Details of micro:bit V2

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Overview

The **new micro:bit** (http://microbit.org/new-microbit) has a built-in microphone and speaker to allow sound-sensing and sound-making without the need to attach another device. It also introduces capacitive touch sensing, a power-saving mode and more computing power for the classroom.

The latest micro:bit will work with your existing lessons and materials; all the existing MakeCode blocks and MicroPython code will work in the same way as they do on the original micro:bit.

Previous micro:bit revisions, will also continue to work just as they did before.

The latest revision builds upon the current micro:bit experience by refining the board and adding widely requested sound-making and sensing capabilities.

Amongst the micro:bit features, ‘sound’ is in a unique position of being already present in the editors, but not on the board, so it is already familiar to teachers, yet the speaker and microphone on the board are transformative in the kinds of applications people can build.

Contents

Features

- Onboard speaker
- MEMs Microphone with LED indicator
- Touch-sensitive logo
- Built-in sleep/off mode that means the board can be powered-down with batteries connected
- Discrete regulator that can supply up to 190mA of current to external accessories

Refinements

- Notched edge connector. To make it easier to connect things like crocodile clips and conductive thread
- Power LED indicator. In addition to the USB activity indicator, a power LED shows whether the micro:bit is powered on or off
- Gold plated antenna. To easily identify the radio/Bluetooth component

Hardware specification

A detailed breakdown can be found on our **hardware page** (https://tech.microbit.org/hardware/)

- Target MCU, Nordic Semiconductor nRF52833 (64MHz Cortex-M4F, 512kB Flash, 128kB RAM)
- Interface MCU: NXP KL27, 256kB Flash (128kB reserved for future enhancement), 32kB RAM
- Motion sensor: ST LSM303
- MEMS microphone: Knowles SPU0410LR5H-QB-7 MEMS
- Power consumption 300mA (up to 190mA for accessories)

Guides

These pages provide further guidance on the updates for different audiences.

Guidance for accessory makers (https://support.microbit.org/support/solutions/articles/19000119053-guidance-on-using-the-latest-micro-bit-revision-for-accessory-makers)

Guidance for editor developers (https://support.microbit.org/support/solutions/articles/19000119055-guidance-on-the-latest-micro-bit-revision-for-editor-developers/)

Guidance for content producers (https://support.microbit.org/support/solutions/articles/19000119057-guidance-on-using-the-latest-micro-bit-for-content-producers/)

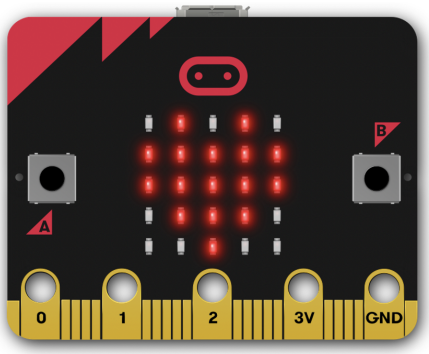
Comparison

Feature comparison

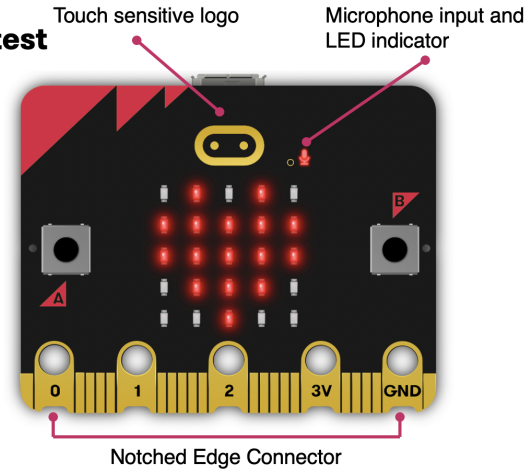
Current (v1.5)	Feature	Latest (v2)
Nordic Semiconductor nRF51822	Processor	**Nordic Semiconductor nRF52833**
256kB Flash 16kB RAM	Memory	**512kB Flash, 128kB RAM**
NXP KL26Z, 16kB RAM	Interface	**NXP KL27Z, 32kB RAM**
N/A	Microphone	**MEMs microphone and LED indicator**
N/A	Speaker	**On board speaker**
N/A	Logo touch	**Touch sensitive logo pin**
25 pins. 3 dedicated GPIO, PWM, i2c, SPI and ext. power. 3 ring pins for connecting crocodile clips/banana plugs.	Edge Connector	25 pins. **4 dedicated GPIO**, PWM, i2c, SPI and ext. power. 3 ring pins for connecting crocodile clips/banana plugs. **Notched for easier connection**
Shared I2C Bus	I2C	**Dedicated I2C bus for peripherals**
2.4Ghz Micro:bit Radio/BLE Bluetooth 4.0	Wireless	2.4Ghz Micro:bit Radio/BLE **Bluetooth 5.0**
5V via Micro USB port, 3V via edge connector or battery pack	Power	5V via Micro USB port, 3V via edge connector or battery pack, **LED power indicator, Power off (push and hold power button)**
90mA available for accessories	Available current	**200mA available for accessories**
ST LSM 303	Motion sensor	ST LSM 303
C++, MakeCode, Python, Scratch	Software	C++, MakeCode, Python, Scratch
5cm(w) x 4cm(h)	Size	5cm(w) x 4cm(h)

Front

Current

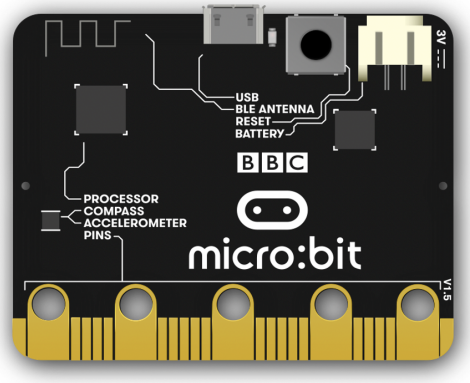


Latest

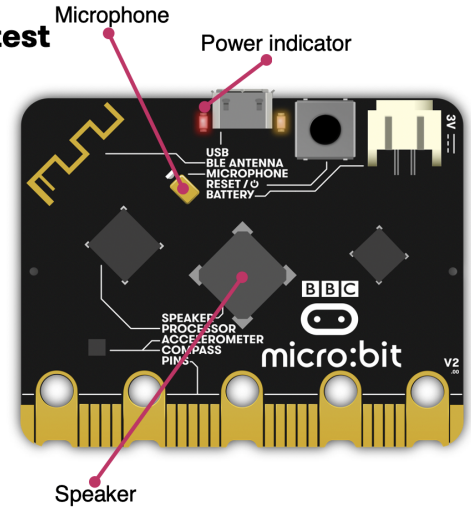


Back

Current



Latest



Universal Editors & Universal Hex Files

In an effort to ensure the greatest degree of continuity for teachers, users will not need to select which version of the device they have before using MakeCode or the Python Editor. Instead, the editors will support a new format called “universal hex” which can run on all micro:bit board revisions

This means that you can use MakeCode or the online Python Editor as you always have, to use all of the features that are common to both version of the BBC micro:bit: Display, buttons, motion sensing, gestures like shake, light sensing, and even the Music blocks.

How do I use the new features?

The **speaker** works in the same way you would expect when you connect up your headphones or an external speaker to the micro:bit. By default, the sound output will be on both the speaker and Edge connector. The **microphone** will have an additional set of blocks in MakeCode and objects in MicroPython to use, so that you can monitor and respond to sound. The **logo touch** is implemented in the same way as touching a pin on the edge connector and will have equivalent blocks in MakeCode and objects in MicroPython to use. Note that **Logo touch is capacitive touch by default and the edge pins are resistive**.

To access the features of the latest revision only (eg. to output sound only on the speaker and not the edge connector), you will need to add additional code to your programs. This ensures that the default editor experience continues to work for everyone, regardless of the board revision.

Features that are common to all board variants will work in the same way they always have. For example, you will be able to use the same blocks in MakeCode to use the accelerometer on any board revision.

Makecode

You can use the latest board revision in the live editor

https://makecode.microbit.org (https://makecode.microbit.org)

MakeCode APIs
The Microphone and Logo touch features can be found in the Input menu
The Speaker features can be found in the music menu

Read more about the **new blocks on the MakeCode blog** (https://makecode.com/blog/microbit/microbit-V2)

Microphone
https://makecode.microbit.org/reference/input/on-sound (https://makecode.microbit.org/reference/input/on-sound)
https://makecode.microbit.org/reference/input/sound-level (https://makecode.microbit.org/reference/input/sound-level)
https://makecode.microbit.org/reference/input/set-sound-threshold (https://makecode.microbit.org/reference/input/set-sound-threshold)

Sound/speaker
https://makecode.microbit.org/reference/music/play-until-done (https://makecode.microbit.org/reference/music/play-until-done)
https://makecode.microbit.org/reference/music/play (https://makecode.microbit.org/reference/music/play)
https://makecode.microbit.org/reference/music/set-built-in-speaker-enabled (https://makecode.microbit.org/reference/music/set-built-in-speaker-enabled)
https://makecode.microbit.org/reference/pins/set-audio-pin (https://makecode.microbit.org/reference/pins/set-audio-pin)

Logo touch and pin mode
https://makecode.microbit.org/reference/input/on-logo-event (https://makecode.microbit.org/reference/input/on-logo-event)
https://makecode.microbit.org/reference/input/logo-is-pressed (https://makecode.microbit.org/reference/input/logo-is-pressed)
https://makecode.microbit.org/reference/pins/touch-set-mode (https://makecode.microbit.org/reference/pins/touch-set-mode)

Python

You can use the latest board revision and APIs in the live Python editor:

https://python.microbit.org/ (https://python.microbit.org/)

MicroPython APIs

An overview of the microbit module
https://microbit-micropython.readthedocs.io/en/v2-docs/microbit_micropython_api.html (https://microbit-micropython.readthedocs.io/en/v2-docs/microbit_micropython_api.html)

How to use the `Sound` class in audio
https://microbit-micropython.readthedocs.io/en/v2-docs/audio.html (https://microbit-micropython.readthedocs.io/en/v2-docs/audio.html)

How to use the microphone and `SoundEvent`
https://microbit-micropython.readthedocs.io/en/v2-docs/microphone.html (https://microbit-micropython.readthedocs.io/en/v2-docs/microphone.html)

Updates to include the new `pin_logo` and `pin_speaker`
https://microbit-micropython.readthedocs.io/en/v2-docs/pin.html (https://microbit-micropython.readthedocs.io/en/v2-docs/pin.html)

..which can also be found in music
https://microbit-micropython.readthedocs.io/en/v2-docs/music.html (https://microbit-micropython.readthedocs.io/en/v2-docs/music.html)
...and speechhttps://microbit-micropython.readthedocs.io/en/v2-docs/speech.html (https://microbit-micropython.readthedocs.io/en/v2-docs/speech.html)
(https://codewith.mu/)

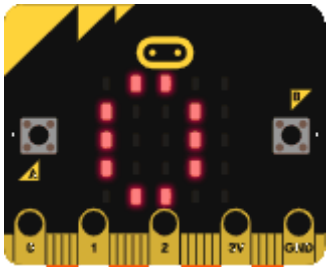
Universal Hex Format

The editors and apps are compatible with and will let you download and flash a file to any micro:bit revision. This is called a **Universal Hex** file. A clear indication that you are working with this format is that a compiled .hex file will be **~1.8Mb** as opposed to **~700Kb** in size.

More information about this is available on our **hex format (https://tech.microbit.org/software/hex-format/#universal-hex-files)** page.

Will my saved hex files work with the new board?

Yes, however, you will need to update the files by dragging and dropping them into the software editor in which they were created.
If you attempt to use an old .hex file without updating it, the micro:bit will display a compatibility error eg. `:( 029`



How do I get a device?

Visit the **Buy page** (https://microbit.org/buy/) on the micro:bit website for updates on where to buy the micro:bit from reseller companies.

The Micro:bit Educational Foundation is a not-for-profit. When you buy the micro:bit we receive a royalty which helps our work in education programmes worldwide.

How do I find out more about the hardware and software updates?

Our **DAL, Devices and Editors mailing list** (http://eepurl.com/dyRx-v) provides up to date information about any technical changes regarding the micro:bit.

How do I feed back or raise issues?

Any questions or issues should be reported via **micro:bit support** (https://support.microbit.org/support/tickets/new) or on the respective Github repositories for the software.