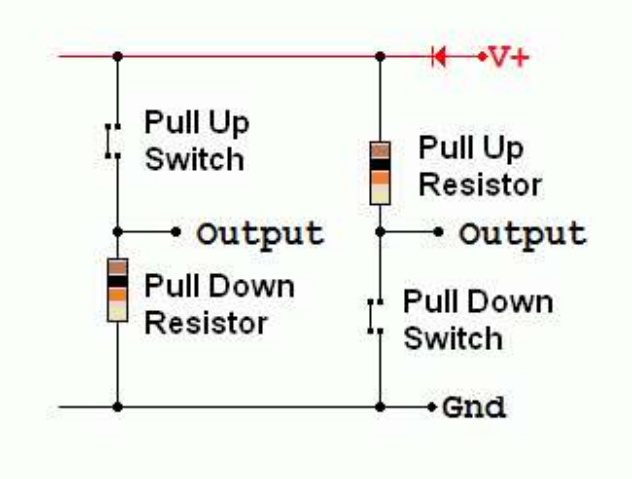
Difference Between Pull-up and Pull-down Resistors and Practical Examples

A microcontroller in any embedded system utilizes I/O signals to communicate with the ex The simplest form of I/O is usually stated to as GPIO(General Purpose Input/Output). V voltage level is low, then it is in high or high impedance state, then the pull up and pull-dov used to ensure GPIO which is always in a valid state.Usually, the GPIO is arranged on a mi I/O. As an input, the microcontroller pin can take one of these states: high, low and impedance. When an i/p is driven above the i/p is high threshold, it is a logic one.When t below the I/P, which is low threshold, the input is logic 0. When in a floating or high impec I/P level is not constantly high nor low. To ensure the values of an I/P is always in a know and pull-down resistors are used.The main function of pull-up and pull-down resistors is resistor pulls the signal to high state unless it is driven low; and, a pull-down resistor pulls t state unless it is driven high.



Pull-up and Pull-down resistors

What is a Resistor?

The Resistor is a most commonly used component in many electronic circuits and electron main function of the resistor is, it restricts the flow of current to other components. The re the principle of ohms law which states that dissipation due to the resistance. The unit of re and the symbol of ohm shows resistance in a circuit. There are numerous resistor types the market with different sizes and rating. They are Metal film resistors, thin film resistor resistors, wire wound resistors, network resistors, surface resistors, mount resistors, variab special resistors.

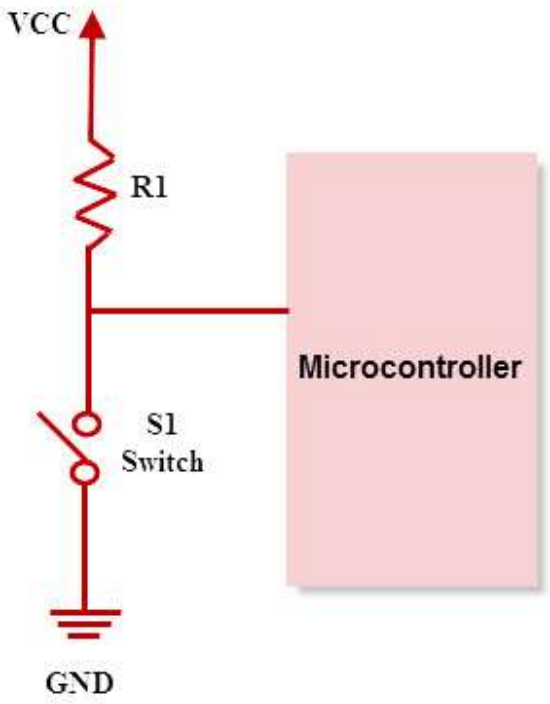
Resistor

Consider a two resistors in series connection, then the same current I flows through the tw the direction of the current is indicated by an arrow.When the two resistors are in parallel c the potential drop V across the two resistors is the same.

Pull-up Resistors

Pull-up resistors are simple fixed value resistors, that are connected between the voltage particular pin. These resistors are used in digital logic circuits to ensure a logic level at a pi in state wherein the input/output voltage is nonexistence driving signal. Digital logic circuits states like high, low and floating or high impedance. When the pin is not pulled to a lowe level, then the high impedance state occurs. These resistors are used to solve the p microcontroller by pulling the value to a high state, as seen in the figure. When the swit

microcontrollers input would be floating and brought down only when the switch is closed. A resistor value is 4.7kilo Ohms, but can change depending on the application.



Pull-up Resistor

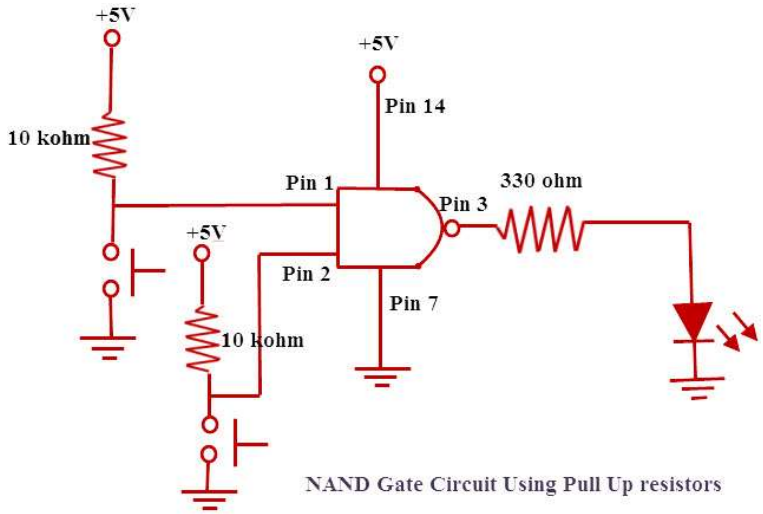
NAND Gate Circuit using Pull Up Resistor

In this project, the pull-up resistor is wired up to a logic chip circuit. These circuits are the test pull up resistors. Logic chip circuits work based on low or high signals. In this project, is taken as an example of logic chip. The main function of the NAND gate is, when any or gate input is low, then the output signal is high. In the same way, when the inputs of the high, then the output signal is low.

The required components for AND gate circuit using pull-down resistors are NAND ga 10Kilo Ohm resistors-2, Pushbuttons-2, 330ohm resistor and LED.

- Each NAND gate consists of two I/P and one O/P pin.
- Two push buttons are used as an inputs to the AND gate.
- The pull-up resistor value is 10 kilo Ohm and the remaining components are 330 Ohm re The 330 Ohm resistor is connected in series to limit the current to the LED

The circuit diagram of the NAND gate using 2-pull-down resistors at the i/ps to the NANI below.

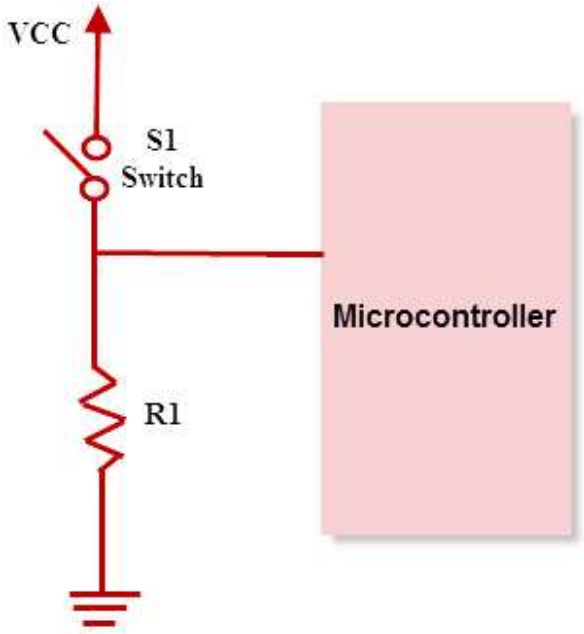


NAND Gate Circuit using Pull -up Resistor

In this circuit, to give power to the chip it is fed with 5V. So, +5V is given to the pin 14 connected to the ground. Pull-up resistors are connected to the NAND gate inputs. A pu connected to the first input of the NAND gate and positive voltage. A push button is conn When the push button is not pressed, the NAND gate input is high. When a push button NAND gate input is low. For the NAND gate, both I/Ps must be low to get an output high. I the owl circuit, you must press down on both buttons. This shows the great usefulness of pu

Pull-Down Resistors

As pull up resistors, Pull-down resistors also works in the same way. But, they pull the pin Pull-down resistors are connected between a particular pin on a microcontroller and the g An example of a pull down resistor is a digital circuit shown in the figure below. A switc between the VCC and the microcontroller pin. When the switch is closed in the circuit, t microcontroller is logic 1,but when the switch is open in a circuit, the pull down resistor pulls voltage to the ground (logic 0 or logic low value). The pull down resistor should have a hi than the impedance of the logic circuit.



Pull-down Resistor

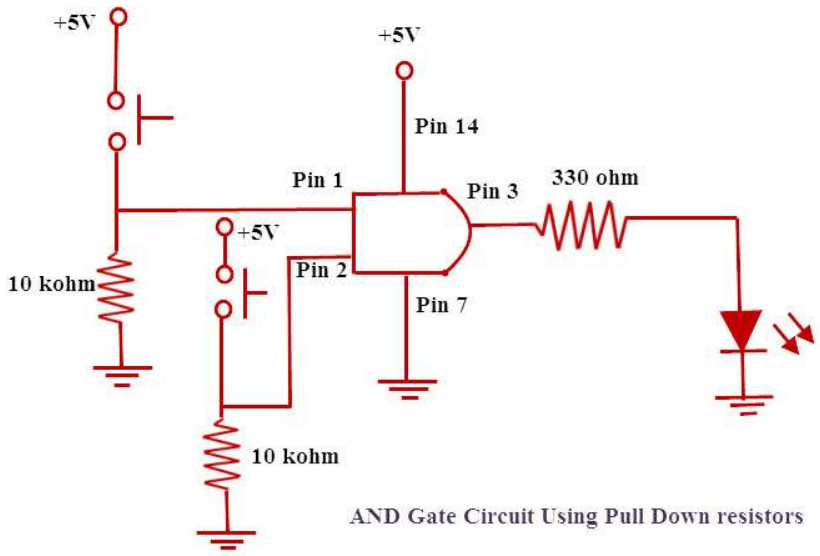
And Gate Circuit using Pull Down Resistor

In this project, the pull-down resistor is wired up to a logic chip circuit. These circuits are the test pull-down resistors. The Logic chip circuits work based on the low or high signals. In th gate is taken as an example of the logic chip.The main function of the AND gate is, when bo AND gate are high, then the output signal is high. In the same way when the inputs of the low, then the output signal is low.

The required components for AND gate circuit using a pull-down resistors are AND gate 10Kilo Ohm resistors-2, Push buttons-2, 330 Ohm resistor and LED.

- Each AND gate consists of two I/P and one O/P
- Two push buttons are used as an inputs to the AND gate.
- The pull-down resistor value is 10 kilo Ohm and the remaining components are 330 Ohm LED. The 330 Ohm resistor is connected in series to limit the current to the LED.

The circuit diagram of the AND gate using 2-pull down resistors at the i/ps to the AND below.



And Gate Circuit using Pull Down Resistor

In this circuit, to give power to the chip, it is fed with 5V. So, +5V is given to pin 14 and pin7 the ground. The Pull-down resistors are connected to the AND gate inputs. One pull d connected to the first input of the AND gate.The pushbutton is connected to the positive vo a pull-down resistor is connected to GND. If the push button is not pressed, AND gate inp the push button is pressed, AND gate input will be high.For AND gate, both I/Ps must be output high. In order to work the owl circuit, you must press down both the buttons.This s usefulness of pull-down resistors.

Applications of Pull-Up and Pull-Down Resistors

- Pull-up and pull-down resistors are frequently used in interfacing devices like interfac microcontroller.
- Most of the microcontrollers have inbuilt programmable pull up/pull down resistors.S switch with a microcontroller directly is possible.
- In general, pull up resistors are often used than pull down resistors, although some families have both pull-up and pull-down resistors.
- These resistors are often used in A/D converters to provide a controlled flow of current sensor
- Pull-up and pull-down resistors are used in I2C protocol bus, wherein the pull-up resist allow a single pin to act as an I/P or O/P.
- When it is not connected to a I2C protocol bus, the pin floats in a high impedance s resistors are also used for outputs to afford a known O/P

Therefore, this is all about the working and the difference between pull-up and pull-dow practical example.We believe that you have got a better idea about this concept.Furthe queries regarding this article or Electronics projects, you can contact us by commenting i section below.

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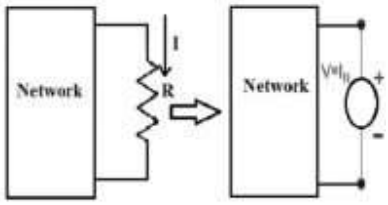

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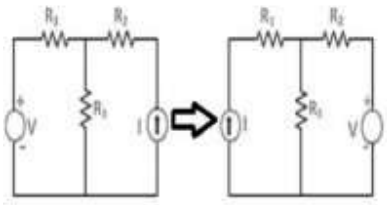

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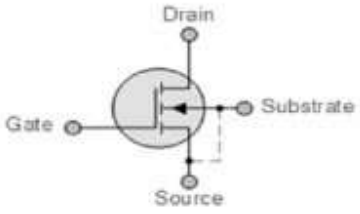

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