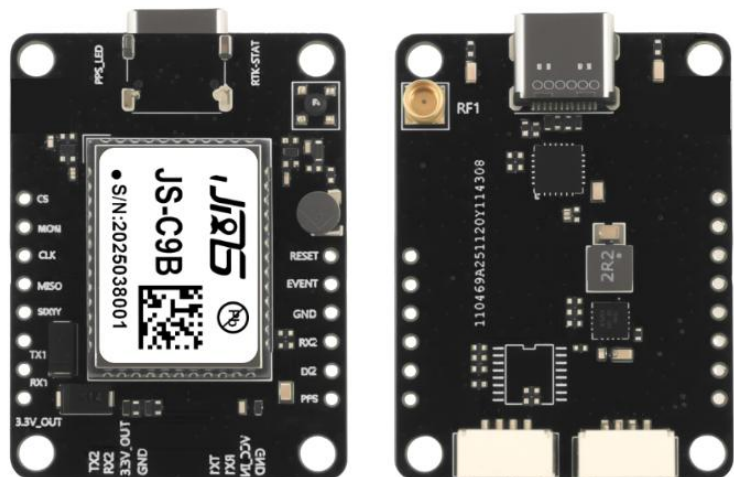


JS-BCK43-2

Multi-constellations,multi-frequencies RTK board

Datasheet



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1 Function descriptions

1.1 Overview

JS-BCK43-2 is a high-precision multi-frequency multi-constellation GNSS board. Its core advantage lies in its high-performance inertial navigation device, which provides continuous and robust auxiliary positioning support even in complex scenarios with weak or even transient satellite signal loss, ensuring positioning continuity. The device fully supports signal tracking from mainstream satellite navigation systems such as BDS-2, BDS-3, GPS, GLONASS, Galileo, and QZSS, integrating efficient combined navigation algorithms to further improve positioning accuracy and stability. It also features advanced anti-interference technology, effectively resisting interference from complex electromagnetic environments. With these core characteristics, the JS-BCK43-2 can be widely used in professional fields such as surveying and mapping, monitoring, outdoor robot control, and precision engineering operations etc...

1.2 Product features

- High performance chip
- Onboard inertial navigation devices
- Support combined navigation algorithms
- Support multi-frequencies full system positioning
- Support multi constellation multi frequencies tracking
- Flexible to use and easy to integrate
- Support NMEA 0183 protocol, RTCM2.X,3.X, CMR (GPS)
- It has the ability to suppress potential narrowband and single-tone radio interference signals within the GNSS signal band, with an interference-to-signal ratio of up to 60dB.
- Best in its same grade SWaP(size,weight and power)
- Small size (39.00mm*30.00mm*6.04mm±0.2mm) , lightweight<25g, Suitable for relatively compact spaces
- Orientation accuracy 0.2°@1m base line
- RTK positioning accuracy up to millimeter

1.3 Performance index

Parameter		Descriptions
Constellations & frequency band ¹		■BDS-2:B1I, B2I, B3I ■GPS:L1C/A ,L2P, L5,L1C ■GLONASS:G1,G2,G3¹ ■SBAS:L1C/A,L5 ■L-Band¹ ■BDS-3:B1I,B1C, B2a, B2b, B3I ■NavalC:L5¹ ■QZSS:L1C/A, L1C, L2C, L5 ■Galileo:E1, E5a, E5b,E5 ALTBoC¹,E6c¹
Tracking performance(C/N0 threshold)		Signal tracking sensitivity -160dBm Signal acquisition sensitivity -145dBm
Positioning time		Cold start 20s Hot start (use RTC) 10s Re-acquisition 1s
Accuracy of measurement		Pseudorange accuracy 10cm Carrier phase accuracy 1mm
Accuracy	PPS(RMS): time accuracy	20ns
	SPP:Standard single point positioning accuracy	Horizontal: 1.5m Elevation: 3m
	Velocity accuracy	0.02m/s
	Auxiliary dead reckoning (tolerance)	3% ^{d 2}
PPP(precise point positioning)	PPP initial time	20 min
	PPP accuracy	Horizontal: 0.1m Elevation: 0.2m
RTK	RTK initial time	5s ($d^2 < 10\text{km}$)
	Initial confidence	99.9%
	RTK accuracy	Horizontal: 8mm+1ppm ³ Elevation: 15mm+1ppm ³
IMU(inertial sensor)	Gyroscope	Measuring range: $\pm 125^\circ/\text{s}$
		Zero bias repeatability: 0.5°/s
		Zero bias stability: 5°/h

Angle random walk: $0.12^{\circ}/\sqrt{h}$

	Accelerometer	Measuring range: $\pm 2g$
		Zero bias repeatability: 20mg
		Zero bias stability: 50ug
		Speed random walk: $0.07m/s/\sqrt{h}$
Data update rate	Default 10Hz	
Max data update rate	Single point positioning: 50Hz	
	RTK: 50Hz	
	IMU: 100Hz	
Baud rate	9600~921600bps (default 115200bps)	
Anti-interference	It has the ability to suppress potential narrowband and single-tone radio interference signals within the GNSS signal band, with an interference-to-signal ratio of up to 60dB.	

✎1 Adjusted along with the version

✎2 d represent the distance traveled

✎3 1ppm increase per kilometer 1mm tolerance

1.4 Protocol descriptions

Output data format	Type
NMEA 0183 protocol	GPGGA,GPGSV,GPGLL,GPGSA,GPGST,GPHDT,GPRMC,GPVTG,GPZDA etc.
Binary format	User-defined binary
RTCM2.X	RTCM1,RTCM3,RTCM9,RTCM1819,RTCM31,RTCM41,RTCM42
RTCM3.X	1004~1008,1012,1019,1020,1033,1042,1045/1046,1230,4078 MSM3~MSM7: 1073~1077, 1083~1087, 1123~1127, 1093~1097
CMR (GPS)	CMROBS,CMRRREF

1.5 Antenna

JS-BCK43-2, single antenna board, Positioning can be achieved by simply connect RF1

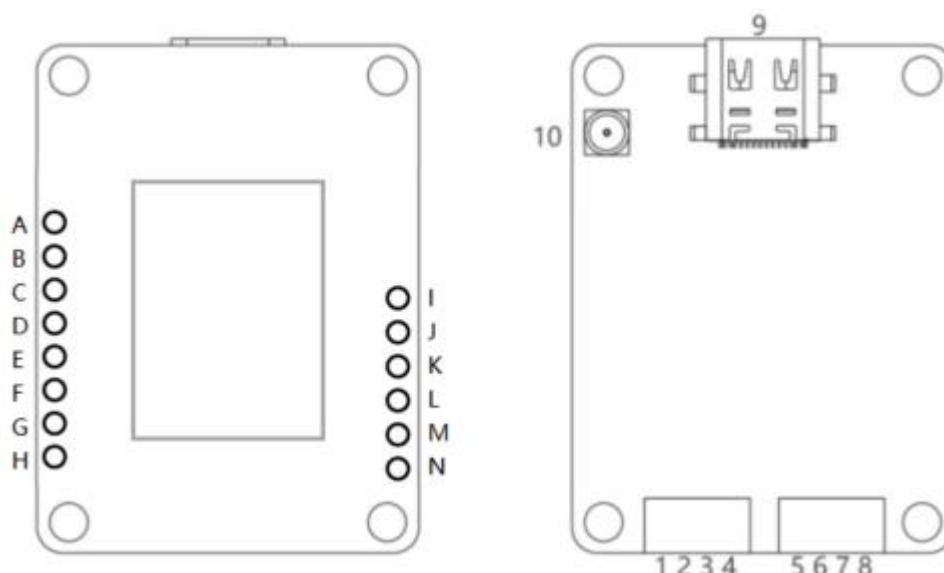
Antenna parameter	Impedance matching	Antenna gain
Best input gain	50Ω	20~35dB

1.6 Product application

- Outdoor robot control
- Intelligent logistics scheduling
- Surveying & mapping
- Monitor logistics
- Precision engineering operation
- Intelligent lawn mower
- Drones
- Vehicle devices application

2 Pin definitions

2.1 Pin assignment

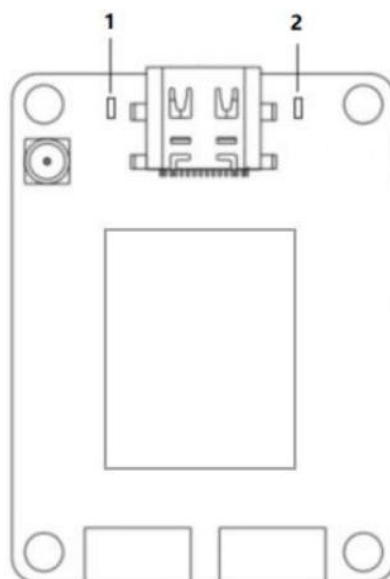


No.	Name	Input/output	Descriptions
1	GND	-	Ground
2	VCC_IN	Input	GNSS power supply 3.5-12.0V conventional 5V power supply
3	RX1	Input	Serial port 1 GNSS receive data
4	TX1	output	Serial port 1 GNSS transmitter data
5	GND	-	Ground
6	3.3V_OUT	output	3.3V It can be used to power other devices.
7	RX2	Input	Serial port 2 GNSS receive data
8	TX2	output	Serial port 2 GNSS transmitter data
9	USB	Input/output	TYPE-C power supply+data transmission
10	RF1	Input	GNSS main antenna connect port, use for positioning, power supply voltage 3.0-5.5V

A	CS	Input/output	Optional
B	MOSI	output	GNSS transmitter data
C	CLK	output	Synchronization Timing
D	MISO	Input	GNSS receive data
E	SDRY	Input	Indicates slave device status, triggers master control to read
F	TX1	output	Serial port 1 GNSS transmitter data
G	RX1	Input	Serial port 1 GNSS receive data
H	3.3V_OUT	output	3.3V It can be used to power other devices.
I	RESET	output	Reset
J	EVENT	output	External interrupt triggered
K	GND	-	Ground
L	RX2	Input	Serial port 2 GNSS receive data
M	TX2	output	Serial port 2 GNSS transmitter data
N	PPS	output	Second pulse

✎1 JS-BCK43-2 it is single antenna board, if need double antenna, please reference the JS-BCK43H-3 double antenna data sheet.

2.2 Indicator

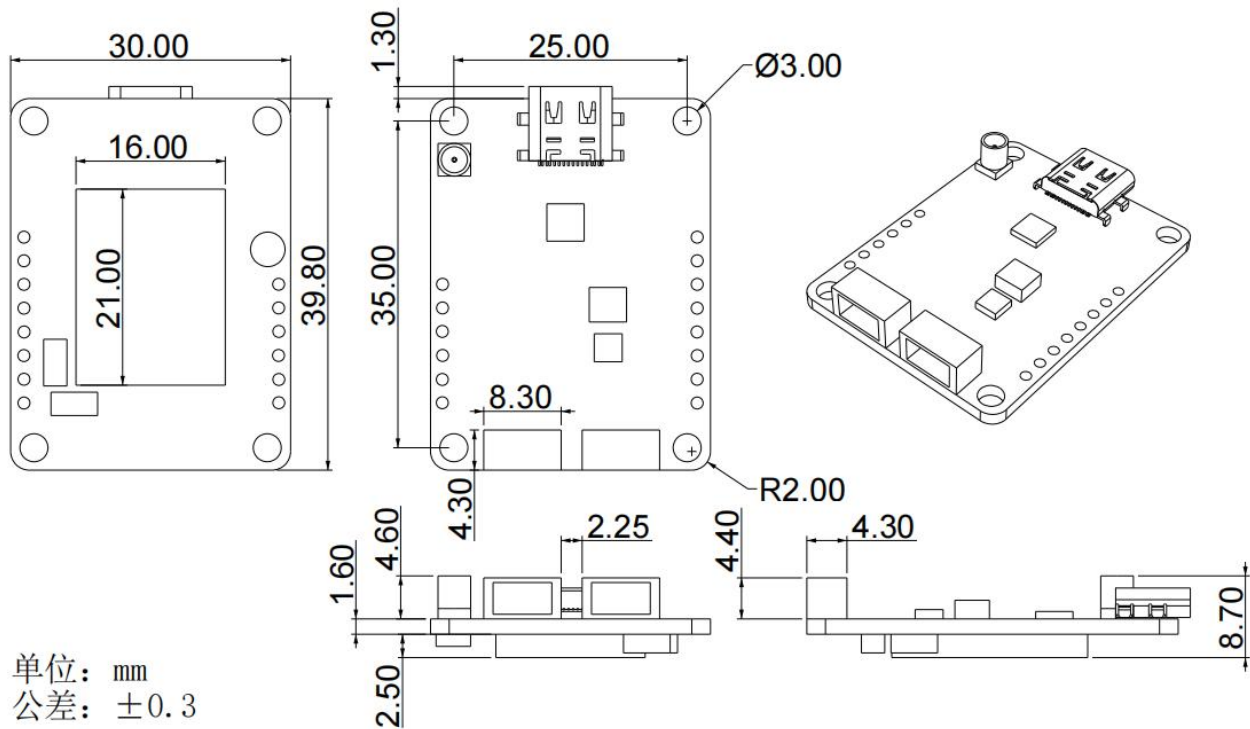


No.	Name	Color	Description
1	RTK	Green	When receiving or sending differential signals, it outputs a high-level pulse, and the light stays on; in other states, it outputs a low level, and the light flashes.
2	PPS	Green	Second pulse, Flash once per second after positioning

3 Electrical characteristics

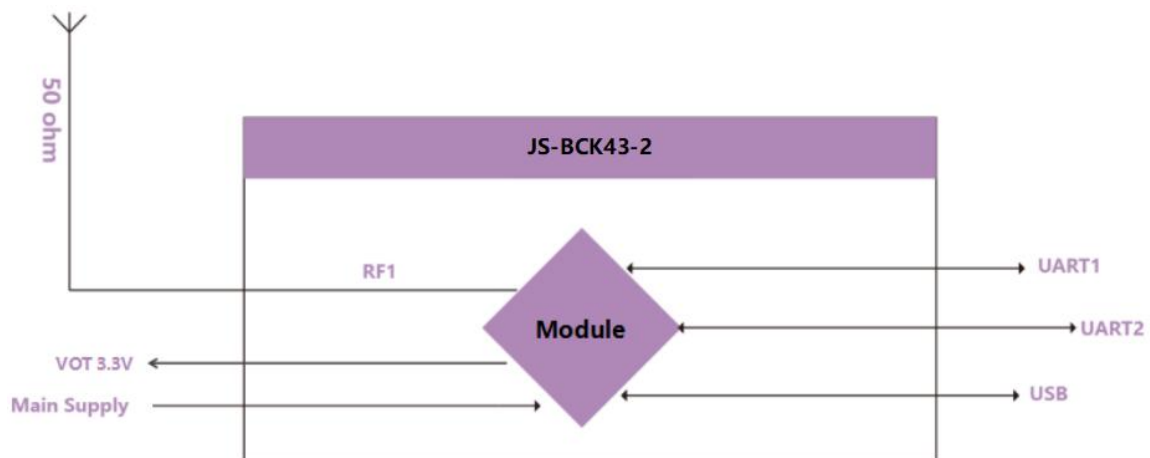
Parameter	Symbol	Min	Conventional	Max	unit
Power voltage range	VCC	3.5	5.0	12.0	V
Work current	Lopr	168@5V	174@5V	190 @5V	mA
Power consumption	0.87W(anti-interference not enable)		0.97W (Anti-interference function enabled)		
Storage temperature	Tstg	-40	-	85	°C
Work temperature	Tstg	-40	-	85	°C
Humidity	RH	-	Non-condensing	95	%rh

4 Mechanical dimensions



5 Interface configuration optional

JS-BCK43-2 board include 2pcs UART port, 1piece Type-C port, used for host communication, diagram as follow:



6 RoHS

ROHS compliant