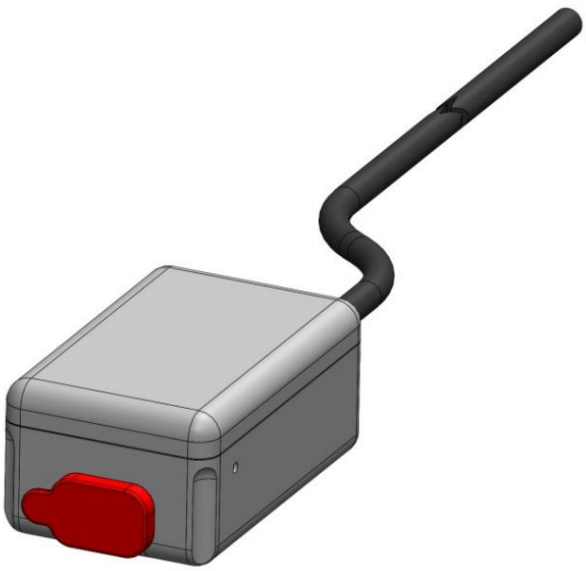
CAN-BOARD-LoadCell



CAN-BOARD-LoadCell detects the voltage differential of the wheatstone bridge of each load cell (or of any sensor that uses this configuration to measure physical quantities) and sends the value (with a 24-bit resolution) on the CAN bus

Introduction

CAN-BOARDs are programmable modules capable of detecting various electrical or physical signals (or from sensors or modules), processing them, and transmitting them over the CAN bus. For example, you can use the CAN-BOARD-LoadCell to detect the signal from a load cell (force sensing) and send the data over the CAN bus of a data logger or automotive system. You can also use the CAN-BOARD-GPS to detect geographic coordinates and ground speed via the GNSS system and send them over the CAN bus.

CAN-BOARDs can be programmed using the GUBELLINI DataSuite software (via a USB-C connection) to define the CAN ID, CAN baud rate, sampling frequency, and other parameters. All CAN-BOARDs share a common set of configuration parameters and some parameters specific to the specific model. Once programmed, each time the CAN-BOARD is turned on, it will detect the input signals (derived from a sensor or module) and transmit them on the CAN bus according to the programming specifications.

CAN-BOARDs are designed for use in a variety of fields (such as laboratory analysis and monitoring, machinery monitoring, precision agriculture, industrial monitoring, process analysis, automotive, motorsport, etc.). Each CAN-BOARD can also be easily used with our GUBELOG and MICROLOG dataloggers thanks to their datalogging capability via CAN bus.

CAN Bus Interface

- **Transceiver:** High-Speed CAN 2.0B.
- **Protocols:** Using the GUBELLINI DataStudio software it is possible to configure the CAN bus for according to OpenCAN protocols (EN-50325-4).
- **Termination:** The 120 Ohm termination resistor is present internally in the module.
- **CAN baud rate:** 250kbps, 500kbps, 1Mbps.
- **ID format:** CAN IDs can be set as desired, either in 11bit format (standard) or 29bit (extended format)
- **Endianess:** Little endian

Configuration software

The CAN-BOARDs can be programmed using the free GUBELLINI DataSuite software (via a USB-C connection).

Diet

CAN-BOARDs can be powered by a DC voltage of 7 to 24V. The main connector includes the +12V pin, CAN-H, CAN-L and GND.

USB-C connection

You can connect to the CAN-BOARD via a USB-C connector located on the back of the enclosure and protected by a rubber gasket. The USB connection allows you to send and receive configuration data.

Main Connector: (Automotive Grade)

To ensure maximum reliability in signal transmission and maintain the IPX7 waterproof certification, the physical interface of the CAN bus is via a 4-pin AMP Super Seal 1.5 series connector (code 282106-1).

PART 1: Hardware

1.1 CAN Bus Main Connector

To ensure maximum reliability in signal transmission and maintain the IPX7 waterproof certification, the physical interface is entrusted to a single automotive-grade connector.

Pin-out Table (CAN Bus Connector)

Pin	Name	Description	I
1	V BATT	Diet	POWER SUPPLY
2	CAN H	CAN line	CAN BUS
3	CAN L	CAN line	CAN BUS
4	GND	Mass	POWER SUPPLY

Pin-out Table (Load Cell Connector)

Pin	Name	Description	I
1	+3.3V	Wheatstone bridge power supply	POWER
2	Signal +	Positive Wheatstone bridge signal	Signal
3	Signal -	Wheatstone bridge negative signal	Signal
4	GND	Mass	POWER SUPPLY

1.2 Mechanical Specifications

- **Casing Material: Nylon PA12H.**
- **External Dimensions (L x W x H): E.g. 93 mm x 63 mm x 30 mm.**
- **Weight: 80 grams.**
- **Protection rating: IPX7.**
- **Operating Temperatures: From -20°C to +85°C.**

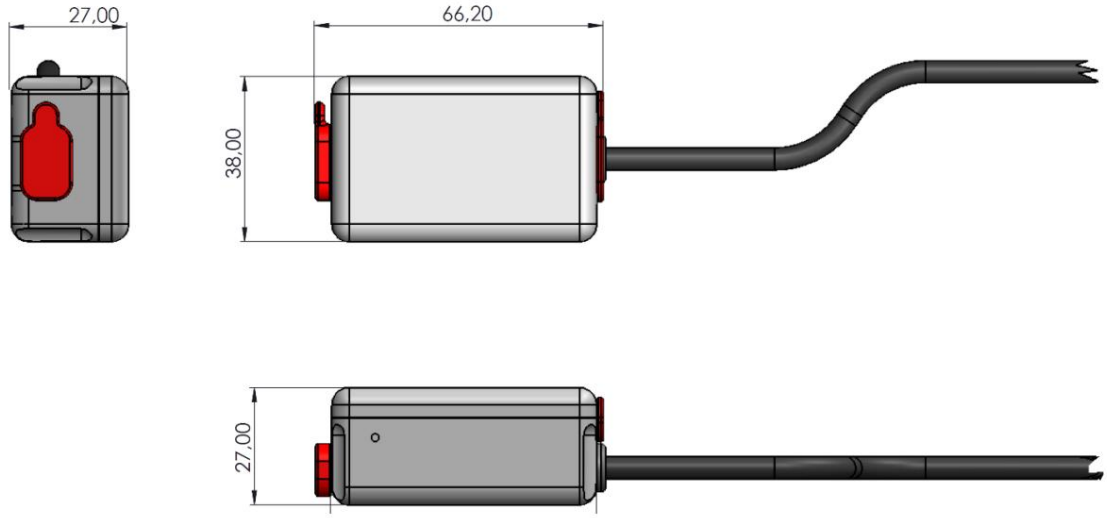
1.3 Electrical Specifications

CAN-BOARD-LoadCell detects the voltage differential of the wheatstone bridge of each load cell (or any sensor that uses this configuration to measure physical quantities)

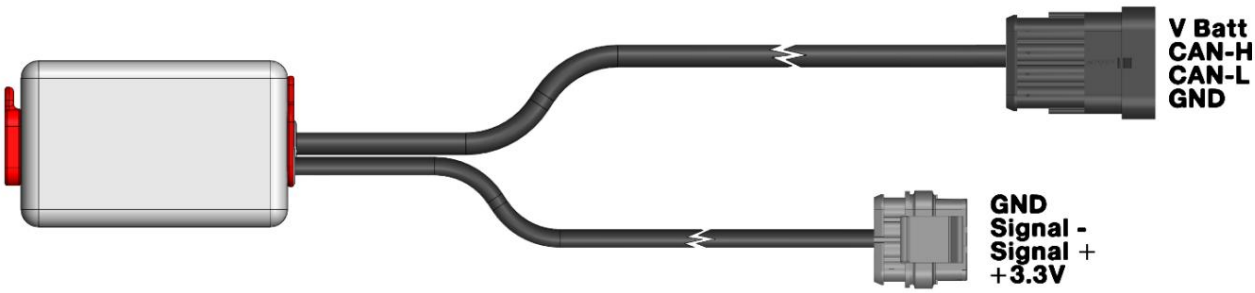
- **Vin Range:** +/- 50mV
- **Resolution:** 24bit
- **Format:** 2's complement
- **Sensor sampling rate:** 80Hz
- **Wheatstone bridge supply voltage:** 3.3V
- **CAN-BOARD supply voltage:** 7-24V
- **Current draw:** 80mA (excluding load cell current)
- **CAN transceiver:** High-Speed CAN 2.0B.

1.4 Technical Drawing and Dimensions

Note: The dimensions shown are expressed in millimeters (mm).



1.5 Connection diagram

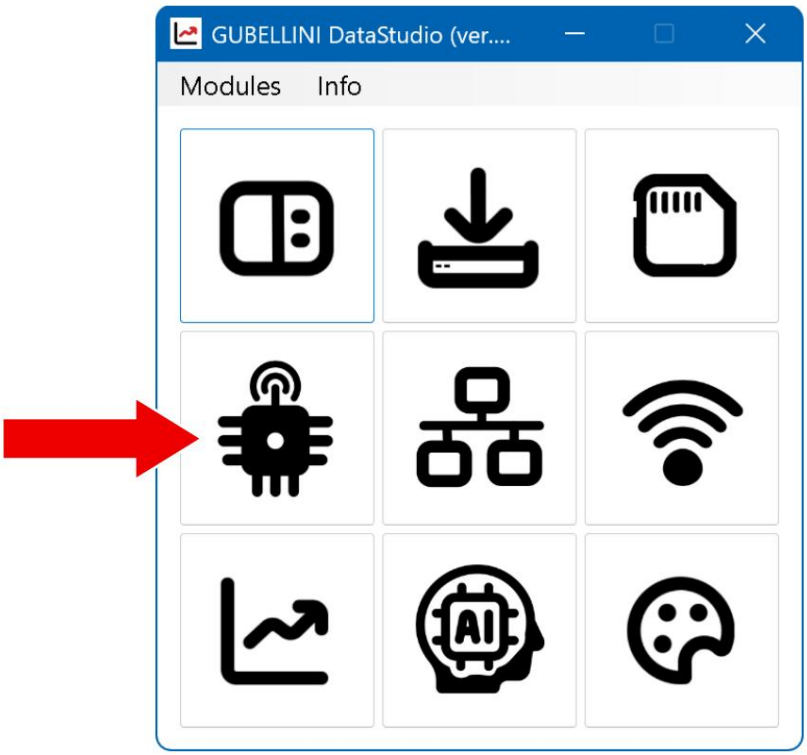


PART 2: Software

2.0 Introduction and Main Interface

CAN-BOARD is managed entirely through the GUBELLINI DataStudio software. Using GUBELLINI DataStudio, you can configure the device (setting IDs, sampling rates, and more). Download the software (in .zip format) from our website and copy it to your computer. Simply extract the contents of the .zip file. The software does not require installation. Run the GUBELLINIDataStudio.exe file to start the software.

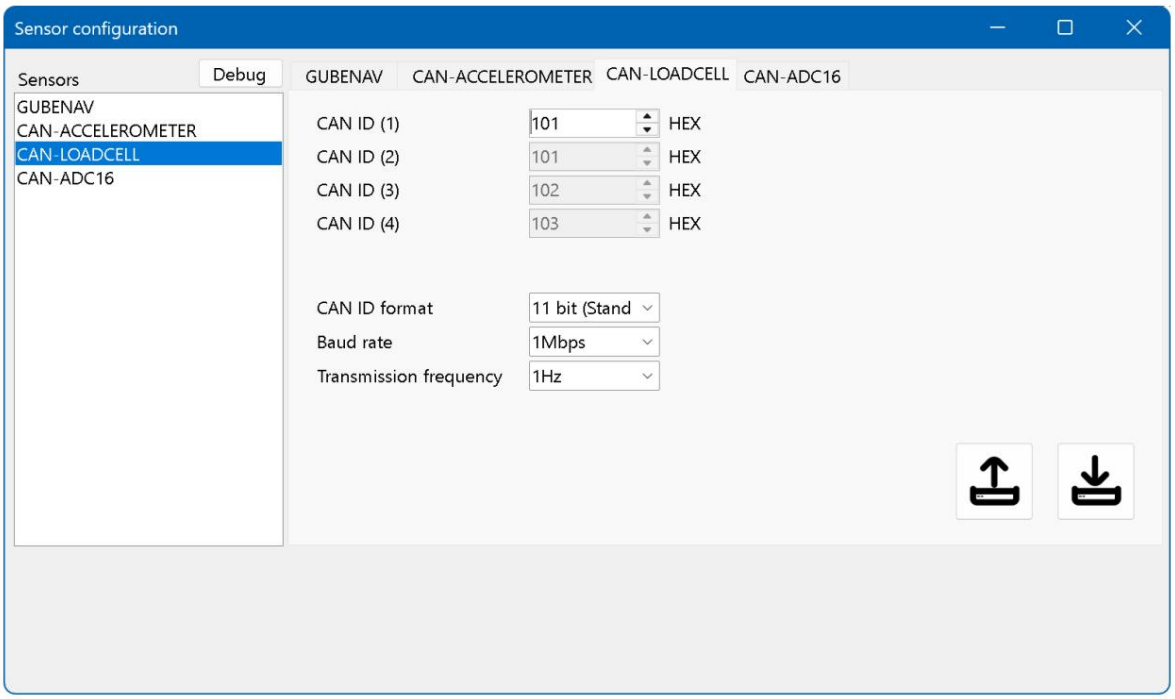
2.1 The Home Screen (Hub)



When you start the GUBELLINI DataStudio software, you will find yourself in front of the main screen, which acts as a real "command center" (Hub). From here you can quickly access all the modules of the program via large buttons. Clicking on the **SENSOR CONFIGURATION** button () accesses the main) Yes CAN-BOARD management panel. From here it will be possible to configure the parameters related to the device.

2.2 CAN-BOARD Configuration

In the SENSOR CONFIGURATION window you will find the list of available CAN-BOARDS on the left and the folders with the configuration parameters on the right.



For each folder (and for each CAN-BOARD) you will find the following parameters:

- **CAN ID:** Each CAN-BOARD (depending on the needs) can have up to 4 CAN IDs on which transmit. Each ID corresponds to an 8-byte CAN packet. Set the IDs according to the needs of your CAN network.
- **CAN ID format:** You can select the CAN ID format between standard (11bit) or standard format extended (29bit)
- **Baud Rate:** Choose the speed of the CAN bus (e.g. 1 Mbps, 500 Kbps or 250 Kbps).
- **Transmission Frequency:** this parameter indicates the frequency at which the CAN-BOARD Sends packets on the CAN bus. You can choose between 1Hz, 10Hz, 50Hz, or 100Hz. Be careful not to overload the CAN bus by sending too many packets. NOTE: The **Transmission Frequency** does not define the sampling frequency of the signal (derived from the sensor connected to the device or the information detected by the module included in the CAN-BOARD). The sampling frequency is fixed and depends on the specifications of the individual CAN-BOARDs.

2.3 Sending and Receiving Configuration

Connect the CAN-BOARD to your computer via the USB-C cable to power it. Use the “send” button ( ) to send the configuration parameters to the CAN-BOARD. Once the parameters are sent, they will remain stored in the internal Flash memory even after the power is turned off.

Use the “receive” button ( ) to receive the configuration parameters from the CAN-BOARD.

PART 3: CAN Bus

3.0 CAN Protocol

CAN-BOARD-LoadCell detects the voltage differential of the wheatstone bridge of each load cell (or of any sensor that uses this configuration to measure physical quantities) and sends the value (with a 24-bit resolution) on the CAN bus.

CAN-BOARD-LoadCell uses ID1 to send data on the CAN bus.

	BYTE7	BYTE6	BYTE5	BYTE4	BYTE3	BYTE2	BYTE1	BYTE0
ID1	12	0	0	0	0	Value (bits 16..23)	Value (bits 8..15)	Value (bits 0..7)
ID2	Not used	Not used	Not used	Not used	Not used	Not used	Not used	Not used
ID3	Not used	Not used	Not used	Not used	Not used	Not used	Not used	Not used
ID4	Not used	Not used	Not used	Not used	Not used	Not used	Not used	Not used

- Data: Delta Vin
- Description: value expressed in volts given by (Signal+) – (Signal-)
- Date length: 24bit
- Start bit: 0
- Format: 24bit signed (2-complement)
- Endianess: little endian
- CAN packet payload: 8 bytes
- Formula: Delta Vin = (Value * 3.3) / (32 * 2^24)

Practical example

I use a 0-500kg (full scale) load cell with a sensitivity of 10mV/V

I subject the cell to a weight of 100kg and I obtain a **Delta Vin** equal to:

(100kg / 500kg) * 10mV/V * 3.3V = 6.6mV

Value results:

(0.0066V * 32 * 2^24) / 3.3 = 1073741

Note: Bytes 3 to 7 always return the values indicated in the table to be recognized by our dataloggers

GUBELLINI sas by Diego Gubellini & C.

Via Euridia Bergianti 10B 40059 Medicina BO Italy | VAT IT 03466001207

URL. https://www.gubellinielectronics.com | https://www.gripone.com

EMAIL. info@gubellinielectronics.com | info@gripone.com