Datasheet

Linnet Mosaic X5

Features

- 5V-450mA power supply
- LED status: Timepulse / Power / **RTK**
- Timepulse and External interrupt
- USB and UART
- Gold plated connector
- ESD protection diodes

Applications

- Drones
- **RTK**
- Ground vehicles
- Precise navigation
- Automation of moving machinery

Description Linnet Mosaic x5 is a compact and high precision multi bands, multi frequencies **GNSS RTK** device.

It is based on the septentrio **Mosaic-X5** module, and offers reliable and fast convergence to provide centimeter accuracy within seconds. **GPS**, **GLONASS**, **BEIDOU** and **GALILEO** signals are supported. The JSTGH connectors pinout is compatible with most of **px4** and **ardupilot** device.

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

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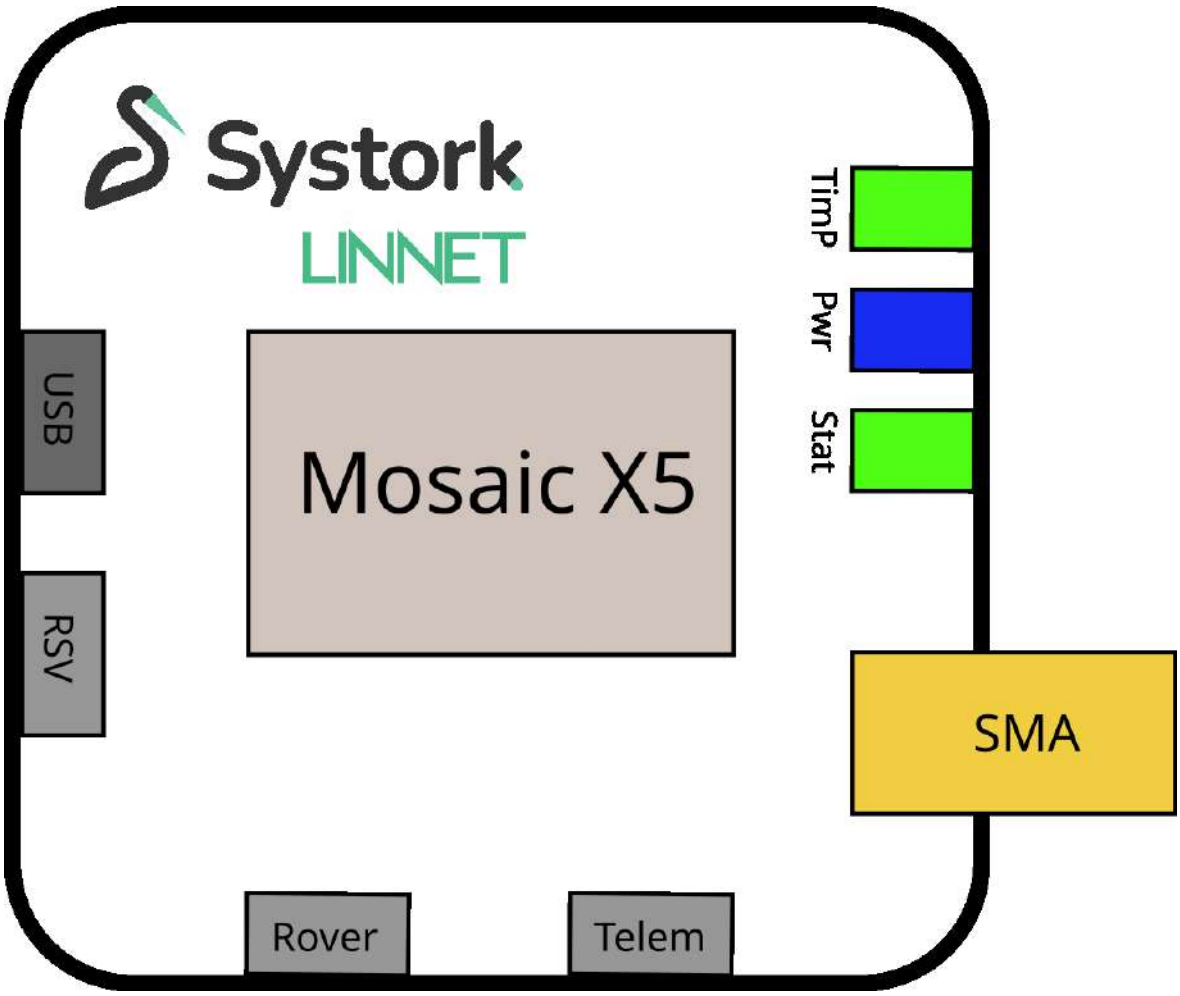
1 : Diagram and pin description

1.1 : Diagram

The following figure represent the different LEDs and connector from Linnet.

Figure 1: Linnet Diagram



1.2 : LED description

Table 1: LED sequence status

LED name	Color	Light sequence	Comment
Timepulse	Green	● ○ ● ○	Blinking LED when RTK fix is available
Power	Blue	● ● ● ●	Solid blue LED when powered ON
RTK Status	Green	○ ○ ○ ○	3D fix mode / No RTK fix
		● ○ ● ○	float RTK
		● ● ● ●	fixed RTK

1.3 : Pin description

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

Figure 2: JST-GH, pin 1

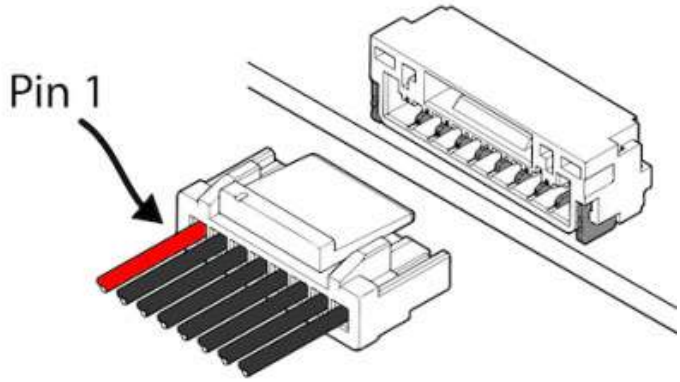


Table 2: Pinout configuration

	Pin	Name	Type	Function	
Rover	B1	5V	P	5V input	
	B2	RX1	I	UART1 receive	
	B3	TX1	O	UART1 transmit	
	B4	reserved	-		-
	B5	reserved	-		-
	B6	GND	P	Ground interface	
Telem	C1	5V	P	5V input	
	C2	TX2	O	UART2 transmit	
	C3	RX2	I	UART2 receive	
	C4	EXT	O	External interrupt	
	C5	TP	O	Timepulse	
	C6	GND	P	Ground interface	
RSV	-	reserved	-		-

2 : Electrical and mechanical specifications

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

Table 3: Electrical and mechanical specifications

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
V_{USB}	USB supply voltage	-	4.5	5.0	5.5	V
Vdd	Internal supply voltage	-	-	3.3	-	V
Vdd_{IO}	Supply voltage for I/O	-	-	3.3	-	V
Idd	Current consumption	-	160	210	450	mA
V_{il}	IO pin low level input voltage	-	0	-	1.0	V
V_{ih}	IO pin high level output voltage	-	2	-	Vdd	V
V_{ol}	IO pin low level output voltage	I_{ol} = 1mA	-	-	0.15	V
V_{oh}	IO pin high level output voltage	I_{oh} = 1mA	3.15	-	-	V
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 4: Absolute maximum ratings

Symbol	Parameter	Maximum value	Unit
V_{USB}	USB supply voltage	-0.3 to +6	V
Vdd	Internal supply voltage	-0.3 to 3.6	V
Vdd_{IO}	I/O pins supply voltage	-0.3 to Vdd + 0.5	V
$PwrRF_{IN}$	Input power at RF_{IN}	20	dBm
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 5: Supported frequency band

GPS	L1C/A, L1PY, L2C, L2P, L5
Glonass	L1CA, L2CA, L2P, L3 CDMA
BeiDou	B1I, B1C, B2a, B2b, B2I, B3
Galileo	E1, E5a, E5b, E5 AltBoc, E6
QZSS	L1C/A, L1 C/B, L2C, L5
Navic	L5
SBAS	Egnos, WAAS, GAGAN, MSAS, SDCM (L1, L5)

4.2 : GNSS performance

All values for proper antenna and open sky conditions.

Table 6: GNSS performance

	Parameter	Value	Unit
RTK performance	Horizontal accuracy	0.6 + 0.5ppm CEP	cm
	Vertical accuracy	1 + 0.5ppm CEP	cm
	Initialization time	7	s
Tracking performance	Tracking	20	dB-Hz
	Acquisition	33	dB-Hz
Maximum update rate	Position	100	Hz
	Measurements only	100	Hz
Time to first fix	Cold start	<45	s
	Warm start	<20	s
	Re-acquisition	1	s
Time precision	xPPS out	5	ns
	Event accuracy	<20	ns
Miscellaneous	Velocity accuracy	3	cm/s
	Latency	<10	ms

5 : Communication interface

There are several communications interfaces including UART and USB. All the inputs have internal pull-up resistors in normal operation and can be left open if unused. All the PIOs are supplied by Vdd, therefore all the voltage levels of the PIO are related to the Vdd supply voltage.

5.1 : UART interface

There are two UART interfaces: UART1 on the *Rover* connector, and UART2 on the *telem* connector. UART1 and UART2 have configurable baud rates.

Hardware flow control is not supported.

The UART settings (baud rate etc.) are set with the **setCOMSettings** user command. The maximum baud rate is 4 Mbits/s.

5.2 : USB device interface

The USB-C is configured in USB 2.0 (high speed, with a maximum of 480 Mbps). This product emulates two virtual serial and USB/IP ports to facilitate communication. By utilizing the USB/IP port, users can access access the internal Web Server configurator of mosaic.

To connect your Web Browser to the Mosaic Web Server:

- Connect Linnet using the provided USB port
- Open your preferred Web Browser and enter the following URL : **http://192.168.3.1**

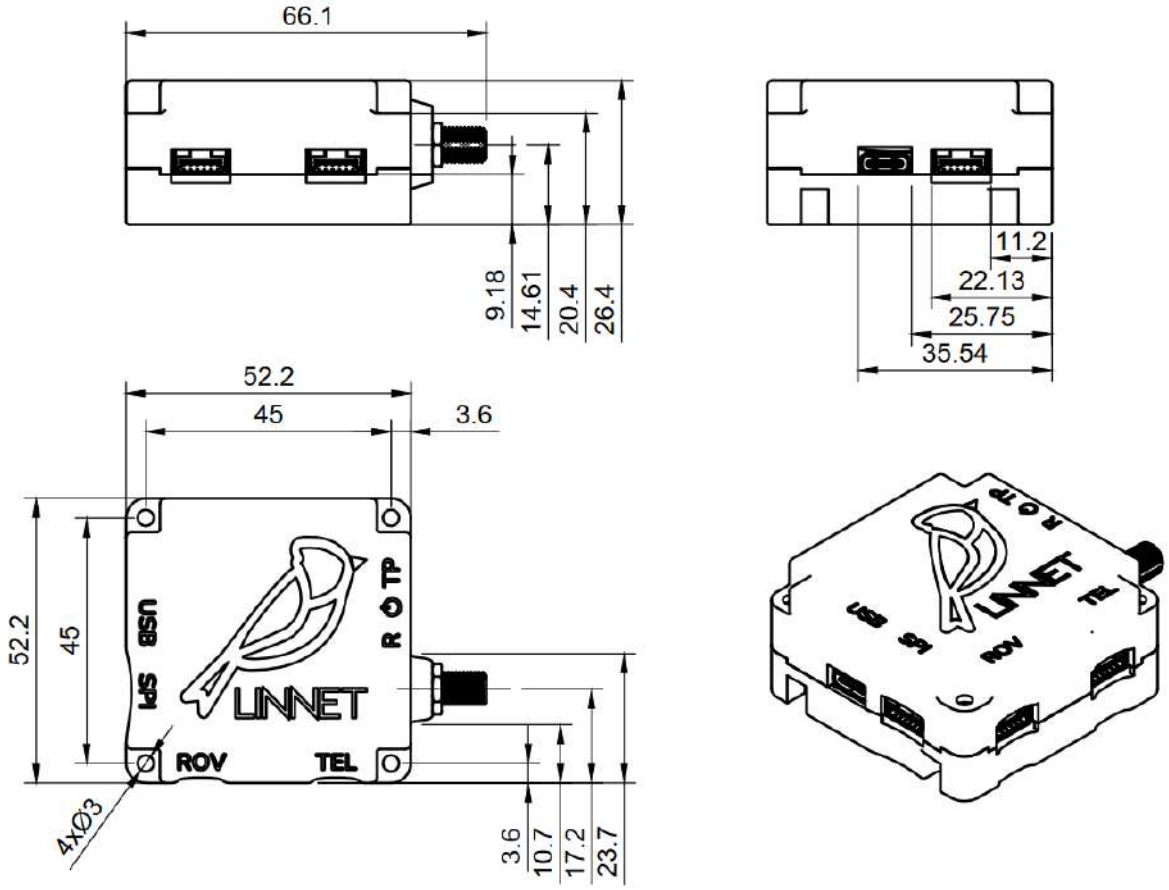
6 : Jamming protection

Septentrio provide the **AIM+** technology on his Mosaic-X5 module, offering great resistance against radio interferences and GNSS jamming and spoofing. In particular, some advanced GNSS signal generator ban de identified as "non-authentic" signal. These protections can be configured using the web-interface.

7 : Mechanical drawing

To facilitate mounting on a drone or another platform, Linnet features 4 screw passages located at the corners.

Figure 3: Mechanical drawing



8 : Appendix

8.1 : Useful link

septentrio mosaic-X5 web page
septentrio AIM+ jamming protection
Systork forum

8.2 : Glossary

9 : Revision History

Table 7: Document revision history

Date	Revision	Changes
8 February 2024	1.0	Initial release