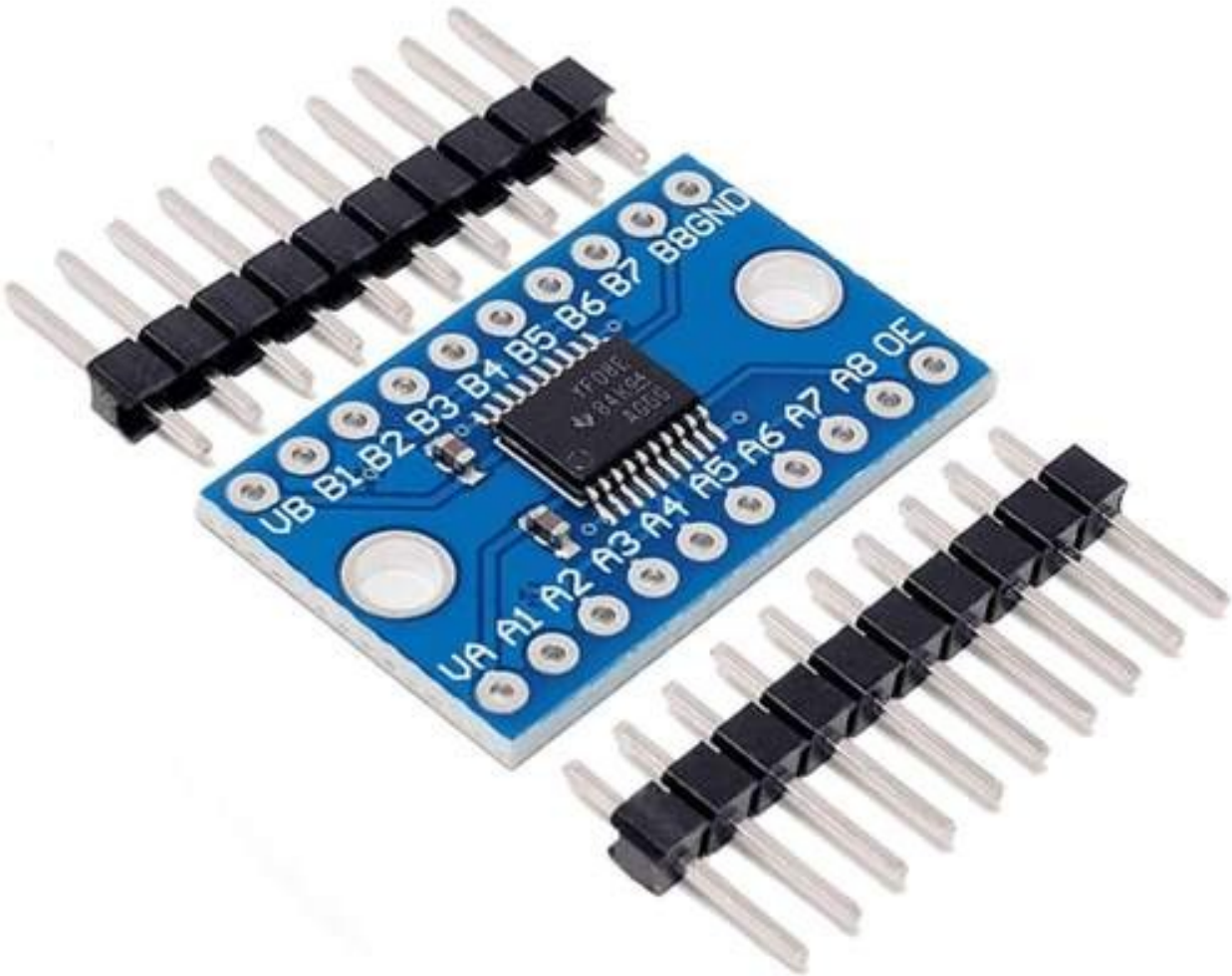
Welcome!

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!



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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 Arduino, 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.

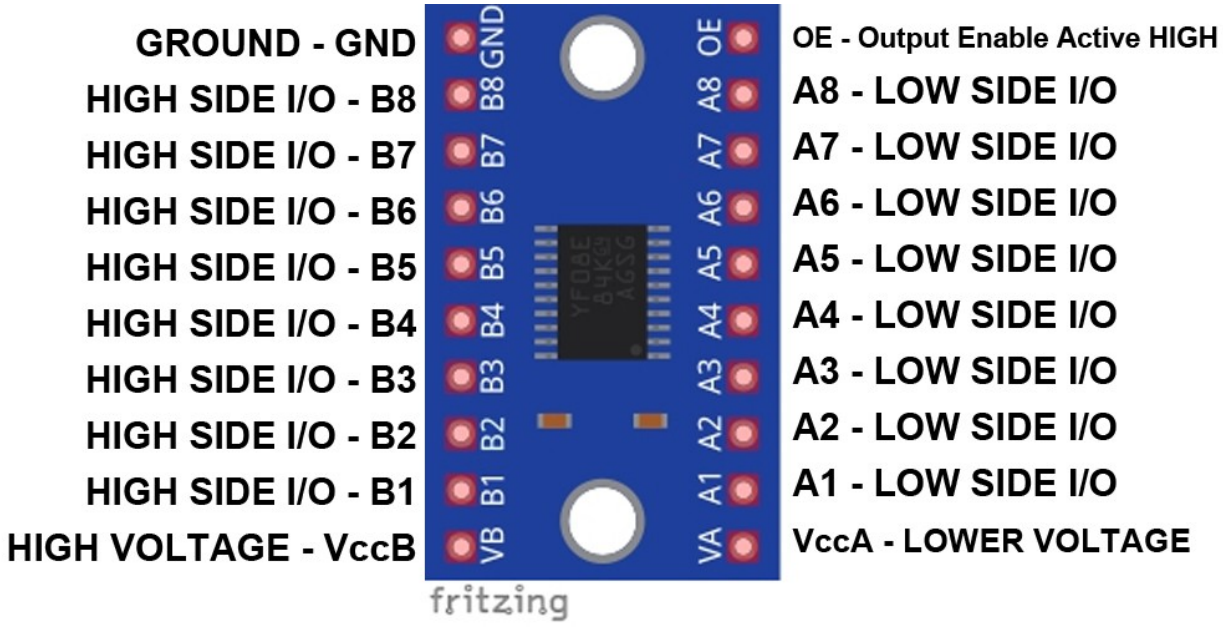
The A-port accepts I/O voltages varying from *1.4 V* to *3.6 V*. The B-port accepts I/O voltages from *1.65 V* to *5.5 V*.

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.

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.

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

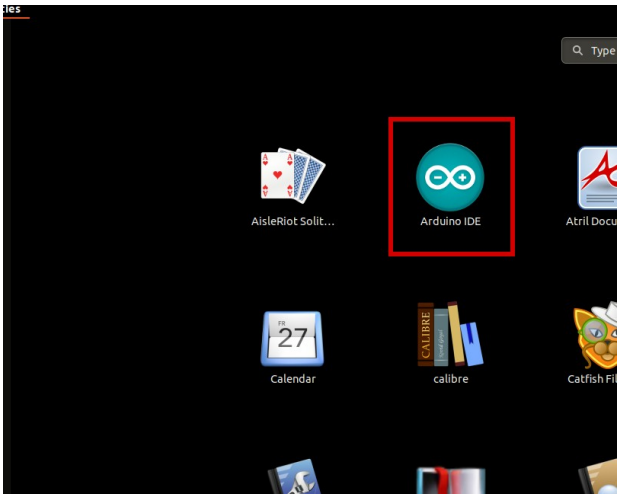
For *Linux* users, download a file with the extension *.tar.xz*, which has to be extracted. When it is extracted, go to the extracted directory and open the terminal in that directory. Two *.sh* scripts have to be executed, the first called *arduino-linux-setup.sh* and the second called *install.sh*.

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.

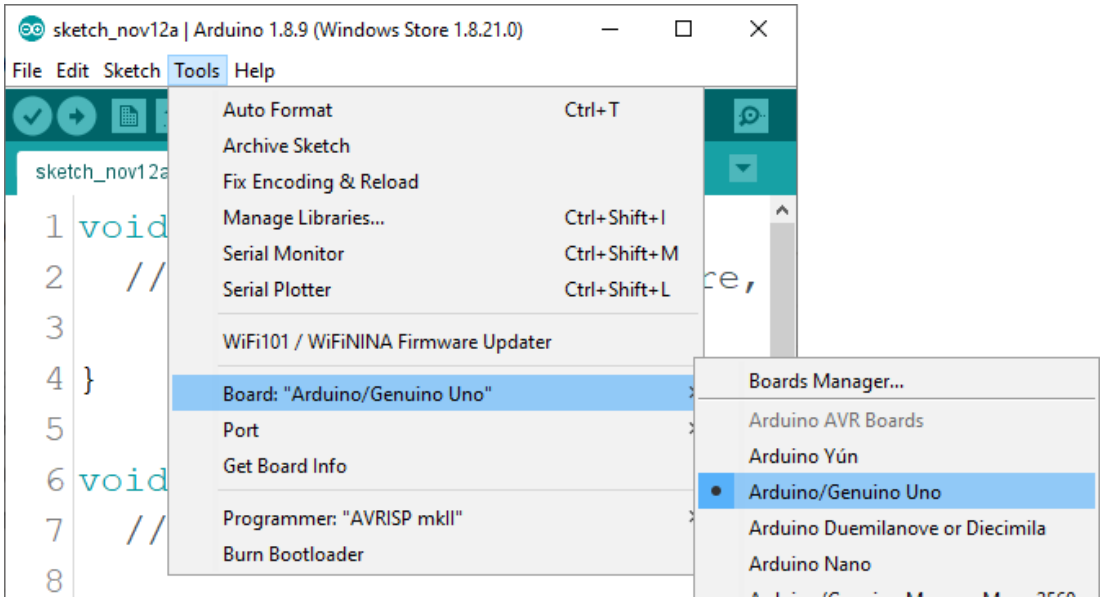
The second script, called *install.sh*, has to be used after the installation of the first script. Run the following command in the terminal (extracted directory): **sh install.sh**



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 Arduino 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:

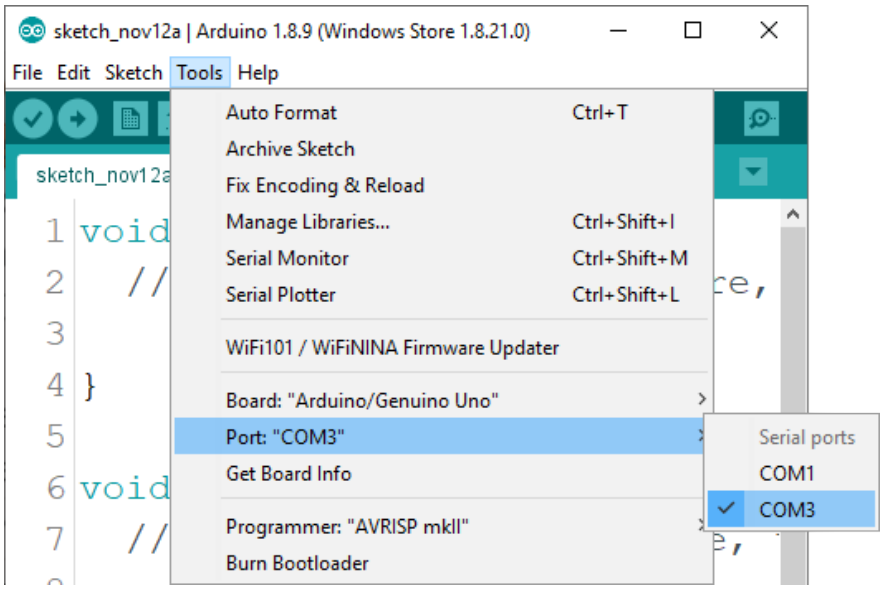


The port to which the Arduino board is connected has to be selected. Go to:

Tools > Port > {port name goes here}

and when the Arduino 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*.

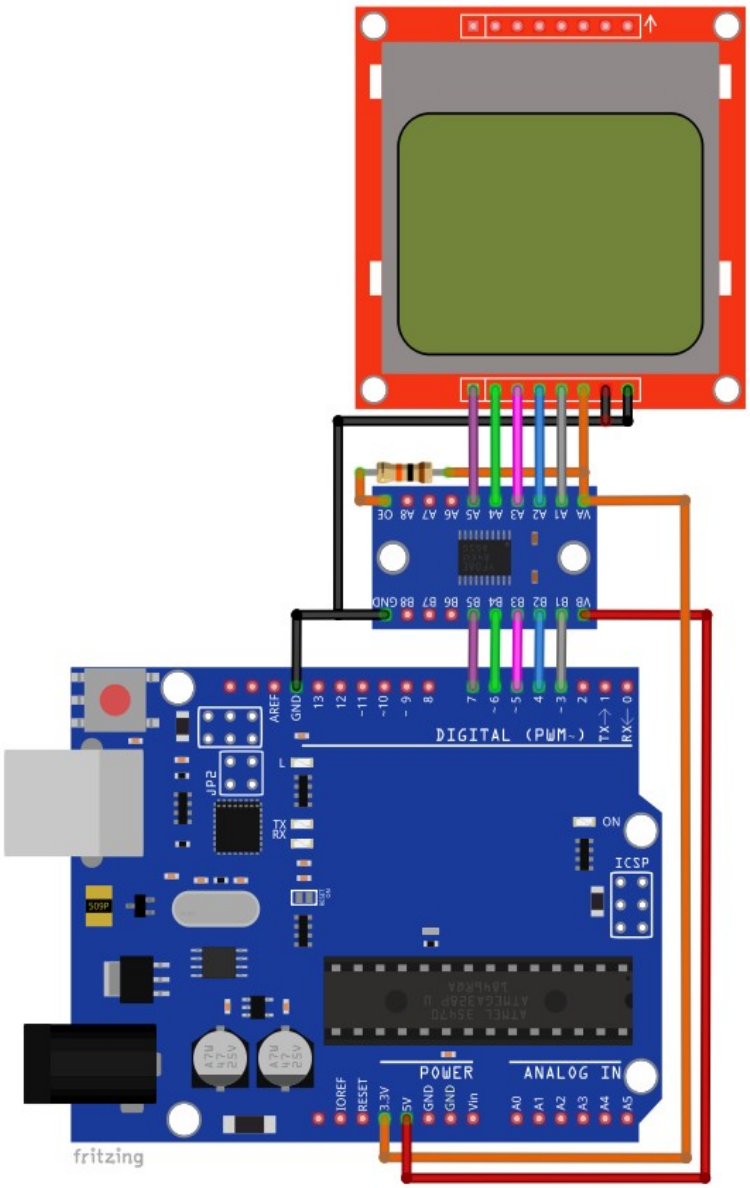
How to set-up the Raspberry Pi and Python

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 Uno

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

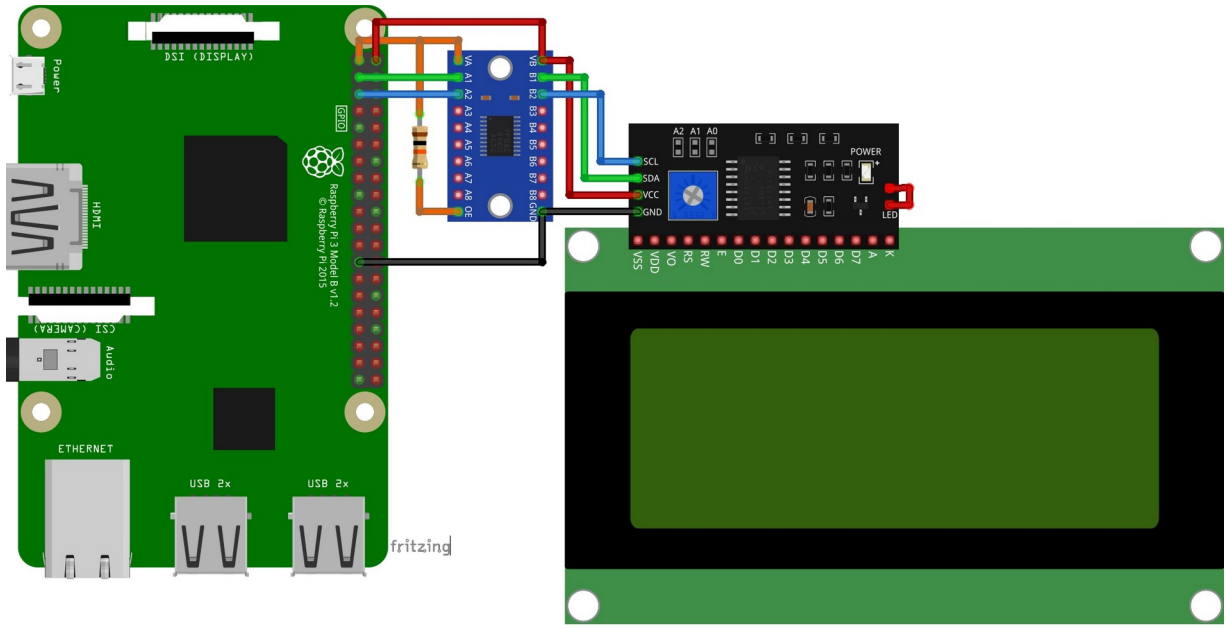


The Logic Level converter is connected to the Uno and to the 84x48 LCD Display. The operating voltage for 84x48 LCD Display is *3.3V* and for Uno it is *5V*, so the Logic Level Converter is needed to prevent damaging the devices.

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.

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 products for Arduino and Raspberry Pi, 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

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