BC-GNSS2CAN-000   **CAN(-FD) GNSS module (optional with integrated IMU)**

Key Features

- ➤ <u>GPS/GNSS features</u>
    - o 25 Hz GNSS receiver (GPS, Galileo, GLONASS and BeiDou are received concurrently)
    - o SBAS and QZSS augmentation support
    - o Typical accuracy of CEP < 1.00 m
    - o Speed, Course and Position accuracy channels
    - o Automatic GPS laptrigger detection for more than 330 racetracks worldwide
    - o Additional user configurable GPS position for individual GPS lap time calculation

- ➤ Interface type: CAN(-FD) Bus

- ➤ Optional with built-in 6DoF-IMU (*BC_GNSS2CAN_3A3G-00x*)
    - o Integrated 6 DoF (optional 9DoF)
    - o IMU with range +/- 16 G (optional +/- 30 G)
    - o Up to 1000 Hz IMU signal output
    - o Internal calibration and temperature compensation
    - o Built-in orientation correction to rotate mounting position of the module internally to the vehicles coordinate system
    - o Additional first order IIR filter for individual filtering for all axes

- ➤ Speed pulse signal or lap trigger output
- ➤ Math (CALC) channels for online calculations
- ➤ Online roll angle calculation
- ➤ Module can work with GPS laptriggers as TransponderX2 simulator
- ➤ Mechanical features
    - o Compact and light weight housing (Rugged and waterproof (IP67))
    - o Mounting by screws

Available options

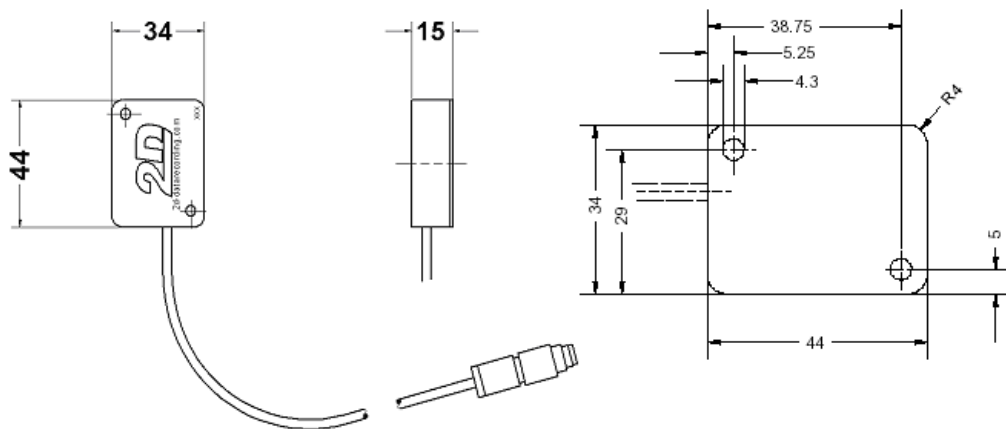|	
_3A3G-001	Integrated 6 DoF IMU with individual range selection for Acc (±2/4/8/16 G) and Gyros (±250/500/1000/2000 °/s)
_3A3G-002	Integrated 6 DoF IMU with individual range selection for Acc (±4/8/16/30 G) and Gyros (±500/1000/2000/4000 °/s)

_3A3G-options are enabled/disabled via firmware update of the module!

Technical specifications

CAN characteristics		
CAN(-FD) lines		1
CAN Baud rate	kBd	up to 2000
CAN-FD Baud rate	Mbit	2 / 4 / 5 / 8
Transmission rate CAN channels	Hz	max. 1000

3 axis accelerometers (optional)		
Range (switchable for all 3 axes)	G	±2/±4/±8/±16
Error of linearity	FS	±0.5%
Lowpass filter (programmable)	Hz	10 to 250
Sampling rate	Hz	1000

3 axis gyroscopes (optional)		
Range (switchable for all 3 axes)	°/s	250 /500/1000 /2000
Error for linearity	FS	±0.1%
Low-pass filter (programmable)	Hz	10 to 250
Sampling rate	Hz	1000

3 axis magnetometer (optional)		
Range	µT	±4900
Sampling rate	Hz	100

Speed Pulse / Laptrigger out		
Pulse output via open collector	P/min	max. 1000
Sink current	mA	20

Mechanical		
Dimensions	mm	44 x 34 x 15
Weight Bike (cable included)	g	80
Housing material		Aluminum / PC
Connector		Binder 712, 5PM
Cable Type		Raychem
Wire cross section		5x AWG26
Length	mm	400

Electrical		
Power supply	V	4 to 28
Current consumption @ 5V	mA	80 to 85
Current consumption @ 12V	mA	40 to 55

Environmental		
Sealing class		IP67
Operating temperature	°C	-40 to +85

Ordering information
BC-GNSS2CAN-000
BC-GNSS2CAN_IMU-000   with IMU (200Hz)
BC-GNSS2CAN_IMU_Full-000   with IMU (1000Hz)
with 2000mm cable length
BC-GNSS2CAN-001
BC-GNSS2CAN_IMU-001
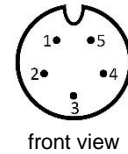BC-GNSS2CAN_IMU_Full-001

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

front view

Connector and cable length can be modified on customer request

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		SSHH		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

Documentation reference
For more information about *Mounting Instructions* please see manual
GPS – General description on our website:
http://2d-datarecording.com/downloads/manuals/

Downloads

- GPS – General description
- Revision of GNSS
- Overview 2D GPS/GNSS modules

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