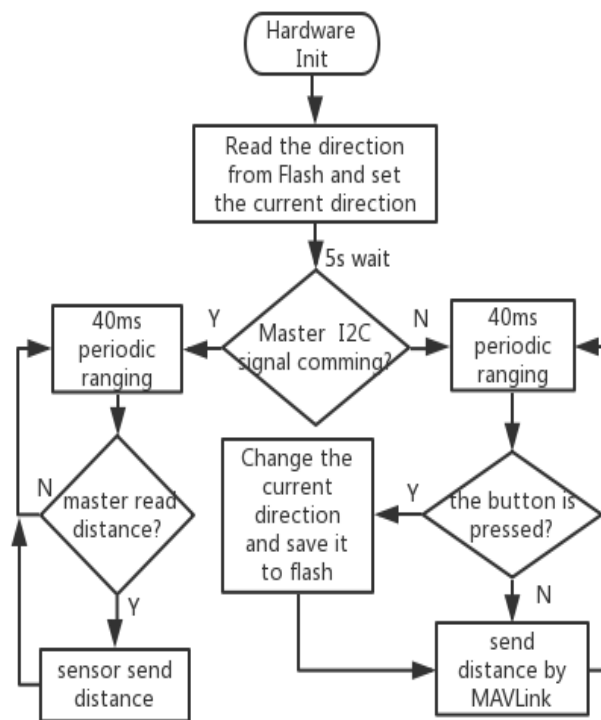


# SU04 Development Manual

## Introduction:

The module is an ultrasonic ranging module that combines UART and I2C. Each 40ms automatically detects distance and sends a distance to an external device communicating with this module. The module works in I2C slave mode, waiting for an external master I2C signal within 5 seconds after power-on. If there is an I2C signal within 5 seconds, the communication mode of the module is set to I2C mode, whether it is set to UART mode. After judging the communication port, the module starts to work normally, triggers the ranging every 40 ms automatically, calculates the detection distance, and sends the distance to the communication device through the MAVLink protocol or I2C protocol.

## 1. The working process of the module



The module power on, initialize the hardware, read a direction from FLASH, and set the current direction of the module. 5 seconds waiting to detect whether there is a master I2C signal, then the module enter the I2C communication mode, no access to serial communication mode. Finally, the 40ms cycle detects the distance and sends the distance to the external device.

## 2. Uart communication mode

Uart protocol:MAVLink protocol、 NO.132 distance MAVLink message

Baud rate:57600

Data bit:8 bit

Parity:no

Stop bit :1 bit

Under this mode,the module send the 132 distance message to the external device with the MAVLink protocol.A Mavlink message data is as follows:

FE 0E 4B 2A BE 84 00 00 00 00 02 00 E8 03 BD 00 01 01 00 00 7F 4D

1)FE 0E 4B 2A BE 84:message header

2)00 00 00 00 02 00 E8 03 BD 00 01 01 00 00:pack data

00 00 00 00:Time since module boot is 0

02 00: Minimum distance the module can measure in centimeters is 2cm

E8 03:Maximum distance the module can measure in centimeters is 1000cm

BD 00:Current distance is 198cm

01 01:Module type is 1,id is 1

00:Direction the module is 0

00:Covariance is 0

3)7F 4D:checksum

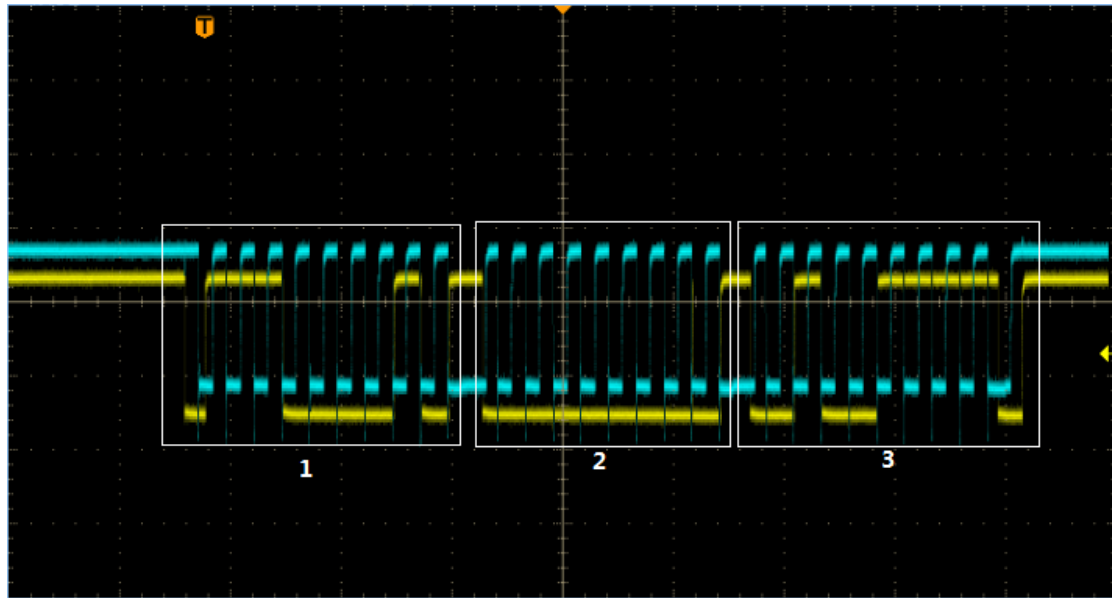
The above data indicates that the 0 direction 198cm distance message is sent to the external module

Note: This module sends only the direction and distance of the module to the external device at a fixed time of 40ms. The distance is in cm. It does not need to receive the mavlink message of the external device.

### 3.I2C communication mode(the module works in slave mode)

Module I2C address :112(0x70)

In this communication mode, the module does I2C slave, the master only needs to send read operation, can read the distance detected by the module, do not need to write operation and enable. The specific reading process is as follows:



- 1) As shown in box 1 above: Master sends request to read device operation (address 0x70)
- 2) As shown in box 2 above: This module sends high 8 bit data (0x00) to the Master.
- 3) As shown in box 3 above: This module sends low 8 bit data (0x27) to the Master.

Note: When the module can not detect the object, it will send 10 values to the master, unit cm, indicating the current distance is infinite. When using I2C communication, the module sends only the distance, not the direction. Therefore, when choosing this communication mode, the module has no direction.

### 4.Button function

The button function is only useful for uart mode.

Each time the button is pressed, the module changes the current direction in (0 24 1 2 3 4 5 6 7) order and saves it in the flash. At the same time, Uart sends 450 cm distance to the external device before sending the actual value of the current direction.