

Prime Turbo (Prime TTL and Prime TTL-RA Modules) Addendum to Prime User Manual

Introduction

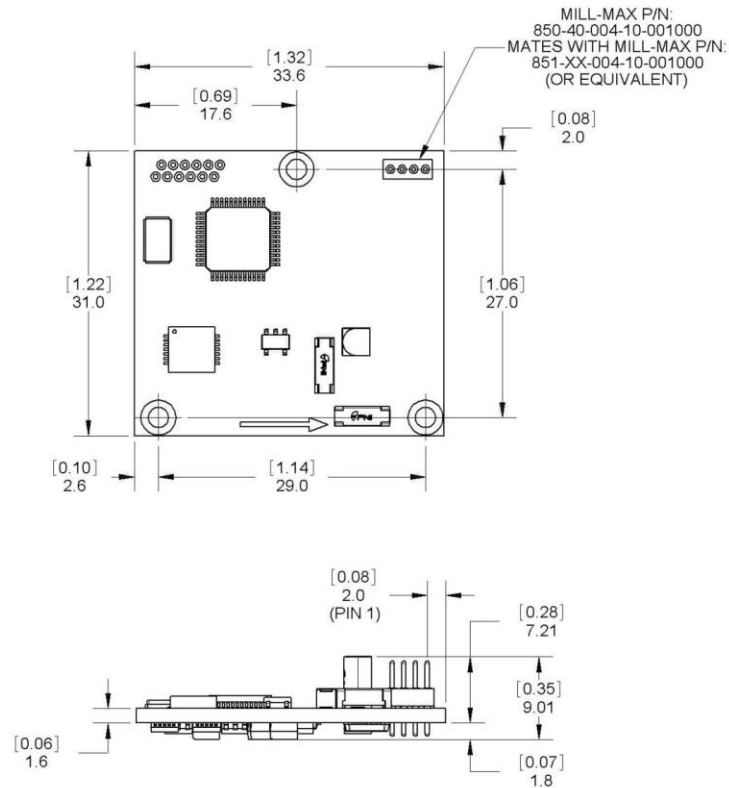
The Prime Turbo is similar in many aspects to the standard Prime 3-axis compass module. This document discusses the differences between the two models, which are the mechanical interface, the electrical interface, and the incorporation of TurboMode in the firmware. For how to operate the Prime Turbo, please refer to the [Prime User Manual](#).

Prime Turbo supports two types of pin connectors. The unit with a straight pin connector is Prime TTL (aka RDI), part number 12951. The unit with a 90° angle pin connector is Prime TTL-RA, part number 14592. Except the connector, Prime TTL and Prime TTL-RA are identical.

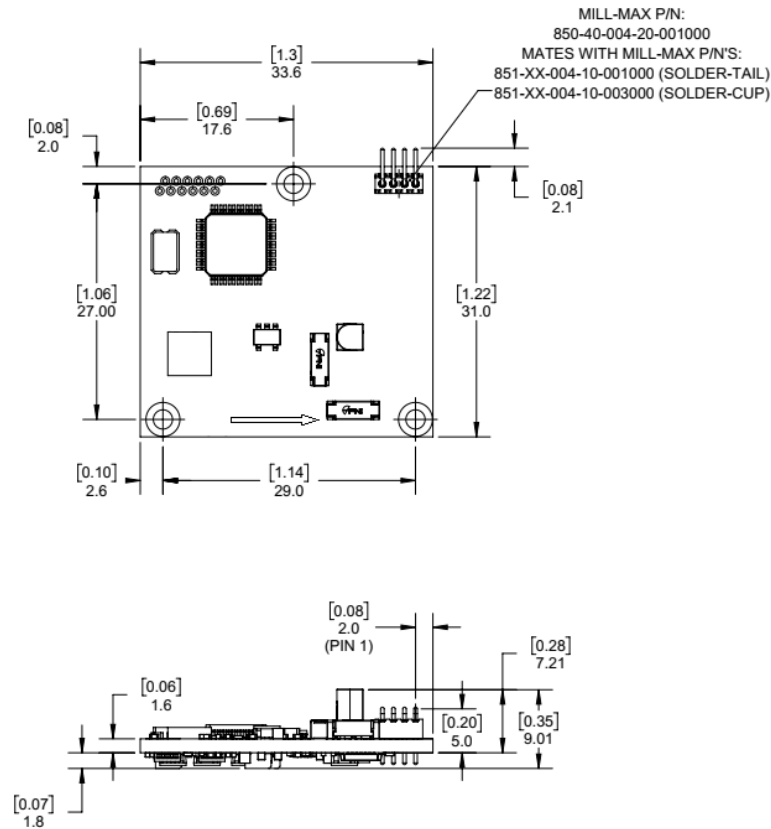
Connector Type	Name	Part number
Straight Pins	Prime TTL	12951
90° Angle Pins	Prime TTL-RA	14592

Mechanical Interface

- **The Prime TTL** incorporates a single electrical connector, Mill-Max part number 850-40-004-10-001000. See [Mill-Max](#) for mating parts.
The mechanical drawing of the Prime TTL is given below. The footprint and hole locations are the same as for the standard Prime.



- **The Prime TTL-RA** incorporates a single electrical connector, Mill-Max part number 850-40-004-20-001000. See [Mill-Max](#) for mating parts. The mechanical drawing of the Prime TTL-RA is given below. The footprint and hole locations are the same as for the standard Prime.



Electrical Interface

Prime Turbo electrical interface requirements are given below, with the items in red and bold being different from the standard Prime.

I/O Characteristics		
Communication Interface		Binary CMOS/TTL UART
Communication Rate		300 to 115,200 baud
Maximum Sample Rate (non-Turbo Mode)		10 samples/second
Maximum Receive Voltage Range (Rx)		0 to +5 V
Threshold Voltages	Receive (Rx) Low	0.8 V maximum
	Receive (Rx) High	2.0 V minimum
	Transmit (Tx) Low	0.4 V maximum
	Transmit (Tx) High	2.9 V minimum
Time to Initial Good Data ¹	Initial power up	<180 ms
	Recovery time from sleep mode	<60 ms
Power Requirements		
DC Supply Voltage (Vcc)		3.15 – 6.5 V (3.3 V nominal)
Average Current Draw @ 10Hz Sample Rate		18 mA
Peak Current Draw ²	During external power up	120 mA peak, 75 mA average over 2 ms

	During logical power up/down	110 mA peak, 85 mA average over 1 ms, 60 mA over 2 ms
Sleep Mode Current Draw		0.25 mA

Footnotes:

1. FIR Taps set to 0.
2. Tested at 3.6 V.

The Prime TURBO pin-out is given below. Pin #1 is the pin closest to the corner of the PCB.

Pin #	Connection
1	GND
2	Vcc
3	Tx (output)
4	Rx (input)

TurboMode

The Prime Turbo can take samples at a higher rate than a standard Prime module by enabling TurboMode. The standard Prime module has a maximum sample rate of 10 samples/sec. When put in TurboMode, the Prime Turbo can sample at rates up to 25Hz to 50Hz, depending on how fast the Prime is configured. For example, in push mode, with the sample interval set as 0 second, the sample rate can be 50Hz. These faster sampling rates allow the Prime to more quickly respond to changes in the measured magnetic field. It should be noted, however, that the power consumption will noticeably increase while in TurboMode.

An additional configuration identifier, kTurboMode (configuration ID 15), is added to the configuration commands in order to enable TurboMode. (See Table 7-3 in the Prime User Manual.). This configuration is set using the kSetConfig command, and can be queried using the kGetConfig command. The format for the kTurboMode configuration identifier is given below, and sample commands and responses to the commands also are provided.

Setting	Configuration ID	Format	Units/ Range	Default
kTurboMode	15	Boolean	True (1) or False (0)	False (0)

Sample Commands

Enable Turbo Mode

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6
Number of Bytes		Frame ID	Config ID	value	Checksum	
		kSetConfig	kTurboMode			
0	7	6	15	1	227	146

Disable Turbo Mode

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6
Number of Bytes		Frame ID	Config ID	value	Checksum	
		kSetConfig	kTurboMode			
0	7	6	15	0	243	179

Get Turbo Mode Flag

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5
Number of Bytes		Frame ID	Config ID	Checksum	
		kSetConfig	kTurboMode		
0	6	7	15	218	216

Sample Responses

Confirm completion of setting kSetConfig (response to kSetConfig)

Byte 0	Byte 1	Byte 2	Byte 4	Byte 5
Number of Bytes		Frame ID	Checksum	
		kSetConfigDone		
0	5	19	221	167

Confirm TurboMode Enabled (response to kGetConfig)

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6
Number of Bytes		Frame ID	Config ID	value	Checksum	
		kConfigResp	kTurboMode			
0	7	8	15	1	248	147

Confirm Turbo Mode Disabled (response to kGetConfig)

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6
Number of Bytes		Frame ID	Config ID	value	Checksum	
		kConfigResp	kTurboMode			
0	7	8	15	0	232	178