

BC-GNSS2CAN(_IMU)-000**CAN(-FD) GNSS Module with optional integrated 9DoF IMU****Key Features**

- **CAN-FD** (compatible to classic CAN)
- 25Hz GNSS Update Rate
- GPS, Galileo, GLONASS and BeiDou - can be received concurrently
- SBAS and QZSS augmentation support
- Typical accuracy of CEP < 1m
- Up to 1000Hz IMU Signal output
- Optional integrated 9DoF IMU ($\pm 30G$ 6DoF IMU available on request)
 - 3 axis accelerometers ($\pm 2 / 4 / 8 / 16G$) - user selectable range
 - 3 axis gyros ($\pm 250 / 500 / 1000 / 2000^\circ/s$) - user selectable range
 - 3 axis magnetometers ($\pm 4900\mu T$)
 - Built-in coordinate transformation to rotate mounting position of the module to the vehicle coordinate system
 - Additional first order IIR filter for individual filtering accelerometers and gyros
- Speed pulse signal or lap trigger pulse output
- Automatic lap time calculation for more than 330 race tracks worldwide (constantly updated)
- User configurable positions for lap time calculation
- **GNSS Speed, GNSS Course and GNSS Position Accuracy Channels**
- **Rugged and Waterproof IP67**

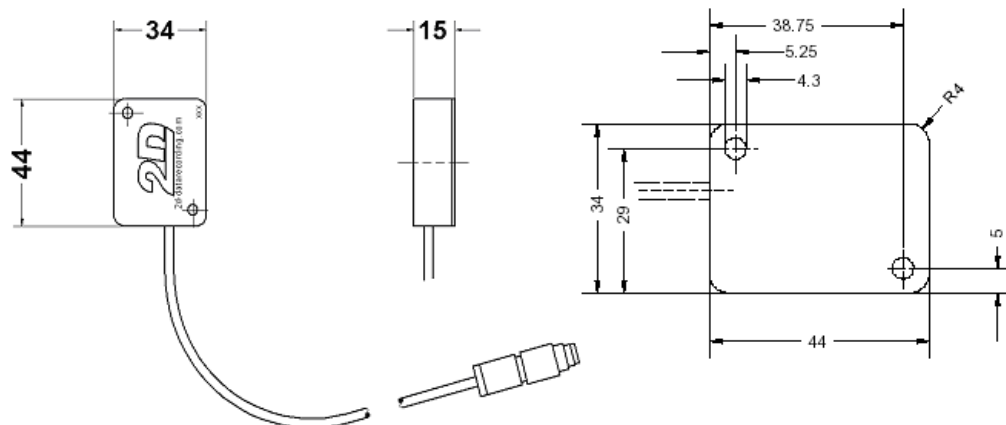
Options:

- Online roll angle calculation
- Internal calibration and temperature compensation for IMU
- Connector and cable length can be modified on customer request

Technical specifications

CAN characteristics			Mechanical		
CAN(-FD) lines		1	Dimensions	mm	44 x 34 x 15
CAN Baud rate	kBd	up to 2000	Weight Bike (cable included)	g	80
CAN-FD Baud rate	Mbit	2 / 4 / 5 / 8	Housing material		Aluminum / PC
Transmission rate CAN channels	Hz	max. 1000	Connector		Binder 712, 5PM
3 axis accelerometers (optional)			Cable Type		Raychem
Range (switchable for all 3 axes)	G	±2/±4/±8/±16	Wire cross section		5x AWG26
Error of linearity	FS	±0.5%	Length	mm	400
Lowpass filter (programmable)	Hz	10 to 250	Electrical		
Sampling rate	Hz	1000	Power supply	V	4 to 28
3 axis gyroscopes (optional)			Current consumption @ 5V	mA	80 to 85
Range (switchable for all 3 axes)	°/s	250 /500/1000 /2000	Current consumption @ 12V	mA	40 to 55
Error for linearity	FS	±0.1%	Environmental		
Low-pass filter (programmable)	Hz	10 to 250	Sealing class		IP67
Sampling rate	Hz	1000	Operating temperature	°C	-40 to +85
3 axis magnetometer (optional)			Ordering information		
Range	µT	±4900	BC-GNSS2CAN-000		
Sampling rate	Hz	100	BC-GNSS2CAN_IMU-000		with IMU (200Hz)
Speed Pulse / Laptrigger out			BC-GNSS2CAN_IMU_Full-000		with IMU (1000Hz)
Pulse output via open collector	P/min	max. 1000	with 2000mm cable length		
Sink current	mA	20	BC-GNSS2CAN-001		
			BC-GNSS2CAN_IMU-001		
			BC-GNSS2CAN_IMU_Full-001		

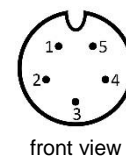
Dimensions



Connector layout

Connector type

CAN line, Binder 712 5PM			
Pin	Name	Description	Color
1	CAN H	CAN high	white
2	CAN L	CAN low	green
3	GND	Ground	black
4	Speed/Lap	Speed Pulse / Laptrigger	blue
5	Vext	Power supply	red



Default CAN identifiers

CAN-ID	Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7
0x790	V_Sat		ValidSat		SSH		Course	
0x791	Lat_dez				Lon_dez			
0x792	Altitude			MMDD		HHMM		
0x793	HorAccu		VerAccu		SpAccu		CourAccu	
	Speed_N		Speed_E		Speed_D		Speed_3D	
	HDOP		GDOP		PDOP		VDOP	
	Year	Month	Day	Hour	Min	Sec	hSec	
	Latitude				Longitude			
	A_Lat		A_Lon		Banking		Yawrate	
with integrated IMU								
	ACC_X_RAW		ACC_Y_RAW		ACC_Z_RAW		ACC_N_RAW	
	Gyro_X_RAW		Gyro_Y_RAW		Gyro_Z_RAW		Vext	
	MAG_X_GNSS		MAG_Y_GNSS		MAG_Z_GNSS		V_Dout	
	ACC_X_IIR		ACC_Y_IIR		ACC_Z_IIR		ACC_N_IIR	
	Gyro_X_IIR		Gyro_Y_IIR		Gyro_Z_IIR		TEMP_GYRO	
0x450	ACC_X_GNSS		ACC_Y_GNSS		ACC_Z_GNSS		ACC_N_GNSS	
0x458	Gyro_X_GNSS		Gyro_Y_GNSS		Gyro_Z_GNSS		TEMP_GNSS	

Mounting Instructions



Improper mounting of the GNSS Receiver can result in bad GNSS accuracy!

- Mount the GNSS Receiver solid / rigid to the vehicle, avoid vibrations and do not use velcro or similar.
- Mount the GNSS Receiver to a stable and low or non-vibrating part of the vehicle
- The GNSS Receiver must be mounted on the top of the vehicle and be oriented parallel to the horizon.
- The optimum receiver location must have “unshaded” direct view to the sky.
- When mounting the receiver on non-metal surfaces, please use the self-adhesive ground plane - AC-GNSS_ground_plane-000

GNSS Speed, Course and Position Accuracy Channels

The Receiver has additional channels for speed, course, horizontal and vertical position accuracy.



- “#SpAccu” - actual speed accuracy in ± x [km/h]
- “#CourAccu” - actual course accuracy in ± x [°]
- “#HorAccu” - actual horizontal position accuracy in ± x [m]
- “#VerAccu” - actual vertical position accuracy in ± x [m]

IIR Filter Channel Group (xxx_IIR)

Each IIR channel is directly linked to the raw channel of the IMU (xxx_RAW). Using the parameter “filter” you can set the desired filter frequency as follows:

$$f_{IIR} = \frac{f_{sampling\ rate\ raw}}{2^{Filterstep}}$$

Example: Filterstep 4; sampling rate of raw channel = 200Hz
→ IIR filter frequency = 12.5Hz

Averaging

If the sampling rate of an IIR channel is set lower than the rate of the raw channel, an average is calculated by the ratio of raw channel to the IIR channel.

Example: If the raw channel is set to 1000Hz and the IIR channel is set to 100Hz, an additional average of 10 samples is calculated.

Rotation Channel Group (xxx_ROT)

The rotation channels are linked directly to the IIR channels, every change of standard and IIR channel will influence the rotation channel. The misalignment can be compensated by entering the mounting angles in comparison to the orthographic system to the rotation channels.

Example: If the sensor is tilted 10 degrees forward and mounted upright,
→ mounting angles to insert: x=90°; y=10°; z=10°



Maximum Sampling Rate

The sampling rate for the IIR / ROT channel can never exceed sampling rate of the raw channel