

User Manual for TeraRanger Evo Swipe (Contactless interface)

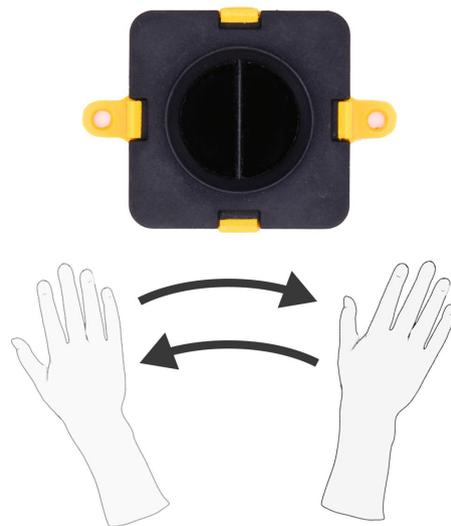


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1. Introduction

1.1. About the TeraRanger Evo Swipe

The TeraRanger Evo Swipe offers gesture recognition of close-range left to right and right to left movements. It offers detection capabilities from just 10 cm up to 50 cm using two pixels in order to detect the sense of movement.

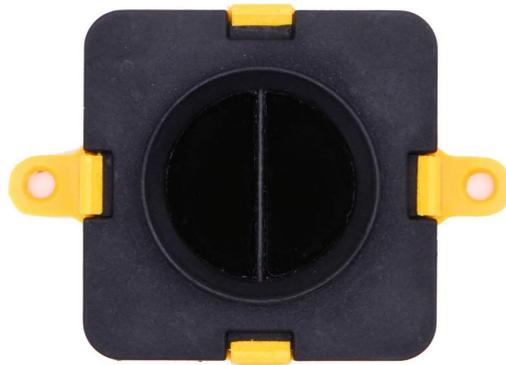


Figure 1. TeraRanger Evo Swipe sensor, top view

The TeraRanger Evo Swipe has zero open electronics and provides an ABS protected enclosure, resulting in a dust-proof and robust operation.

1.2. Technical Specifications

Table 1 - Technical specifications of TeraRanger Evo Swipe

Product code	TR-EVO-SWP
Performance	
Detection Principle	Infrared Time-of-Flight
Light Source Wavelength	940 nm
Use Environment	Indoor
Field of View	27°
*Operation	Gesture recognition: <ul style="list-style-type: none"> - Left to Right hand-movement - Right to Left hand-movement
Range	~ 0.1 m to 0.5 m
Update Rate	~ 20 Hz
Electronics	
Supply Voltage	5V DC +/-5%
Current Consumption Average	50 mA
Initialization Time	< 1 s
Communication	
Serial interfaces	USB 2.0 Micro-B
Visual Notification	2 x LEDs (built-in backboards)
Mechanical data	
Dimensions	42 x 30 x 13 mm (incl. backboard)
Weight	9 g (incl. backboard)
Operating Temperature	-20° C to 75° C
Housing Material	ABS
Mounting Style	2 holes for M2 screws
Type of Connection	USB Backboard: USB 2.0 Micro-B

Conformity

Reference standard CE, RoHS

1.2.1. Performance Table

Table 2 - Gesture recognition (default and only sensor mode)

Gesture mode (Left / Right)	
Range mode	Detection
Range	~ 0.1 m to 0.5 m
Update Rate	~ 20 Hz

1.2.2. Communication interfaces

Table 3 - Communication interfaces for the Gesture recognition mode

Gesture Mode	Left / Right
USB	•

2. Mechanical integration

2.1. Modular design (clip-on, clip-off)

The mechanical design of the main sensor module (black) allows easy assembly to its backboard (yellow) using a simple 'clip-on' technique. When clipping the two together, please ensure there is no visible gap between the black and yellow parts.

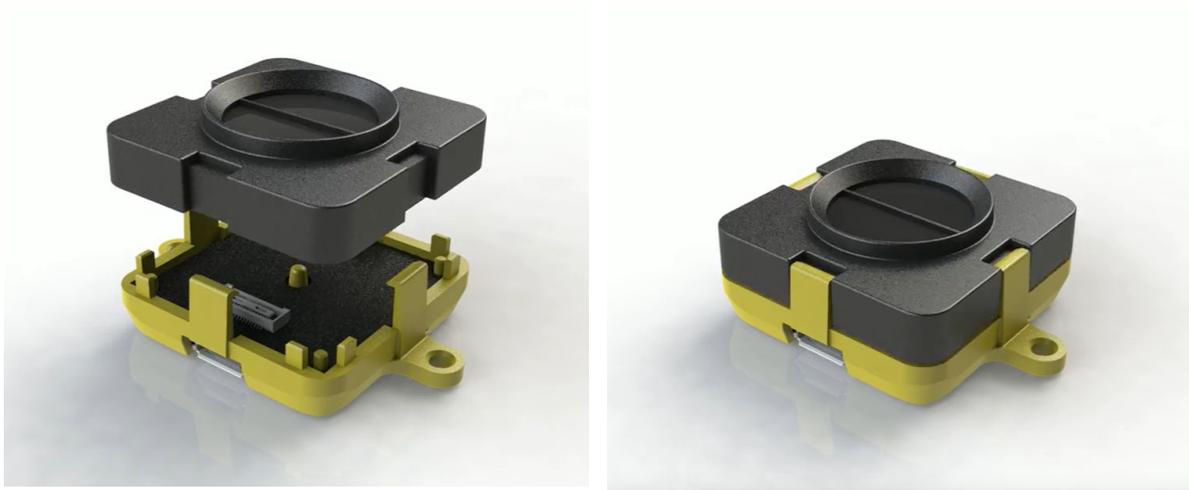


Figure 2 -Modular design of the TeraRanger Evo Swipe sensor

2.2. Mechanical design and mounting

The TeraRanger Evo Swipe sensor offers an ABS housing (both: sensor and backboard) with an option to mount the sensor using 2 holes compatible with M2 screws. Figure 3 illustrates the external dimensions of the TeraRanger Evo Swipe sensor.

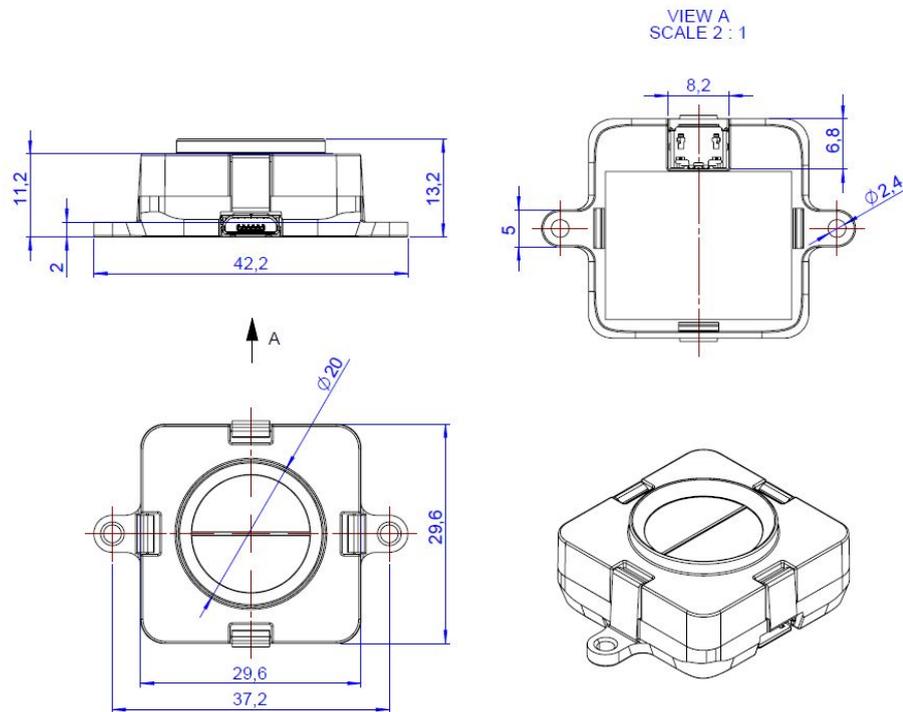


Figure 3 - TeraRanger Evo Swipe external dimensions, USB backboard

The USB Backboard includes two slots for mounting the sensor using standard M2 screws. The following methods can be used to mount the TeraRanger Evo Swipe sensor:

1. Front-panel mount using the M2 screws
2. Back-panel mount using the 2mm ledge on the front side of the sensor

Figure 4 illustrates the two different mount methods. The prior solution allows for easy surface attachment and rapid evaluation of the sensor. The latter provides a more discreet installation and supports design-in projects by installing the sensor behind a surface (e.g panel), ideally with 2mm thickness.



Figure 4 - Front-panel mounting (left image); back-panel mounting (right images)

2.3. Mounting solutions

When choosing a place for mounting the TeraRanger Evo Swipe, please consider the following recommendations:

- Mounting close to sources of heat or strong electromagnetic fields can decrease the sensing performance
- Do not mount anything directly in front of the sensor or in a cone of approximately $\pm 35^\circ$ around the central optical axis of the sensor
- It is advisable to avoid having other sources of Continuous Wave or modulated Infrared light sources near the sensor
- Please consider that dust, dirt and condensation can affect the sensor performance
- It is not advised to add an additional cover in front of the sensor



During assembly and integration, please observe all common ESD precautions. All optical surfaces (sensor front) should be kept clean and free from contact with chemicals.

3. USB backboard use

3.1. LED Indication

3.1.1. Normal operation

Three LED indicators are present on the USB backboard, and are visible through the back side of the yellow plastic case.

Table 4 - LED indicators of the USB backboard

LED designator	Description
PWR (ORANGE)	The Power LED is ON whenever the sensor is powered
RED	Flashes briefly on startup to indicate proper initialization; then switches off
GREEN	Blinks 8 times at power up. GREEN LED blinks every 5 seconds when the sensor is streaming data

3.1.2. Error messages and troubleshooting

Table 5 - USB backboard LEDs troubleshooting

LED designator	Sequence	Signification	Corrective actions
RED	Continuous blinking	Sensor has detected a fault and has stopped functioning	Check that the sensor is properly connected to the backboard, then restart the sensor
RED / GREEN	Both LEDs blinking continuously	Sensor has detected a fault in the sensor initialization process	Check USB output for details of Error Verify that the sensor is properly connected and re-power the unit

3.2. Connecting the TeraRanger Evo to a Host Computer

3.2.1. Windows OS

In Windows it is also possible to use any terminal emulation software for data display. Terabee often works with and suggests using HTerm software. Please follow the provided link to download the software file (<http://www.der-hammer.info/terminal/>), and select the file appropriate for your platform.

Tested with version 0.8.4 on Linux x64 and Windows 10 x64 platforms.

When using Windows, extract the downloaded *zip* file to the selected folder, open it and double click on the "HTerm.exe" file.

When using Linux, extract the downloaded *tgz* file to the selected folder, make sure that you have execution permission for the file "hterm" (command: `chmod u+x hterm`), double click on the "hterm" file or run it from terminal while in its directory: `./hterm`.



On Linux, consider removing the *modemmanager* package if you are sure that it is not required by your system setup. This will shorten the initialization time of serial devices in the Linux system:

```
sudo apt purge modemmanager
```

Connect the TeraRanger Evo Swipe to a computer and select the corresponding USB port (click "R" button to refresh the port list). Please configure the software with the following parameters:

Baud rate : 115200 bit/s
Data bits : 8
Parity bit : None
Stop bit : 1

For easier data reading, select the "LF" option from the "Newline at" drop-down field. See Figure 5 below for visual instructions.

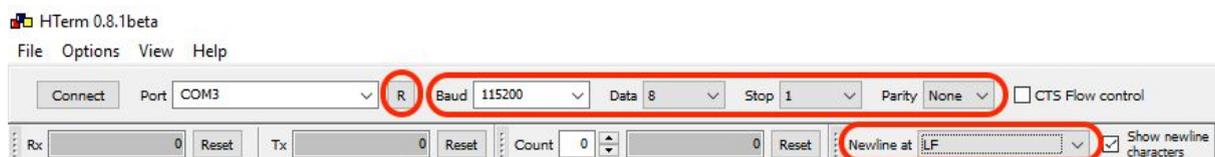


Figure 5 - HTerm parameters for TeraRanger Evo Swipe

Once the USB port is selected and the parameters correctly set, click on the **“Connect”** button. The gesture recognition data will now appear in the **“Received data”** box (see Figure 6).

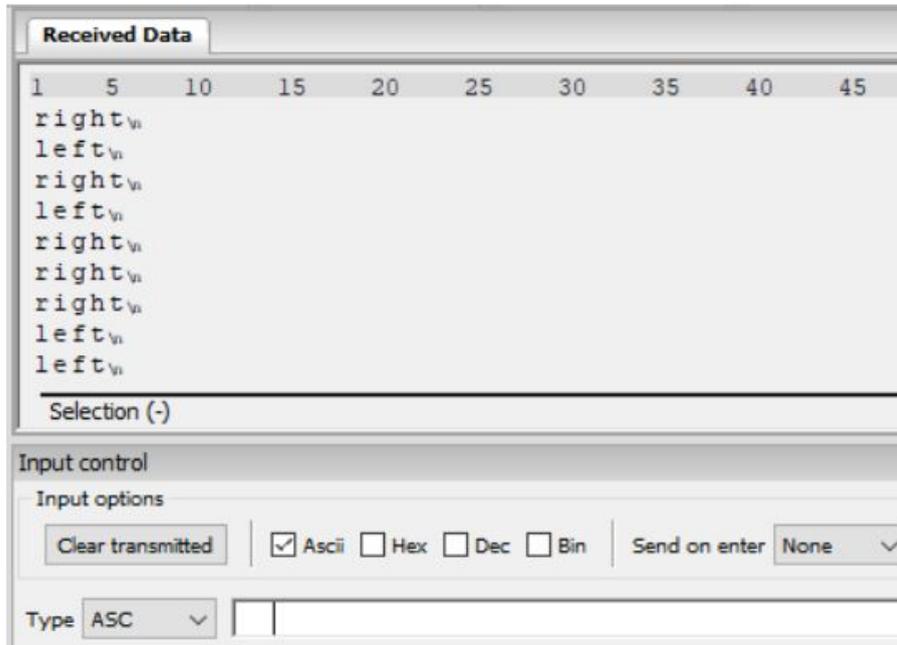


Figure 6 - Data stream on HTerm software

3.2.2. Mac OS

When using a Mac OS it is also possible to use any terminal emulation software for data display. Terabee often works with and suggests using the Coolterm software. Please follow the provided link to download the software file(<https://freeware.the-meiers.org/>).

Next, double click on the **“CoolTermMac.dmg”** file and then on the Coolterm icon. Connect the TeraRanger Evo Swipe to a computer and click the **“Options”** button. Select the corresponding USB port (click **“Re-Scan Serial Ports”** button to refresh the port list). Please configure the software with the following parameters:

Baud rate : 115200 bit/s
Data bits : 8
Parity bit : None
Stop bit : 1

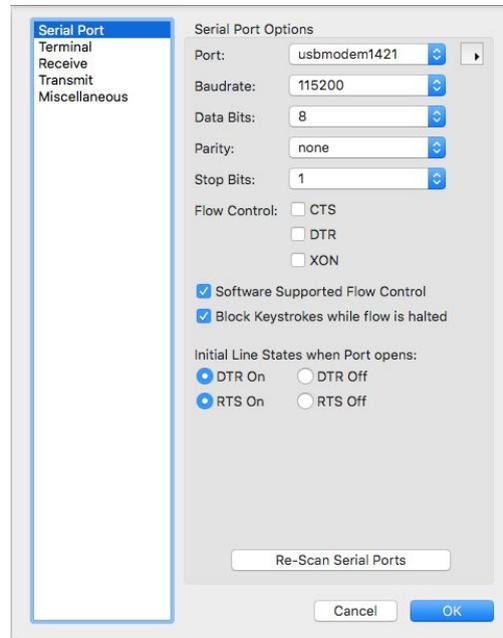


Figure 7 - Coolterm parameters for TeraRanger Evo Swipe

Once the USB port is selected and the parameters correctly set, click on the **“Connect”** button. The gesture recognition data will now appear.

4. USB operation

4.1. Use case

4.1.1. Sensor Orientation

The connector of the USB backboard should be placed on the right, Figure 8 illustrates the correct orientation of the TeraRanger Evo Swipe in order to have a correct reading of the gesture recognition data during use.

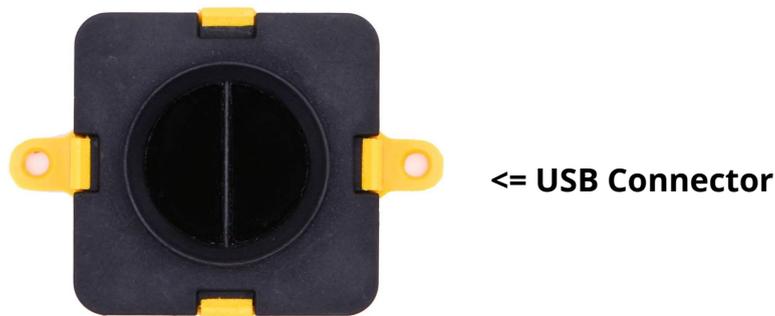


Figure 8 - sensor positioning

4.1.2. Sensor Positioning

For optimal gesture recognition, Terabee recommends 3 different positions:

- **Person in front of the sensor**

Sensor placed in front and in parallel with the user's body.

- **Sensor pointing up with hand swiping**

Sensor placed on top of a flat surface, and without an obstacle in front of the sensor.

- **Sensor pointing down with hand swiping**

For a discreet installation of the TeraRanger Evo Swipe, the sensor is placed beneath a flat surface, without an obstacle in front of the sensor.

 The users' body should be more than 0.5 m away from the sensor, with their hand swiping in the 0.1 m to 0.5 m range of the sensor, to not affect the sensor behavior and to be out of the sensor field of view.

4.2. Printout

When streaming data using the HTerm software the direction of the swipe is displayed in ASCII in the form of a 4 to 5 byte newline terminated message ie. **left\n** or **right\n**.

Swipe reading : xxxxx
New line character : \n (10 decimal / 0x0A hex)

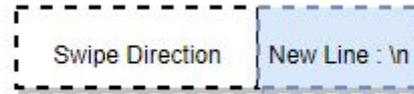


Figure 9 - Message frame