JS-CK43-2
High-precision RTK Positioning Module

Data Sheet

Revision history

Version number	Revision history	Date
V1.0	First Version	2024-08-10
V1.1	Shell upgrade	2024-09-11
V1.2	Modify application circuit	2025-03-12

Table of contents

1. Product Introduction

1.1 Overview

The CK43-2 is a multi-constellation , multi-frequency , high-precision RTK positioning module. Based on a new generation of integrated GNSS SoC high-performance positioning engine with a new-generation RF baseband and high-precision algorithms , it features onboard inertial navigation devices , supports combined navigation algorithms , and integrates a high-speed floating-point processor and a dedicated RTK coprocessor. It supports multiple super channels, providing more powerful satellite navigation signal processing capabilities.

It can simultaneously track signals from satellite navigation systems such as BDS - 2 , BDS - 3 , GPS , GLONASS , Galilee , and QZSS . This receiver offers superior sensitivity and acquisition time, and employs multi -frequency anti- interference technology to achieve enhanced multi-mode, multi-frequency RTK engine calculation, enabling reliable positioning even under challenging and complex signal conditions. It is a new product designed to meet the high-precision positioning needs of markets such as drones, robotics, precision agriculture, and surveying.

1.2 Product Features

- Based on high-performance GNSS C9B
- Supports high-precision RTK positioning calculation across multiple frequencies throughout the entire system.
- RTK positioning data update rate up to 50Hz
- Supports integrated navigation algorithms
- Integrated high-gain antenna
- Its compact size (48.0 mm x 43.2 mm x 37.0 mm ± 0.5 mm) makes it suitable for space-sensitive applications .
- Instant R TK initialization technology
- Capable of suppressing potential narrowband and single-tone radio interference signals within the GNSS signal band, with an interference-to-signal ratio of up to 60 dB.

1.3 Performance Indicators

Performance	Technical parameters
Constellation Frequency	■ BDS -2 B1I , B2I , B3I BDS -3 B1I , B1C , B2a , B2b , B3I ■ GPS L1 C/A, L1C, L2 P, L2C, L5 ■ GLONASS G1 , G2 , G3* ■ Galileo E1 , E5a , E5b ,E5 ALTboC*, E6 c* ■ QZSS L1 C/A, L2 C, L5 , L 1C ■ SBAS L1C/A,L5 ■ IRN SS * L5
First positioning time	Cold start 20s Warm start 10s (using RTC)
Signal capture	Loss and recapture 1second Signal tracking sensitivity -155dBm Signal acquisition sensitivity -140dBm
Measurement accuracy	Pseudorange accuracy ≤10cm Carrier phase accuracy ≤1mm
Positioning accuracy	Horizontal Vertical 3D (1σ, PDOP≤4) 1.5m 3m RTK(RMS) 0.8cm + 1ppm 1.5cm + 1ppm
PPS timing accuracy (RMS)	20ns
Velocity accuracy	≤ 0.02m/s
RTK initialization time	<5s (baseline length less than 10km)
Gyroscope	Measurement range ±125°/s Zero bias repeatability 0.5°/s Zero bias stability 5°/h Angle random walk 0.12°/sqrt(h)
Acceleration	Measurement range ±2g Zero-biased repeatability 20mg Zero bias stability 50ug Angle random walk 0.07 m/s/sqrt(h)
Auxiliary dead reckoning (error)	3%d (d is the distance traveled)

PPP	PPP initialization time: 20 min PPP Precision Plane Elevation 0.1m 0.2m
Baud Rate	115200 - 9216 00bps (Default) 115200bps)
Maximum data rate	Single-point positioning at 50Hz (default 5Hz) RTK frequency is set at 50Hz (default 5Hz). IMU 100Hz (default 5Hz)

Note: Items marked with * will be adjusted according to the version.

1.4 Agreement

Parameter	Protocol
NMEA 0183	GPGGA, GPGSV, GPGLL, GPGSA, GPGST, GPHDT, GPRMC, GPVTG, GPZDA etc.
CNB	Private protocol (binary)
CRM (GPS)	CMR, CMRREF
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

1.5 Antenna Specifications

The antenna of the JS-CK43-2 module is an active antenna design.

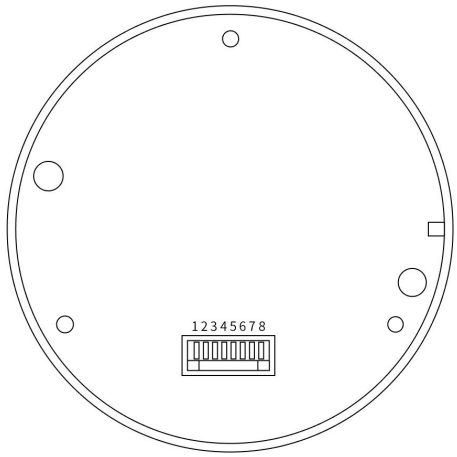
Parameter	Specification
Antenna size	φ35mm, height 25mm (default)

1.6 Application Areas

- Drones
- Automotive Applications
- Precision agriculture
- Maritime Navigation
- Logistics security
- Surveying and mapping
- intelligent robots
- Smart Port
- Power grid
- Smart Transportation

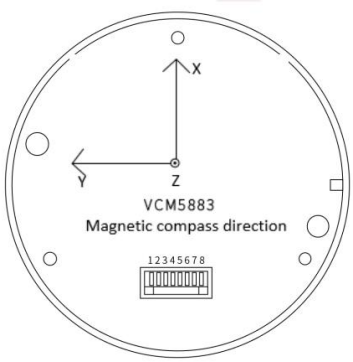
2. Pin definition

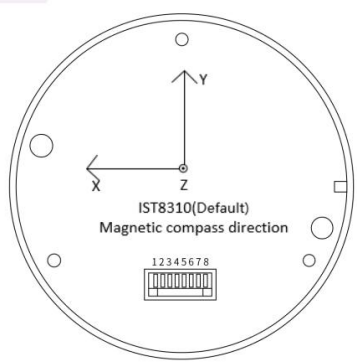
2.1 Pin Assignment

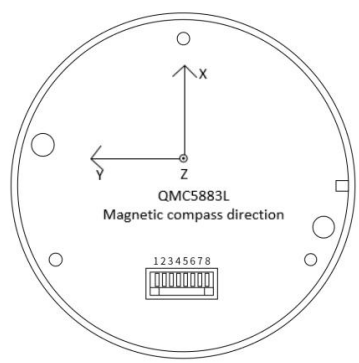


S.N.	Name	I/O	Description
1	GND	G	Ground
2	TX2	O	UART2 Output RTCM3 data
3	PPS/ RX2	O/ I	Serial port (UART 2: for 1PPS output <Default>/RTCM3 input)
4	SDA	I/O	I2C data (keep open when not in use)
5	SCL	I/O	I2C clock (keep on when not in use)
6	TX1	O	Serial port 1 data output
7	RX1	I	Serial Port 1 Data Input
8	VCC	I	Power supply voltage

2.2 Explanation of Geomagnetism







Note: Magnetic compass models: The geomagnetic model is VCM5883, VCM5883_MS_ADDRESS 0x0C; the geomagnetic model is IST8310 (default), IST8310_MS_ADDRESS 0x0F; the geomagnetic model is QMC5883L, QMC5883L_MS_ADDRESS 0x0D.

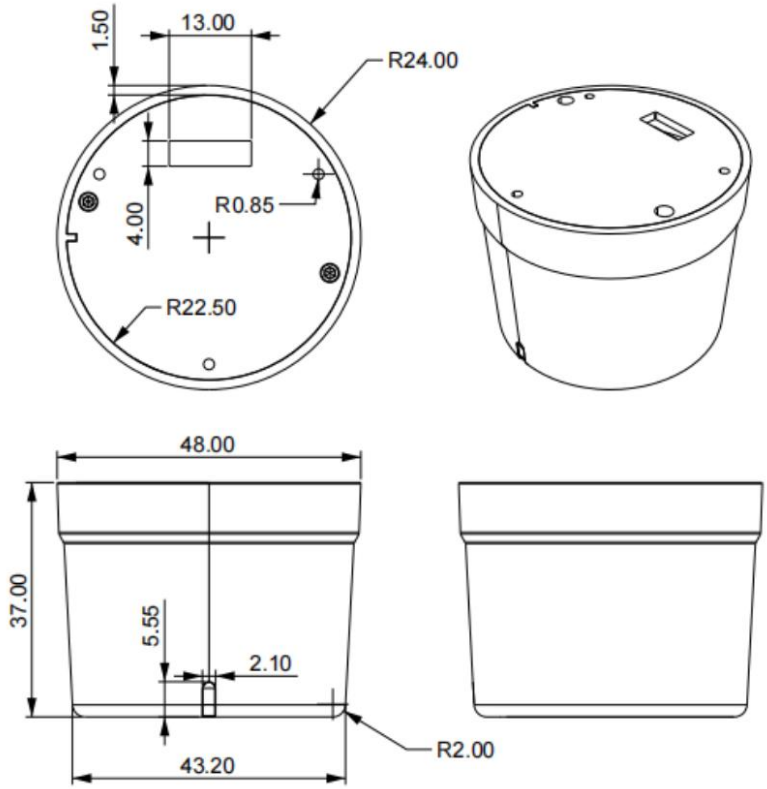
3. Electrical Specifications

Parameter	Symbol	Minimum value	Typical value	Maximum value	Unit
Supply voltage (VCC)	V_{CC}	4.8	5.0	5.5	V
Operating current	Acquisition	135mA@ 5.0V	165mA@5.0V	185mA@5.0V	mA
	Tracking	125mA@5.0V	165mA@5.0V	175mA@5.0V	mA
Backup power			0.07		F
VCC maximum ripple	Vrpp	0	--	50	mV
Storage temperature	Tstg	-45	--	85	℃
Operating temperature [1]	Topr	-40	--	85	℃
Farad capacitor [2]	Tstg	-25		60	℃
Humidity				95	%

1. The current temperature range is the operating temperature range without supercapacitors.

2. The warm start function will not be activated when the ambient temperature is below -25℃ or above 60℃.

4. Mechanical dimensions



Unit: mm . Error : ±0.5 mm

RoHS Lead-free

A±0.15 (01)
1.250 (02)
(03) 0.200
B±0.25 (04)
C±0.20 (05)
4.05 (07)
4.25 (06)
0.10 (08)
0.80 (09)

■ Specifications :

- Voltage rating: 50V AC / DC
- Current rating: 1A AC / DC
- Withstanding voltage: 500V AC/minute
- Temperature range: -25°C~+85°C
- Insulation resistance:≥100MΩ
- Contact resistance: ≤30mΩ
- After environmental testing：≤50mΩ

1251 W R S-XX HF-LP XX XX
(01) (02) (03) (04) (05) (06) (07) (08) (09)

(01) Series No.
(02) Category：W-wafer
(03) Welding Board Angle: R- Right Angle 90°
(04) Welding Way: S-SMT
(05) Row No.-Pin No.: XX-02P~15P
(06) Plug the Pin & Special No.: HF-Halogen free
(07) Material：LP-LCP 94V-0
(08) Planting Category: SN-Bright Tin plating
SW-Matte Tin plating
(09) Color：Blank-natural color

Poles	Dimensions(mm)			Poles	Dimensions(mm)		
	A	B	C		A	B	C
02	1.25	5.75	3.85	09	10.00	14.50	12.60
03	2.50	7.00	5.10	10	11.25	15.75	13.85
04	3.75	8.25	6.35	11	12.50	17.00	15.10
05	5.00	9.50	7.60	12	13.75	18.25	16.35
06	6.25	10.75	8.85	13	15.00	19.50	17.60
07	7.50	12.00	10.10	14	16.25	20.75	18.85
08	8.75	13.25	11.35	15	17.50	22.00	20.10

A
1.25
0.60
2.70
3.70
1.70
Conn. Line
1.00
1.05

Recommended P.C.B Layout
General Tolerance±0.05

1251WRS-XXHF-LPXX	LCP UL 94V-0 Halogen Free	Phorphos Bronze	Bright Tin plating/Matte Tin Plating	1251H
PART N0	Material	Material (Solder Tabs)	Finish (Solder Tabs)	Mates With ADZL Housing

DATE	OLD REV	NEW REV	ECN	DESCRIPTION	CHECK	APPROVAL

GENERAL TOLERANCE
.X ±0.30
.XX ±0.20
.XXX ±0.10
PROJECT

APPROVAL	CHECK	DRAWN	DATA

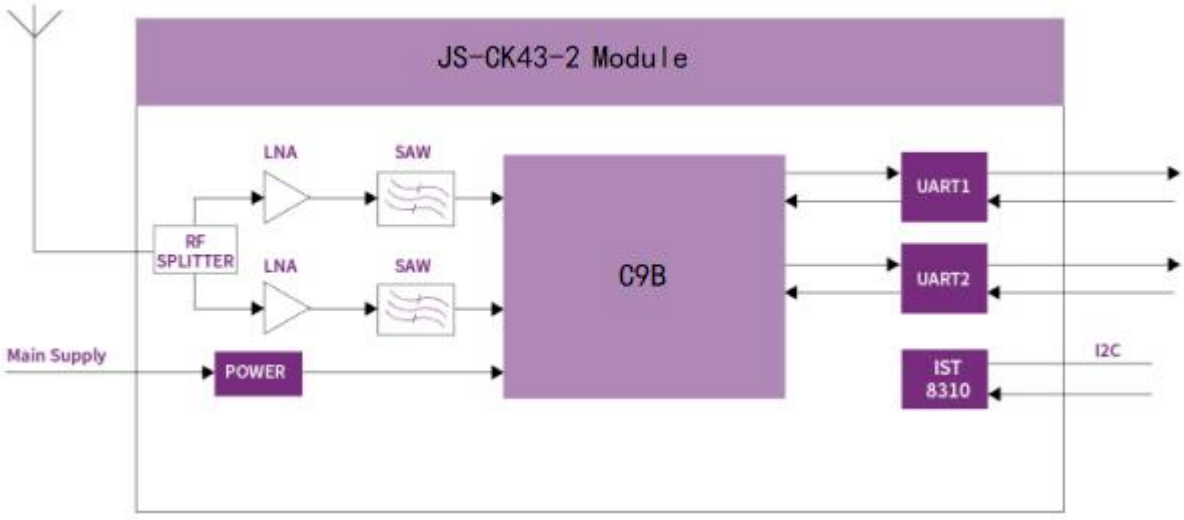
PART NO. 1251WRS-XXHF-LPXX
TITLE 1.25mm Crimp Style Connectors

UNIT	SCALE	NUMBER	REV
MM	1 : 1	A-084	A

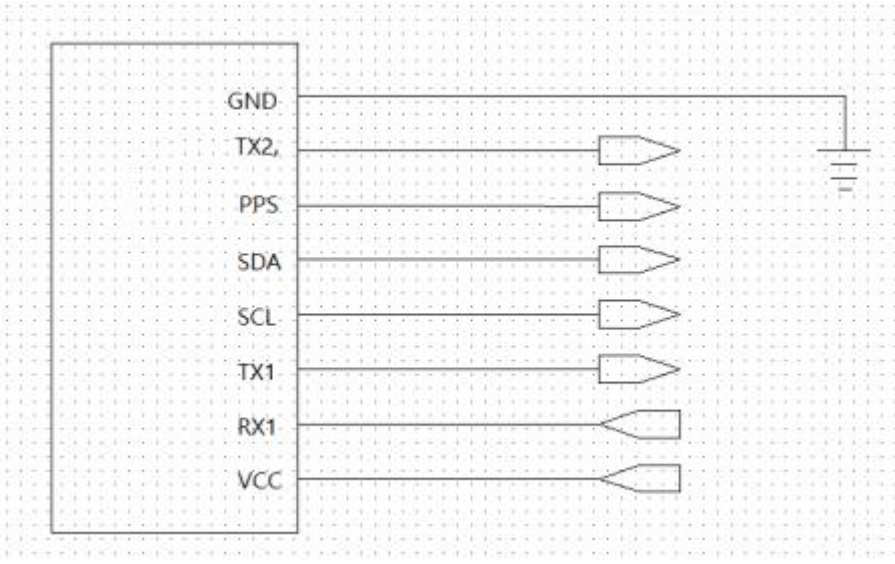
5. Interface Configuration Selection

5.1 Interface Description

The CK43-2 module includes two UART interfaces for communication with the host. Either output interface can be selected to output data, and configurable baud rates are supported.



5.2 Application Circuit



6. RoHS

This product is compliance with RoHS standard.