charger or power bank may cause damage or shorten the life of the battery.
10. **DO NOT** leave MU under direct sunlight for a long time.
11. If the device is left unused for a long time, the battery might be drained. Please recharge it before use.

Overview

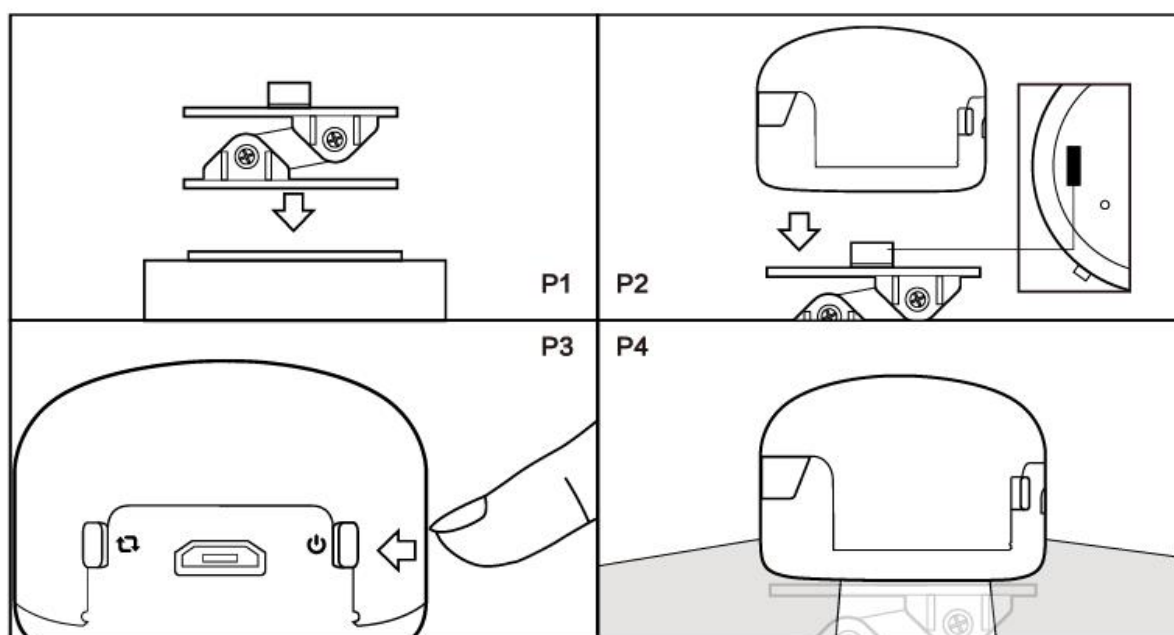


- ① LED eyes
- ② Camera
- ③ Mode button
- ④ Speaker
- ⑤ Charging light
- ⑥ Power button
- ⑦ Micro-USB port
- ⑧ Reset button
- ⑨ Mount port

Getting Started

MU works with a robotic body by sending remote control commands. Just imagine a toy having its remote control on top of its head.. Currently, MU supports the control commands of Lego Mindstorms EV3, Lego Power Functions, Hexbug Spider, and Hexbug Fire ant.

MU uses infra-red (IR) technology to send control signals, theoretically any infra-red controlled toy can potentially be controlled by MU. We will add newly supported toys through firmware updates in our online forum (forum.morpx.com). For advanced users, MU also has ports to connect directly with servos, Arduino, or Raspberry Pi (Please also check our online forum for details).



To mount MU on a toy, use the included double-sided tape. First, secure the mount on the toy. **(P1)**

Then insert MU onto the mount. Make sure that the camera direction is looking forward. **(P2)**

Press the Power button to turn on MU. **(P3)**

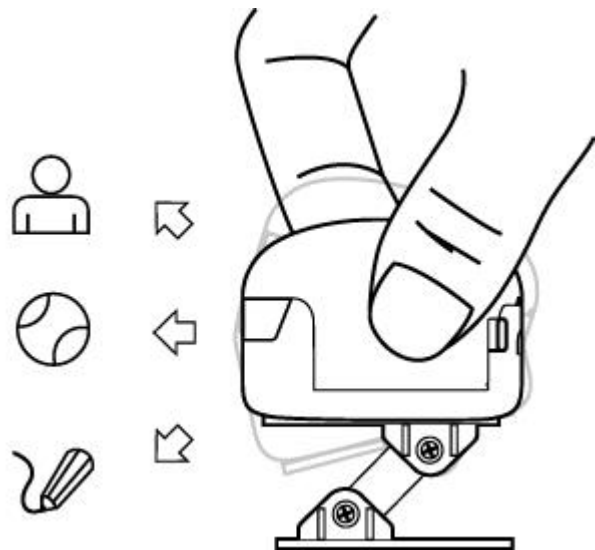
NOTE: The effective range of the IR signal of MU is limited to avoid interferences with other devices. The typical range is a few inches under or behind the device. **P4** illustrates the effective range. Please make sure your toy's IR receiver is within the covered range.

For advanced usage of MU and building instructions of more fancy robots controlled by MU, please visit forum.morpx.com.

Mode Button

For a MU to work on a toy robot, it has to know what the toy is and what target object is selected for MU to detect. These two pieces of information are selected using the mode button at the back of MU. **Long press** the mode button will switch among the supported toy mode. MU will give voice confirmation of each toy mode after the long press.

For each toy type, there may be different target modes that MU will search and track. **Short press** the mode button to switch among these target modes. Again, MU will give voice confirmation of what the current target mode is.



Toy Select (Long press)	Target Select (Short press)	Explanation
No Toy Mode	human mode	demo mode that detects faces and gives welcome message
Lego EV3	greeting bot/snake	detecting human silhouette
Lego Power Functions	ball grabber	follow ball
Hexbug Spider	ball mode/ line mode/ human mode	follow ball / line / human
Hexbug Ant	ball mode/ line mode/ human mode	follow ball / line / human
Vision Sensor Mode	loop mode/setup mode	For arduino/raspberry pi developer, detection results sent through UART serial port, please check our forum for more details.

The general behavior of the pre-programmed MU is searching, detecting and following. When MU detects a target object, it will play a sound and drive the toy to follow it. Otherwise MU will drive the toy around to find the target. Note that If multiple target objects appear, MU might switch between the targets.

You should adjust the mount direction when the target mode is changed to make it easier for MU to spot the target.

NOTE: The viewing angle of MU is about 40° horizontally in front of the camera. MU might not respond to a target If the distance between them is more than 1 meter. MU also works better in good lighting conditions and might have trouble finding object in low light situations.

Please visit www.morpx.com to get more details about the different modes of MU. We have some videos that show you how to play with MU in each mode.

Q&A

Q: My MU cannot be turned on.

A: Charge MU to make sure its battery is full. If it still does not work, reset MU and try to turn it on again. To reset MU, insert a thin needle tip to the reset hole on the bottom of MU until you hear a button click sound

Q: My MU cannot respond to a target object.

A: Make sure the camera is facing forward, and possibly adjust the angle of the mount. Try to give it an easy target object to follow.. Make sure MU is working in the right toy mode and target mode. Also, make sure both MU and the toy is fully charged.

Q: When I charge the battery, the charging light is blinking

A: This might be due to a battery error. Try to detach and plug in the Micro-USB cable again. If this does not work, contact support@morpx.com for help.

If you have other questions, please post it on forum.morpx.com. Someone in the MU team will reply to the posts. Alternatively, you can contact support@morpx.com. **Thank you!**

FCC

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions:

This device may not cause harmful interference.

This device's signal may be interfered by other devices.

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

—Reorient or relocate the receiving antenna.

—Increase the separation between the equipment and receiver.

—Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

—Consult the dealer or an experienced radio/TV technician for help.

Warning: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Software License Agreement

The software and firmware running on MU is the intellectual property of Morpx Inc.

By powering on the MU, (either by press the power-on button, or connecting MU to a USB port), you agree not to copy the software and/or firmware on MU elsewhere without the permission of Morpx Inc. You also agree not to disassemble the software and/or firmware code on MU without the permission of Morpx Inc.

Morpx 90-Day Limited Warranty

Morpx's warranty obligations for MU (this "Product") are limited to the terms set forth below.

Morpx Inc. warrants to the original end-user purchaser that this Product will be free from defects in manufacturing, materials and workmanship under normal use for a period of 90 days from the date of purchase. This warranty is extended only to the original end-user purchaser of a new product that was not sold "as is".

If a defect arises: you may email to support@morpx.com and describe what's wrong with this Product. We will evaluate the defect and contact you to provide the after-sale service.

EXCLUSIONS AND LIMITATIONS

This warranty covers the normal and intended use of this Product. This warranty does not apply:

(a) to damage caused by accident, abuse, unreasonable use, improper handling and care or other external causes not arising out of defects in materials or workmanship; (b) to damage caused by service performed by anyone who is not an authorized representative of Morpx; (c) to any hardware, software or other add-on component that is not provided by Morpx, but installed by the end-user; (d) if this Product has been disassembled or modified in any way; (e) to cosmetic damage, including but not limited to scratches, dents or broken plastic, or normal wear and tear.