

Goal: Follow-up control of a fan

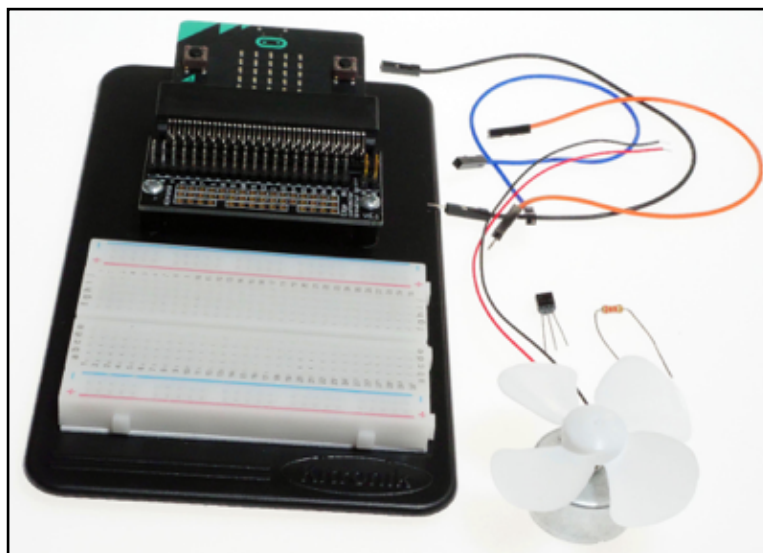
Contents: Radio transmission
Transistor circuit

LESSON 1

Assignment

Build a receiver circuit for a fan. Use a second Micro Bit to switch on and off the fan. Radio transmission also includes the follow-up time for how long the fan "keeps running" after it is switched off. For example, these follow-up times are used for ventilation systems in bathrooms, which remain running for a certain time after a shower.

Ingredients



LESSON 2

Pulse width modulation (PWM)

As the digital pins of the Micro Bit only enable output of 3V or 0V, a range of voltage values must be generated, for example, for dimming of LEDs or control of the speed of a motor.

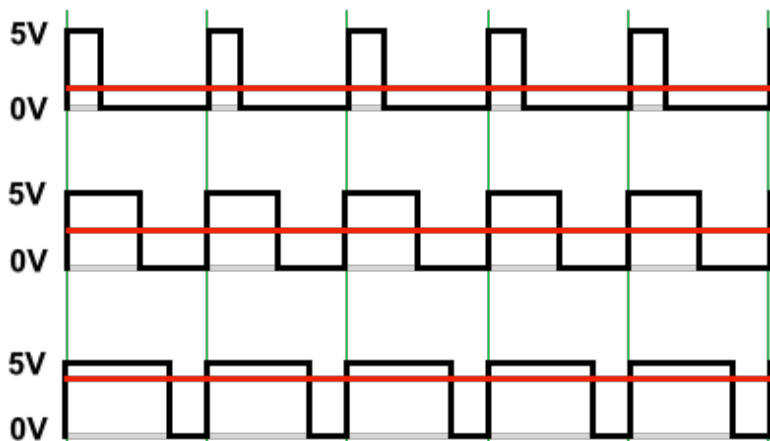
This is realised by **pulse width modulation (PWM)**.

In this process, the voltage itself is not adjusted but the output duration of the voltage. This means, the LED or the motor is switched on and off in a rapid sequence.

As rapid switching on and off of an LED cannot be seen with the human eye and the motor is running continuously due to its inertia despite the PWM, the brightness of the LED or speed of the motor is defined by the ratio between pulse (on) and pause (off).

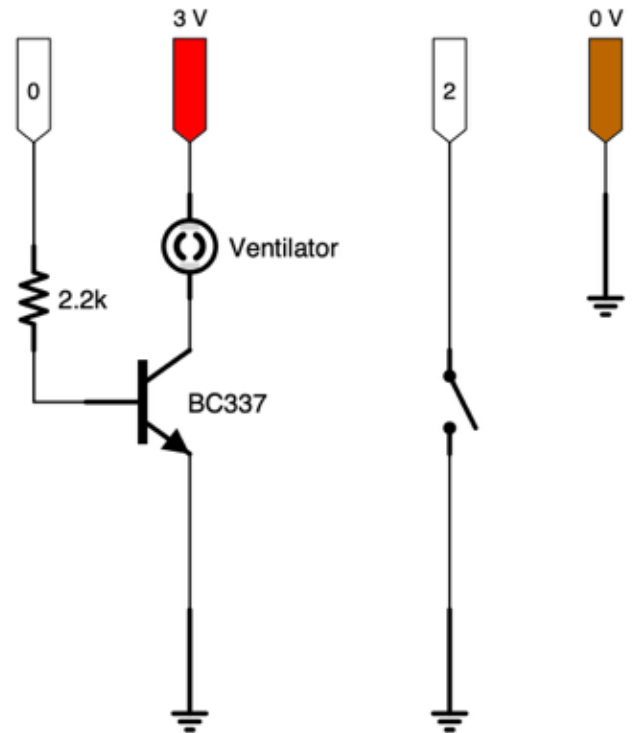
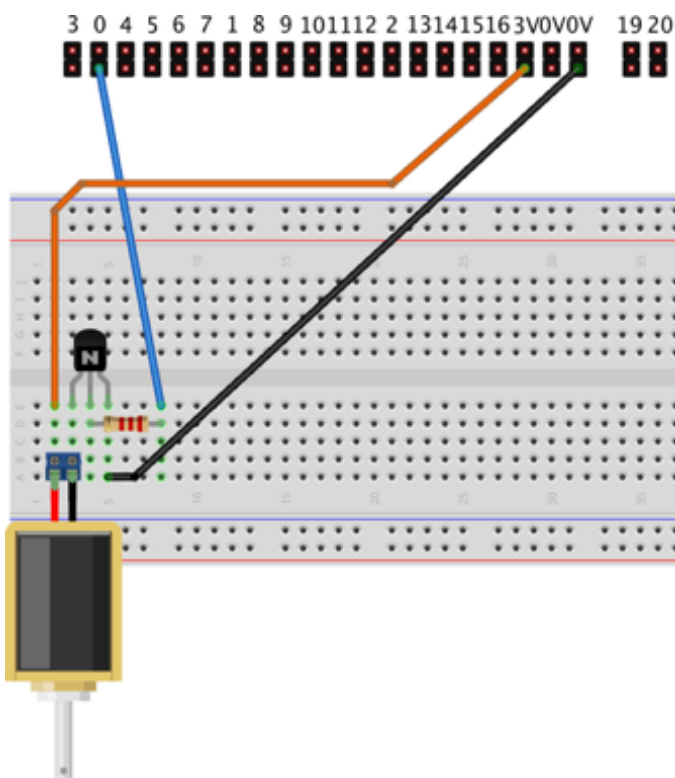
At a pulse-pause ratio of 50:50, the motor is rotating at half power (LED => brightness 50%).

At a pulse-pause ratio of 80:20, the motor is rotating at 80%, the maximum speed (LED => brightness 80%).



LESSON 3

Schaltungsaufbau



- Position the transistor on the breadboard in such a way that the round edges face upwards.
- The right connection of the motor terminal is connected to the collector (left pin) of the transistor.
- With the orange cable, the left connection of the motor terminal is connected to the **3V pin** of the Micro Bit.
[Orange cable – 3V]
- The emitter (right pin) of the transistor is connected to the 0V pin of the Micro Bit via the black cable.
[Black cable – 0V]
- The basis (centre pin) of the transistor leads to the 2.2 kOhm resistor.
- With the blue cable, this basic resistor is connected to pin 0 of the Micro Bit.
[Blue cable – Pin0]

LESSON 4

beim Start

setze Gruppe **1** über Funk

wenn Datenpaket empfangen **receivedNumber** ▼

schreibe digitalen Wert von Pin **P0** ▼ auf **1**

pausiere (ms) **receivedNumber** ▼

schreibe digitalen Wert von Pin **P0** ▼ auf **0**

RECEIVER

beim Start

setze Gruppe **1** über Funk

wenn Knopf **A** ▼ gedrückt

sende Zahl **3000** über Funk

TRANSMITTER

Information on block code

RECEIVER

beim Start

setze Gruppe 1 über Funk

wenn Datenpaket empfangen receivedNumber

schreibe digitalen Wert von Pin P0 auf 1

pausiere (ms) receivedNumber

schreibe digitalen Wert von Pin P0 auf 0

For radio transmission, the transmitter and receiver require the same group

If a numerical value is received ...

... the fan is switched on.

It is running for the transmitted time.

Afterwards, it is switched off.

TRANSMITTER

beim Start

setze Gruppe 1 über Funk

wenn Knopf A gedrückt

sende Zahl 3000 über Funk

For radio transmission, the transmitter and receiver require the same group

If the button is pressed, the follow-up time is transmitted.