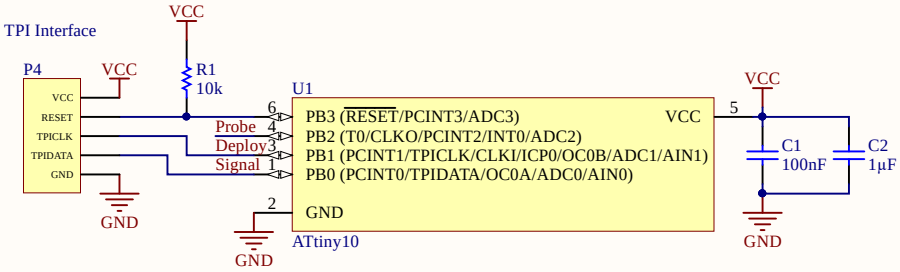
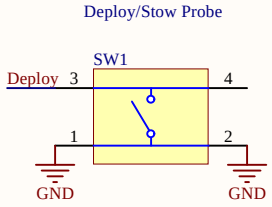
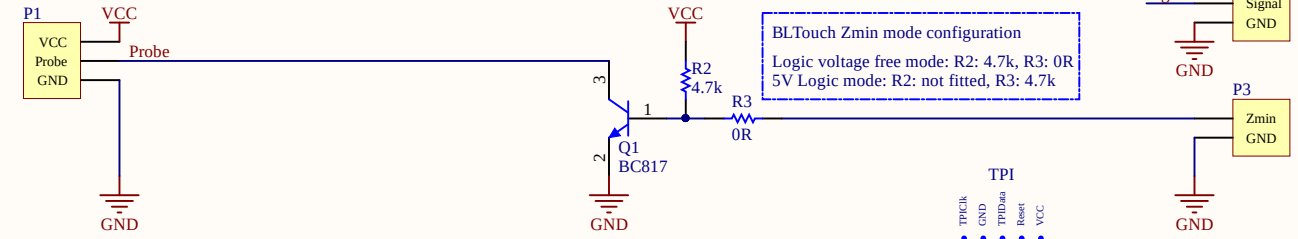
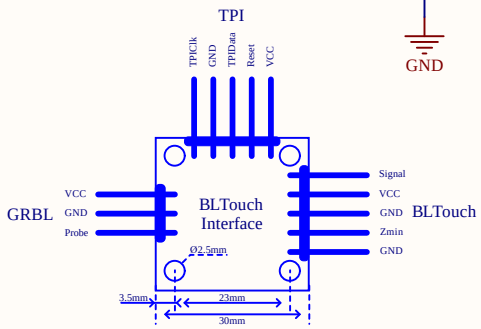


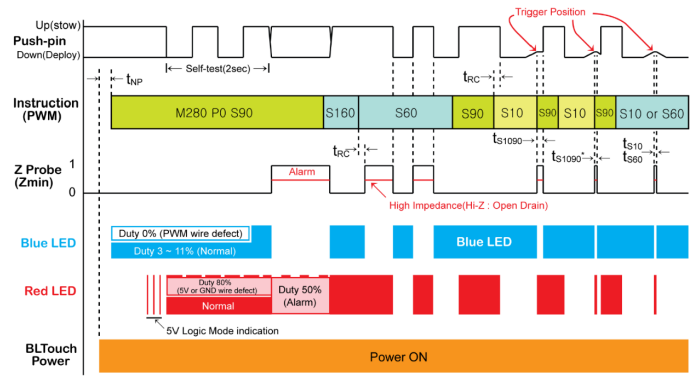






Datasheet: www.antclabs.com/manual

■ Timing Diagram



t_{RC}: Read Cycle Time (min=60ms)
t_{NP}: Non-PWM Time for checking power wiring defects (min=100ms)
t_{S10}: Trigger pulse Time of probing using S10 (647㎲)
t_{S60}: Trigger pulse Time of probing using S60 (1162㎲)
t_{S1090} / t_{S1090}*: Trigger pulse Time of probing using S10 (647㎲) and S90 (1473㎲)

t_{S10}: 1 ~ 10ms(Time depends on the 3D printer board), max = ≤620ms, Alarm

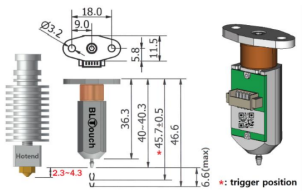
t_{S60}: 1 ~ 10ms(Time depends on the 3D printer board), max=∞

t_{S1090}: 40~150ms, max≒650ms, Alarm t_{S1090}*: 1 ~ 10ms(Time depends on the 3D printer board) , max≒650ms, Alarm

t_{NP}: If a 5V or GND wiring defect occurs during printing, the red LED flashes at 80% duty. Please check the 5V or GND line.

Specification	
Voltage / Current	4.8 ~ 5.1 V
Current Maximum (Peak)	15mA 300mA
Z Probe Output Open Drain VDS / ID	**Logic Free (Open Drain: default)** or 5V logic Max VDS = 5V / Max ID = 300mA
PCB / Soldering	OSP / Lead Free
Cable Length	150±5 mm (for retail)
Weight	0.35oz (10g)
Wiring	**3Pin**: Brown (GND), Red (+5V) Orange (control signal) **2Pin**: Black (GND) White (Zmin)
Case & Push-pin	Polycarbonate (PC)

BLTouch CAD Dimension



※ An additional power supply may be needed in case your board does not supply enough current at 5V.
※ Electronic devices can be damaged or even destroyed if connected to the wrong side polarity.
※ Set Zmin pull-up on your firmware when using Logic Free (In most cases, it is already set up)
※ If push-pin deploy fails, turn the core by up to 180 degrees with an Allen-key so that the core is further inside the casing.
※ Depending on your type of 3D printer, you may need to remove or add some parts to the controller board.
※ In principle, a controller board with a large capacitor in the end stop input circuit is not supported.(You may need to remove such a capacitor from your board)
※ If noise, etc. interference is expected, you should use an anti-interference extension cable (Shielded or Twisted Cable).
※ Selling price and specifications are subject to change without prior notice.

■ Logic Voltage Conversion (writing to EEPROM)

In most cases, this operation is not required. We recommend that you do not set this up if possible.
If necessary, you can set the logic voltage in one of two ways:

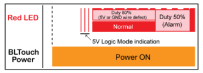
1. **The Z probe input pin on the control board is not pull-up or has an abnormal input circuit. (A board with a large capacity capacitor in the end-stop input circuit, such as the Melzi)**
   - ☞ And if the nozzle is in contact with the bed after missing the trigger signal
   - ☞ If you want more precision bed leveling. Remove the capacitor(recommended).
   - ☞ This setting is not required if the large capacity capacitor has already been removed from the board.
   - ☞ Do not activate 5V logic on the 3.3V logic system without 3.3V logic conversion.

   Step 1: Connect the 3pin (brown, red, orange) and 2pin (black, white) to the control board.
   Step 2: M280 P0 S10 ← least 500ms
   Step 3: M280 P0 S140 ← least 150ms
   Step 4: M280 P0 S130 ← least 150ms
   Step 5: M280 P0 S140 ← least 150ms
   Step 6: Check if there is a 5V Logic Mode indication.
   If no 5V Logic Mode Indication is found, perform Steps 2 to Step 5 again.

2. **Return to default (Logic voltage free) mode**
   - ☞ This operation is not necessary if you have not previously set it to 5v Logic.

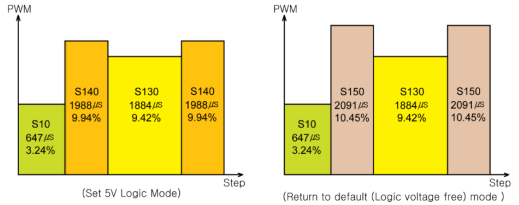
   Step 1: If your control board is a 3.3V Logic system, connect 3 pin to the control board without 2pin connections.
   Step 2: M280 P0 S10 ← least 500ms
   Step 3: M280 P0 S150 ← least 150ms
   Step 4: M280 P0 S130 ← least 150ms
   Step 5: M280 P0 S150 ← least 150ms
   Step 6: Check if there is a 5V Logic Mode indication. The 5V Logic Mode Indication should no longer appear.
   The 5V Logic can damage the 3.3V Logic system.
   If there is a 5V Logic Mode Indication, perform Step2 to Step5 again.
   Step 7: Connect the 2pin to the control board

5V Logic Mode Indication: ☞ see Timing Diagram
When the BLTouch is disconnected and re-connected, the red LED flashes at 10ms length 3 times immediately.



Handshake:
When each EEPROM command (S130, S140, S150) is completed, the 10ms red LED is turned on once or twice.
The last command for mode conversion (S140 or S150) will be activated immediately and the 10ms red LED flashes two times.

Please don't mix up the sequence.
If the correct order and minimum retention time are not observed, a retry may be required.



Logic voltage (EEPROM) is not changed until a new setting is completed.

BLTouch – Smart V3.1

BLTouch Instruction	Center Of PWM (Available PWM Rage ±20)	G-code	x: Servo Pin or No.	
		Marlin / Duet	Repetier	Smoothieware
Push-pin Down (deploy)	647 ㎲ (10°)	M280 Px S10	M340 Px S647	M280 S3.24
Alarm Release & Touch SW Mode(M119)	1162 ㎲ (60°)	M280 Px S60	M340 Px S1162	M280 S5.81
Push-pin Up (Stow)	1473 ㎲ (90°)	M280 Px S90	M340 Px S1473	M280 S7.36
Self-test (10 Times)	1782 ㎲ (120°)	M280 Px S120	M340 Px S1782	M280 S8.9
EEPROM Conversion Request	1884 ㎲ (130°)	M280 Px S130	M340 Px S1884	M280 S9.42
EEPROM::5V Logic Zmin (Do not activate on 3.3V logic system)	1988 ㎲ (140°)	M280 Px S140	M340 Px S1988	M280 S9.94
EEPROM::Logic voltage Free Zmin (Return to default: Open Drain)	2091 ㎲ (150°)	M280 Px S150	M340 Px S2091	M280 S10.45
Alarm Release & Push-pin UP	2194 ㎲ (160°)	M280 Px S160	M340 Px S2194	M280 S10.97

※ Depending on your board, you can need to adjust the PWM range or Duty cycle.
※ EEPROM::5V Logic Zmin: Used with 130° when the Z probe input pin on the control board is not pull-up or has an abnormal input circuit.
☞ see Logic Voltage Conversion

Title	BLTouch Interface for GRBL		
Size	Number	Revision	
A4	-	B	
Date:	28.08.2019	Sheet 1 of 1	
File:	C:\Users\..\BLTouch_Interface.SchDoc	Drawn By: Tobias N.