



USB/Keyboard Mouse Extender Series

User Manual

Model : UE03H

USB 3.2 Gen1 CAT6a Extender 100M

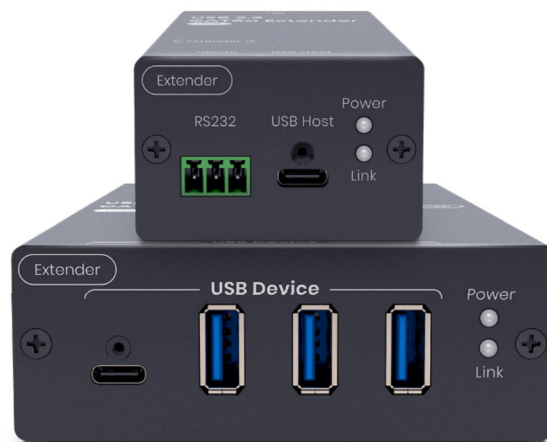


Table of Contents

Introduction	2
Features	2
Application Diagram	2
USB Extension for General Purposes.....	2
USB Extension for Security/Monitoring.....	3
USB Extension for Video Conferencing.....	3
USB Extension for Video Capture.....	3
USB Extension using DisplayLink.....	3
Panel View	4
UE03HT.....	4
UE03HR.....	5
LED Indication.....	6
Functional Description	7
Transmission over HDBaseT.....	7
Distance for UE03H/HDBaseT.....	7
Cable used for UE03H/HDBaseT.....	7
USB Interface.....	8
Read and write speed.....	8
USB Compatibility.....	9
USB Power Output.....	10
RS232 Interface.....	11
Technical Specification	12
Caution	12
Package Includes	14
Installation	15
Installed on a DIN-rail.....	15
Installed on a Platform.....	16
Installed on Wall.....	17
Installed on a Rack.....	18

Introduction

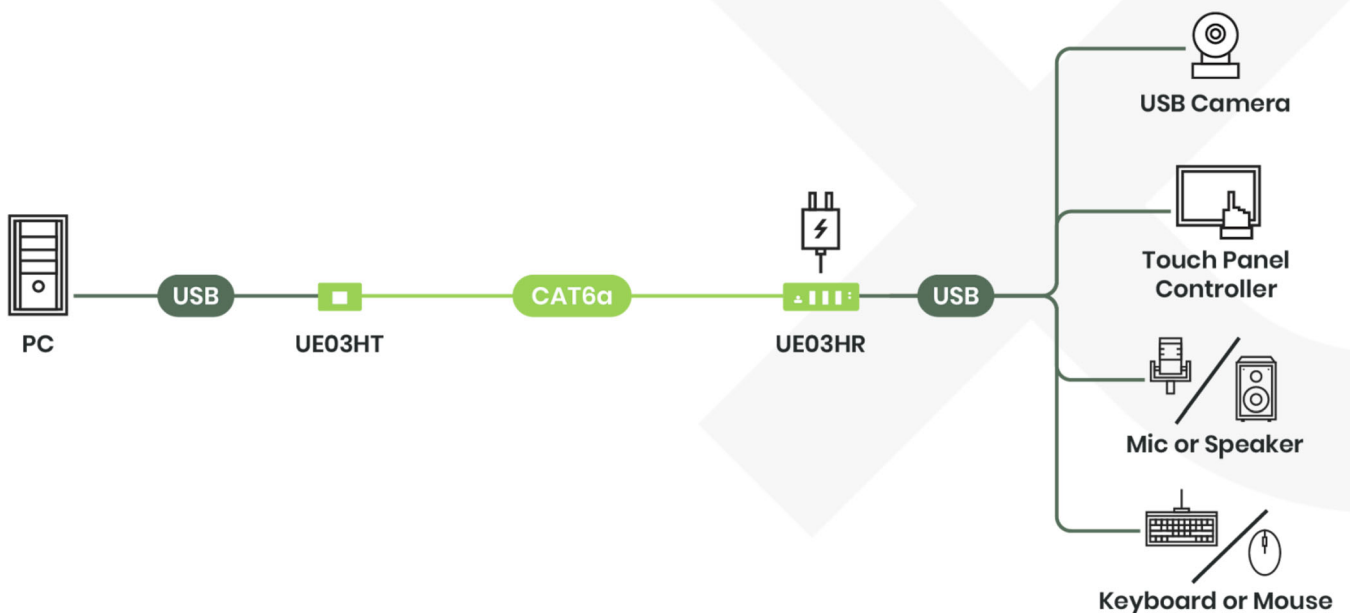
UE03H is a USB 3.2 Gen1 extender designed to carry USB signals using CAT6a/7 Ethernet cable. It is totally backward compatible with USB 2.0 & USB 1.x devices. It is perfect for multiple applications including devices such as USB cameras, touch panels, and any other USB devices.

Features

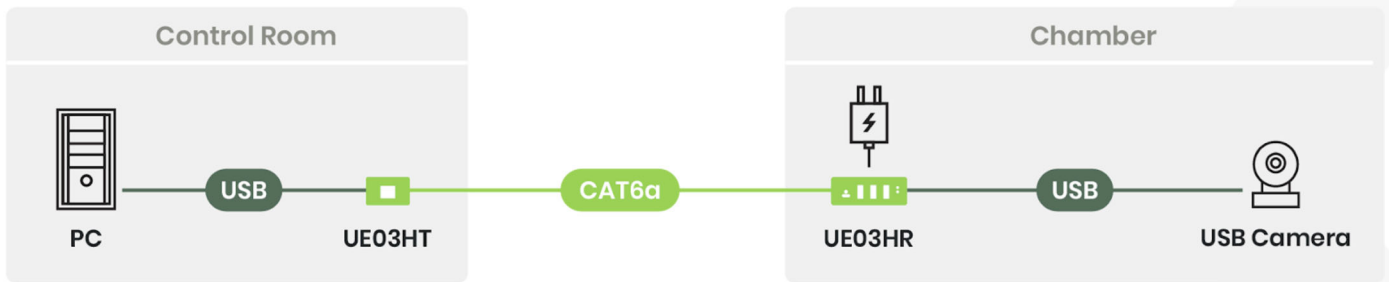
- USB 3.2 Gen1 up to 5Gbps
- Transmission distance up to 100m with CAT6a cable
- No power needed at host side (UE03HT)
- Max power output 5V/1.5A at Device side (UE03HR).
- RS232 optional extension
- Compatible with USB 2.0 and USB 1.x devices
- USB Type-C port on both sides
- Plug & Play
- Small & compact, easy to install
- Low power consumption
- Multiple mounting options (Wall/Rack & Din Rail)

Application Diagram

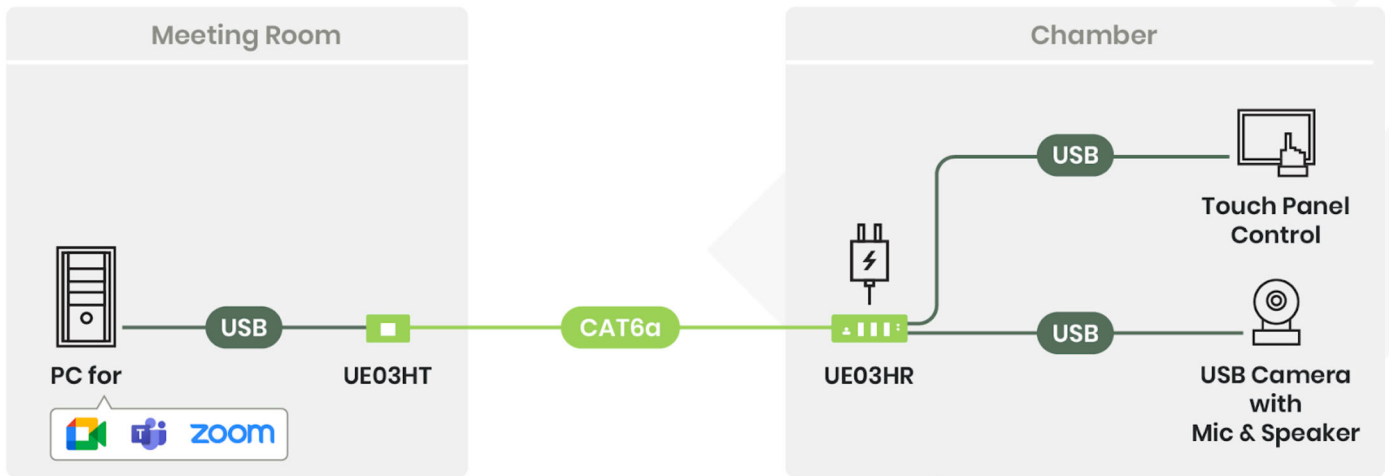
USB Extension for General Purposes



USB Extension for Security/Monitoring



USB Extension for Video Conferencing



USB Extension for Video Capture

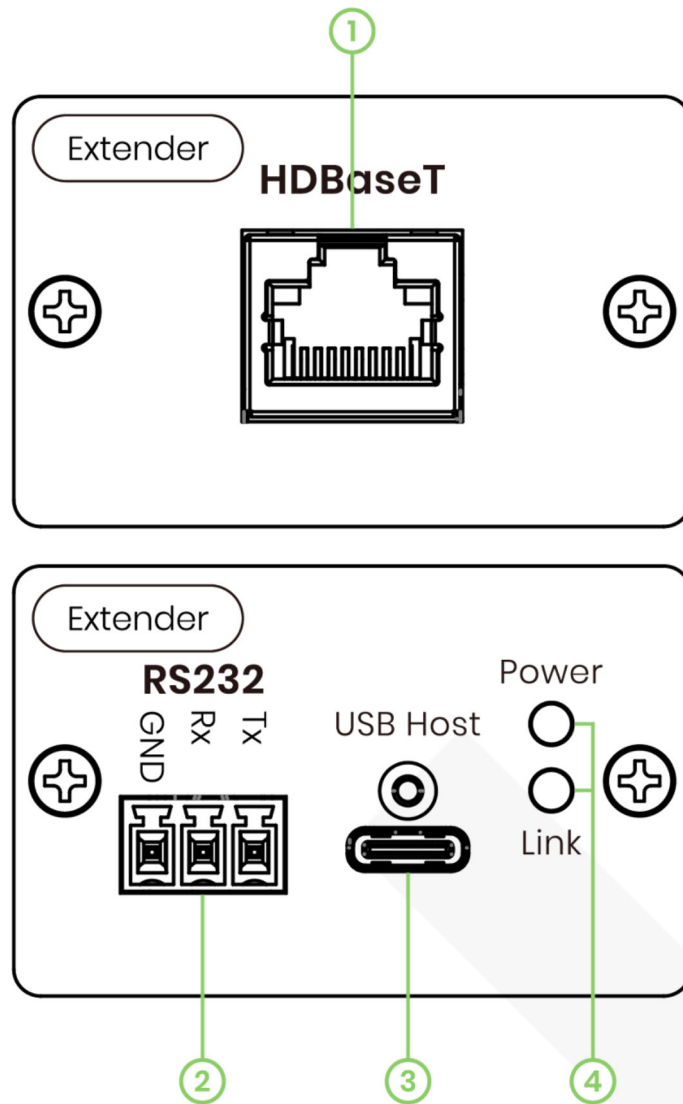


USB Extension using DisplayLink



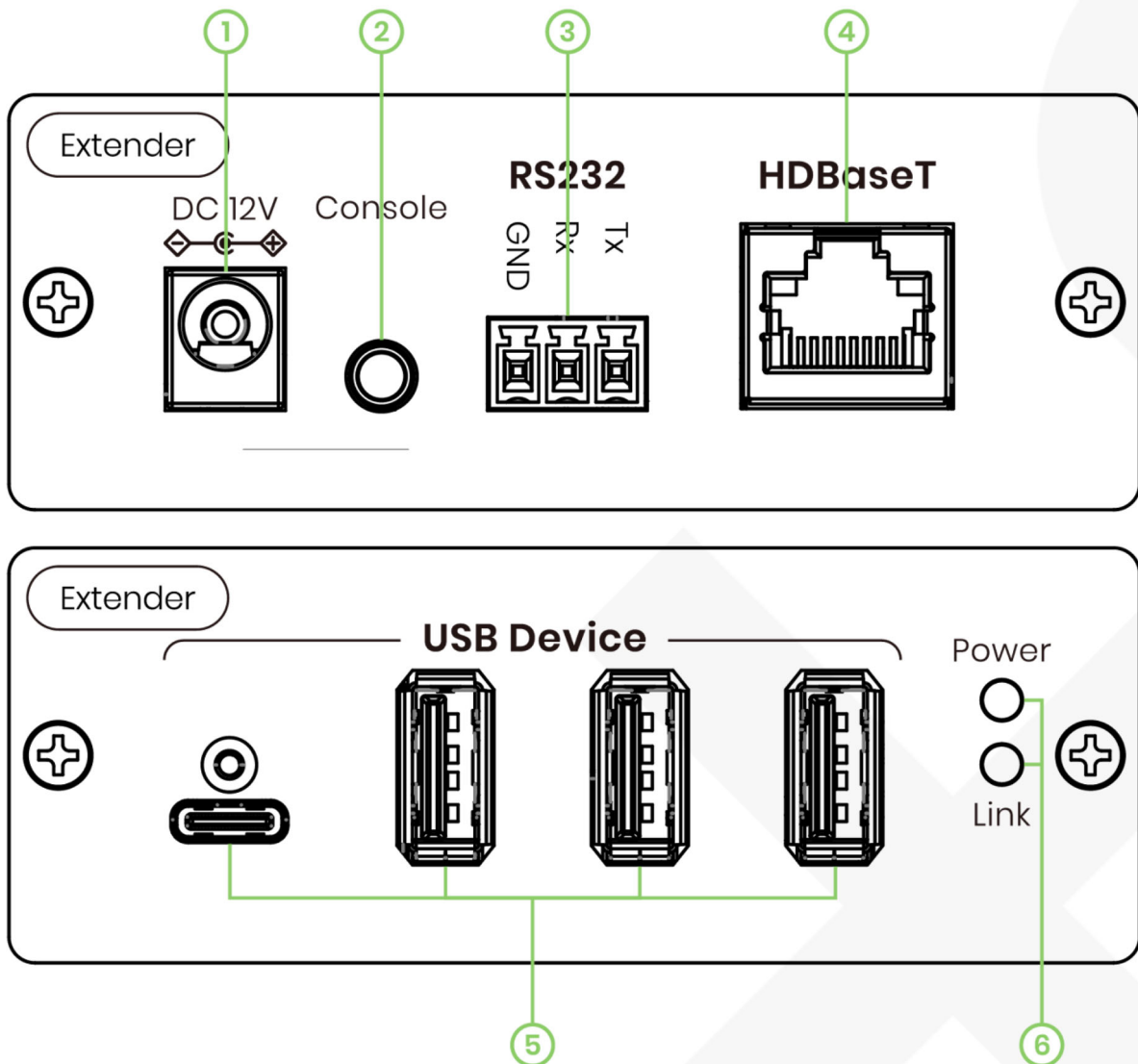
Panel View

UE03HT



	Interface	Description
1	HDBaseT	To connect to UE03HR
2	RS232	To connect to RS232-command-controllable device (needs Terminal Block to RS232)
3	USB Type-C	To connect to USB 3.2 Gen1 source
4	Power/Link LED	Refer to LED Indication

UE03HR



	Interface	Description
1	DC Jack	To plug in DC 12V power adapter
2	Console	To update firmware (needs 3.5mm jack cable to DB9)
3	RS232	To connect to RS232-command-controllable device (needs Terminal Block to RS232)
4	HDBaseT	To connect to UE03HT
5	USB Type-C/Type-A	To connect to USB device, compatible with USB 3.2 Gen1 / 2.0 / 1.1 / 1.0
6	Power/Link LED	Refer to LED Indication

LED Indication

Interface	LED Color	Status
Power (Green)	On	Power On
	Off	Power Off
Link (Blue)	On	RJ45 Linked
	Off	RJ45 Unlinked

Functional Description

Transmission over HDBaseT

UE03H utilizes HDBaseT¹ connectivity technology, enabling the transmission of uncompressed high-definition multimedia content and various signals over a single long-distance cable.²

The USB signals transmitted by USB devices are encoded by UE03HT/UE03HR into HDBaseT packets³ and then transmitted over the HDBaseT link to UE03HR/UE03HT on the other side of the link, where the HDBaseT packets are decoded back to the original USB signals.

Distance for UE03H/HDBaseT

- UE03H utilizes HDBaseT technology to transmit USB 3.2 Gen 1 signals over a four-pair STP/UTP cable, specifically CAT6a (or higher), with a transmission distance of up to 100 meters (328 feet)⁴.

Cable used for UE03H/HDBaseT

- For HDBaseT recommended cable catalog please refer to the following link website:
<https://products.hdbaset.org/avcat/cti19001/index.cfm>
- The quality and specifications of the twisted-pair cable can impact the transmission distance.
- CAT6a U/FTP 100-meter tested cables TELDOR 83G02HD105 and Runasia RS6A23Y04X.
- Conditions of cable:
 - The cable is separate from other cables.
 - The cable is loosely arranged alongside other Category cables.
 - The cable is kept at a distance from potential interference sources like power lines and radios.

¹ The HDBaseT Alliance is a cross-industry organization that promotes the adoption of HDBaseT technology. The alliance works on standardizing and certifying HDBaseT products to ensure interoperability and compliance with industry specifications.

² HDBaseT is developed by the HDBaseT Alliance, this technology is commonly used in audio-visual and home entertainment systems, as well as professional and commercial applications.

³ The HDBaseT packets are transmitted over the HDBaseT link using Dynamic PAM Modulation, (PAM16/PAM8/PAM4) – depending on the payload type. This ensures the delivery quality of specific types of data or control information.

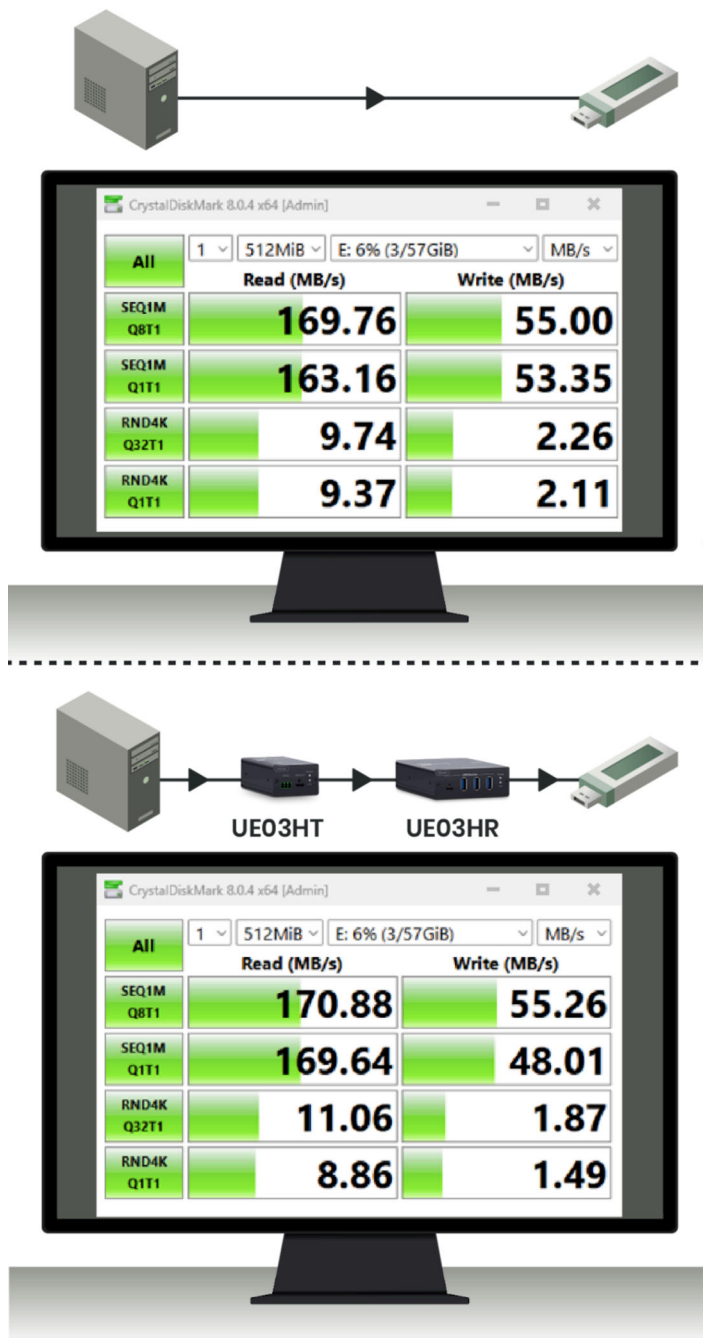
⁴ Two pairs are used to transmit data over the link, while the other two pairs are used to receive data.

USB Interface

UE03H is a USB 3.2⁵ Gen 1 extender designed for connecting and transferring data between electronic devices. Utilizing a versatile and widely compatible interface, it can be employed for various purposes, including data transfer, power, and device connectivity. Please notice, UE03H does not support audio-visual transmission (DP alternate mode).

Read and write speed

UE03H uses four-pair STP/UTP cable to enable bidirectional, 6 Gbps transfer of HDBaseT data over a CAT6a cable. UE03H has low impact on USB read/write speeds, the testing results are shown below::



⁵ USB is a universal standard utilized across a broad range of electronic devices, providing a common interface for connecting peripherals such as computers, smartphones, printers, cameras, and other consumer electronics.

(Results may vary with devices from different manufacturers.)

USB Compatibility

UE03H complies with USB 3.2 Gen 1 and USB 2.0⁶, and supports all USB transfer types⁷. However, it's not certain that it will work with every USB device or host because different factors can affect how USB devices perform over long distances.

UE03H is compatible with a variety of communication protocols and device types, allowing it to send different kinds of data including files, sound, picture, and input from devices like mice, keyboards, and touchpads that connect via USB cable or Bluetooth.

UE03H supports up to a total of 3 depth levels of hubs. In theory, the maximum number of USB3.2 endpoints can be up to 125 devices, however, connecting this maximum number of devices simultaneously may not be practical or efficient due to bandwidth limitations, power constraints and other factors.

UE03H, as mentioned before, is fully compatible with USB 2.0, USB 1.1 and USB 1.0. The total number of USB 2.0 devices connected and working simultaneously shall not exceed a total of 7 devices.

⁶ USB 2.0 supports speeds up to 480 Mbps, while USB 3.2 Gen 1 offers faster transfer rates, reaching up to 5 Gbps.

⁷ Control Transfers: Typically used for command and status operations, along with bulk, interrupt and isochronous transfers.

Bulk Transfers: Used for transmission of large quantities of data, typically by mass storage devices, cameras that generate compressed video streams, and other devices that require fast file transfers.

Interrupt Transfers: Used by devices, such as keyboards and mice.

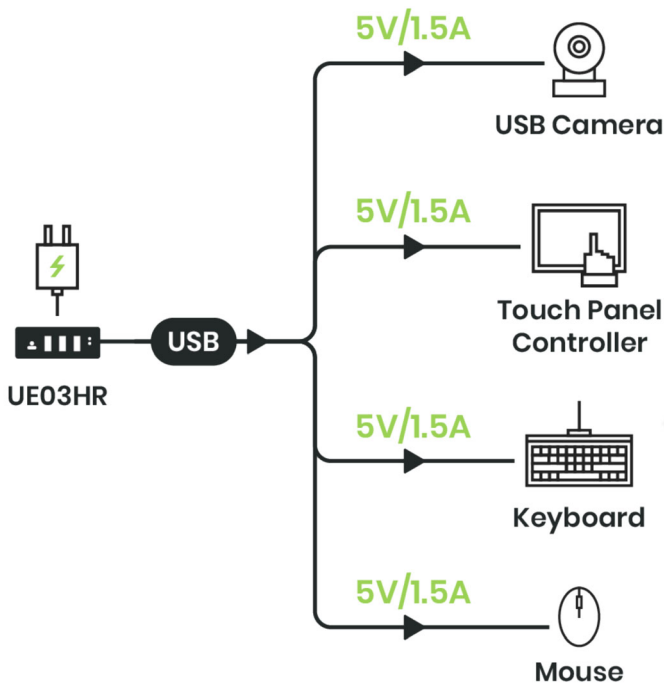
Isochronous Transfers: Used by time-sensitive devices such as streaming cameras and audio products.

USB Power Output

- UE03HT is powered through the host device and does not require any additional power cables.



- Max power output for USB devices is 5V/1.5A at Device side (UE03HR). QC (Quick Charge) and PD (Power Delivery) are NOT SUPPORTED.



RS232 Interface

UE03H supports RS232⁸ control, used for connecting various electronic devices. It defines the electrical characteristics and timing of signals for serial communication between devices⁹, typically facilitating communication between computers and peripherals such as modems, printers, and other serial devices.

For successful communication, both communicating devices must operate at the same baud rate¹⁰. If one device transmits at a different baud rate than the other, communication errors may occur.

Lower baud rates are often chosen for longer communication distances and improved resistance to noise interference. In certain environments, a lower baud rate is preferred to ensure stable communication.

For RS232 pin definition, please refer to the Panel View Section.

⁸ RS-232 is used for serial communication, allowing data to be transmitted one bit at a time over a single wire.

⁹ RS-232 communication can be simplex (one-way), half-duplex (two-way, but only one direction at a time), or full-duplex (two-way, simultaneous communication).

¹⁰ Common baud rates in RS-232 communication include 2400, 4800, 9600, 19200, 38400, 57600, 115200, and more. The selection of baud rate depends on the capabilities and requirements of the communicating devices.

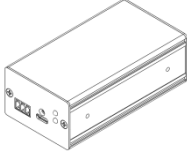
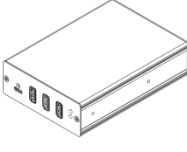
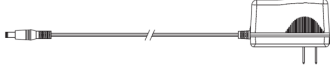
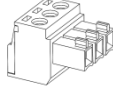

Technical Specification

UE03H	UE03HT	UE03HR
Compliance		
Standard	USB 3.2 Gen1 USB 2.0 USB 1.1 USB 1.0	
Max. Transmission Distance	100m over CAT6a/7	
Data Rate	USB 3.2 Gen1 up to 5Gbps bidirectional	
Ports & Interfaces		
USB Data	1 x USB Type-C	3 x USB Type-A 1 x USB Type-C
Transmission Medium	1 x RJ45	1 x RJ45
RS232	1 x 3-Pin Terminal Block	1 x 3-Pin Terminal Block
Console	-	1 x 3.5mm Phone Jack
Power		
Power Supply	USB 5V	12V 1.5A
Power Consumption	2W	2.76W (w/o USB devices)
Power Saving	1.6W	1.8W
Ambient Temperature		
Operation	0 to 55°C	
Storage	-40 to 80°C	
Operating Altitude	2000m	
Humidity	Up to 95%	
Physical Characteristics		
Dimension (D x W x H)	93 x 51 x 32mm	123 x 88 x 32mm
Weight	128g	259g

Caution

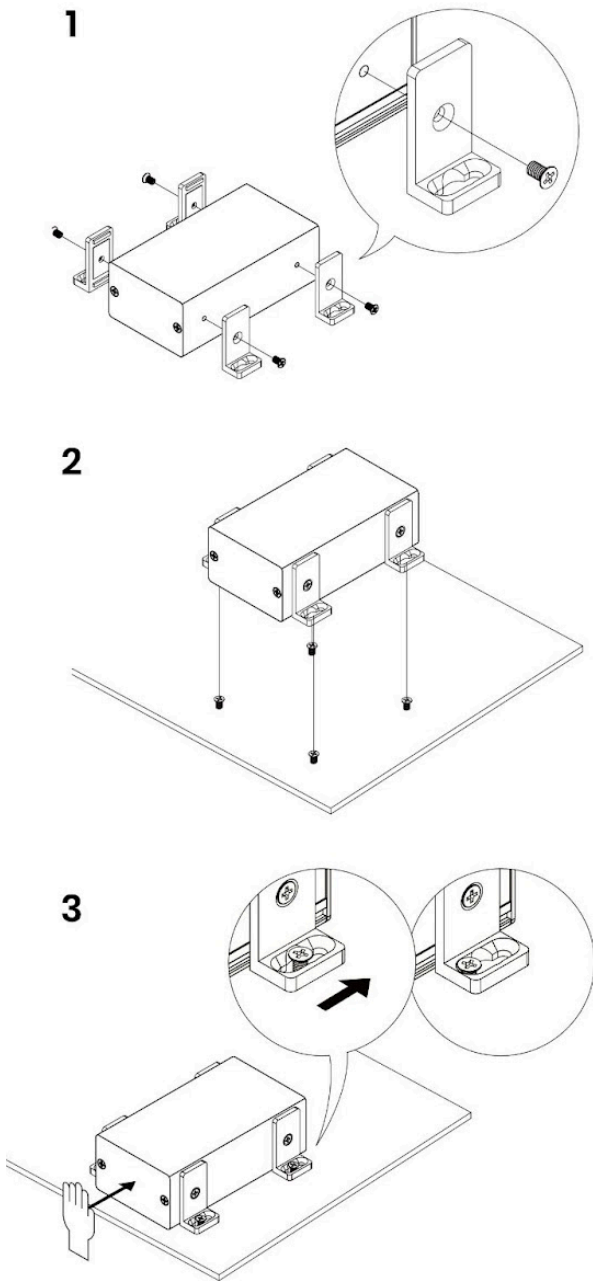
1. This product is designed for indoor applications. If it is desired for outdoor use, please install additional equipment for waterproof protection and surge protectors to prevent damages caused by lightning.
2. Do not put anything on the power and system cables, place them where they cannot be stepped on. Please be sure there is nothing resting on any cables.
3. Avoid using this product close to water places, or near high temperature devices such as radiators, stoves, etc.
4. Shut down the power supply and unplugged all equipment immediately if:
 - A. water or any kind of liquid has been spilled into the product;
 - B. the product has been damaged by external force;
 - C. the product does not operate normally as this manual indicates;
 - D. Please contact us for further repair if the above conditions happen.
5. We strongly recommend using high quality CAT6a, CAT7 UTP/STP/FTP cable. Improper installation may cause unstable connection.
6. The transmission distance may differ by cable or construction quality. Using CAT6a, CAT7 cable between UE03HT and UE03HR, the transmission distance can reach up to 100 meters.
7. This product does not support video and audio transmission (DP alternate mode).
8. RS232 does not support hardware handshake.
9. The USB Type-C ports on both host and device sides do not support power delivery mode.

Package Includes

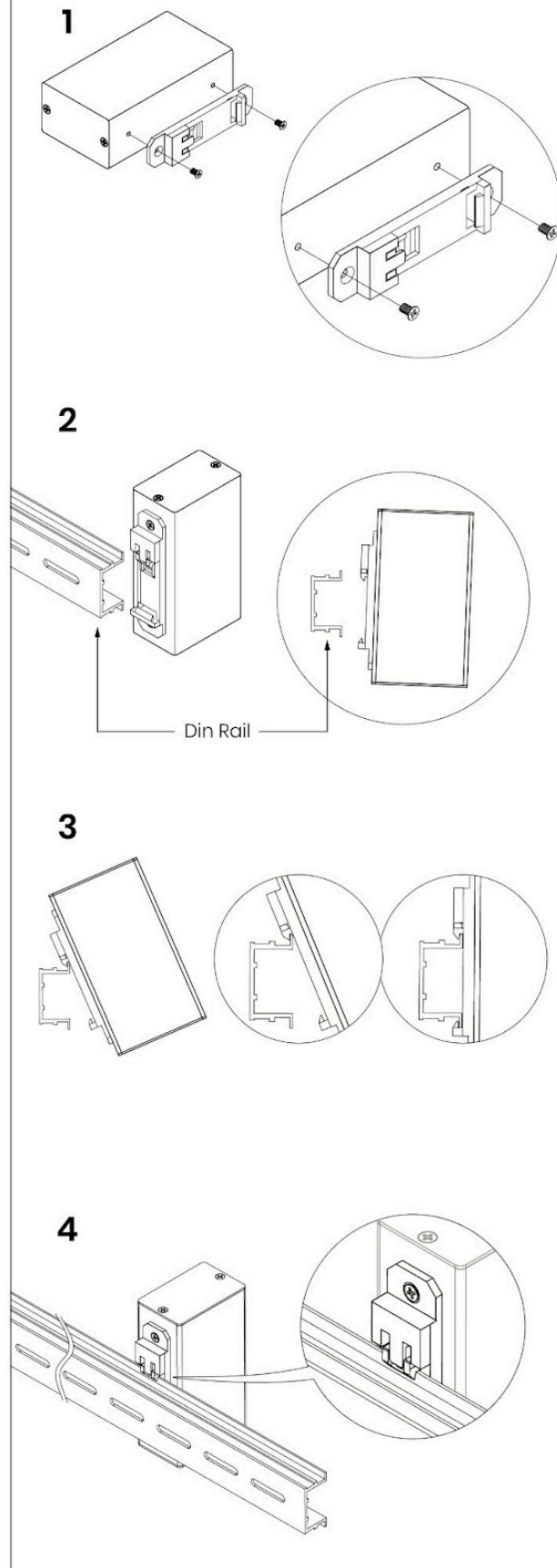
Item	Amount	Image
UE03HT (Host)	1 pc	 <p>The unit has a width of 51mm and accommodates six units within a standard 19-inch rack</p>
UE03HR (Device)	1 pc	 <p>The unit has a width of 88mm and accommodates four units within a standard 19-inch rack</p>
DC12V 1.5A Power adaptor	1 pc	
Terminal Block (F)	2 pcs	
Mounting Screw Pack	2 bags	 <p>4 pcs (bag) 4 pcs (bag) 4 pcs (bag) 4 pcs (bag) 1 pcs (bag)</p>

Installation

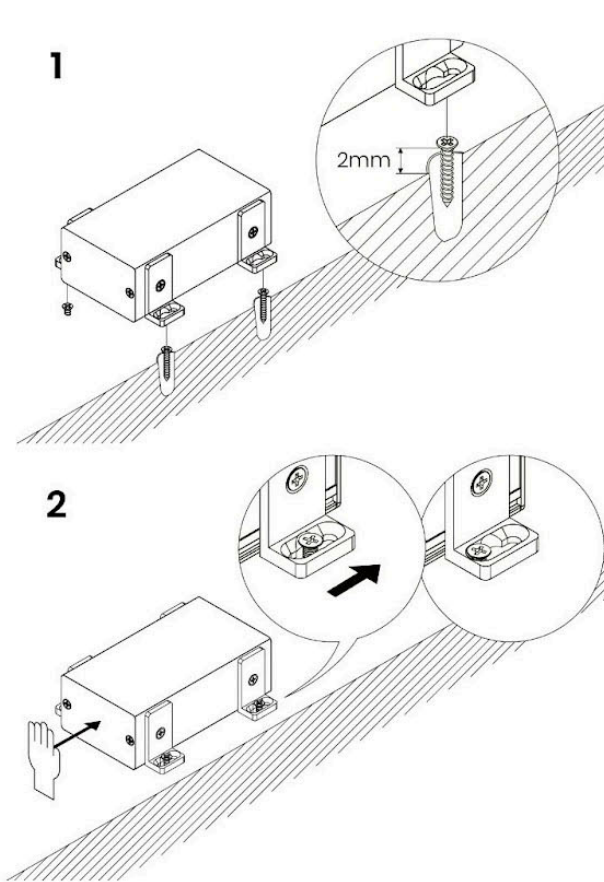
Installed on a Platform



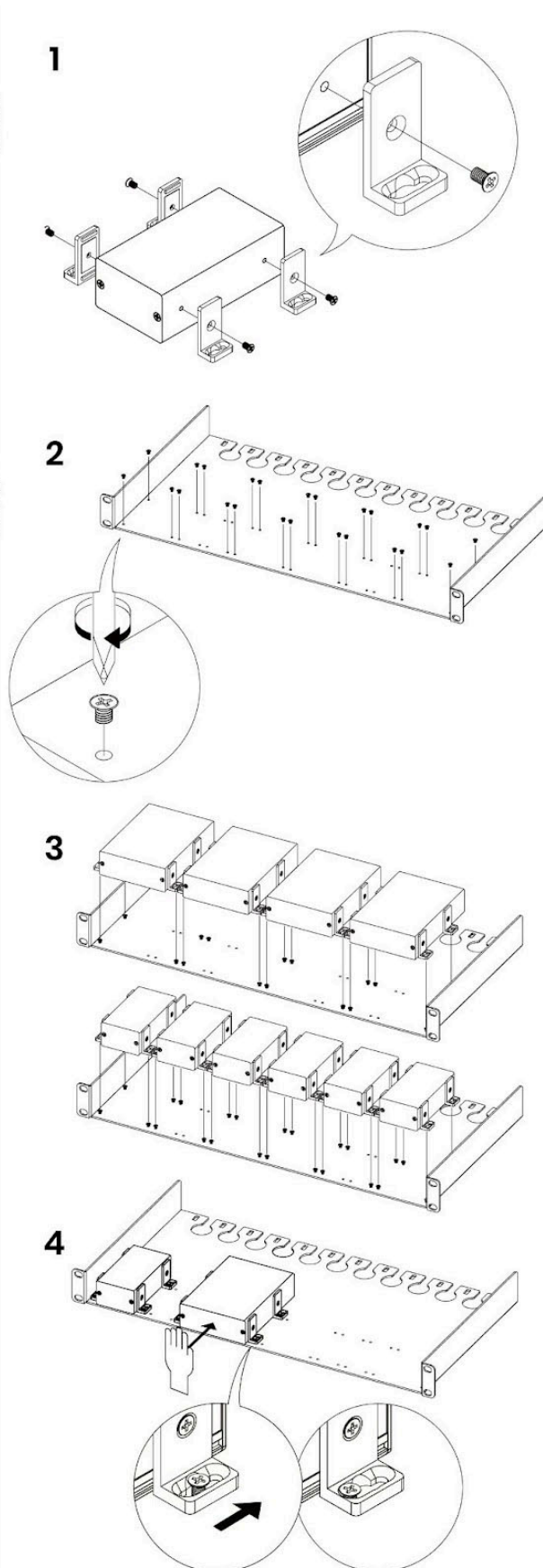
Installed on a DIN-rail



Installed on Wall



Installed on a Rack



RoHS CE