

# DepthEngine T100 User Manual

## 1. General Description

The purpose of this user manual is to familiarize DepthEngine T100 module users with the software, including the basic operation of TOF GUI, setting of parameters, import and export data, various display and control elements.

## 2. Hardware Introduction

To explain more clearly about the hardware of DepthEngine T100 module, we opened the front cover, which is a 850nm infrared light filter. Make sure there is no obstacles near the VCSEL when in use, or it may shield the light.

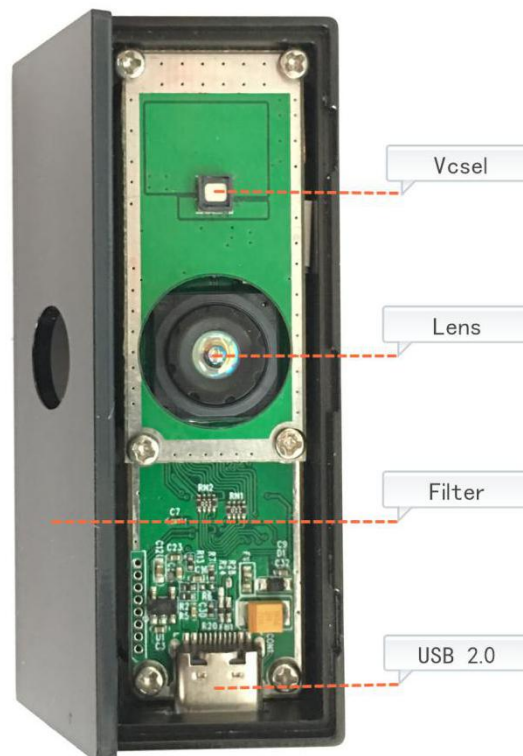


Figure1. Components of the DepthEngine T100 module

## 2.1 VCSEL

As we can see in Figure1, there is one VCSEL as the illumination light source. Compared with led, it has the advantage of uniform light, which can also provide a better measurement in image edge. The VCSEL device is designed at Class 1 during normal operation. **However, we still recommend users do not look direct into the VCSEL when it is working.**

## 2.2 USB Interface

This module use USB Type-C as the communication and power interface. Actually, it's an USB 2.0 slave device. Considering that the working current of this module can up to 1A, we recommend users plug this module to USB3.0 host device(Typically USB2.0 can provide 500mA current while USB 3.0 can provide up to 1000mA).

## 3. Installation and setup

### 3.1 VCP Driver Install

If host system is windows10, this step can be skipped.

If host system is windows 7/8, then choose the corresponding driver shown as below.





<input type="checkbox"/> Name	Date modified	Type	Size
 VCP_V1.5.0_Setup_W7_x64_64bits.exe	12/6/2017 3:38 AM	Application	6,745 KB
 VCP_V1.5.0_Setup_W7_x86_32bits.exe	12/6/2017 3:40 AM	Application	6,745 KB
 VCP_V1.5.0_Setup_W8_x64_64bits.exe	12/6/2017 3:25 AM	Application	6,745 KB
 VCP_V1.5.0_Setup_W8_x86_32bits.exe	12/6/2017 3:32 AM	Application	6,745 KB

Figure2. VCP driver list

After VCP driver is installed, then connect the DepthEngine T100 module to windows PC with USB Type-C cable. The device manager can show this module name in ports list(The port number maybe different). See in Figure3.

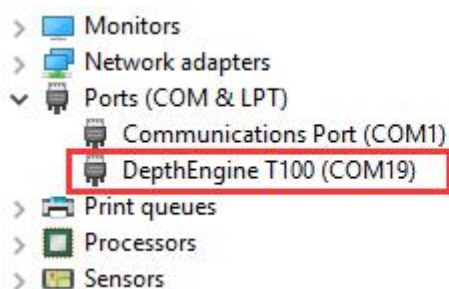


Figure3. Module name in device manager

## 4. GUI Functionality

### 4.1 Overview

The TOF GUI is free installation and support hot plug. It consists of two windows: The control window Figure4 and the display window Figure5. The control window is used to set parameters, choose the way of displaying the camera images and to log data. It can auto detect DepthEngine T100 module after device plugged in.

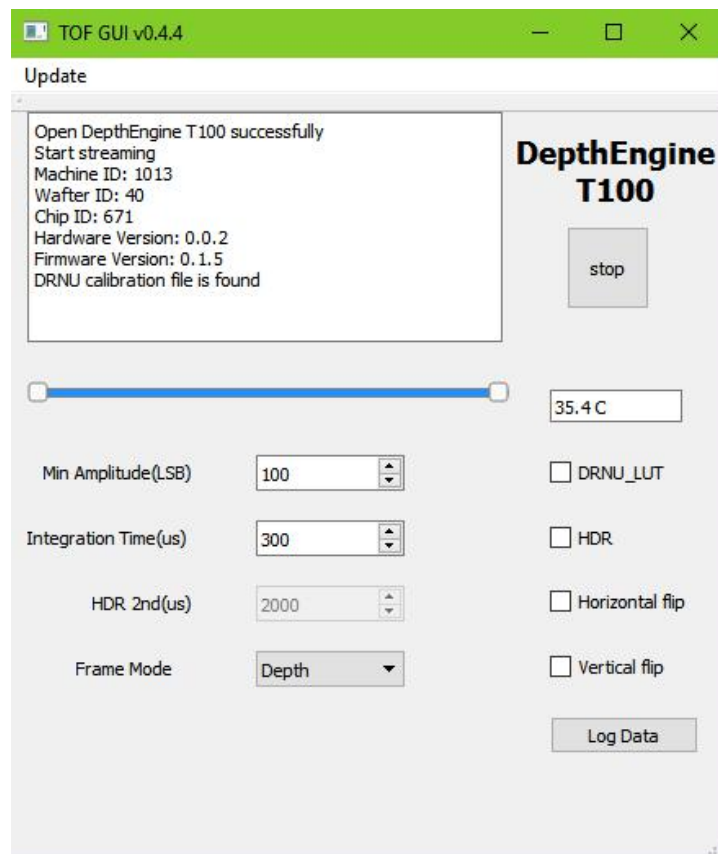


Figure4. Control window

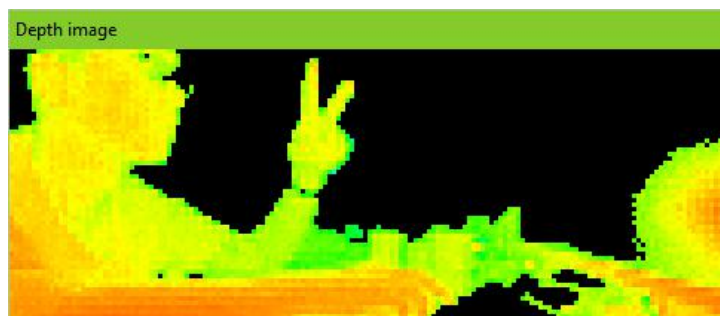


Figure5. Display window

Most of the functions are self-explaining and are not described herein.

## 4.2 Operating mode and display setting

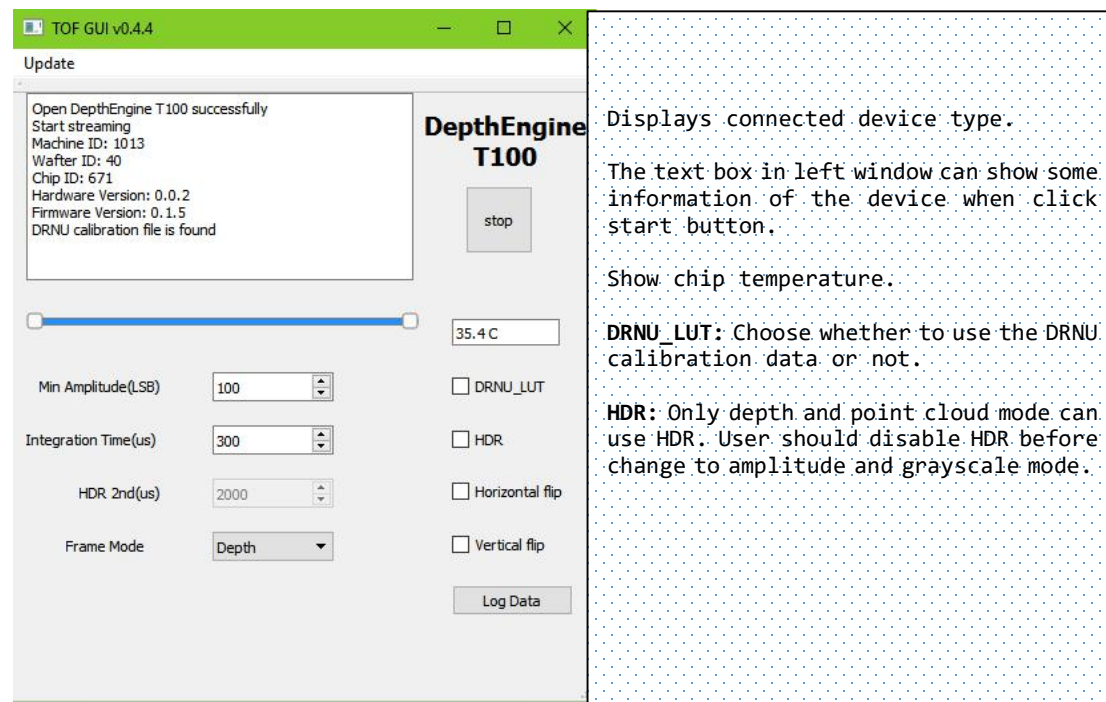


Figure6. Display setting

### 4.2.1 Min Amplitude

When the amplitude of one pixel is lower than this, the distance of that pixel will not be calculated.

### 4.2.2 Integration Time

Range 0 - 4000us. The longer the integration time, the farther the measurement distance. At the same time, frame rate will decrease for heat and safety consideration.

### 4.2.3 HDR 2nd

Range 2000 - 4000us. Only when HDR box is checked can this parameter be set. Meanwhile, the range of integration time(used as HDR 1<sup>st</sup>) is changed to 0 - 2000us.

## 4.2.3 Frame Mode

Change to another frame type.

### 4.2.3.1 Depth

When left-click the depth image, the depth value of that point will show on text box. The same with amplitude and gray-scale frame mode. See in Figure7.

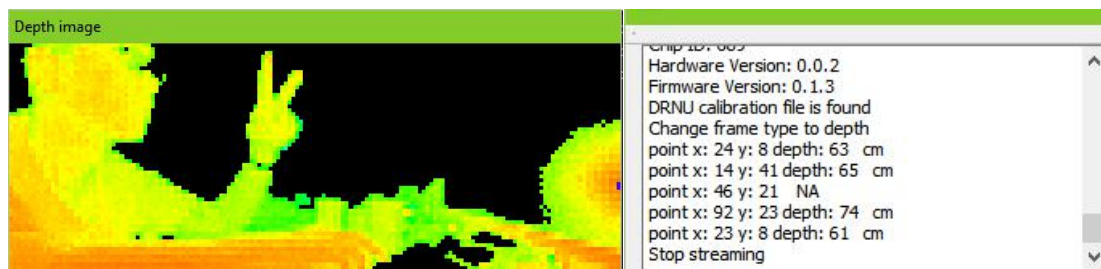


Figure7. Show depth value

When pixel is over exposure or low amplitude, the distance can not be calculated. It will show NA on text box.

### 4.2.3.2 Point Cloud

Use left mouse button to rotate the image.

Use mouse wheel to zoom in and zoom out the image.

Use control + left mouse button to move the image.

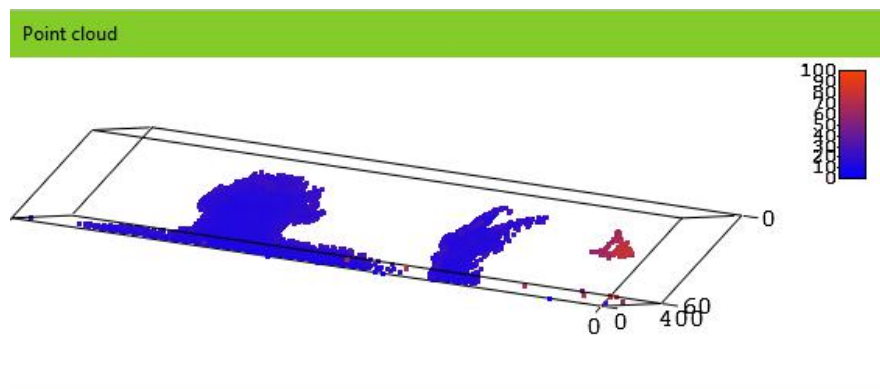


Figure8. Show point cloud

## 4.2.4 Log Data

Click this button to save image and data. It can be found in /TOF\_GUI/log/1013\_40\_689. The name of this directory is consist by machine ID, wafter ID and chip ID. See in Figure9.

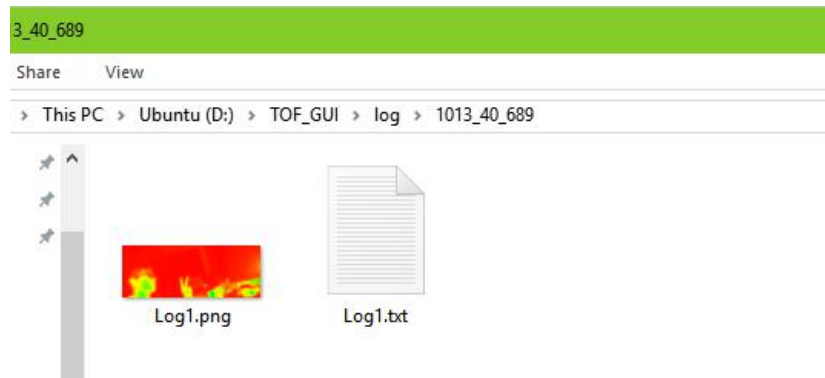


Figure9. Log data

In text file , it records total 160x60 values. In depth mode, the meaning of this values explained as below:

Pixel value logged	Meaning
Value < 30000	Normal, Depth = Value/2 (unit: mm)
Value = 65200	Over exposure, Depth = NA
Value = 65300	Low amplitude, Depth = NA
Value = 65500	ADC overflow, Depth = NA

Figure10. Value meaning

## 4.2.5 Update Firmware

To get the best performance of this device, users can update its firmware when new update is available. This can be checked in <https://github.com/DepthEngine/>. After new firmware is downloaded to local disk. Click the **update** button, the device will enter bootloader mode. If users want to cancel update at this time, just close the update firmware window. The device will come back to working mode. **Choose** the directory where the firmware is located. Then click **send** button, the firmware will be downloaded to device. After finished, the device will come back to working mode automatically. Users need to repress **start** button. See in Figure 11.

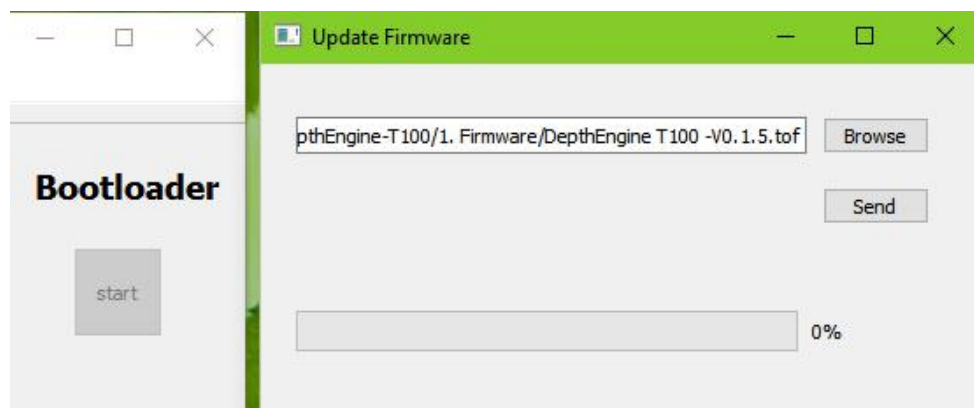


Figure11. Update firmware

## 5. Addendum

### 5.1 Related documents

■ DepthEngine\_T100.pdf

### 5.2 Links

[github.com/DepthEngine/](https://github.com/DepthEngine/)

[www.depthengine.com](http://www.depthengine.com)

[www.pointcloud.org](http://www.pointcloud.org) - Point Cloud Library (PCL)

[www.pdal.io](http://www.pdal.io) - Point Data Abstraction Library (PDAL)

[www.opencv.org](http://www.opencv.org) - OpenCV (OpenSource Computer Vision)

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