TOF MODULE HARDWARE SPECIFICATION

Model No. `FLT_K100_TOF`

Prepared by David Qiu
on behalf of FRUITION CO., LTD.

Last revision: January 16th, 2020

Full revision history and latest data sheets are available at
`https://github.com/diracs-delta/fruition-specs/tree/master/FLT_K100_TOF` .

Contents

1 Product Overview

1.1 Brief Description

Summary: A 2.5 cm–10 cm range TOF module.

Figure 1.1: Overhead view of the TOF module.

`FLT_K100_TOF` is a high-performance time-of-flight (TOF) module, which can measure distances optically. This module consists of two chipsets, including a single photon avalanche diode (SPAD) and an infrared photodiode coupled with an infrared optical bandpass filter.

This module sensor adopts the TDC electric circuit system, and has good crosstalk characteristics. The `FLT_K100_TOF` module performs crosstalk calibration automatically. The automatically calibrated, highly precise measurement stability allows for accurate distance measurement even with fingerprints and smudges. The `FLT_K100_TOF` module also has strong anti-light interference, and measures distances independent of object reflectivity, ambient temperature, and working time.

1.2 Product Features

- PSD, infrared LED, and signal processing circuit built-in.

- Short measurement cycle (16.5 ms).

- Distance measurement range 2.5–10 cm.

- Efficient usage of volume (21.0×7.6×1mm).

- Digital I2C output.

1.3 Applications

- Robot vacuums.

- Industrial robots.

- Autonomous vehicles or drones.

- User interaction interface.

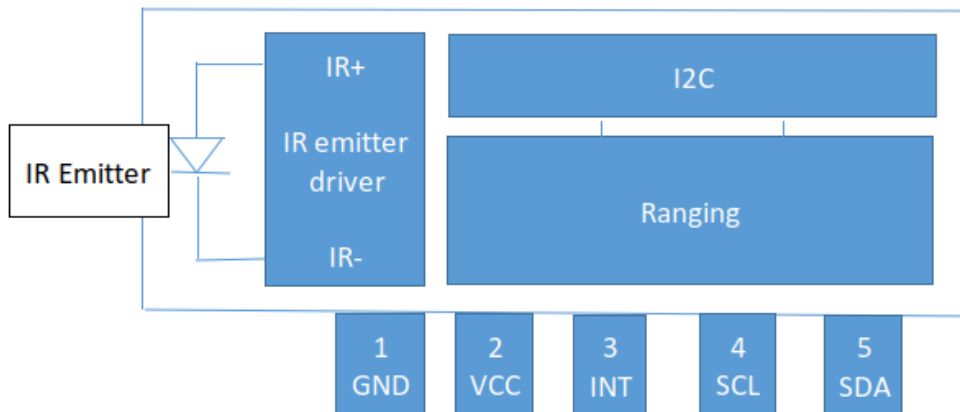- Any other test or measurement equipment.

1.4 Figures

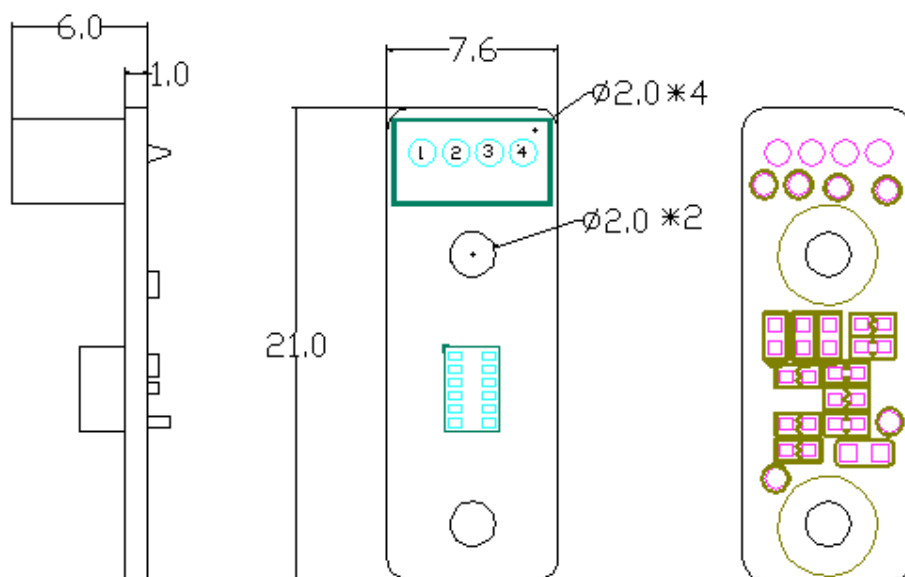Figure 1.2: Product diagram of the `FLT_K100_TOF` module.

Figure 1.3: Dimensions of the `FLT_K100_TOF` module. Units are in mm.

1.5 Detailed Specifications

Table 1.1: Interface definition of the `FLT_K100_TOF` module.

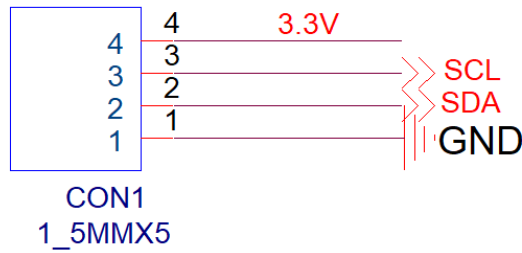| PIN1	GND	–	PIN3	SCL	Clock
PIN2	SDA	Data bus	PIN4	3.3V	–

Figure 1.4: Pin layout of the `FLT_K100_TOF` module.

Table 1.2: Recommended working ranges of the `FLT_K100_TOF` module.

Parameters	Abbreviations	Conditions	Ratings	Units
Voltage	VDD	–	3.3V/0.15V (+/-)	V
Temperature	TA	–	-20–$+70$	°C

Table 1.3: Absolute maximum ranges of the `FLT_K100_TOF` module.

Parameters	Abbreviations	Conditions	Ratings	Units
Supply Voltage	VDD	–	0–3.8	V
ESD Protection	ESD	HBM	2	KV
Storage Temperature	TSTG	–	-40–$+125$	°C

1.6 Crosstalk Calibration

Figure 1.5 demonstrates the distance-response histogram without a glass cover panel between the TOF sensor and the object, while Figure 1.6 represents the distance-response histogram with a thin glass cover panel directly in front of the TOF sensor. Without crosstalk calibration, the TOF sensor inaccurately measures distances even following initial calibration. However, with the special crosstalk calibration firmware built into the `FLT_K100_TOF` module, the `FLT_K100_TOF` module is able to maintain an accurate, linear distance-response curve even with a glass panel causing crosstalk feedback, as shown in Figure 1.7.
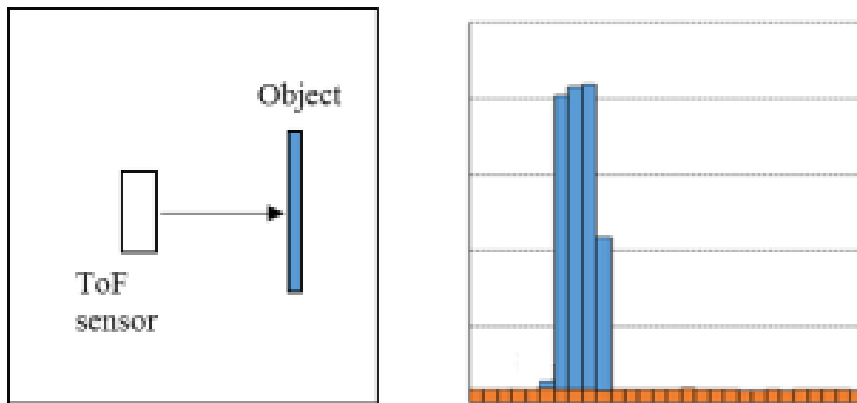
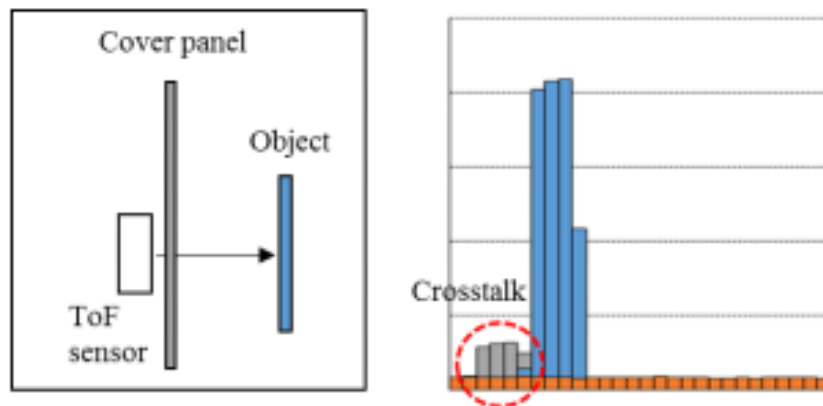Figure 1.5: Histogram without cover glass.

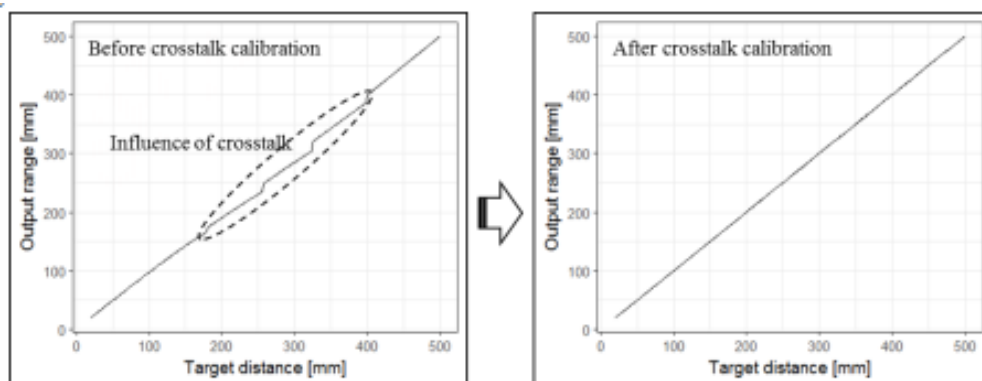Figure 1.6: Histogram with cover glass.

Figure 1.7: Distance response curve before and after crosstalk calibration.

2 Liability

FRUITION CO., LTD. does not hold itself liable for any damage caused by improper use of equipment that does not meet the conditions specified in the relevant specification sheet, pushing the module past its operating range, or failing to meet any other specified working conditions.