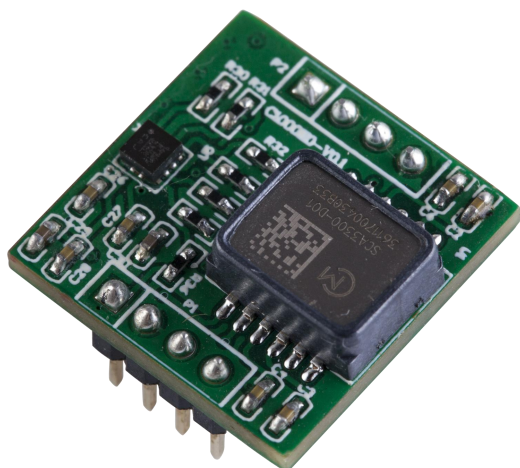


ECB100

High Accuracy 3D Electronic Compass Board



Main Features

- 3D Angle (Heading, Pitch, Roll) Output
- Hard/Soft Magnetic Compensation, Tilt Compensation
- Heading Accuracy: 0.8° RMS (25°C, Tilt Angle < 30°)
- Pitch and Roll Accuracy: ±0.1° (25°C, Full Range)
- Power Supply: 3.3±0.3VDC
- Interface: LV-TTL
- Widely Working Temperature: -40~+85°C
- Small Size: 16.5*16.5*6.5mm (without pins)

ECB100 electronic compass board is a high accuracy 3D digital compass module, it adopts advanced hard and soft magnetic calibration algorithm, and it uses special calibration technology and provides high accuracy inclination information, and it has perfect cross coupling performance.

ECB100 integrates 3-axis magneto-inductive sensors, 3-axis MEMS accelerometer and central processing unit to calculate the heading data in real time and compensate the heading when it has inclination angle. ECB100 enjoys compact size, high accuracy, low power consumption, which is widely used in antenna pointing, vehicle, camera, system integration fields.

- ✓ 12-Step Quality Control, Super Reliability, More Functions
- ✓ Adopting Original Big Brand Component, High-class Material, Competitive Price

- ✓ Real Actual Precise after Calibration, Perfect Performance
- ✓ Successful Applications in Tens of Fields, More than 1000 Customers are Using

Typical Applications



Thermal Imagers



Laser Rangefinders



Antenna Pointing



Ship Platform

Super Reliability & Performance

www.SkyMEMS.com Mobile: +86 133 7203 8516
Skype: skymems

Copy Right Reserved © 2019 Nanjing Sky MEMS Technology co., Ltd.
Focus on MEMS Measurement & Control Technologies, Products include:

MEMS Acc	MEMS Gyro	IMU	Vertical Gyro	AHRS
INS	GNSS/INS	E-compass	Inclinometer	FOG

ECB100

High Accuracy 3D Electronic Compass Board

Technical Specifications

Technical Specs		
Parameters	Value	Comments
Heading		
Range	0~360°	
Accuracy	0.8° RMS	25°C, tilt angle<30°
	1.2° RMS	25°C, tilt angle<60°
	1.5° RMS	25°C, tilt angle<85°
Resolution	<0.1°	
Tilt Performance Specs		
Range	roll: ±180°, pitch: ±85°	
Accuracy	0.1° RMS	25°C
Resolution	< 0.01°	
Electronical Performance		
Input Voltage	3.3±0.3VDC	
Current	33mA@3.3VDC	
Power Consumption	<0.15W	
Startup Time	≤200ms	
Environment Condition		
Working Temperature	-40~+85°C	
Communication Protocol		
Communication Mode	LV-TTL	
Braud Rate	2400~115200	settable
Maximum Output Speed	100Hz	ODM supported
Physical Parameter		
Dimensions (L x W x H)	16.5*16.5*6.5mm	without pins
Weight	around 6grams	

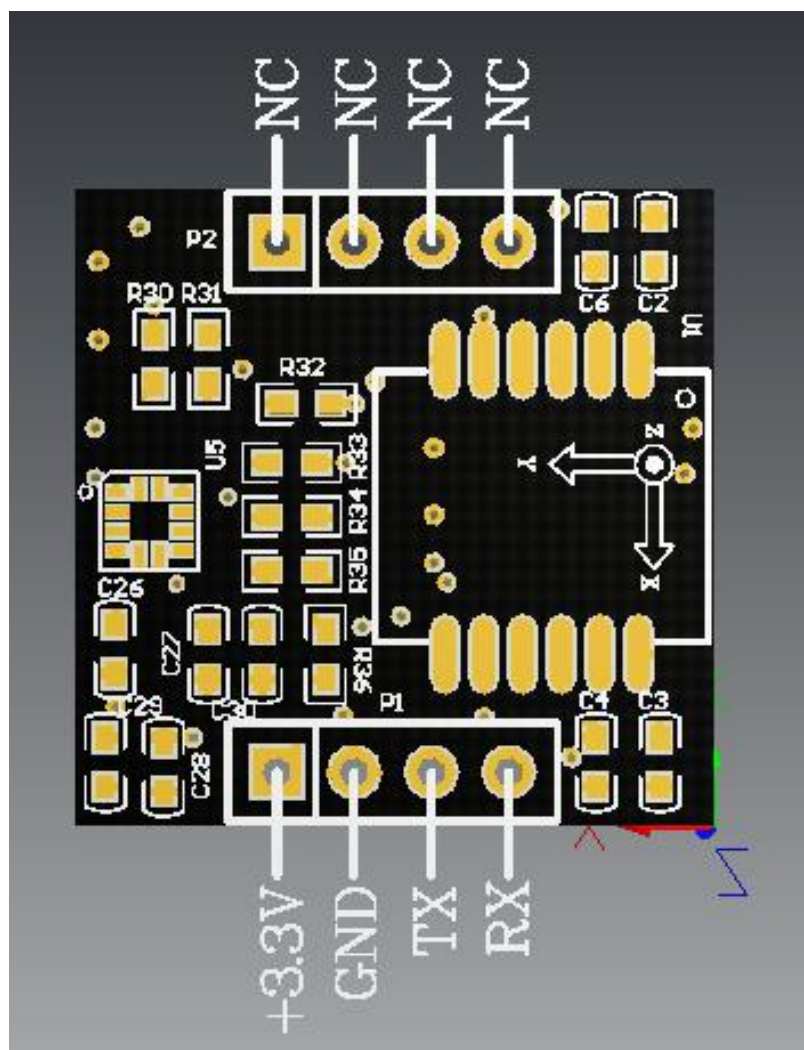
ECB100

High Accuracy 3D Electronic Compass Board

Pins Definition

Pins Definition

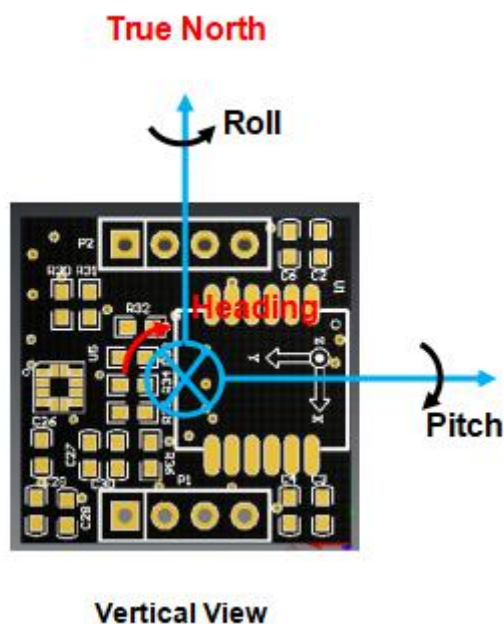
Pins No.	Name	Description
P1-1	VCC	power positive pole (3.3VDC)
P1-2	GND	power ground
P1-3	UART-TX	UART transmitting
P1-4	UART-RX	UART receiving
P2	NC	don't connect with any outside signal



ECB100

High Accuracy 3D Electronic Compass Board

Axis/Angle Definition



Remarks:

- Arrow direction indicates positive angle direction
- Heading angle that directs true north is 0°
- Heading angle that directs true south is 180°

Installation

Though SkyMEMS E-Compass can compensate magnetic interference, please install and use the compass in the environment that has no or very little magnetic interference. And please keep the compass far away from iron, nickel, magnetic-iron, motors and other types of magnetic materials.

Be sure that keeping strong magnetic materials (such as magnetic iron and motors) away from the compass, which will damage the compass' accuracy, and the damage can't be recovered.

SkyMEMS E-Compass has done calibration in the factory, if using it in the environment where there is no or less magnetic interference, it can be used without the environment calibration. It is better to do the magnetic calibration in the actual application. The calibration procedure please refers to "User Manual of SkyMEMS E-Compass Second Calibration Software".

Remarks: during the calibration, the operator should not have mobile phone, keys, and other material that can generate the magnetic field.

Super Reliability & Performance

ECB100

High Accuracy 3D Electronic Compass Board

Communication Protocol

You may get direct access to the product through communication protocol (**RS232**), with which the product can be easily integrated into your system

1 Data Frame Format: (the default rate is 115200)

Send the Command:

Preamble Code (1 byte)	Data Length (1 byte)	Address (1 byte)	Command Code (1 byte)	Data Domain	Checksum (1 byte)
68	XX	XX	XX	XX	XX

Data format: Hexadecimal System

Preamble Code: 68 (fixed)

Data Length: the length from Data Length to Checksum (including Checksum)

Address: the module's address, the default address is 00)

Data Domain: the content and length of Data Domain will be different according to the different command.

Checksum: it is the sum of Data Length, Address, Command Code (command response), (No carry). for example, if the command is 68 06 00 06 02 08 16, so the checksum=06+00+06+02+08=16

ECB100

High Accuracy 3D Electronic Compass Board

Communication Protocol

2 Command Description

2.1 Read Angle of Pitch, Roll, Yaw

Send Command: 68 04 00 04 08

Preamble Code (1 byte)	Data Length (1 byte)	Address (1 byte)	Command Code (1 byte)	Data Domain	Checksum (1 byte)
68	04	00	04	-	08

Command response:

Preamble Code (1 byte)	Data Length (1 byte)	Address (1 byte)	Command Code (1 byte)	Pitch (3bytes)	Roll (3bytes)	Yaw (3 bytes)	Checksum (1 byte)
68	0D	00	84	SXXXYY	SXXXYY	SXXXYY	XX

Remarks: the data domain is 9 bytes, they are representing Pitch, Roll, and Yaw. S is sign bit (0: positive, 1 negative), XXX is 3 bit integer value, YY is decimal fraction, for example, if the command response is 68 0D 00 84 00 10 50 10 10 05 01 04 01 1C, it means that the pitch: +010.50°, roll: -010.05°, yaw: +104.01°

2.2 Set magnetic declination angle

Send Command: 68 06 00 06 02 08 16

Preamble Code (1 byte)	Data Length (1 byte)	Address (1 byte)	Command Code (1 byte)	Data Domain (2 bytes)	Checksum (1 byte)
68	06	00	06	SXXY	XX

Remarks: the data domain is 2 bytes, SXXY, S is sign bit (0: positive, 1 negative), XX is 2 bit integer value, YY is decimal fraction, for example, if the command response is 68 06 00 06 02 08 16, it means that the data domain is 02 08, it is +20.8degree.

Command response:

Preamble Code (1 byte)	Data Length (1 byte)	Address (1 byte)	Command Code (1 byte)	Data Domain (1 byte)	Checksum (1 byte)
68	05	00	86	00 (setting success) FF (setting failed)	8B 8A

ECB100

High Accuracy 3D Electronic Compass Board

Communication Protocol

2.3 Read magnetic declination angle

Send Command: 68 04 00 07 0B

Preamble Code (1 byte)	Data Length (1 byte)	Address (1 byte)	Command Code (1 byte)	Data Domain (2 bytes)	Checksum (1 byte)
68	04	00	07	-	0B

Command response:

Preamble Code (1 byte)	Data Length (1 byte)	Address (1 byte)	Command Code (1 byte)	Data Domain (2 bytes)	Checksum (1 byte)
68	06	00	87	SXXY	XXXX

Remarks: the data domain is the returned magnetic declination angle, 2 bytes, SXXY, S is sign bit (0: positive, 1 negative), XX is 2 bit integer value, YY is decimal fraction, for example, if the command response is 68 06 00 87 02 08 97, it means that the magnetic declination angle is +20.8degree.

2.4 Set communication rate

Send Command: 68 05 00 0B 02 12

Preamble Code (1 byte)	Data Length (1 byte)	Address (1 byte)	Command Code (1 byte)	Data Domain (1 byte)	Checksum (1 byte)
68	05	00	0B	XX	XX

Remarks: the data domain is 1 byte, XX is the baud rate option: 00 means 2400, 01 means 4800, 02 means 9600, 03 means 19200, 04 means 38400, 05 means 115200, the default is 04: 115200.

Command response:

Preamble Code (1 byte)	Data Length (1 byte)	Address (1 byte)	Command Code (1 byte)	Data Domain (1 byte)	Checksum (1 byte)
68	05	00	8B	00 (setting success) FF (setting failed)	90 8F

ECB100

High Accuracy 3D Electronic Compass Board

Communication Protocol

2.5 Set module address

Send Command: 68 05 00 0F 01 15

Preamble Code (1 byte)	Data Length (1 byte)	Address (1 byte)	Command Code (1 byte)	Data Domain (1 byte)	Checksum (1 byte)
68	05	00	0F	XX	XX

Remarks: the data domain is address XX, the range is from 00 to FE; we reserved FF address as backup address, if forgetting the setting address, user can use FF to operate the module.

Command response:

Preamble Code (1 byte)	Data Length (1 byte)	Address (1 byte)	Command Code (1 byte)	Data Domain (1 byte)	Checksum (1 byte)
68	05	00	8F	00 (setting success) FF (setting failed)	94 93

2.6 Set output mode

Send Command: 68 05 00 0C 00 11

Preamble Code (1 byte)	Data Length (1 byte)	Address (1 byte)	Command Code (1 byte)	Data Domain (1 byte)	Checksum (1 byte)
68	05	00	0C	00 (QA mode) 01 (Auto mode)	11 12

Remarks: output mode: 00 is question and answer mode, 01 is output automatically (default)

Command response:

Preamble Code (1 byte)	Data Length (1 byte)	Address (1 byte)	Command Code (1 byte)	Data Domain (1 byte)	Checksum (1 byte)
68	05	00	8C	00 (setting success) FF (setting failed)	91 90

ECB100

High Accuracy 3D Electronic Compass Board

Communication Protocol

2.7 Query output mode

Send Command: 68 04 00 42 46

Preamble Code (1 byte)	Data Length (1 byte)	Address (1 byte)	Command Code (1 byte)	Data Domain (0 byte)	Checksum (1 byte)
68	04	00	42	-	46

Command response:

Preamble Code (1 byte)	Data Length (1 byte)	Address (1 byte)	Command Code (1 byte)	Data Domain (1 byte)	Checksum (1 byte)
68	05	00	C2	00	C7

Remarks: The data domain indicate the output mode : 00 is question and answer mode, 01 is output automatically.