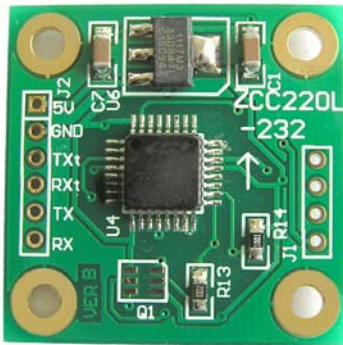# ZCC220N-TTL Digital Compass Specification

ZCC220N-TTL is a high accuracy plane digital compass module. Its working principle: Two axis perpendiculars with each other induce the earth's magnetic field at the same time then calculate the azimuth. It communicates with PC via TTL interface. It features stable performance and high accuracy. Also it has calibration function and you can get accurate azimuth wherever. There are both continuous and inquiry output mode. At the same time it has declination angle and installation angle compensatory function. It can suit different working conditions.

Features

· High accuracy
· Small size
· Light weight.
· Cost effective.
· Ease of integration.

Applications

· Handheld instruments and meters
· Navigation system.
· Auto helm ruder.
· Aerial position.
· Automobile GPS navigation
· Aero model position.
· Robots navigation and position

Order part number：□ ZCC220N-TTL

Technical specifications:

Parameter	Test condition	Min. Value	Type Value	Max. Value	Unit	Parameter
Measuring Range			0 ～360		°	Compass placed horizontally
Resolution				0.3	°	
Accuracy			<1		°	RMS
Response Frequency		3	4	5	Hz	
Repeatability				0.3	°	
Supply Voltage		4.8	5.0	5.2	V	5V continuous output
Operating Current	5V Power supply	30	40	45	mA	

Operating Temperature		-40	25	85	℃	
Storage Temperature		-40	25	125	℃	

Communication Protocol：（output via ASC11；Baud rate is 9600bp/s）：

1　ASC11 format

One set of data has 13bytes.

Byte1：$(0x24)

Byte2：H(0x48)

Byte3：,(0x2C)

Byte4：hundreds digit of angle

Byte5：tens digit of angle

Byte6：units digit of angle

Byte7：．(0x2e)

Byte8：decimal place of angle value.

Byte9：*(0x2A)

Byte10：First bit calibration

Byte11：Second bit calibration

Byte12：0x0D（Enter）

Byte13：0x0A（New line）

2　User instructions

- Output version of software first after powered on： ZCcC 1.6c

- Enter into angle output mode automatically.

3　Order word related：(Please distinguish lower case and capitalization)

"**R**"——System reset

"***Bau=4800*" ——**Setting baud rate 4800.

"***Bau=9600*" ——**Setting baud rate 9600.

"***Bau=19200*" ——**Setting baud rate 19200.

"***P*"——** Single output. When it sends once system will output a set of data.

"***n*" ——**Continuous output.

"***z*"——** Setting zero. Sets zero degree as datum mark and angle output based on the

datum mark.

"p"——Calibration. After calibrated the compass will circularly output "studing…'

"r"—— Finish calibration. Return to continuous output mode.

"b"—— Setting declination angle. It will wait after system has accepted it and PC will

output declination angle among 000-360 degrees.

"c"—— Reading declination angle.

"d"—— Setting deviation angle. It will wait after system has accepted it and PC will

output deviation angle among 000-360 degrees.

"e"—— Reading deviation angle.
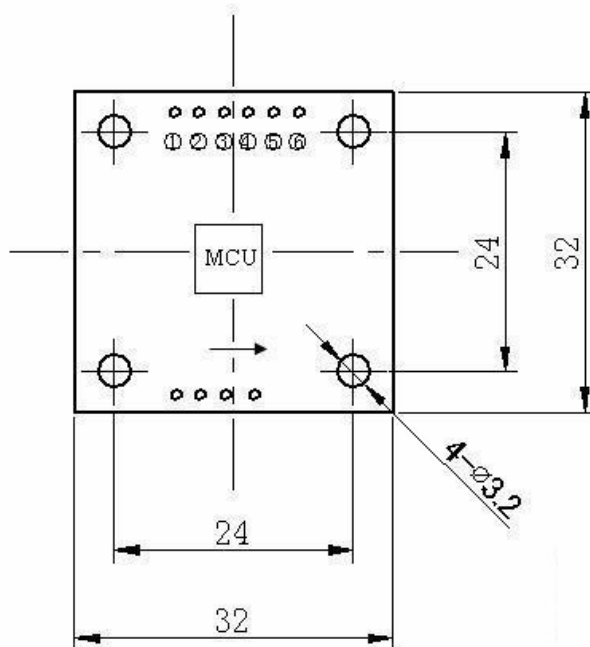
4   Parity bit arithmetic

Byte4^ Byte5^ Byte6^ Byte8^0x32

The value of the frontal 4 digits is the first parity bit and the latter is the second parity bit.

For example: $ZC, 281. 4*3D

2^8=A, A^1=B, B^4=F, F^0x32=0x3D; The first parity bit: 0x33. The second: 0x3D.

Installing Size and Definition of Connection：（Unit :mm）

Connection definition:

① RX

② TX

③ RXt

④ TXt

⑤ GND

⑥ VCC +5Vdc

Note: The below four holes is just for factory's debug. The user should hang in the air in the actual using, otherwise it will cause devastating result to the product

www.zc-sensor.com

Technical terms:

1 Declination Angle

It is the angle between magnetic north and true north. Declination angle of different place are different, even at the same place declination angle varies with the time. When we use compass to navigating, we get directions relative to magnetic north. So we can get directions relative to true north through declination angle compensation. For example, the current direction counted by compass is north by east 30 degrees and the declination angle is 5 degrees. So the direction relative to true north is 35 degrees (30+5°=35°)

2 Installation Angle

There is an arrowhead on the compass module and it's used to denote directions. When installed, it requests that forward direction of the object surveyed is consistent with the arrowhead. So the direction counted by the compass is the right direction. If installing direction is not consistent with the arrowhead, there is a included angle and it is the deviation angle. Only after we compensate it the compass outputs the true direction.

3 Calibration

It's also called hard iron compensation. All digital compasses must be calibrated before used. Once hard iron conditions change, the magnetic field conditions will be changed too. At this time angle information counted by the compass will be inaccurate. In order to remove the influence, it's necessary to calibrate the compass.

4 Calibrating methods and functions

When magnetic field changes angle information counted by compass will be in accurate.
This time it is necessary to calibrate the compass to remove the influence.

Methods:

Send "P" command, and then rotate the compass two circles slowly, equably and flatly, fast not allowed. One cycle needs more than one minute. Then send "r" command to finish calibration.