CAN TRANSCEIVER

CAN – Galvanic-Isolation Daugther Board

Purpose of the Document

The purpose of this document is to explain the technical specifications and manual for using the daugther board which has CAN Galvanically-Isolated Transceiver.

Document History

Version	Author	Date	Description
A	5G HUB	26.10.2024	Initial Document

Table of Contents

1 Package contents:

1.1 CAN transceiver Board:

- CAN Transceiver daughter board.
  The daugther board is used with the STM32 motherboard.

1.2 Download

Install STM32CubeProgrammer for Windows.
https://www.st.com/en/development-tools/stm32cubeprog.html

Arduino software can be downloaded from the following website:
https://github.com/5ghub/stm32

To use the board with Arduino IDE and start running Arduino projects and sketches, install the following software:

Install Arduino IDE for Windows from the following web site
https://www.arduino.cc/en/Main/Software

2 General Description

2.1 Overview

This is a controller Area Network (CAN) board. As a CAN transceiver, the device provides differential transmit capability to the bus and differential receive capability to a CAN controller at signaling rates up to 1 Mega Bit per Second (Mbps). The board is designed for operation in especially harsh environments, and it features cross-wire, overvoltage and loss of ground protection from –27 V to 40 V and overtemperature shutdown, as well as –12V to 12V common-mode range.

The CAN board is ISO1050 which is a galvanically isolated CAN transceiver that meets the specifications of the ISO11898-2 standard. The board has the logic input and output buffers separated by a silicon oxide (SiO2) insulation barrier that provides galvanic isolation of up to 5000 VRMS. Included in the glavnic-isolated CAN board, the isolated power supply. The isolated power supply prevents noise currents on a data bus or other circuits from entering the local ground and interfering with or damaging sensitive circuitry.

The ISO1050 CAN is characterized for operation over the ambient temperature range of –55°C to 105°C.

2.2 Key Features

- ISO1050 galvanic-isolated CAN transceiver
- Used with STM32F072 Motherboard
- Support CAN 2.0A (11-bit ID) and 2.0B (29-bit ID)
- CAN baud rate up to 1 Mbps
- Meets the requirements of ISO11898-2
- 5000-VRMS isolation (ISO1050DW)
- Fail-safe outputs
- Low loop delay: 150 ns (typical), 210 ns
- (maximum)
- 50-kV/µs typical transient immunity
- Bus-fault protection of –27 V to 40 V
- Driver (TXD) dominant time-out function
- Safety-related certifications
- Compact board size of 35 mm x 25mm
- Arduino IDE Compatible
- Ready as a CAN adaptor, CAN application, vehicle CAN reader, OBDs (On Board vehicle Diagnostic).
- Works with CAN bus standards such as CANopen, DeviceNet, NMEA2000, ARINC825, ISO11783, CAN Kingdom, CANaerospace

2.3 Overview Diagrams

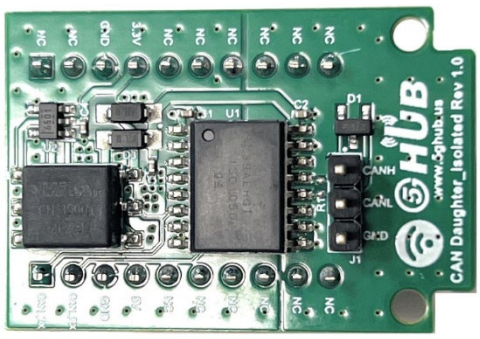

Figure 1. CAN Transceiver Overview Diagram – Top View

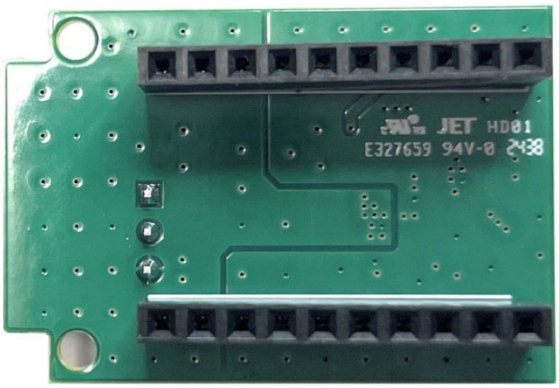

Figure 2. CAN Transceiver Overview Diagram – Bottom View

2.4 Physical Characteristics

The width and length of the USB modem is 350 mm (width) by 255 mm (length). The board have two screw holes in each corner that allows the board to be attached to a surface or case.

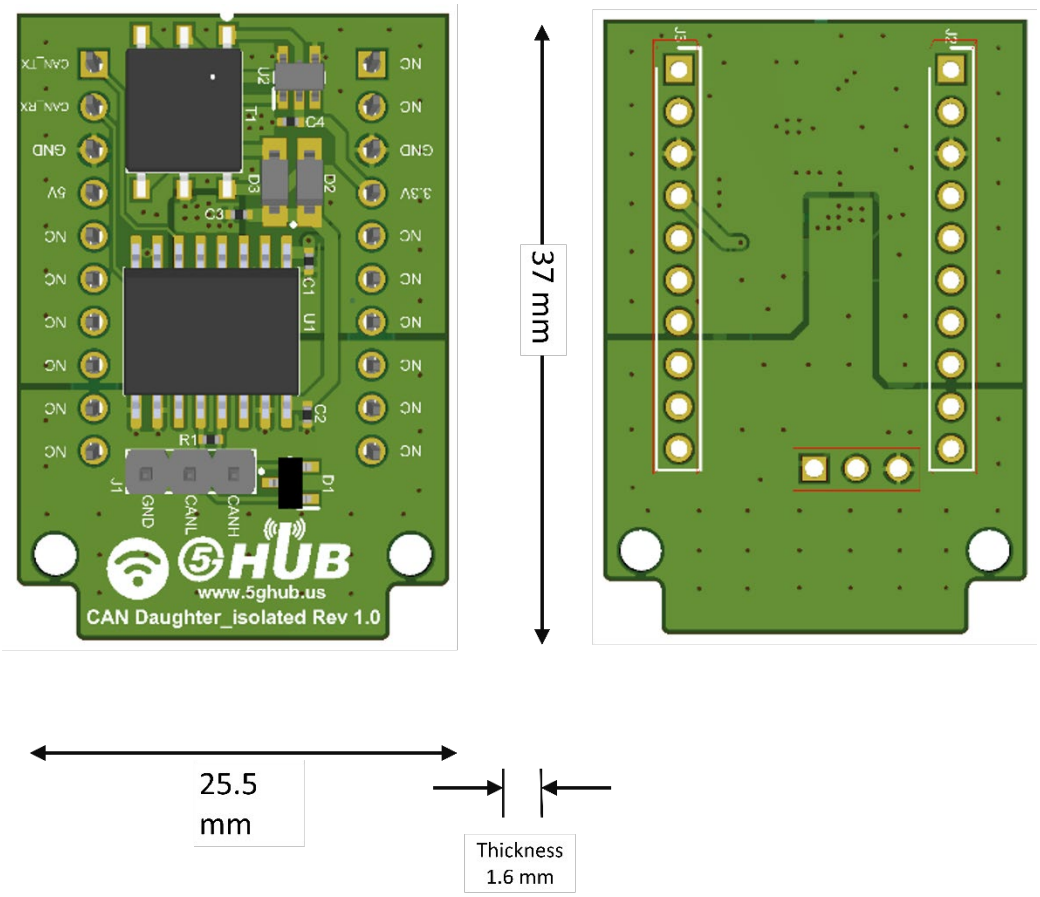

Figure 3. Physical Characteristics.

2.5 Peripherals – Key Components

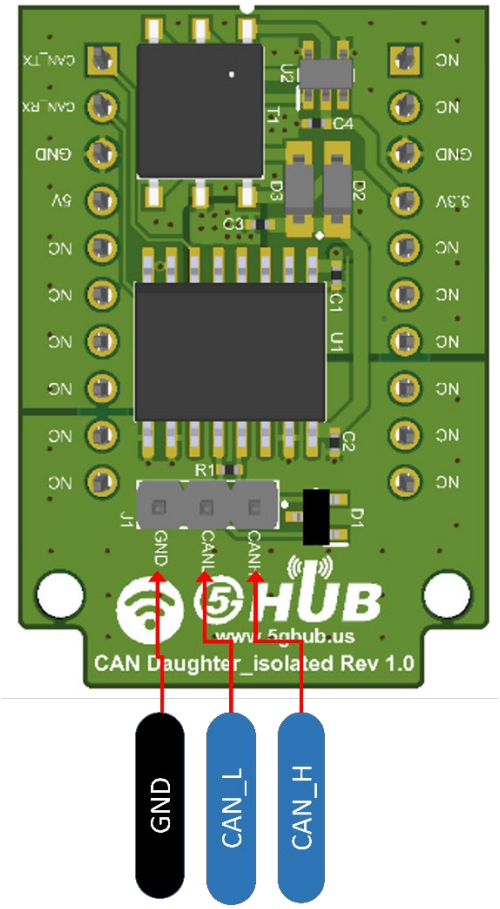

Figure 4. CAN Transceiver Board Top Side

2.6 PIN Description

PIN	DIRECTION	Description
CAN_H	IO	CAN High
CAN_L	IO	CAN Low
GND	I	Ground

3 Using the Board with Arduino IDE

3.1 Installing the Software

To use the board with Arduino IDE and start running Arduino projects and sketches, install the necessary software for Arduino.

3.2 Setting Up the Motherboard

The motherboard is shown below. Follow the instructions in the STM32 motherboard documentation to set it up for Arduino.

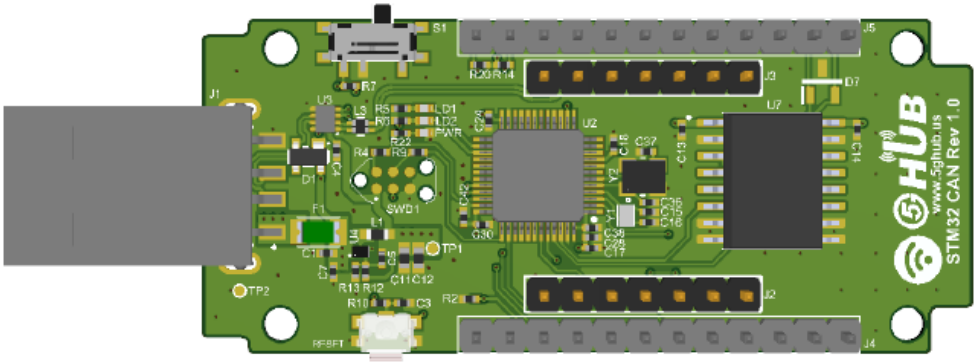

Figure 5. STM32 Motherboard

3.3 Setting Up the CAN Daughterboard

The CAN daughterboard can be stacked and plugged into the STM32 motherboard. The motherboard communicates with the daughterboard through the two jumper pin headers J2 and J3.

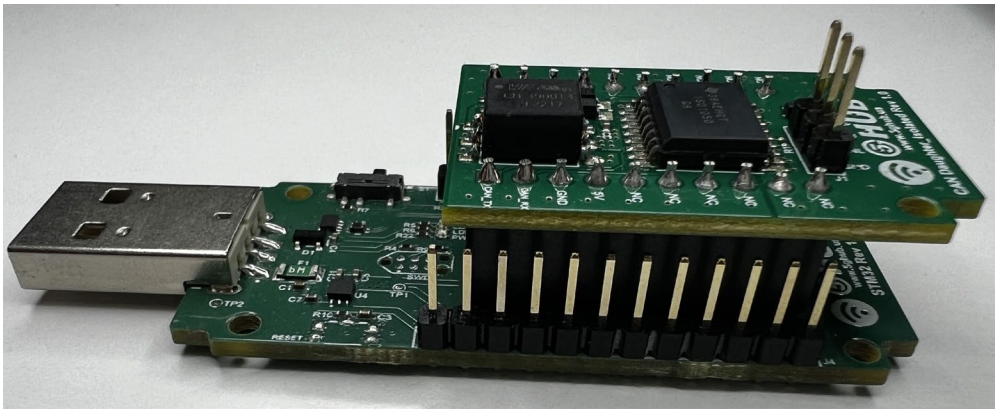

Figure 6. Stacked CAN Transceiver Daughterboard with the Motherboard

4 Application as CAN Adaptor for OBD Application

When the CAN transceiver is stacked into the STM32 motherboard, it can be used with the OBD II cable. The CAN High and CAN Low pins on the OBD socket are shown as in the figure below.

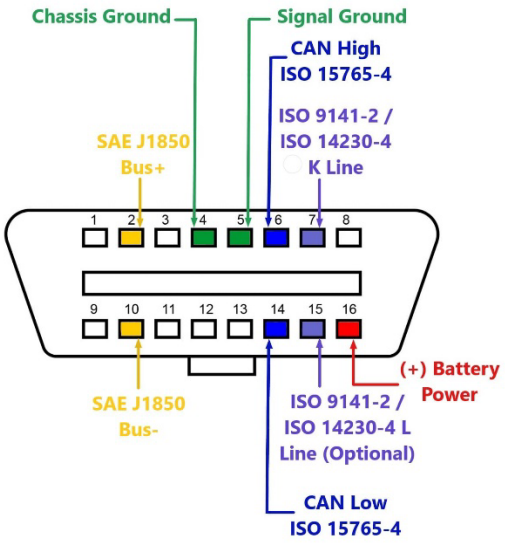

Figure 7. OBD II Socket in Vehicle

Insert and connect the OBD II cable to a vehicle OBD socket and then connect the two wires in the OBD II cable to the CAN_H and CAN_L on the CAN transceiver board. Using Arduino software and OBD emulator, the vehicle telematics CAN data can be read and written from the vehicle. Different telematics can be obtained from the CAN traffic such as vehicle speed, engine speed, fuel Level, throttle position, and many more OBD telematics data.

The OBD Emulator used is shown in the figure below and the use of the hardware setup for the motherboard, CAN transceiver board, and OBD II cable are also shown.

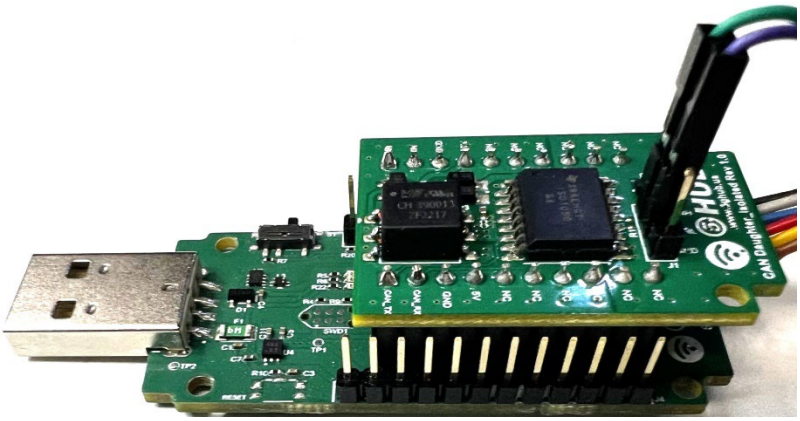

Figure 8. Hardware Setup

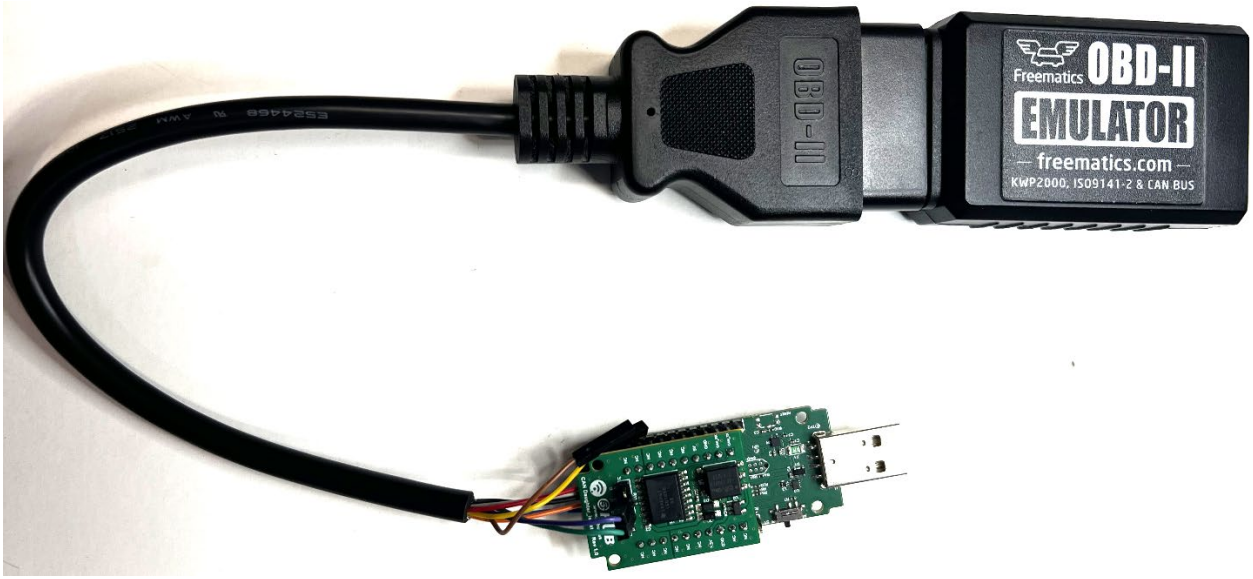

Figure 9. Hardware Setup with OBD Emulator

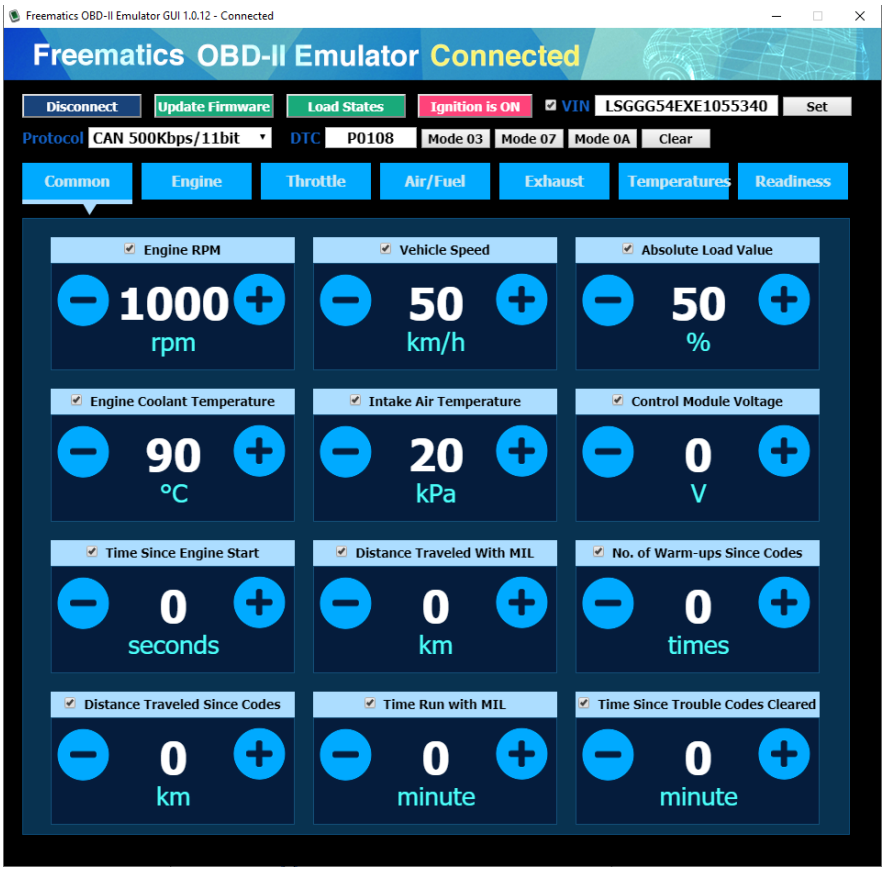

Figure 10. OBD II Emulator

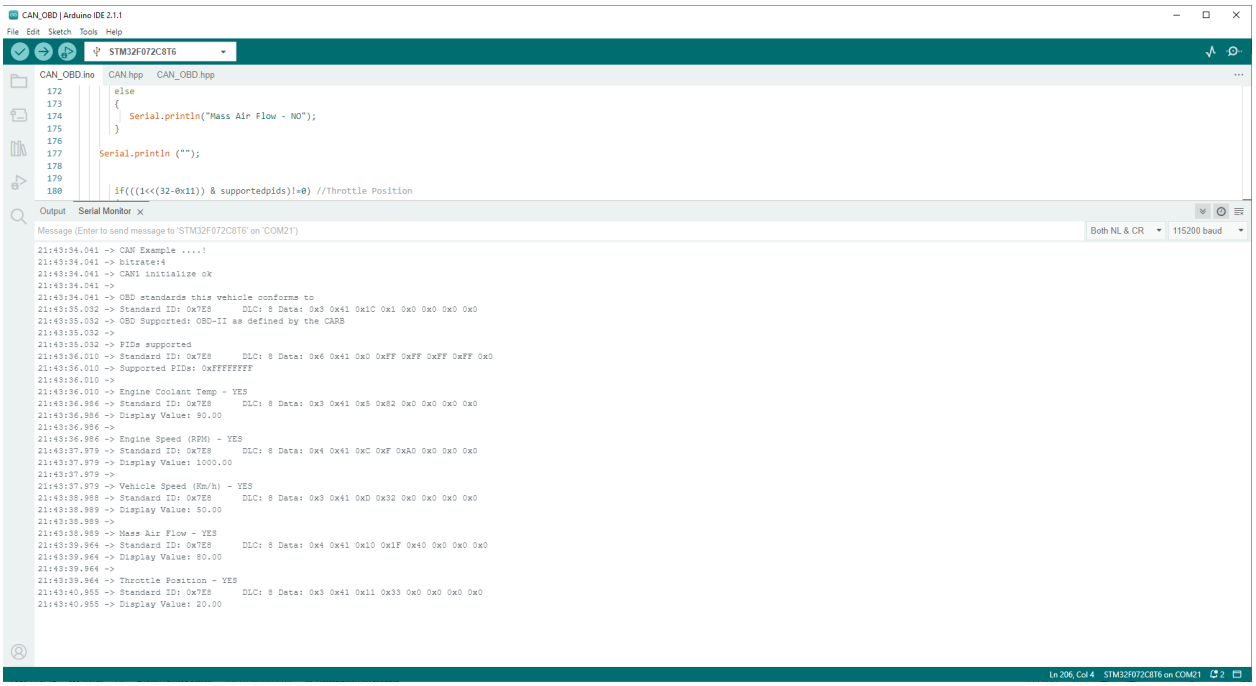

Figure 11. Arduino IDE Sketch for OBD