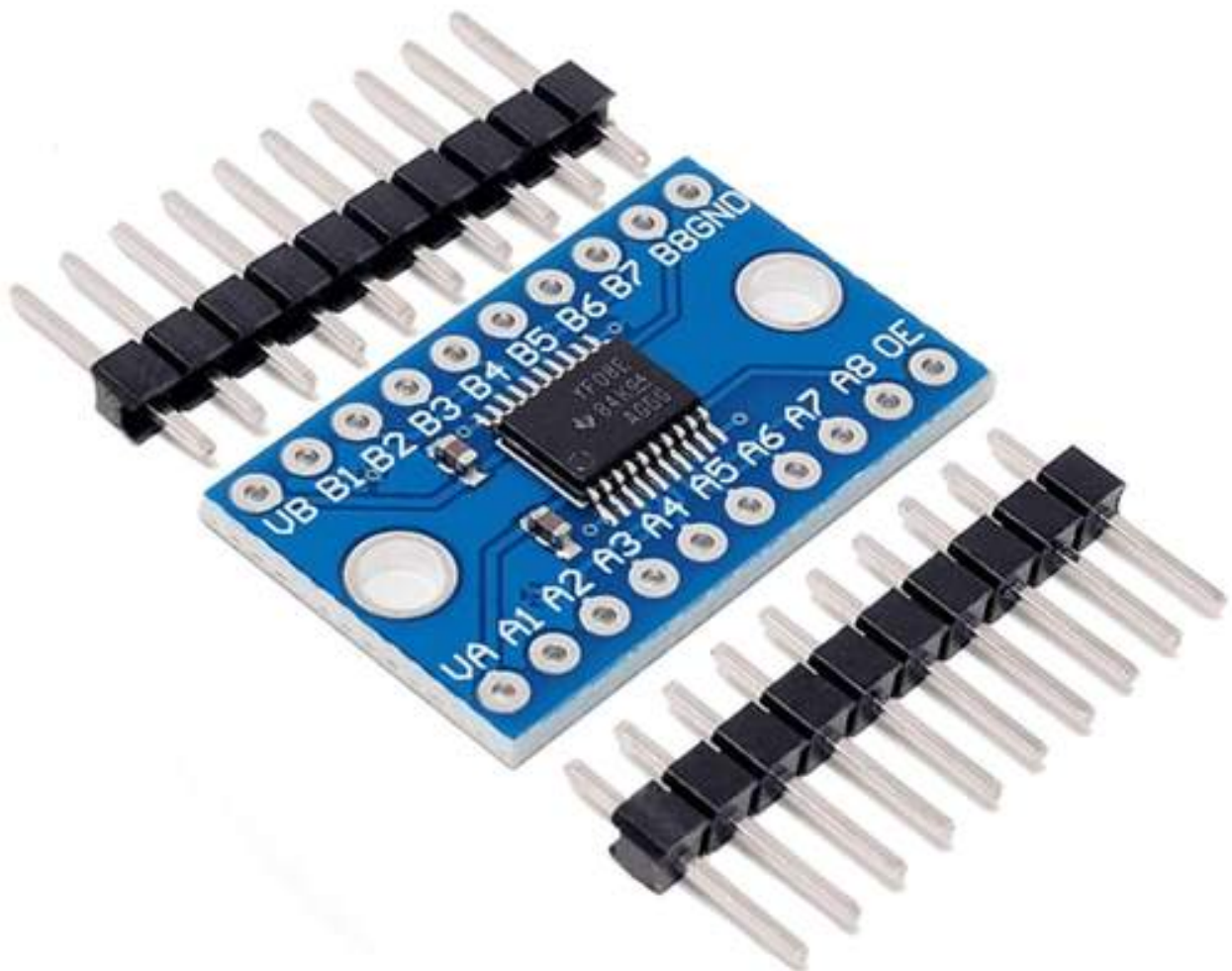


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Welcome!

Thank you for purchasing our *AZ-Delivery Logic Level Converter TXS0108E*. On the following pages, you will be introduced to how to use and set up this handy device.

Have fun!



Areas of application

Education and teaching: Use in schools, universities and training institutions to teach the basics of electronics, programming and embedded systems. Research and development: Use in research and development projects to create prototypes and experiments in the fields of electronics and computer science. Prototype development: Use in the development and testing of new electronic circuits and devices. Hobby and Maker Projects: Used by electronics enthusiasts and hobbyists to develop and implement DIY projects.

Required knowledge and skills

Basic understanding of electronics and electrical engineering. Knowledge of programming, especially in the C/C++ programming language. Ability to read schematics and design simple circuits. Experience working with electronic components and soldering.

Operating conditions

The product may only be operated with the voltages specified in the data sheet to avoid damage. A stabilized DC power source is required for operation. When connecting to other electronic components and circuits, the maximum current and voltage limits must be observed to avoid overloads and damage.

Environmental conditions

The product should be used in a clean, dry environment to avoid damage caused by moisture or dust. Protect the product from direct sunlight (UV)

Intended Use

The product is designed for use in educational, research and development environments. It is used to develop, program and prototype electronic projects and applications. The Sensor product is not intended as a finished consumer product, but rather as a tool for technically savvy users, including engineers, developers, researchers and students.

Improper foreseeable use

The product is not suitable for industrial use or safety-relevant applications. Use of the product in medical devices or for aviation and space travel purposes is not permitted

disposal

Do not discard with household waste! Your product is according to the European one Directive on waste electrical and electronic equipment to be disposed of in an environmentally friendly manner. The valuable raw materials contained therein can be recycled become. The application of this directive contributes to environmental and health protection. Use the collection point set up by your municipality to return and Recycling of old electrical and electronic devices. WEEE Reg. No.: DE 62624346

electrostatic discharge

Attention: Electrostatic discharges can damage the product. Note: Ground yourself before touching the product, such as by wearing an anti-static wrist strap or touching a grounded metal surface.

safety instructions

Although our product complies with the requirements of the RoHS Directive (2011/65/EU) and does not contain any hazardous substances in quantities above the permitted limits, residues may still be present. Observe the following safety instructions to avoid chemical hazards: Caution: Soldering can produce fumes that can be harmful to health. Note: Use a solder fume extractor or work in a well-ventilated area. If necessary, wear a respirator mask. Caution: Some people may be sensitive to certain materials or chemicals contained in the product. Note: If skin irritation or allergic reactions occur, stop use and, if necessary, consult a doctor. Caution: Keep the product out of the reach of children and pets to avoid accidental contact and swallowing of small parts. Note: Store the product in a safe, closed container when not in use. Attention: Avoid contact of the product with food and drinks. Note: Do not store or use the product near food to prevent contamination. Although our product complies with the requirements of the RoHS Directive (2011/65/EU) and does not contain any hazardous substances in quantities above the permitted limits, residues may still be present. Observe the following safety instructions to avoid chemical hazards: Caution: Soldering can produce fumes that can be harmful to health. Note: Use a solder fume extractor or work in a well-ventilated area. If necessary, wear a respirator mask. Caution: Some people may be sensitive to certain materials or chemicals contained in the product. Note: If skin irritation or allergic reactions occur, stop use and, if necessary,

consult a doctor. Caution: Keep the product out of the reach of children and pets to avoid accidental contact and swallowing of small parts. Note: Store the product in a safe, closed container when not in use. Attention: Avoid contact of the product with food and drinks. Note: Do not store or use the product near food to prevent contamination. The product contains sensitive electronic components and sharp edges. Improper handling or assembly can result in injury or damage. Observe the following safety instructions to avoid mechanical hazards: Attention: The product's circuit board and connectors may have sharp edges. Use caution to avoid cuts. Note: Wear appropriate protective gloves when handling and assembling the product. Caution: Avoid excessive pressure or mechanical stress on the board and components. Note: Only mount the product on stable and flat surfaces. Use appropriate spacers and housings to minimize mechanical stress. Attention: Make sure the product is securely fastened to prevent accidental slipping or falling. Note: Use appropriate support or secure mounting in enclosures or on mounting plates. Caution: Make sure all cable connections are connected securely and correctly to avoid strain and accidental unplugging. Note: Route cables so that they are not under tension and do not pose a tripping hazard. The product operates with electrical voltages and currents that, if used improperly, can result in electric shocks, short circuits or other hazards. Observe the following safety instructions to avoid electrical hazards: Attention: Use the product only with the specified voltages. Note: The performance limits of the product can be found in the associated data sheet Caution: Avoid short circuits between the connectors and components of the product Note: Make sure that no conductive objects touch or bridge the circuit board. Use insulated tools and pay attention to the arrangement of connections. Caution: Do not perform any work on the product when it is connected to a power source. Note: Disconnect the product from power before making any circuit changes or connecting or removing components. Caution: Do not exceed the specified current ratings for the product's inputs and outputs. Note: The performance limits of the product can be found in the technical specifications or in the data sheet Attention: Make sure that the power sources used are stable and correctly sized. Note: Only use tested and suitable power supplies to avoid voltage fluctuations and overloads. Attention: Maintain sufficient distance from live parts to avoid accidental contact. Note: Ensure that the cabling is arranged safely and clearly according to the voltage used. Caution: Use insulating housings or protective covers to protect the product from direct contact. Note: Place the product in a non-conductive case to avoid accidental touching and short circuits. The product and the components on it may become warm during operation. Improper handling or overloading the product can result in burns, damage or fire. Observe the following safety instructions to avoid thermal hazards: Caution: Make sure the product is used within recommended operating temperatures. Note: The recommended operating temperature range is typically between -40°C and +85°C. Check the specific information in the product data sheet. Attention: Do not place the product near external heat sources such as radiators or direct sunlight. Note: Ensure that the product is operated in a cool and well-ventilated area. Attention: Make sure the product is well ventilated to avoid overheating. Note: Use fans or heat sinks when operating the product in a closed enclosure or in an environment with limited air circulation. Attention: Mount the product on heat-resistant surfaces and in heat-resistant housings. Note: Use enclosure materials that can withstand high temperatures to avoid damage or fire hazard. Caution: Implement temperature monitoring when using an enclosure and, if necessary, protection mechanisms that shut down the product if it overheats. Note: Note: Use temperature sensors and appropriate software to monitor the temperature of the product and shut down the system if necessary. Caution: Avoid overloads that can cause excessive heating of components. Note: To prevent overheating, do not exceed the specified current and voltage limits. Caution: Short circuits can generate significant heat and cause fires. Note: Make sure that all connections are correct and secure and that no conductive objects can accidentally cause short circuits.



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Introduction

A logic level converter is a circuit that is used to translate signals from one logic level or voltage domain to another, allowing compatibility among different ICs (integrated circuits) with different voltage requirements. It is also called logic level shifter or voltage level translator. The level converter can be uni-directional, where all input pins are dedicated to one voltage domain and all output pins to the other, and bi-directional, where each voltage domain has both input and output pins. Simply put, level converters fix voltage incompatibility between various elements of the system. It connects one digital circuit that uses one logic level to another digital circuit that uses another logic level.

A logic level, in a digital circuit, is a specific voltage or a state in which a signal can exist. Usually, the two states in the digital circuit are referred to be ON (which translated to binary is *1*), or OFF (which is *0* when translated to binary). In Atmega328p, these signals are called HIGH (for ON and binary *1*) or LOW (for OFF and binary *0*). The strength of a signal is usually represented by its voltage level (the voltage difference between the signal and the ground).

Specifications

- » Bi-directional
- » Automatic direction control
- » Maximum data rates:
 - 110 Mbps (push pull)
 - 1.2 Mbps (open drain)
- » Low voltage 1.4 to 3.6 V
- » High voltage 1.65 to 5.5 V
- » Dimensions: 26 x 16 mm

Logic Level Converter TXS0108E is an 8-bit non-inverting level converter which uses two separate configurable power-supply rails. This device is created for open-drain applications, but it also can translate push-pull CMOS (complementary metal-oxide-semiconductor) logic outputs.

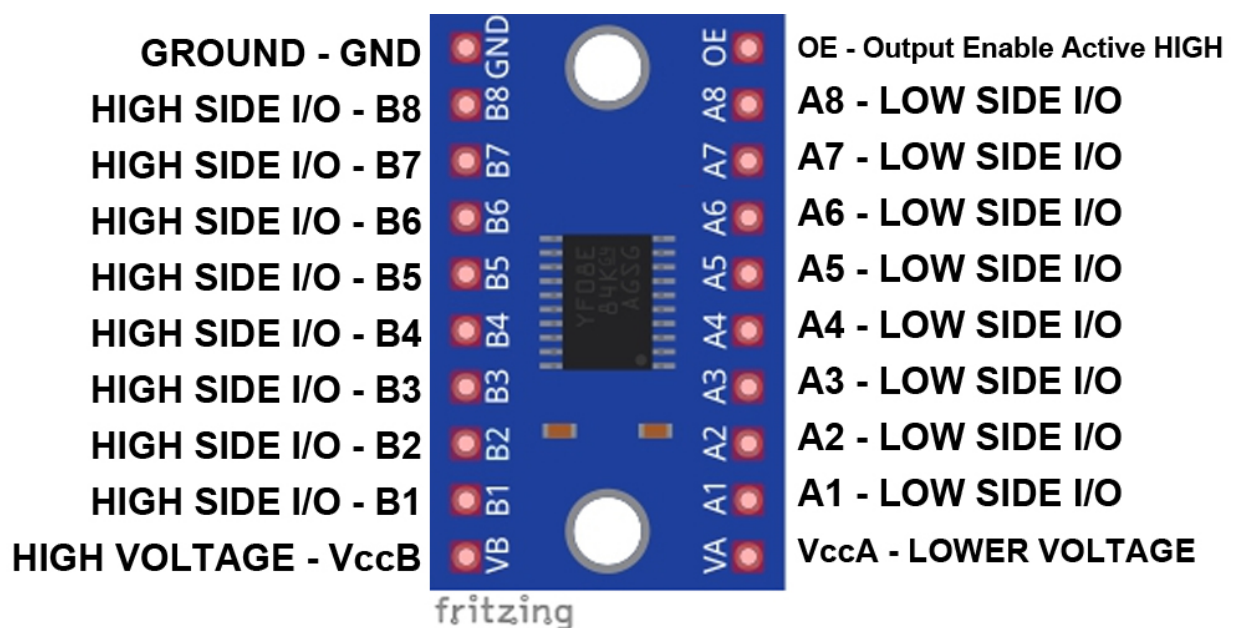
The A-port accepts I/O voltages varying from 1.4 V to 3.6 V. The B-port accepts I/O voltages from 1.65 V to 5.5 V.

Electrostatic Discharge Caution: This device has limited built-in ESD protection. To prevent electrostatic damage to the MOS (Metal Oxide Semiconductor) gates, the leads should be shorted together or the device placed in conductive foam during storage or handling.

For further information on open drain circuitry we provide the link to Wikipedia [here](#).

The pinout

The Logic Level Converter TXS0108E has 20 pins. The pinout is shown in the following image:



The VCCA pin receives any supply voltage between 1.4 V and 3.6 V. The A port tracks the VCCA pin supply voltage. The VCCB pin receives any supply voltage between 1.65 V and 5.5 V. The B port tracks the VCCB pin supply voltage. Two 0.1mF capacitors are recommended between the VCC connectors and GROUND.

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GROUND is connected to both devices. And OE (Output Enable) is connected to VCCA (the lower voltage) through a 10 kOhm pullup resistor.

B1 to B8 and A1 to A8 are eight independent signal pins. Pull-up resistors for the signal lines have been integrated in the chip.

How to set-up Arduino IDE

If the Arduino IDE is not installed, follow the [link](#) and download the installation file for the operating system of choice.

Download the Arduino IDE



The screenshot shows the Arduino IDE download page. On the left, there is a teal circle with a white infinity symbol containing a minus and a plus sign. To its right, the text reads: **ARDUINO 1.8.12**, followed by a description of the IDE as open-source software that runs on Windows, Mac OS X, and Linux. On the right side of the page, there are links for downloading the IDE for various operating systems: Windows (Installer and ZIP file), Windows app (with a 'Get' button), Mac OS X (10.8 Mountain Lion or newer), and Linux (32 bits, 64 bits, ARM 32 bits, and ARM 64 bits). At the bottom right, there are links for Release Notes, Source Code, and Checksums (sha512).

ARDUINO 1.8.12
The open-source Arduino Software (IDE) makes it easy to write code and upload it to the board. It runs on Windows, Mac OS X, and Linux. The environment is written in Java and based on Processing and other open-source software.
This software can be used with any Arduino board. Refer to the [Getting Started](#) page for Installation instructions.

Windows Installer, for Windows XP and up
Windows ZIP file for non admin install

Windows app Requires Win 8.1 or 10
[Get](#)

Mac OS X 10.8 Mountain Lion or newer

Linux 32 bits
Linux 64 bits
Linux ARM 32 bits
Linux ARM 64 bits

[Release Notes](#)
[Source Code](#)
[Checksums \(sha512\)](#)

For *Windows* users, double click on the downloaded .exe file and follow the instructions in the installation window.

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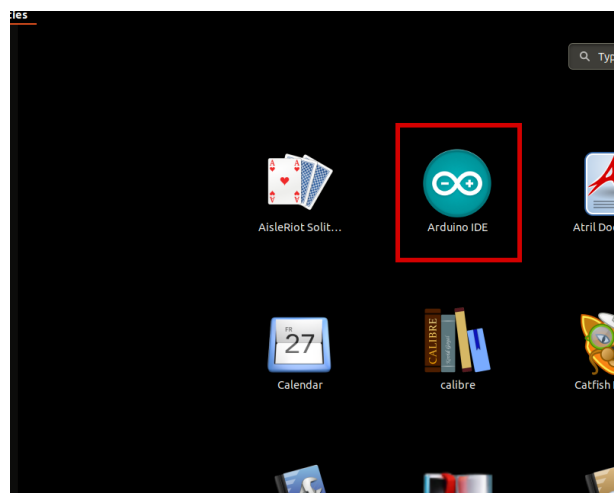
For *Linux* users, download a file with the extension *.tar.xz*, which has to be extracted. When it is extracted, go to the extracted directory and open the terminal in that directory. Two *.sh* scripts have to be executed, the first called *arduino-linux-setup.sh* and the second called *install.sh*.

To run the first script in the terminal, open the terminal in the extracted directory and run the following command:

```
sh arduino-linux-setup.sh user_name
```

user_name - is the name of a superuser in Linux operating system. A password for the superuser has to be entered when the command is started. Wait for a few minutes for the script to complete everything.

The second script, called *install.sh*, has to be used after the installation of the first script. Run the following command in the terminal (extracted directory): **sh install.sh**



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After the installation of these scripts, go to the *All Apps*, where the *Arduino IDE* is installed.

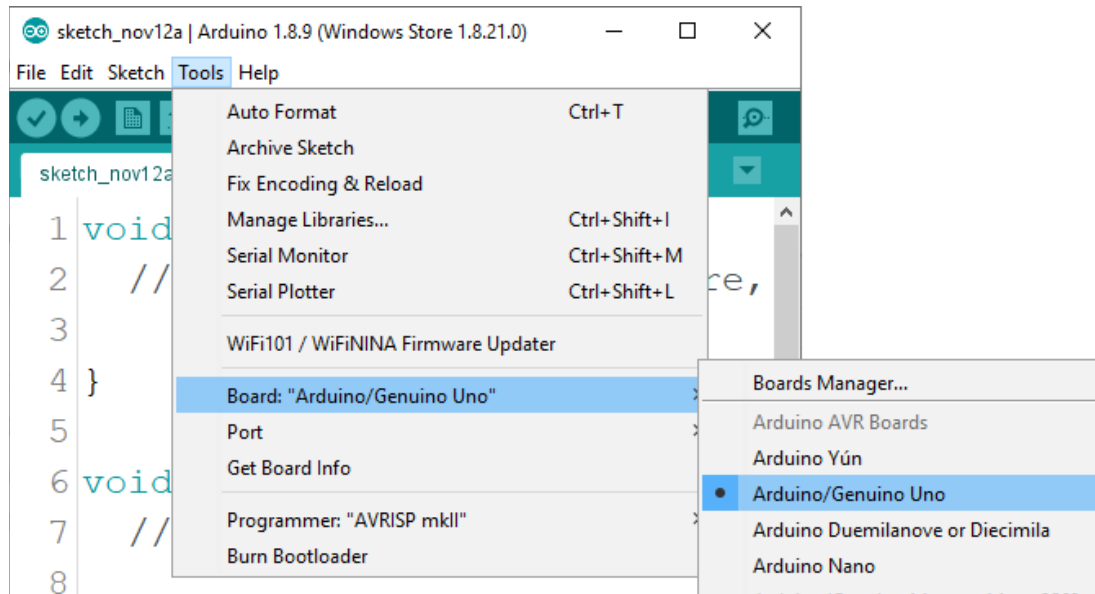
Almost all operating systems come with a text editor preinstalled (for example, *Windows* comes with *Notepad*, *Linux Ubuntu* comes with *Gedit*, *Linux Raspbian* comes with *Leafpad*, etc.). All of these text editors are perfectly fine for the purpose of the eBook.

Next thing is to check if your PC can detect an Atmega328p board. Open freshly installed Arduino IDE, and go to:

Tools > Board > {your board name here}

{your board name here} should be the *Arduino/Genuino Uno*, as it can be seen on the following image:

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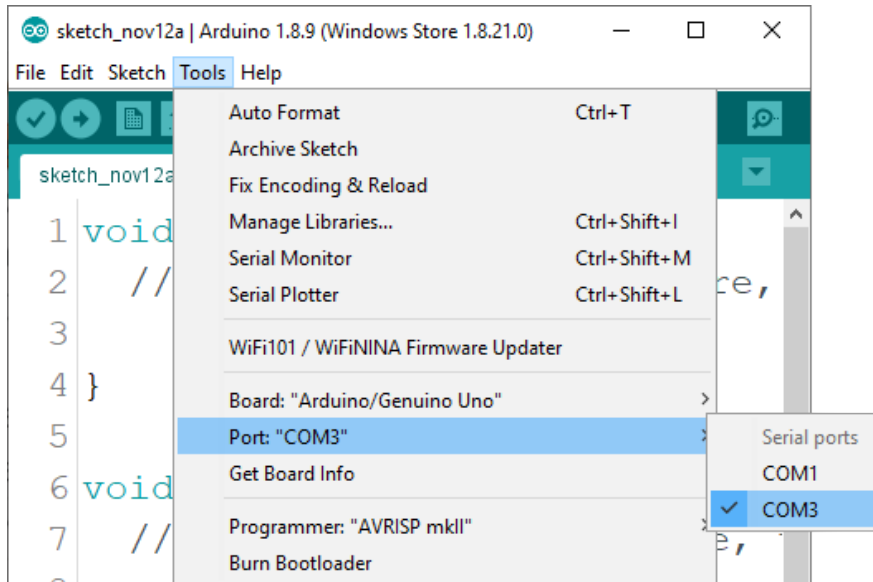


The port to which the Atmega328p board is connected has to be selected.

Go to: *Tools > Port > {port name goes here}*

and when the Atmega328p board is connected to the USB port, the port name can be seen in the drop-down menu on the previous image.

If the Arduino IDE is used on Windows, port names are as follows:



For *Linux* users, for example, port name is `/dev/ttyUSBx`, where *x* represents integer number between 0 and 9.



How to set-up the Raspberry Pi and Python

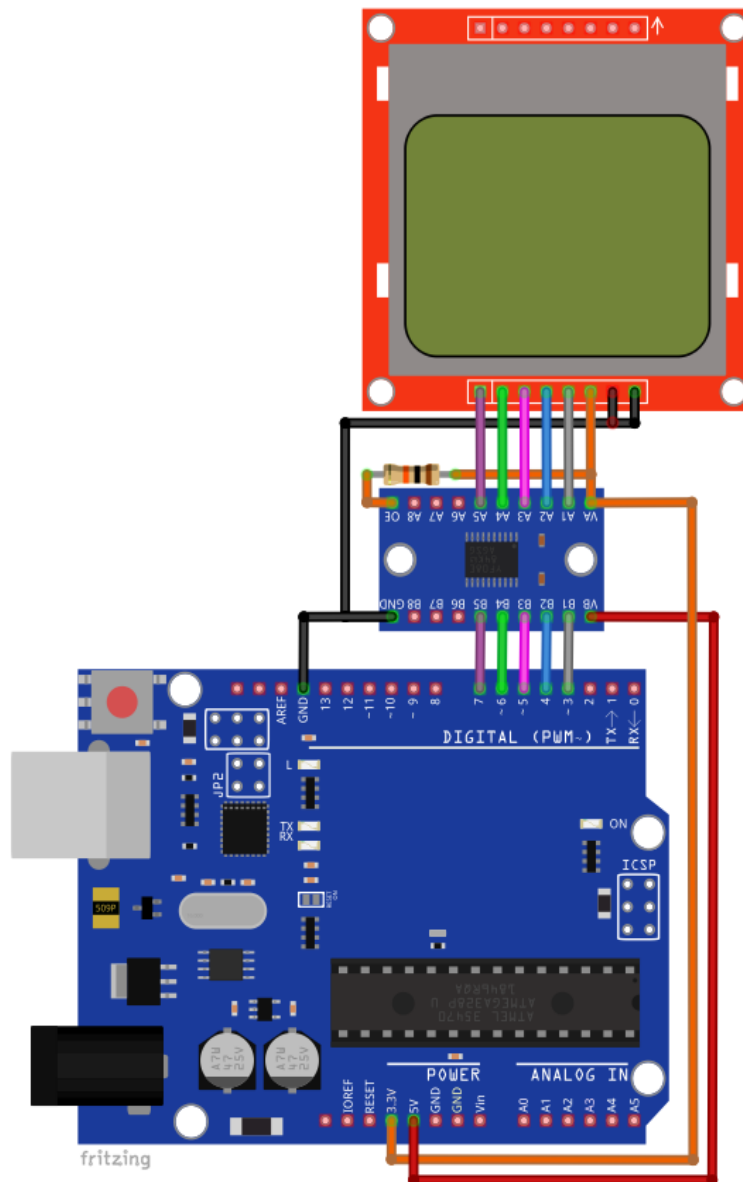
For the Raspberry Pi, first the operating system has to be installed, then everything has to be set-up so that it can be used in the *Headless* mode. The *Headless* mode enables remote connection to the Raspberry Pi, without the need for a *PC* screen Monitor, mouse or keyboard. The only things that are used in this mode are the Raspberry Pi itself, power supply and internet connection. All of this is explained minutely in the free eBook:

[Raspberry Pi Quick Startup Guide](#)

The *Raspberry Pi* OS (operating system), previously known as Raspbian, comes with *Python* preinstalled.

Connecting with Atmega328p

An example of the usage of Logic Level Converter with the Atmega328p is shown on the following connection diagram:



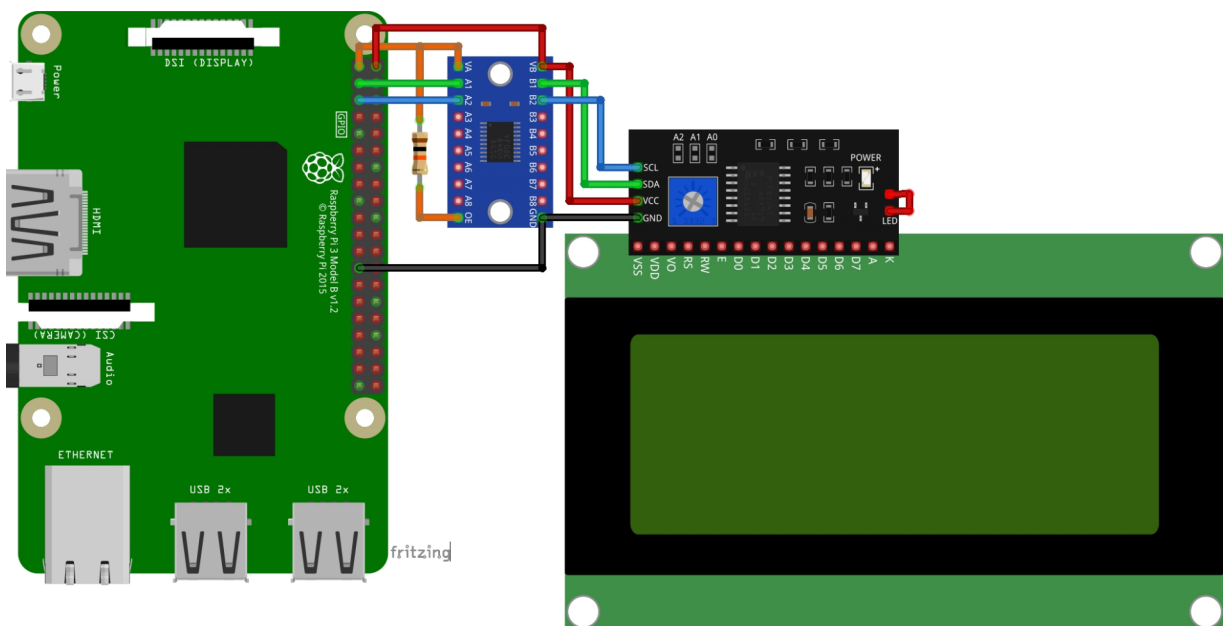
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The Logic Level converter is connected to the Atmega328p and to the 84x48 LCD Display. The operating voltage for 84x48 LCD Display is 3.3V and for Atmega328p it is 5V, so the Logic Level Converter is needed to prevent damaging the devices.

For those who want to know more about the devices or look for an example sketch, there is a [Quick Start Guide](#) for 84x48 LCD Display on our AZ-Delivery website.

Connecting with Raspberry Pi

An example of the usage of Logic Level Converter with the Raspberry Pi is shown on the following connection diagram:



The Logic Level Converter is connected to the Raspberry Pi and to the I2C adapter which is connected with 20x04 Green LCD Screen. The operating voltage for I2C adapter is 5V and for Raspberry Pi it is 3.3V, therefore the Logic Level Converter is needed, otherwise Raspberry Pi can be damaged.

For those who want to know more about the devices or look for a Python example script, there is a [Quick Start Guide for 20x04 Green LCD with I2C adapter](#) on our AZ-Delivery website.

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Now it is the time to learn and make your own projects. You can do that with the help of many example scripts and other tutorials, which can be found on the Internet.

If you are looking for the high quality microelectronics and accessories, AZ-Delivery Vertriebs GmbH is the right company to get them from. You will be provided with numerous application examples, full installation guides, eBooks, libraries and assistance from our technical experts.

<https://az-delivery.de>

Have Fun!

Impressum

<https://az-delivery.de/pages/about-us>