Datasheet

Wren Mini

Features

- Fully integrated **RTK** module
- Embedded ArduPilot
- Open Source Hardware
- GNSS antenna and magnetometer
- Drone CAN interface
- LC29H Quectel RTK chip
- USB interface
- ESD protection diodes

Applications

- Drones
- **RTK**
- Ground vehicles
- Precise navigation

Description

Wren Mini is a fully integrated RTK module, primly designed for **GNSS** usage. It comes in a small enclosure (TODO insert dimension), with a multi band GNSS antenna and a magnetometer.

It is based on the Quectel **LC29H** module, and offers reliable and fast convergence to provide centimeter accuracy within seconds. **GPS**, **GLONASS**, **BEIDOU** and **GALILEO** signals are supported. The JSTGH connectors follow the CAN pinout of **px4** and **ardupilot** device and offer a **DroneCAN** interface.

Linnet is designed to work over a temperature range of -20 °C to +70 °C.

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Contents

List of Figures

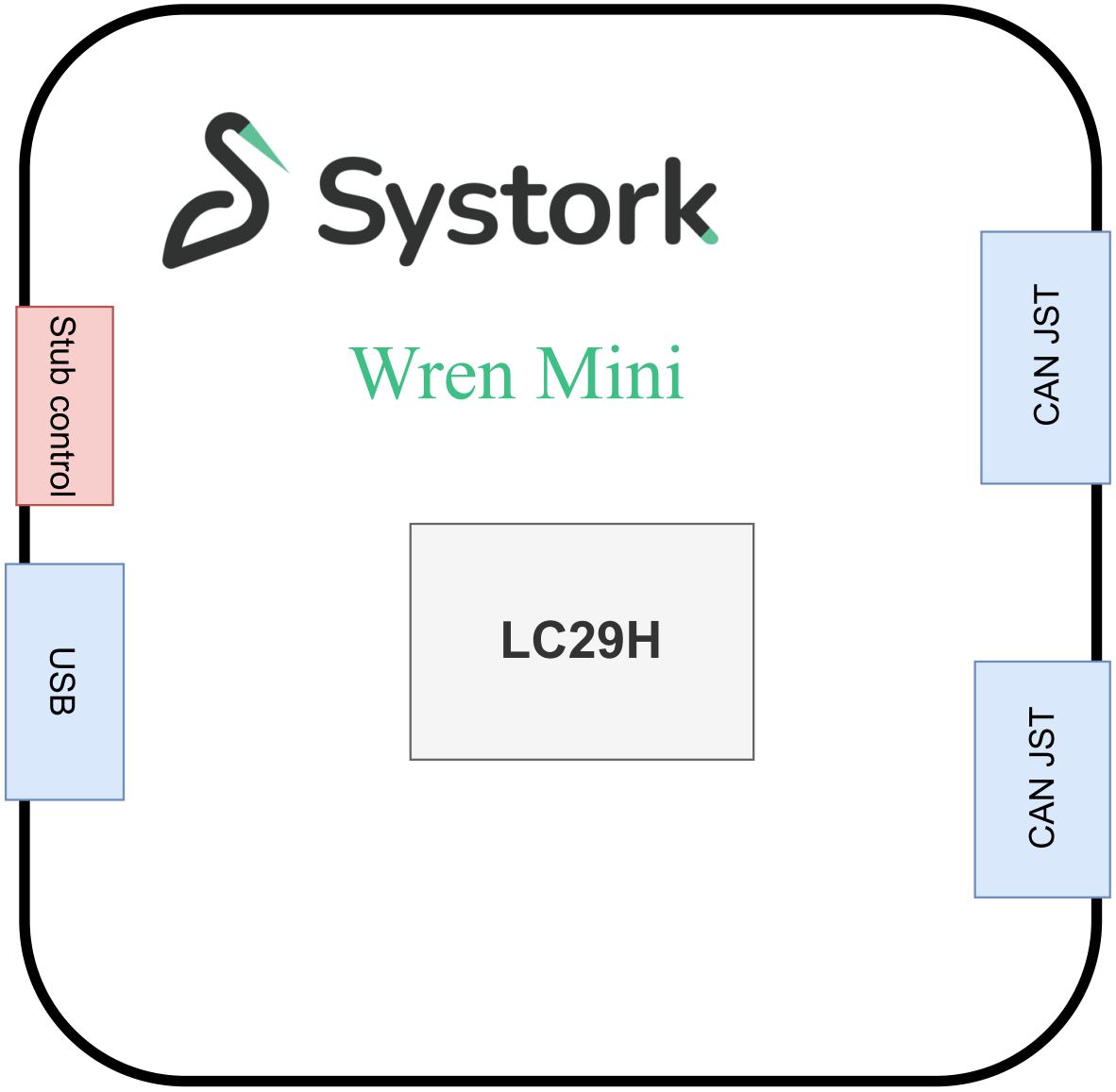
List of Tables

1 : Diagram and pin description

1.1 : Diagram

The following figure represent the different connectors from Wren Mini.

Figure 1: Wren Mini Diagram



1.2 : Pin description

Pinout follows the **JST-GH** standard.

Figure 2: JST-GH, pin 1

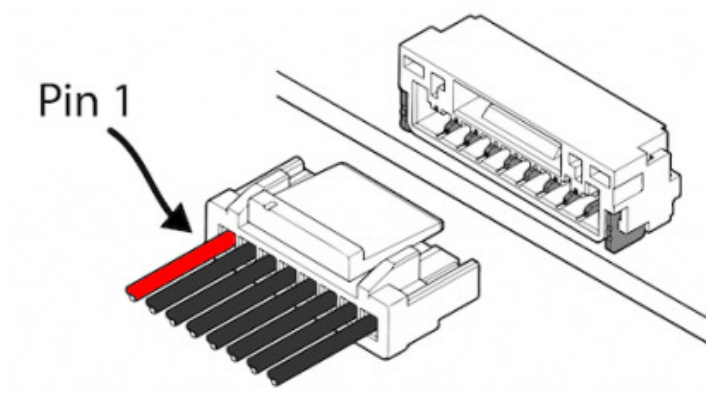


Table 1: Pinout configuration

	Pin	Name	Type	Function
DroneCAN	1	Vcc	P	5V input
	2	CANH	IO	UART1 receive
	3	CANL	IO	UART1 transmit
	4	GND	P	

2 : Electrical and mechanical specifications

The values for the following operating conditions have been specified at 25 °C ambient temperature.

Table 2: Electrical and mechanical specifications

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
V_{USB}	USB supply voltage	-	4.5	5.0	5.5	V
Vcc	Operating CAN voltage input	-	3.4	5.0	5.5	V
Vdd	Internal supply voltage	-	-	3.3	-	V
Idd	Current consumption	-	-	120	200	mA
T_{op}	Operating temperature	-	-20	-	+70	°C

3 : Absolute maximum rating

Stresses above those listed "absolute maximum ratings" may cause permanent damage to the device. This is a stress rating only and functional operation of the device under these conditions is **not** implied. Exposure to maximum rating operations for extended period may affect device reliability.

Table 3: Absolute maximum ratings

Symbol	Parameter	Maximum value	Unit
V_{USB}	USB supply voltage	-0.3 to +6	V
T_{op}	Operating temperature	-20 to +70	°C
T_{stg}	Storage Temperature	-40 to +80	°C

4 : GNSS

4.1 : Frequency band

Most of the standard GNSS frequency bands are supported

Table 4: Supported frequency band

GPS	L1C/A, L5
Glonass	L1CA
Galileo	E1, E5a
Beidou	B1i, B2a
QZSS	L1C/A, L5

4.2 : GNSS performance

All values for proper antenna and open sky conditions.

Table 5: GNSS performance

	Parameter	Value	Unit
RTK performance	Horizontal accuracy	1 + 1ppm CEP	cm
Maximum update rate	Position	10	Hz
Time to first fix	Convergence time	<10	s
Miscellaneous	Velocity accuracy	3	cm/s

5 : Communication interface

There are two interfaces on Wren Mini:

- DroneCAN interface, allowing the user to connect with the ardupilot microcontroller,
- USB interface, to update the LC29H firmware

5.1 : DroneCAN interface

The CAN interface follow the **DroneCAN** hardware recommendations. There are 2 JST-GH connectors, working with a 5V bus.
The stub control switch button allows the user to connect a 120 Ω resistor between CANH and CANL internally.

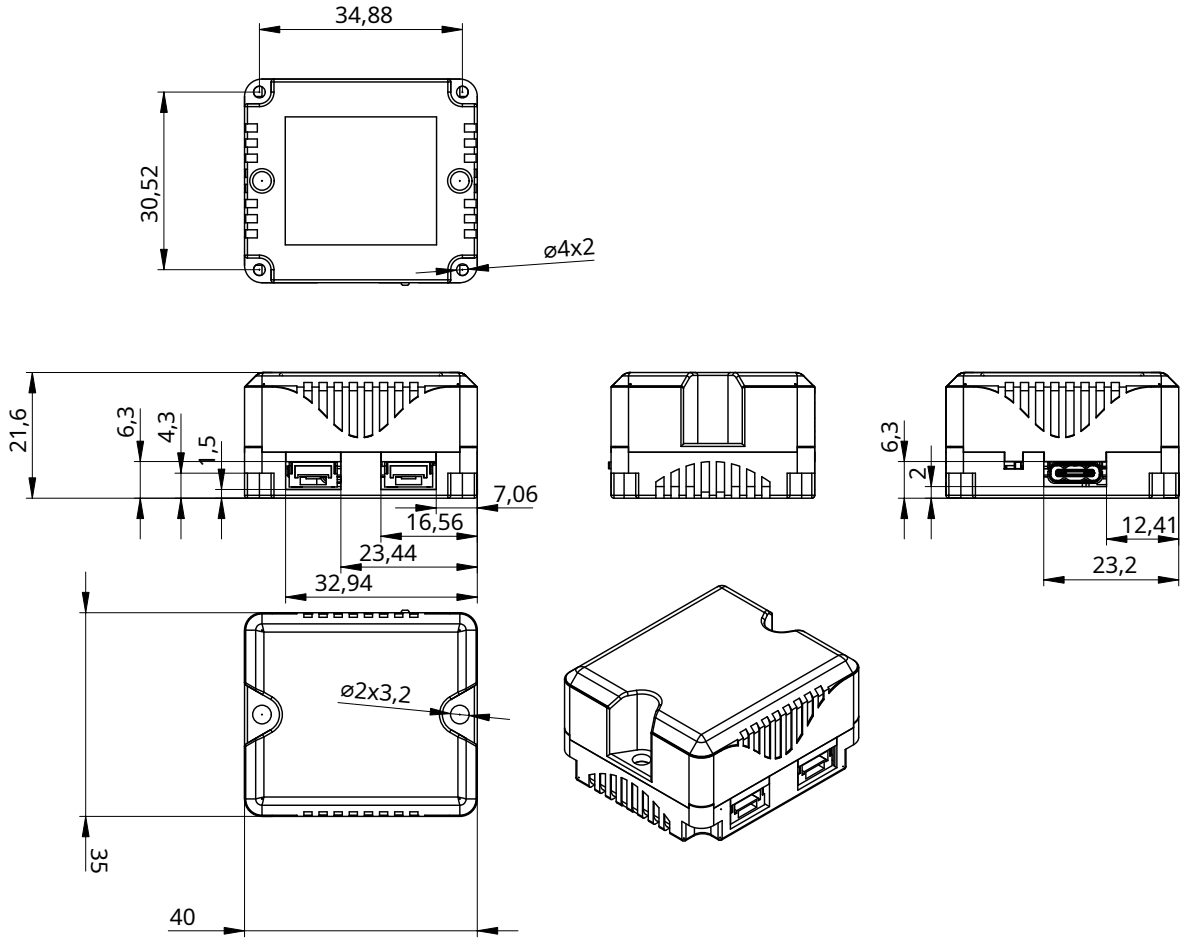
5.2 : USB device interface

The USB-C is configured in USB 2.0 (high speed, with a maximum of 480 Mbps).

6 : Mechanical drawing

All dimensions are given in millimeter.

Figure 3: Mechanical drawing



7 : Appendix

7.1 : Useful link

Quectel LC29H series web page
Systork forum

7.2 : Glossary

BeiDou BeiDou Navigation Satellite System. Chinese satellite-based navigation system. . 1

Galileo Galileo. European satellite-based navigation system. . 1

Glonass Globalnaya Navigatsionnaya Sputnikovaya Sistema. Russian satellite-based navigation system. . 1

GNSS Global Navigation Satellite System. Satellite-based positioning system (GPS, Glonass, Beidou...). . 1

GPS Global Positioning System. American satellite-based navigation system. . 1

JST-GH Standard wire-to-board connector. There are used on most of PX4 and ArduPilot devices. . 4

RTK Real Time Kinematic. Allows achieving centimeter-level accuracy using a base sending correction data with a GNSS module. . 1

8 : Revision History

Table 6: Document revision history

Date	Revision	Changes
29 October	1.0	Initial release