pixhawk®

DS-009 Pixhawk Connector Standard

Revision: 0.1.0
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Abstract

This document is the formal version of the Pixhawk Connector industry standard that includes all aspects of the hardware standard required to build compatible products.

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Document Revisions

Revision	Editor	Reviewer	Comments
0.1.0	Lorenz Meier	Hamish Willee	Initial specification

Contact and Public Developer Call

This standard is being developed on a public developer call.
For further questions, please contact the maintainer of the standard, lorenz@px4.io.

Trademark Guideline

Pixhawk is a registered trademark and is used to mark and protect the consistent use of this standard. The requirements for this are covered in this document: Trademark Guideline

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Related Standards

- DS-010 Pixhawk Autopilot Bus
- DS-011 Pixhawk Autopilot v5X Standard

Connector Series

The Pixhawk connector standard is intended for in-vehicle, cross-PCB use. It uses the JST GH series which offers a latch lock mechanism at small size and a very competitive cost ($0.15 / 6 pos connector footprint in quantities).

- JST GH Series

External Connectors

Telemetry Port

This pinout should be used for any serial port. Ports not supporting hardware flow control should leave the CTS and RTS lines floating. Cables should be 1:1 to the peripheral and TX / RX as well as CTS / RTS should be crossed on the peripheral side (e.g. a radio modem would have its RX port on pin 2, TX port on pin 3, RTS on port 4 and CTS on port 5).

Pin	Signal	Volt
1 (red)	VCC	+5V
2 (blk)	TX (OUT)	+3.3V
3 (blk)	RX (IN)	+3.3V
4 (blk)	CTS (IN)	+3.3V
5 (blk)	RTS (OUT)	+3.3V
6 (blk)	GND	GND

Full GPS plus Safety Switch Port

This port is intended for combined serial plus I2C GPS units that include a safety switch and a user-facing LED.

Pin	Signal	Volt
1 (red)	VCC	+5V
2 (blk)	TX (OUT)	+3.3V
3 (blk)	RX (IN)	+3.3V
4 (blk)	I2C1 SCL	+3.3V
5 (blk)	I2C1 SDA	+3.3V
6 (blk)	SAFETY SWITCH IN	+3.3V
7 (blk)	SAFETY LED	+3.3V
8 (blk)	VDD_3V3 (powers switch and led)	+3.3V
9 (blk)	BUZZER (driven by a buzzer driver)	+5-24V
10 (blk)	GND	GND

Basic GPS port

This port is intended for combined serial plus I2C GPS units.

Pin	Signal	Volt
1 (red)	VCC	+5V
2 (blk)	TX (OUT)	+3.3V
3 (blk)	RX (IN)	+3.3V
4 (blk)	I2C1 SCL	+3.3V
5 (blk)	I2C1 SDA	+3.3V
6 (blk)	GND	GND

CAN

Recommended CAN transceivers: TJA1051TK3/118 or LTC2875. Ensure to twist the wires. Please refer to the UAVCAN specification, section 7.2 for further details.

Pin	Signal	Volt
1 (red)	VCC	+5V
2 (blk)	CAN_H	CAN high
3 (blk)	CAN_L	CAN low
4 (blk)	GND	GND

I2C port

Pin	Signal	Volt
1 (red)	VCC	+5V
2 (blk)	I2C SCL (1.5K pullup on autopilot)	+3.3V
3 (blk)	I2C SDA (1.5K pullup on autopilot)	+3.3V
4 (blk)	GND	GND

SPI port

This port is optional and for external SPI sensors.

Pin	Signal	Volt
1 (red)	VCC	+5V
2 (blk)	SPI_EXT_SCK	+3.3
3 (blk)	SPI_EXT_MISO	+3.3
4 (blk)	SPI_EXT_MOSI	+3.3
5 (blk)	!SPI_SS1	+3.3
6 (blk)	!SPI_SS2	+3.3
7 (blk)	GND	GND

Analog Power

The CURRENT signal should carry an analog voltage from 0-3.3V for 0-60A as default. For high-power units the range should be 0-3.3V for 0-120A. The VOLTAGE signal should carry an analog voltage from 0-3.3V for 0-50A as default.

The VCC lines have to offer at least 2.5A continuous and should default to 5.3V. A lower voltage of 5V is still acceptable, but discouraged.

Pin	Signal	Volt
1 (red)	VCC	+5.3V
2 (blk)	VCC	+5.3V
3 (blk)	CURRENT	+3.3V
4 (blk)	VOLTAGE	+3.3V
5 (blk)	GND	GND
6 (blk)	GND	GND

Internal Debug Connectors

IMPORTANT: The connector series used for the debug port is different to the rest of the connectors in this datasheet (JST SH series).

Pixhawk Debug Full

Pixhawk debug port (JST SM10B connector). The indicated voltage is nominal 3.3V, but for a target running at a lower voltage (e.g. 1.8V) the debug probe should shift its voltage to the target sense voltage. Up to 100 mA should be provided on TARGET PROCESSOR VOLTAGE so that debug adapters can drive their shifter / optocoupler directly from this line.

Pin	Signal	Volt
1 (red)	TARGET PROCESSOR VOLTAGE	+1.8V-3.3V
2 (blk)	CONSOLE TX (OUT)	+1.8V-3.3V
3 (blk)	CONSOLE RX (IN)	+1.8V-3.3V
4 (blk)	SWDIO	+1.8V-3.3V
5 (blk)	SWCLK	+1.8V-3.3V
6 (blk)	SWO	+1.8V-3.3V
7 (blk)	TRACE	+1.8V-3.3V
8 (blk)	TRACE	+1.8V-3.3V
9 (blk)	TRACE	+1.8V-3.3V
10 (blk)	GND	GND

Pixhawk Debug Mini

Pixhawk debug port (JST SM06B connector). The indicated voltage is nominal 3.3V, but for a target running at a lower voltage (e.g. 1.8V) the debug probe should shift its voltage to the target sense voltage. Up to 100 mA should be provided on TARGET PROCESSOR VOLTAGE so that debug adapters can drive their shifter / optocoupler directly from this line.

Pin	Signal	Volt
1 (red)	TARGET PROCESSOR VOLTAGE	+1.8V-3.3V
2 (blk)	CONSOLE TX (OUT)	+1.8V-3.3V
3 (blk)	CONSOLE RX (IN)	+1.8V-3.3V
4 (blk)	SWDIO	+1.8V-3.3V
5 (blk)	SWCLK	+1.8V-3.3V
6 (blk)	GND	GND