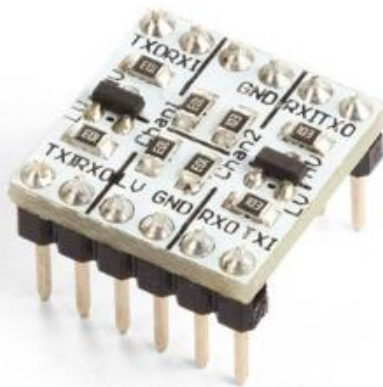# WHADDA

EXCITING ELECTRONICS

EN Arduino® 3.3 V/5 V TTL logic level converter module

WPI410

Introduction

To all residents of the European Union
Important environmental information about this product
This symbol on the device or the package indicates that disposal of the device after its lifecycle could harm the environment. Do not dispose of the unit (or batteries) as unsorted municipal waste; it should be taken to a specialized company for recycling. This device should be returned to your distributor or to a local recycling service. Respect the local environmental rules.
If in doubt, contact your local waste disposal authorities.

Thank you for choosing Whadda! Please read the manual thoroughly before bringing this device into service. If the device was damaged in transit, do not install or use it and contact your dealer.

Safety Instructions

Read and understand this manual and all safety signs before using this appliance.

For indoor use only.

- This device can be used by children aged from 8 years and above, and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning the use of the device in a safe way and understand the hazards involved. Children shall not play with the device. Cleaning and user maintenance shall not be made by children without supervision.

General Guidelines

- Refer to the Velleman® Service and Quality Warranty on the last pages of this manual.
- All modifications of the device are forbidden for safety reasons. Damage caused by user modifications to the device is not covered by the warranty.
- Only use the device for its intended purpose. Using the device in an unauthorized way will void the warranty.
- Damage caused by disregard of certain guidelines in this manual is not covered by the warranty and the dealer will not accept responsibility for any ensuing defects or problems.
- Nor Velleman Group nv nor its dealers can be held responsible for any damage (extraordinary, incidental or indirect) – of any nature (financial, physical…) arising from the possession, use or failure of this product.
- Keep this manual for future reference.

What is Arduino®

Arduino® is an open-source prototyping platform based on easy-to-use hardware and software. Arduino® boards are able to read inputs – light-on sensor, a finger on a button or a Twitter message – and turn it into an output – activating of a motor, turning on an LED, publishing something online. You can tell your board what to do by sending a set of instructions to the microcontroller on the board. To do so, you use the Arduino programming language (based on Wiring) and the Arduino® software IDE (based on Processing). Additional shields/modules/components are required for reading a twitter message or publishing online. Surf to www.arduino.cc for more information.

Product Overview

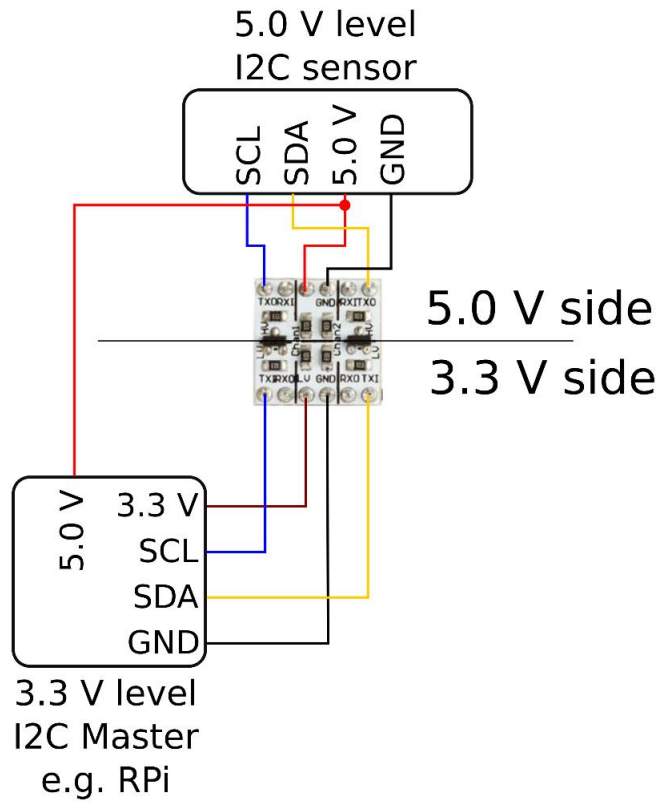This module allows to use 3.3 V sensors on a 5 V microcontroller.

Specifications

- low side (3.3 V): 2 inputs and 2 outputs
- high side (5 V): 2 inputs and 2 outputs
- other connections: Vlow (3.3 V), VHigh (5 V), pass-trough GND
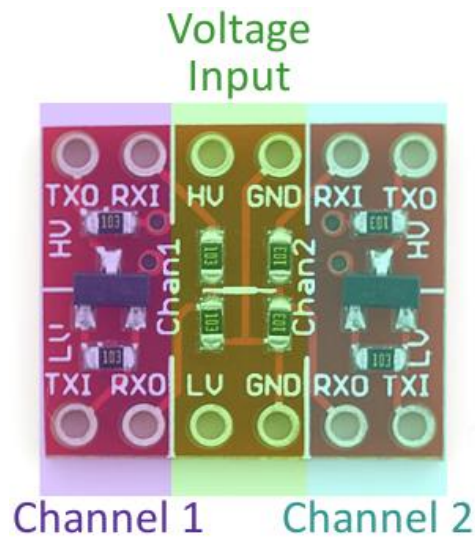- dimensions: 15 x 16 x 15 mm (0.59 x 0.62 x 0.59")

Features

- breadboard compatible

Circuit Diagram

5.0 V level I2C sensor
SCL SDA 5.0 V GND

5.0 V side
3.3 V side

3.3 V level I2C Master e.g. RPi
5.0 V 3.3 V SCL SDA GND

Use

The WPI410 LLC is very easy-to-use. The twelve pins – six on each side – can be divided into groups of three.

Voltage Input

Channel 1   Channel 2

The middle section of the board serves the high and low voltages. Supplying voltage to all four of these pins is required.

Example: To convert 3.3 V into 5 V, run the 5 V into the HV side and 3.3 V into the LV side. Also, make sure each is grounded.

The outer pins serve as inputs and outputs for channels 1 and 2. Each channel has one voltage divider and one MOSFET shifter.

RXI	High-voltage input to voltage divider from the high-voltage device. The signal will be shifted down and sent to the low-voltage device on the RXO pin.
RXO	Low-voltage input from voltage divider to the low-voltage device. The signal will be shifted down from the RXI input.
TXI	Low-voltage input/output of the MOSFET circuit. This pin interacts with the TXO on the high side. Bi-directional, can be used for I2C lines (SDA or SCL).
TXO	High-voltage input/output of the MOSFET circuit. This pin interacts with the TXI on the low side. Bi-directional, can be used for I2C lines (SDA or SCL).
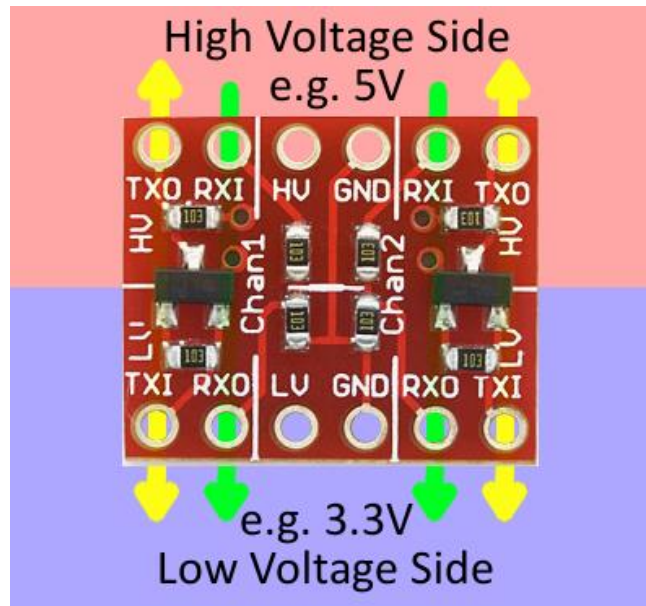
To send a signal from the low-voltage side to the high-voltage side (e.g. from 3.3 V to 5 V), the signal must be input at TXI. It will pass through the converter and come out as a higher voltage on the TXO (transmit output) pin.

On the other hand, a signal that strictly travels from high to low voltage should pass from RXI to RXO.

Sending a signal from the high side to the low side is less restricted. We can use either the bi-directional channel or the voltage divider, but we may need to leave the bi-directional channel for converting from low-to-high.