
*Delivers centimeter level accuracy within seconds based on U-blox triple-band L1/L2/L5 **ZED-F20P** GNSS RTK module.*

Datasheet - In Production



Features

- 3.3V - 100mA power supply
- LEDs status: Power/RTK/PPS
- Timepulse & External Interrupt
- USB/I²C/UART digital interfaces
- Gold plated mPCIe connector
- 3.3V Active antenna input

Applications

- Drones
- RTK Base
- Ground vehicles
- Precise navigation

Description

The Siderion **SP0702** is an affordable, compact, and high-precision triple-band L1/L2/L5 GNSS RTK (Real-Time Kinematic) device.

Powered by the latest generation of u-blox **ZED-F20P** modules, the SP0701 supports concurrent reception of GPS, Galileo, BeiDou, QZSS, and NavIC signals. Consequently, the device delivers reliable performance and fast convergence, achieving centimeter-level accuracy in seconds.

Its mini PCI Express (mPCIe) interface makes it ideal for integration within embedded systems, drones, industrial tablets, ruggedized laptops, and other compact computing platforms.

The SP0702 operates across a temperature range from -40°C to +70°C.

Table 1. Device summary

Order ref code	Temperature [°C]	Product size [mm]	Weight [g]
SID-GNSS-RTK-SP0702	-40 to +70	51.0 x 30.0 x 5.0	18

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1. Block diagram and pin description

1.1 Block diagram

Figure 1. SP0702 block diagram & connectivity

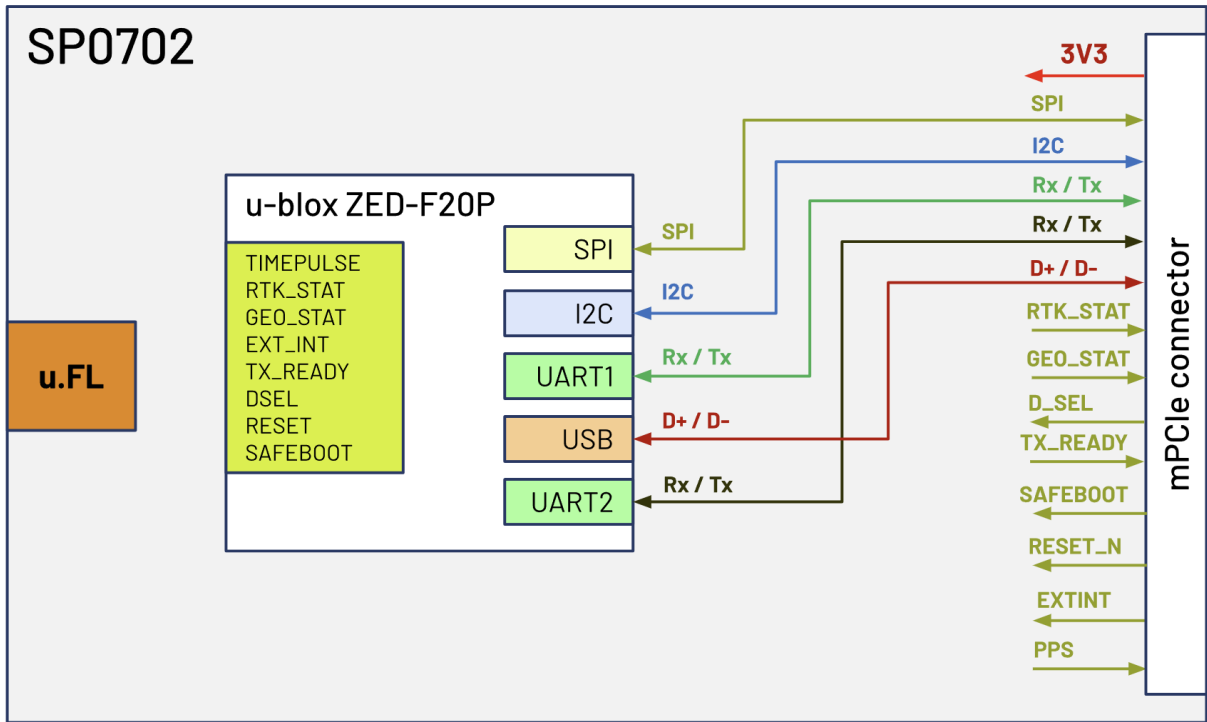
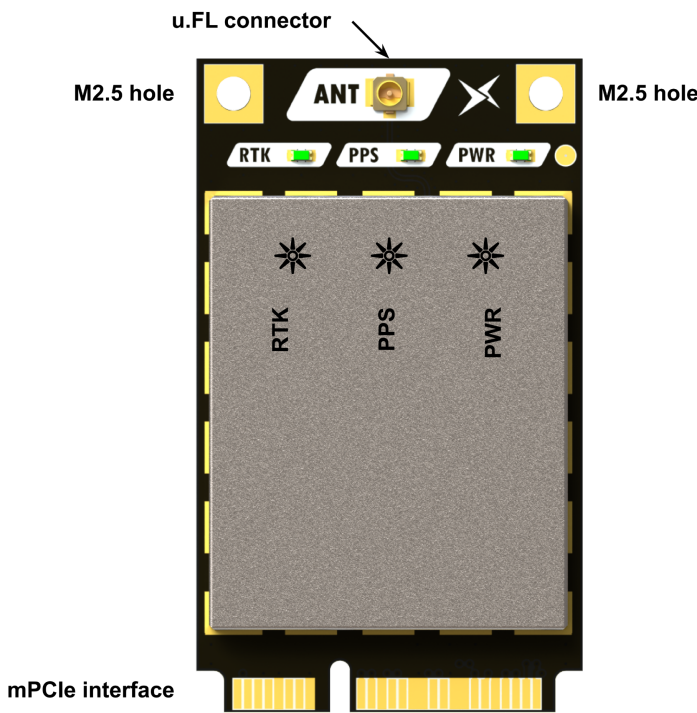


Figure 2. SP0702 top view



1.2 LED description

Table 2. SP0702 LED sequence status

LED name	Color	Light sequence	Comment
Timepulse	Green		Blinking LED at the defined PPS rate
Power	Blue		Solid blue LED when powered ON
RTK Status	Green		3D fix mode / No RTK fix
			RTK fix but no FIXED RTK fix
			FIXED RTK fix

1.3 Pin description

Figure 3. SP0702 mini PCI-Express (mPCIe) pinout

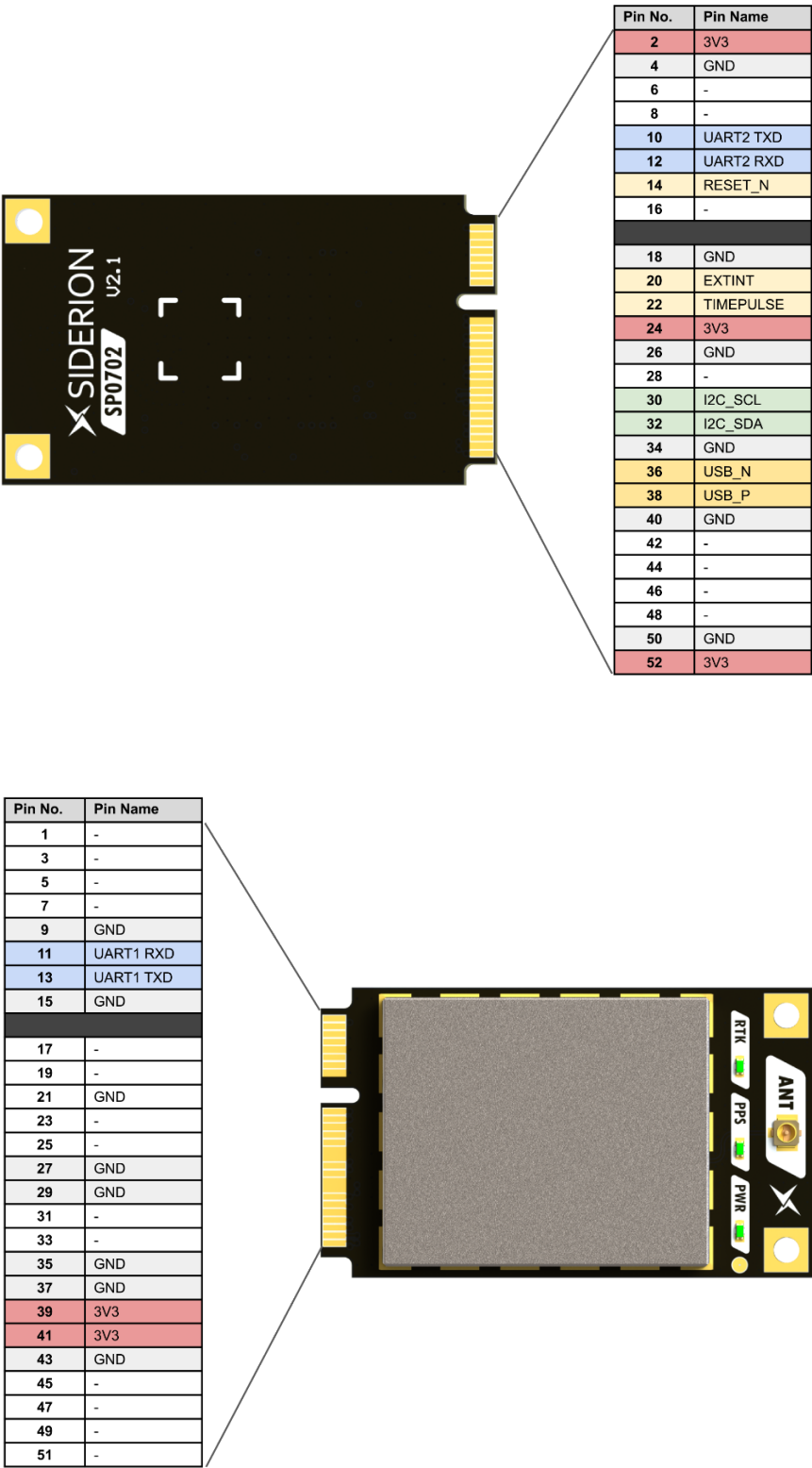


Table 3. Pinout configuration

Pin n°	Bottom		Pin n°	Top
2	3V3		1	-
4	GND		3	-
6	-		5	-
8	-		7	-
10	UART2 TXD		9	GND
12	UART2 RXD		11	UART1 RXD
14	RESET_N		13	UART1 TXD
16	-		15	GND
Mechanical Key				
18	GND		17	-
20	EXTINT		19	-
22	TIMEPULSE		21	GND
24	3V3		23	-
26	GND		25	-
28	-		27	GND
30	I2C_SCL		29	GND
32	I2C_SDA		31	-
34	GND		33	-
36	USB_N		35	GND
38	USB_P		37	GND
40	GND		39	3V3
42	-		41	3V3
44	-		43	GND
46	-		45	-
48	-		47	-
50	GND		49	-
52	3V3		51	-

2. Absolute maximum ratings

Stresses above those listed as “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 conditions for extended periods may affect device reliability.

Table 4. SP0701 absolute maximum ratings

Symbol	Parameter	Maximum value	Units
Vdd	Internal supply voltage	-0.5 to +3.6	V
Vdd_IO	I/O pins supply voltage	-0.5 to Vdd+0.1	V
Icc_RF	RF output current	300	mA
Prfin	Input power at RF_IN	10	dBm
W	Product weight	18	g
TOP	Operating temperature	-40 to +70	°C
TSTG	Storage temperature	-40 to +80	°C



This device is sensitive to electrostatic discharge (ESD), improper handling can cause permanent damage to the part.

3. Specifications

3.1 Ublox ZED-F20P specifications

Table 5. ZED-F20P mechanical and electrical specifications

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Units
Vdd	Internal supply voltage			3.3		V
Vdd_IO	Supply voltage for I/O			3.3		V
Idd	Current consumption	w/o active antenna		50		mA
		w/ active antenna		130		mA
Vdd_RF	Output RF voltage			Vdd-0.1		V
Idd_RF	Output RF current			50		mA
Vil	IO pin low lvl input volt		0		0.8	V
Vih	IO pin high level input voltage		2		Vdd +0.3	V
Vol	IO pin low level output voltage	Iol = 1mA			0.4	V
Voh	IO pin high level output voltage	Ioh = 1mA	Vdd-0.4			V
Top	Operating temperature		-40		+70	°C
I2Cadd	Default 7bit I ² C address	0b0100010 (0x42)				

Table 6. ZED-F20P general performance

Parameter	Specifications	Value
Receiver type	Multi-band GNSS high precision	
Accuracy of Timepulse	RMS	30 ns
Frequency of Timepulse		0.25 Hz to 10 MHz
Operational limits	Dynamics Altitude Velocity	< 4g 80,000 m 500 m/s
Velocity accuracy		0.03 m/s

Table 7. ZED-F20P performance in different GNSS mode

GNSS	Parameter	GPS+GAL+BDS	GPS+BDS	GPS+GAL	GPS
Acquisition	Cold start Hot start Aided start	25 s 2 s 2 s	-	-	-
Update rate	RTK PVT RAW	25 Hz 25 Hz 25 Hz	-	-	-
Convergence time	RTK	< 7 s	-	-	-
Horizontal pos. accuracy	PVT RTK	1.2 m CEP 0.006 m + 1ppm CEP	-	-	-
Vertical pos. accuracy	RTK	0.01 m + 1ppm CEP	-	-	-
Sensitivity	Tracking & Nav. Reacquisition Cold start Hot start	-167 dBm -160 dBm -148 dBm -158 dBm	-	-	-

Table 8. ZED-F20P supported GNSS constellations and signals

System	Signal	Frequency
GPS	L1C/A L2C L5	1575.420 MHz 1227.600 MHz 1176.450 MHz
Galileo	E1-B/C E5a	1575.420 MHz 1176.450 MHz
BeiDou	B1I B1C B2a	1561.098 MHz 1575.420 MHz 1176.450 MHz
QZSS	L1C/A, L1C/B L2C L5	1575.420 MHz 1227.600 MHz 1176.450 MHz
NavIC	L1-SPS Data L5-SPS	1575.420 MHz 1176.450 MHz

4. Applications

4.1 Standalone configuration

5. Communication interfaces

There are several communication interfaces, including UART, I2C, and USB. All inputs have internal pull-up resistors in normal operation and can be left open if not in use. All the PIOs are supplied by VCC, therefore all the voltage levels of the PIO pins are related to Vdd supply voltage.

5.1 UART Interface

There are two UART interfaces: UART1 and UART2. UART1 and UART2 operate up to and including a speed of 8 Mbaud. No hardware flow control on UART1 and UART2 is supported.

Figure 4. UART chronogram specifications

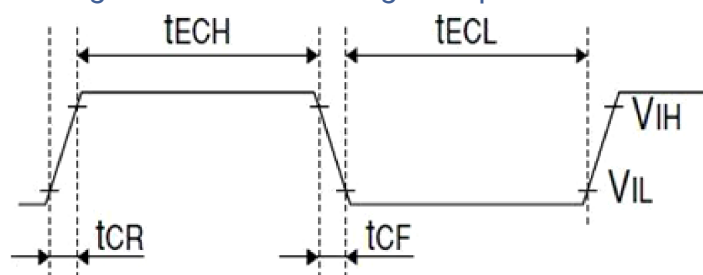
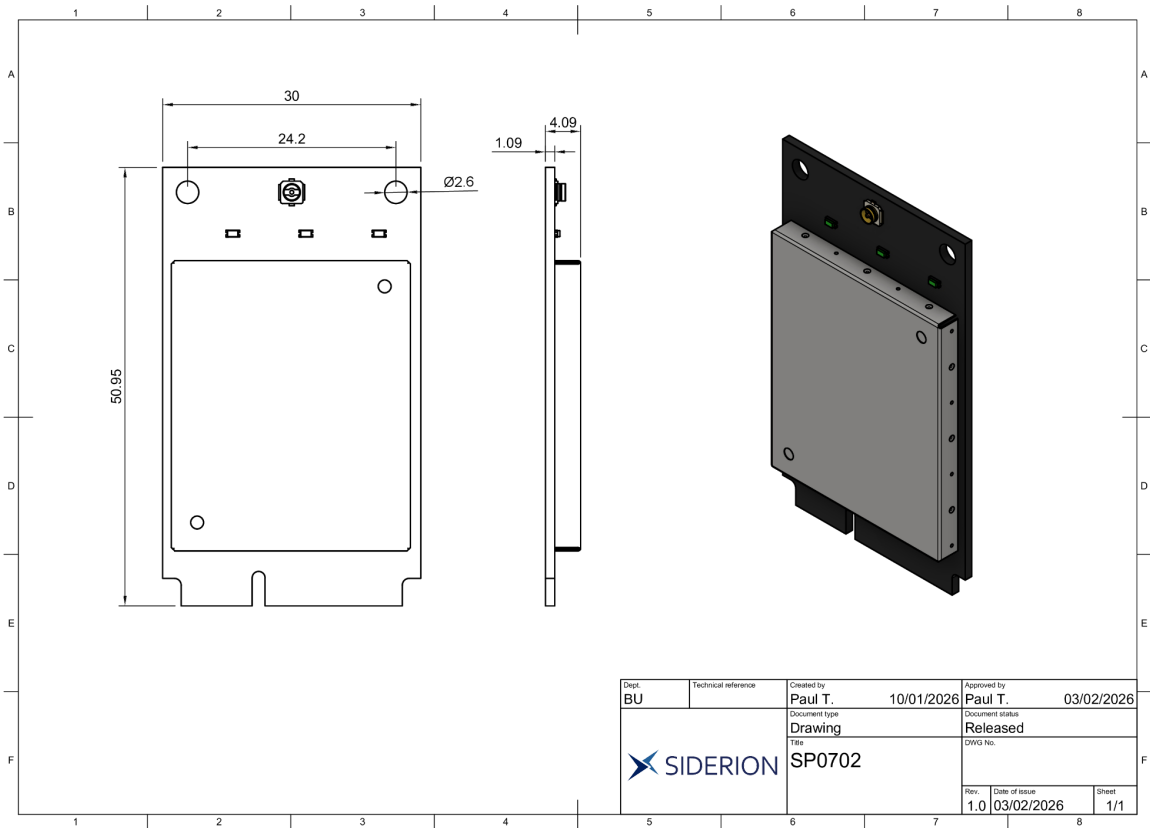


Table 9. ZED-F20P serial UART timing specifications

Symbol	Parameter	Min.	Max.	Units
V_{IL}	LOW-LEVEL input voltage	0	$0.2 \times V_{DD}$	V
V_{IH}	HIGH-LEVEL input voltage	$0.7 \times V_{DD}$	$V_{DD} + 0.3$	V
t_{ECH}	HIGH period of external data input	0	0.4	μs
t_{ECL}	LOW period of external data input	TBA	TBA	μs
R_u	Baudrate	4800	8	Mbps
t_{CR}	Rise time of data		5	ns
t_{CF}	Fall time of data		5	ns

6. Mechanical drawings

Figure 6. SP0702 v1.0 mechanical drawings



7. Revision history

Table 11. Document revision history

Date	Revision	Changes
06-Feb-2026	1.0	SiderionDoc_SP0702 / Initial release
26-May-2026	1.1	Figure 1 - Block Diagram added

8. Appendix

U-blox ZED-F20P datasheet: [ZED-F20P-00B Data sheet](#)

U-blox ZED-F20P integration manual: [ZED-F20P Integration manual](#)

U-blox ZED-F20P interface description: [u-blox F20 HPG 2.02 Interface description](#)

Siderion user's guide:

Siderion tutorials:

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