

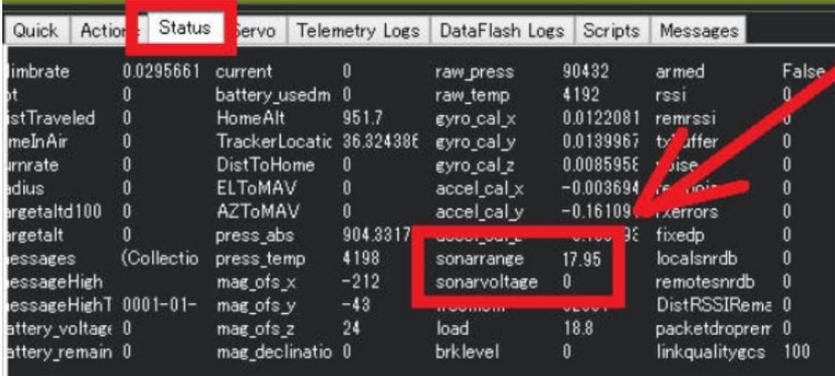
Firmware Development Task

1 Background

Recently the ArduCopter firmware 3.6.2 and Rover 3.4.2 has been released, which is compatible with Benewake LiDAR TF02 and TFmini via serial port. With the new firmware, our customers are allowed to set RINGFND_TYPE as 19 or 20 to choose Benewake LiDARS.

Benewake is about to release TFmini via IIC protocol. To add the TFmini IIC protocol to the latest firmware, we would like to cooperate with an APM developer.

2 Task Description

Stage No.	Content
1	<p>Coding: Add the IIC protocol of TFmini to the latest Copter and Rover firmware. Read both the distance and signal strength information from the LiDAR.</p> <p>Link provided by Randy Mackay: https://github.com/ArduPilot/ardupilot</p> <p>Note: Sonarrange – the distance of the LiDAR Sonarvoltage – the signal strength of the LiDAR</p> 
2	Pull request: submit the featured version to the core developer and debug
3	Test: driver test
4	Publish: ensure the IIC protocol of TFmini is released along the next master firmware

3 IIC protocol of TFmini

The sequence of reading data from TFmini is as follows. The complete specification and operation manual will be attached.



5.3 Time Sequence of Reading Data from TFmini-I2C

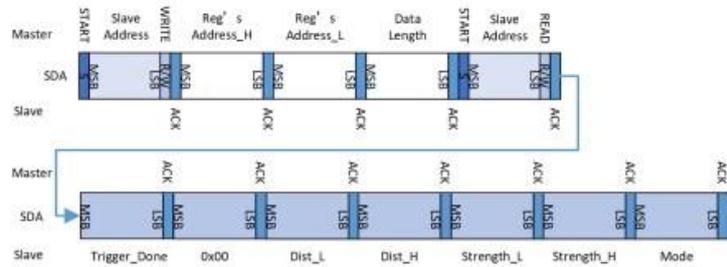


Figure 7 Time Sequence of Reading Data from TFmini-I2C

Explanations are in Table 6.

Table 6 Data Format and Code Explanation

Data Format and Code Explanation	
START	Start condition
STOP	Stop condition
Slave Address	Slave address, which is 0x10 by default and is configurable.
R/W	R/W flag bit; R/W=1 indicates READ; R/W=0 indicates WRITE
ACK	Acknowledge Master/slave response
Reg's Address_H	Higher 8 bits of the register address. When reading range information, Reg's Address_H = 0x01
Reg's Address_L	Lower 8 bits of the register address. When reading range information, Reg's Address_L = 0x02
Data Length	Read the number of bytes of range information. When reading range information, Data Length = 0x07
Trigger_Done	Measurement completion flag. Trigger_Done = 0x01 indicates ranging results of the current frame Trigger_Done = 0x00 indicates ranging results of the previous frame
Dist_L	Lower 8 bits of distance value
Dist_H	Higher 8 bits of distance value
Strength_L	Lower 8 bits of signal strength
Strength_H	Higher 8 bits of signal strength
Mode	Ranging gear information, which goes into automatic switch mode by default Range of values: 00 (short distance), 03 (middle distance), and 07 (long distance)

4 Schedule

Stage No.	Time Duration	Comment
1		
2		
3		
4		

