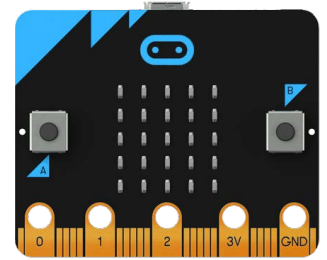
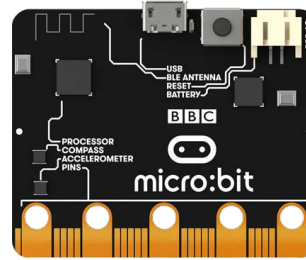


BBC Micro:bit

The micro:bit is a credit card sized board containing a microcontroller and several built-in sensors and outputs. It is powered via USB connected to your computer or an external battery pack. Like an Arduino, additional sensors and peripherals can be attached to the “pins” at the bottom of the board.



Onboard sensors

- ◆ Light sensor
- ◆ Temperature sensor
- ◆ Accelerometer
- ◆ Magnetometer
- ◆ Compass
- ◆ 2 programmable buttons

Onboard display

- ◆ 25 LEDs arranged in a 5 by 5 array

Bluetooth

- ◆ Communicate wirelessly with your computer or other Bluetooth devices.

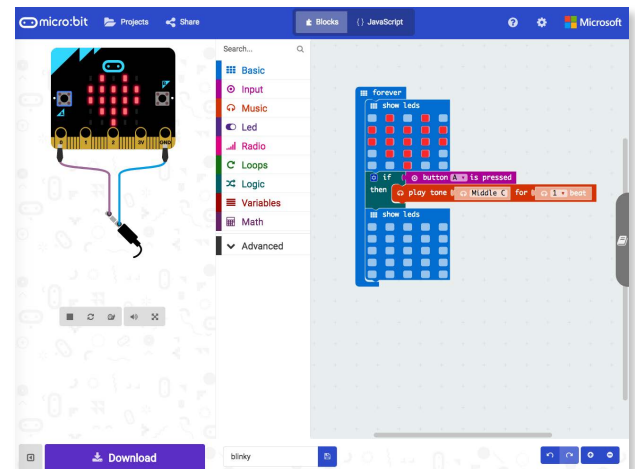
“Radio”

- ◆ Micro:bits can communicate with each other

Browser-based Block Programming at MakeCode.org

The micro:bit has several programming options, but the easiest one is directly in your browser.

- ◆ Go to [MakeCode.org](https://makecode.org) and click on the micro:bit. The “Getting Started” button (right under the Microsoft logo on the top right) will take you through a tutorial on the block language, and how to download programs to your micro:bit.
- ◆ *Code* – Drag code blocks from the palettes (mid screen) to the right and connect them to make programs.
- ◆ *Simulator* – On the left side of the screen, a live image of the micro:bit board simulates your code in real time. The simulator ONLY models the code, it does not communicate with the actual micro:bit.
- ◆ *Name your file* – Identify your work by naming it. Type a name into the box next to the download button at the lower left of your screen.
- ◆ *Download* – Connect your micro:bit to your computer via a USB cable and click the Download button at the bottom left of the screen. This will send a small file named “microbit-yourfilename.hex” to your computer.
- ◆ *Drag and drop* – The micro:bit looks to your computer like a memory card or external drive, allowing you to send your program to the micro:bit simply by dragging the file to the micro:bit “drive.” Find your downloaded file (this is usually in your Download folder) and copy/paste or just drag it onto the external drive named MICROBIT.



Instant conversion to JavaScript

Use the toggle buttons at the top to switch back and forth. Changes made in Blocks will appear in JavaScript and vice versa.

Every time you change your program, remember to download and drag it to the micro:bit.

Scratch via Bluetooth is available. See scratch.mit.edu/microbit for instructions

Other programming options include Python and mobile apps. See microbit.org/code

More projects and resources inventtolearn.com/mb and makecode.microbit.org/projects

See our collection of resources at inventtolearn.com/resources-physical-computing for more online project ideas, micro:bit books and magazines, and micro:bit accessories.

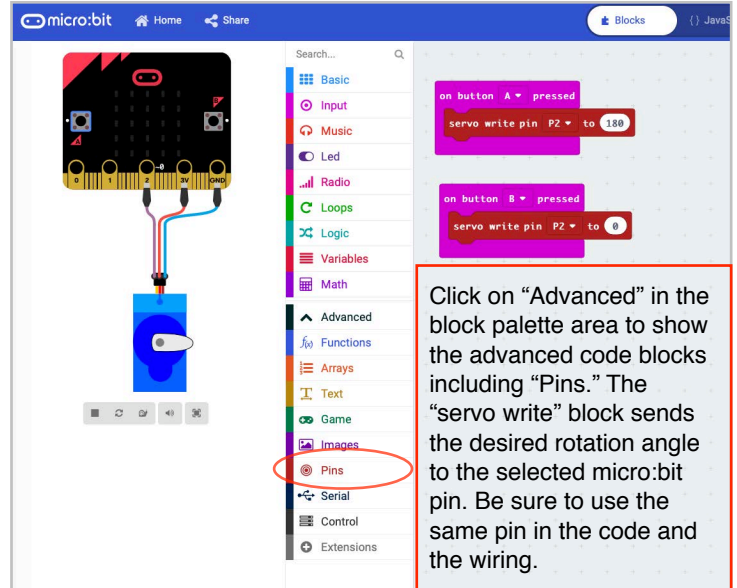
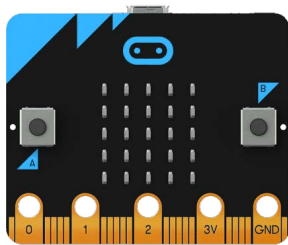
How to Connect to the Micro:bit...

Connections use power – if you have things connected to the micro:bit, use the battery pack.

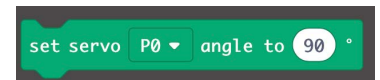
...to a Servo Motor

A servo motor turns to a specific position and stops. There are three connections from the micro:bit board to the servo motor: power, ground, and the control signal. Be sure to connect them correctly. The control signal can be connected to pins at the bottom of the micro:bit. Pins 0, 1, and 2 are large and useable with alligator clips. There are more pins in the edge connector that are accessible if you add a breakout board for the micro:bit. (Note: the colors of the servo wires on the MakeCode simulator may not be the same as your servo.)

Connect to..	Color Scheme 1	Color Scheme 2	Color Scheme 3
Ground (GND)	Black	Brown	Black
Power Supply (3V)	Red	Red	Red or Brown
Control Signal (Pin 0, 1, or 2)	White	Orange or Yellow	Yellow or White



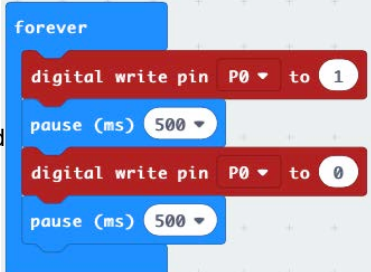
Servos can also be controlled by adding a “servo extension” palette. Click on “Extensions” at the bottom of the palette menu and select “Micro-servo library.” This will add specific servo blocks to MakeCode. It’s not any different than the “servo write” blocks under the Pins menu, but might make more sense if you are using a lot of servos in your projects.



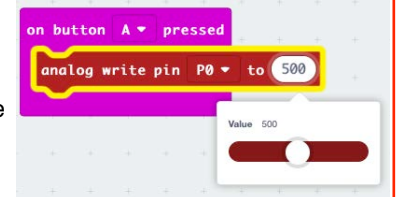
...to LEDs

An LED can be attached to the micro:bit and controlled by the code by connecting the + leg to a Pin and the - leg to GND. There are two ways to turn the LED on or off. (Note: use caution if you directly connect an LED to the micro:bit, it may overheat. We find that 10mm LEDs work the best if you don’t use a resistor.)

The **digital write** block sends ON (1) or OFF (0) signals to the LED attached to a Pin. The code to the right blinks the LED attached to Pin 0, with a 1/2 second pause between blinks.



The **analog write** block sends a signal from 0 (off) to 1023 (full on) to the LED attached to a Pin. The code to the right will turn the the LED attached to Pin 0 to about half brightness when button A is pressed..



...to a speaker or headphones

The micro:bit will play tones if a speaker (or headphone jack) is connected to Pin 0 and GND.

