pixhawk®

Pixhawk Radio Interface Standard

Revision: 0.9.0
Revision date: Mar 22, 2022

Abstract

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

Table of contents

Document Revisions

Revision	Editor	Reviewer	Comments
0.1.0	Tanja Baumann	Nico van Duijn	Initial specification
0.5.0	Tanja Baumann	Ramon Roche	Submit for review before release
0.9.0	Tanja Baumann	Ramon Roche	Implement last review comments

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

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Pixhawk Radio Interface (PRI)

Executive Summary

Pixhawk Radio Interface is an open standard developed by the Pixhawk Special Interest Group during open collaboration hosted by the Dronecode Foundation and its member companies. The main goal is to provide a standard interface to facilitate communication between host systems (such as ground stations or autopilots) and radio modules.

The standard is based on open electrical and software interfaces to unify the interface to radio modules..

Both software and hardware interface specifications are listed in this document to allow adopters to create their full implementation on the electrical level. Adopters will get the benefit of plug-n-play interoperability if fully compliant with the standard.

Design Considerations

This interface is a mechanical and electrical system intended to be used for data link modules such as radios.

Hardware Interface

It has these main interfaces:

- 100 base-T Ethernet
- USB 2.0
- UART
- VCC_BAT needs to be between 10V (4S empty) and 20V

Power:

- Voltage: 10V-20V
- Max power rating: 20V / 13A burst (100 ms), 20V / 5A continuous (100W)

Expected standard use cases:

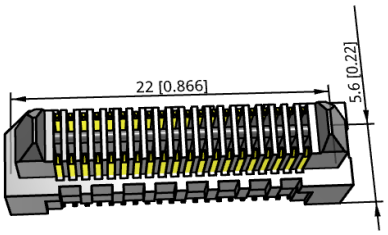
- Ethernet + Radio module (ETH + VBAT)
- USB + Radio module (USB + VBAT)
- USB + LTE module (USB + VBUS)

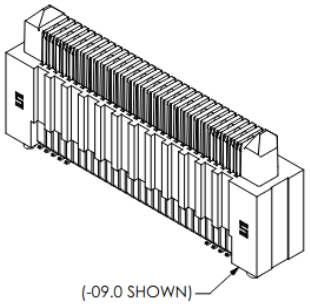
Signal Conventions:

The radio module bay on the ground station or the autopilot is defined as the host, whereas the radio module is the device. All pin definitions are listed from the perspective of the host. For example, UART_TX is an output from the ground station or autopilot and an input to the radio.

Connector PRI-40-100W

The 40-pin connector is SET (severe environment testing) qualified and designed for use in high-speed systems.





- Datasheet ERM8-020-XXX-X-DV: Product page

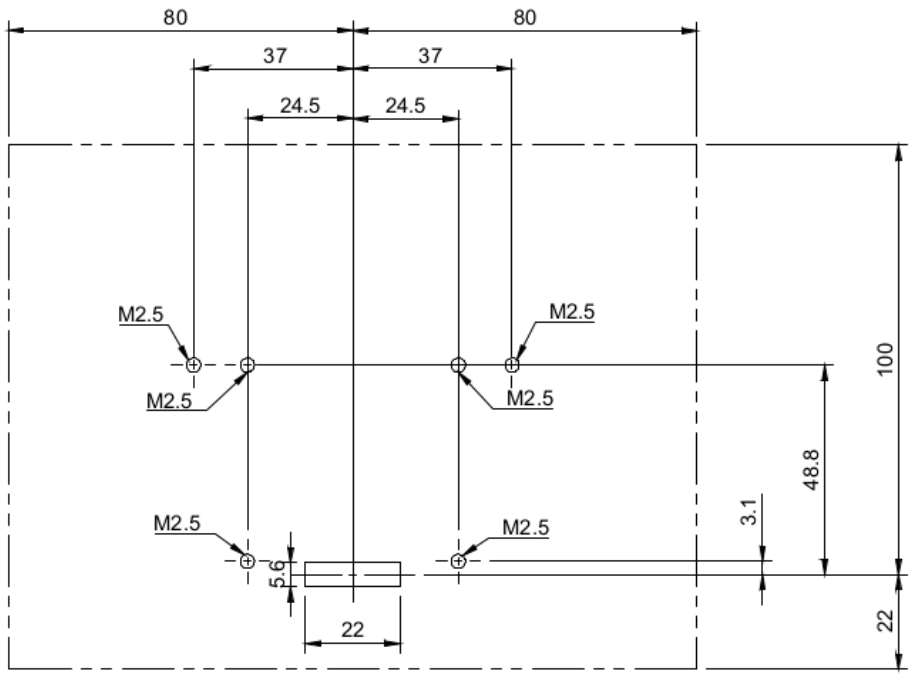
Pinout as seen from the host (ground station or autopilot):

GND	power	1	2	USB_VBUS	power
RSVD_USB_SSRX+	*input*	3	4	USB_P	I/O
RSVD_USB_SSRX-	*input*	5	6	USB_N	I/O
GND	power	7	8	GND	power
RSVD_USB_SSTX+	*output*	9	10	ETH_TX_D1+	output
RSVD_USB_SSTX-	*output*	11	12	ETH_TX_D1-	output
GND	power	13	14	GND	power
RSVD_ETH_BI_D3+	*I/O*	15	16	ETH_RX_D2+	input
RSVD_ETH_BI_D3-	*I/O*	17	18	ETH_RX_D2-	input
GND	power	19	20	GND	power
RSVD_ETH_BI_D4+	*I/O*	21	22	*SPARE*	
RSVD_ETH_BI_D4-	*I/O*	23	24	*SPARE*	
GND	power	25	26	*SPARE*	
SPARE		27	28	UART_TX	output
SPARE		29	30	UART_RX	input
RAD_nRST	output	31	32	UART_CTS	input
RAD_EN_OUT	output	33	34	UART_RTS	output
GND	power	35	36	VCC_BAT	power
GND	power	37	38	VCC_BAT	power
GND	power	39	40	VCC_BAT	power

Side	Upstream side	Device side
Part Number	ERM8-020-XXX-X-DV	ERF8-020-XXX-X-DV
Product Page	Samtech ERM8	Samtech ERF8

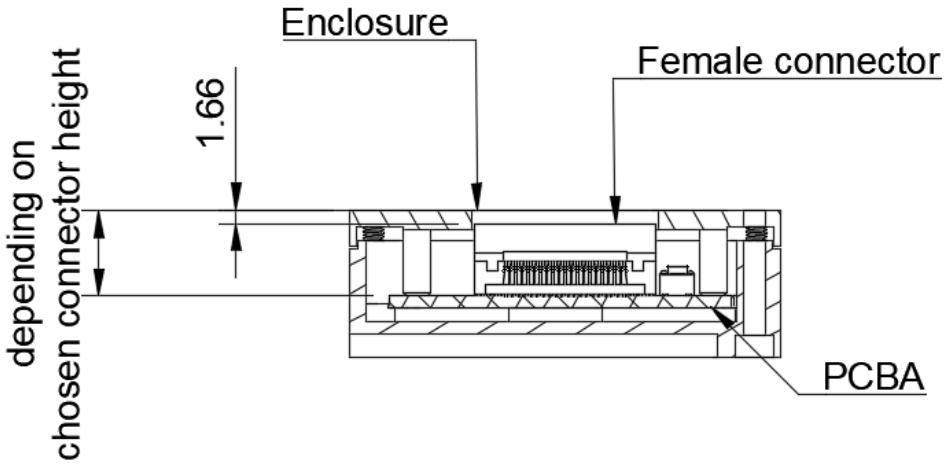
Mechanical Interface

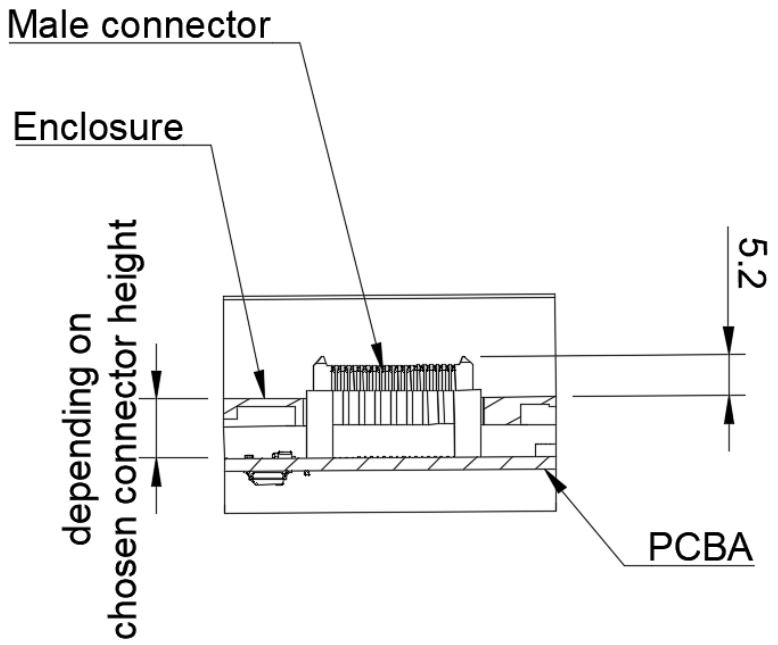
The mounting interface on the ground station as well as the drone side consists of 4 M2.5 mounting points. The location of the mounting holes in respect to the PRI connector is shown in the drawing below (numbers are in mm). The radio module can have a maximum size of 160mm x 122mm. The design of the radio module should be mountable using these mounting points, but not all of them need to be used. The outside measurements specify the absolute maximum dimensions of the radio module in each direction.



There are different connector heights available for the Pixhawk Radio Interface connectors. It is up to the manufacturer to choose which one suits the product best. In order to guarantee compatibility between all products the connector position with respect to the enclosure (if applicable) is included in the standard.

On the radio module side the connector is recessed into the enclosure by 1.66mm to ensure a clean product appearance. On the radio module bay side (ground station or drone) the connector protrudes the surface by 5.2mm.





Attribution

The Radio Interface Work Group created the Radio Interface Standard specification hosted within the Dronecode Foundation and led by Platinum Member Auterion, participating with partners who contributed their expertise in the field.

The Dronecode Foundation thanks the Work Group members who participated in creating the standard for the benefit of the Drone Industry.

Auterion, Doodle Labs, Silvus Technologies, Mobilicom, and Watts Innovations