

Application of TFmini-S IIC in PixHawk (ArduPilot Firmware)

www.benewake.com Benewake (Beijing) Co., Ltd. TFmini-S can be used with PixHawk for the purpose of obstacle avoidance.

1. TFmini-S Settings:

Note: Frame rate should be set to 250Hz, see the details in chapter 7.4 "frame rate" and changing the communication interface.

The default communication of TFmini-S is TTL, IIC and TTL uses the same cable, so please set TFmini-S to IIC communication first, see detail commands in product manual.

We take two TFmini-S as an example in this passage and set the address 0x10 and 0x11 separately.

2. PixHawk Connection:

See the connection details in PixHawk manual and TFmini-S manual, we take example for connecting

PixHawk flight controller:

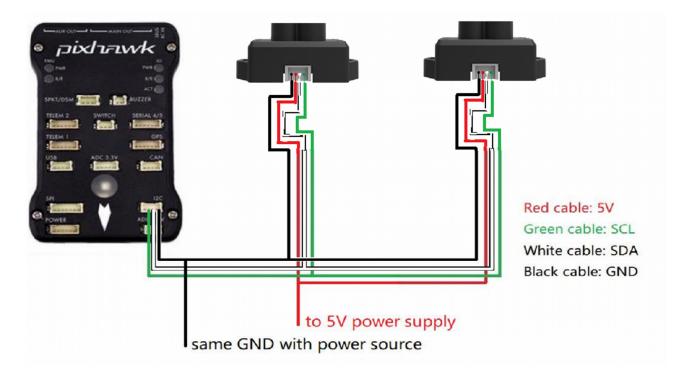


Figure 1: Schematic Diagram of Connecting TFmini-S to I2C Interface of PixHawk

Note:

1. Default cable sequence of TFmini-S and PixHawk are different, please change it accordingly (SDA and SCL wires need to be interchanged). Look at the pinout of controller, pin configurations are **starting from left to right**:



Pin	Signal	Volt
1 (red)	VCC	+5V
2 (blk)	SCL	+3.3 (pullups)
3 (blk)	SDA	+3.3 (pullups)
4 (blk)	GND	GND

- 2. IIC connector should be purchased by user
- 3. If TFmini-S faces down, please take care the distance between lens and ground should be larger than TFmini-S's blind zone (10cm)
- 4. If more TFmini-S need to be connected (10 LiDARs can be connected), the method is same.
- Power source should meet the product manual demands:5V±0.5V, larger than 140mA*number of TFmini-S

3. Parameters settings:

Common settings:

AVOID_ENABLE= 2 [if 3 = UseFence and UseProximitySensor doesn't work in IIC then choose 2 = UseProximitySensor]

AVOID_MARGIN=4

PRX_TYPE=4

Settings for first TFmini-S:

RNGFND1_ADDR=16 [Address of #1 TFmini-S in decimal]

RNGFND1_GNDCLEAR=15 [Unit: cm, depending upon mounting height of the module and should be larger LiDAR than non-detection zone]

RNGFND1_MAX_CM=400 [It could be changed according to real demands but should be smaller than effective measure range of LiDAR, unit is cm]

RNGFND1_MIN_CM=30 [It could be changed according to real demands and should be larger than LiDAR non-detection zone, unit is cm]

RNGFND1_ORIENT=0 [#1 TFmini-S real orientation]

RNGFND1_TYPE = 25 [TFmini-S IIC same as TFmini-Plus IIC]



Settings for second TFmini-S:

RNGFND2_ADDR=17 [Address of #2 TFmini-S in decimal]

RNGFND2 GNDCLEAR=15

RNGFND2_MAX_CM=400

RNGFND2_MIN_CM=30

RNGFND2_ORIENT=25 [#2 TFmini-S real orientation]

RNGFND2_TYPE=25 [TFmini-S IIC same as TFmini-Plus IIC]

Upon setting of these parameters, click [Write Params] on the right of the software to finish.

If the error message "Bad LiDAR Health" appears, please check if the connection is correct and the power supply is normal.

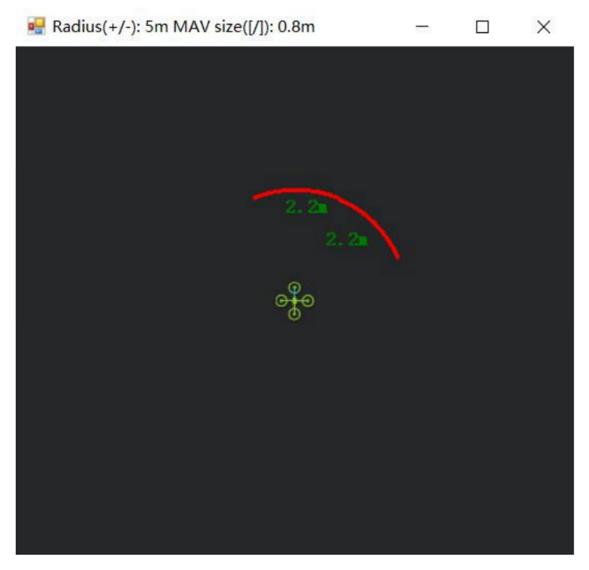
How to see the target distance from the LiDAR: press Ctrl+F button in keyboard, the following window will pop out:

🚽 temp				()		×
Geo ref images	Geo Refrence photos				Presen Ok	
Warning Manager	Create custom audio warnings	siti				
Follow Me	use a runea gps to follow me	streamcombi				
NMEA	outputs the may location in nmea	Inject GPS				
MicroDrone	outputs the may location in microdrone format	FFT				
Mavlink	mirrors the mavlink stream received by mp	TD				
Param gen	regenerage the param info used inside mp	reboot	OPTICAL FLOW			
Lang Edit	translation language editor	pixhawk	VISION POSITION			
OSDVideo	overlay the hud into your recorded videos	QNH				
Moving Base	show an extra icon on the map of your current	Sequence		14 A		
Shp to Poly	convert shp file ot a polygon file	Swarm		DEs		
	output the may location into xplanes	nk In vlc				
Swarm	multi mav swarm interface	gstream				
Follow the leader	follow the leader swarm	Age Map				
MAVSerial pass	create a exclusive passthrough to the gps	Data				
	remove all apm drivers	faram gen cust				
Sort TLogs	sort tlogs into there type and sysid	signing				
rip all fw	download all current fw's	opticalflow	BC RECEIVER	01.		
Inject GE	add custom imagery to mp	calib	10 61902			
Clear Custom Maps	wipe custom imagery	sphere	30 ACCEL2			
structtest	struct conversion speed test	mag calb		Div		
DashWare		log		Dis		
arm and takeoff	quad: arm and takeoff	extract gns_inject				
gimbal test	run the gimbal pointing algo	Proximity	AHRS			
map logs	create map jpg's for all tlogs in a dir		TEBSAIN			
logindex	tlog browser	Swarm				
GST test	DEM logdownload ReSort All Cust	om GDAL Custom DTED		01.		
WI LEST	scp logs Cust	Com Contras				



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Click button *Proximity*, the following window will appear:



The number in green color means the distance from LiDAR in obstacle avoidance mode (the number only refresh when this window opens, closes, zooms in or zooms out, it doesn't mean the real time distance from LiDAR and will not be influenced in Mission Planner version under v1.3.48, the problem could be solved by updating Mission Planner



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