Spooky Signals: Send a Ghost by Radio

Microbit | Beginner | 15 Mins

1 Overview

Have you ever wondered how two gadgets can talk to each other without wires? In this project, you'll make a ghost jump from one micro:bit to another. Shake one micro:bit, and a ghost appears on the other!

🎯 What you'll learn

- How two micro:bits can talk to each other using radio
- How a micro:bit knows when it has been shaken
- How to show pictures on the LED matrix
- How code runs one step at a time

2 What you'll need

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- The micro:bit MakeCode editor
- 2 x micro:bits
- 1 x micro USB cable
- 2 x Battery packs for micro:bit (optional)

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3 Key words

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Accelerometer

An accelerometer is a tiny part inside the micro:bit that senses movement, like tilting, shaking or being turned over. It turns that movement into numbers your code can react to.

A bit like the sensor in a games controller that knows when you tilt it to steer, the accelerometer notices when the micro:bit moves.

LED Matrix

The LED matrix is the grid of little red lights on the front of the micro:bit. By switching them on and off in patterns, your code can show numbers, letters and tiny pictures.

Like a mini scoreboard made of dots, the LED matrix lights up to spell out your step count.

micro:bit

The micro:bit is a tiny programmable computer, about the size of a matchbox, made for learning to code. It has two buttons, a grid of little red LED lights and built-in sensors that can detect movement, light and temperature.

A bit like a pocket-sized computer you can program yourself, a micro:bit can become a step counter, a thermometer or even a simple game.

Radio Group

A radio group is a number that works like a secret channel. Only micro:bits with the same radio group number can send messages to each other.

It's like two walkie-talkies agreeing to use channel 30, so they only hear each other.

String

A string is a line of letters or words, such as GHOST. Strings are the messages your micro:bits send to each other.

It's like writing a word on a note and passing it to a friend.

Pairing

Pairing links your micro:bit to a computer or tablet so they can talk to each other and share your code.

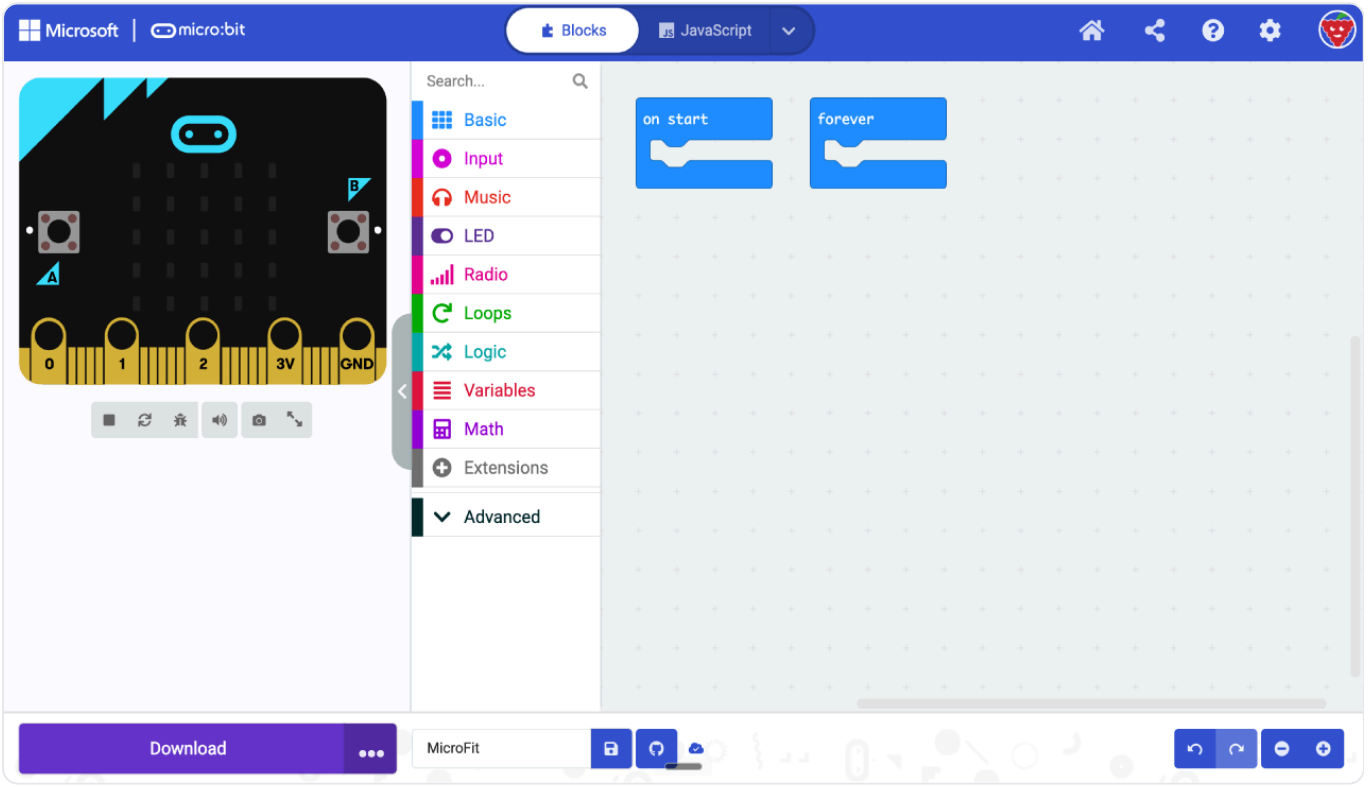
It's like connecting a pair of headphones to your phone so the music can come through.

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4 Navigating to the MakeCode Editor

On a Computer

1. Open your favourite web browser. We recommend either Google Chrome or Microsoft Edge.
2. In the Address bar type makecode.microbit.org.
3. Select **New Project** and give it the name **Spooky Signals**.



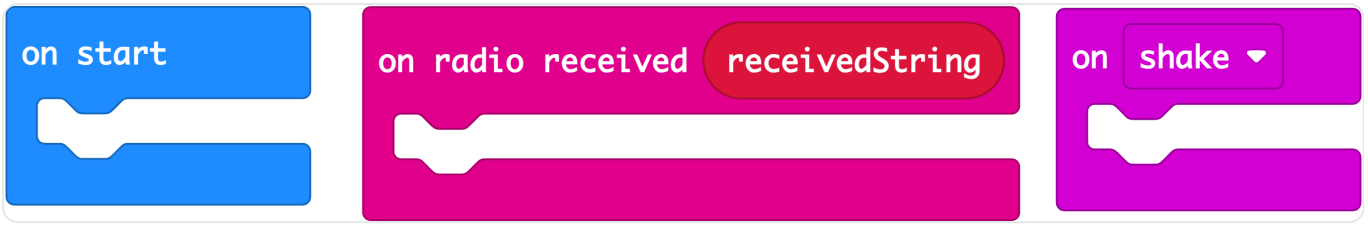
On a Tablet or Phone

1. Open the **micro:bit app**. If you don't have the app yet you can download it from your devices app store by searching for **micro:bit**.
2. Select **Create Code**.
3. Select **New Project** and name it **Spooky Signals**.

5 Set up the Code Area

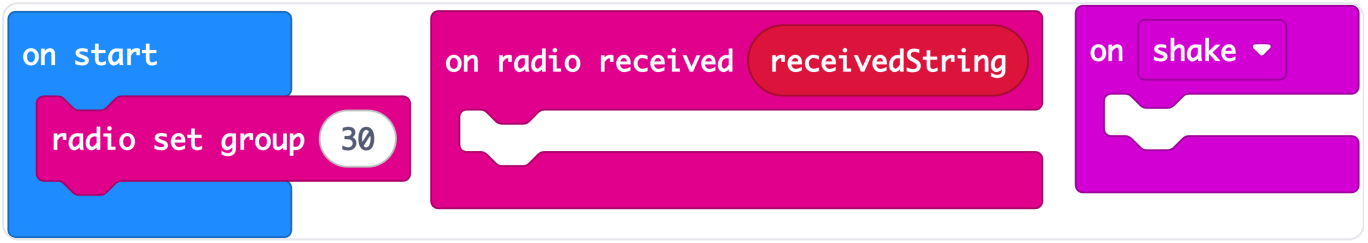
1. Select the `forever` block and drop it on the **bin** icon to delete it.
2. Select **Radio**, then drag an `on radio received receivedString` block into the code area.
3. Select **Input**, then drag an `on shake` block into the code area.

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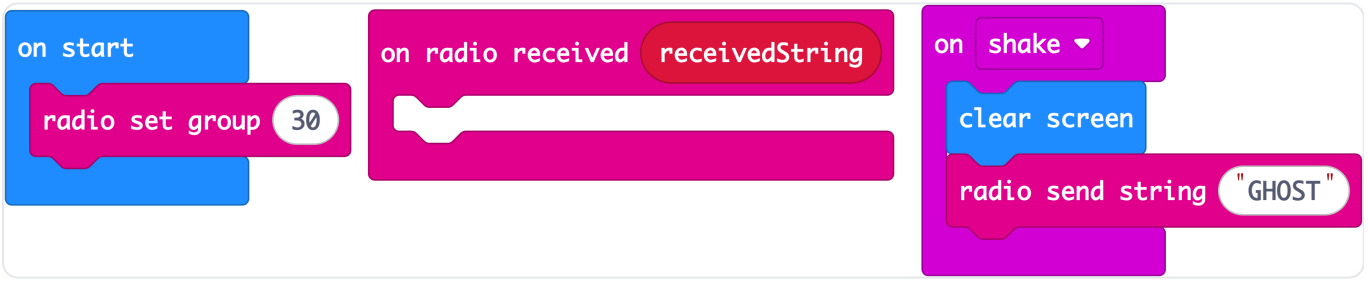
6 Set the radio group

1. Select **Radio**, then drag a `radio set group` block into the `on start` block.
2. Change the number **1** to **30**.



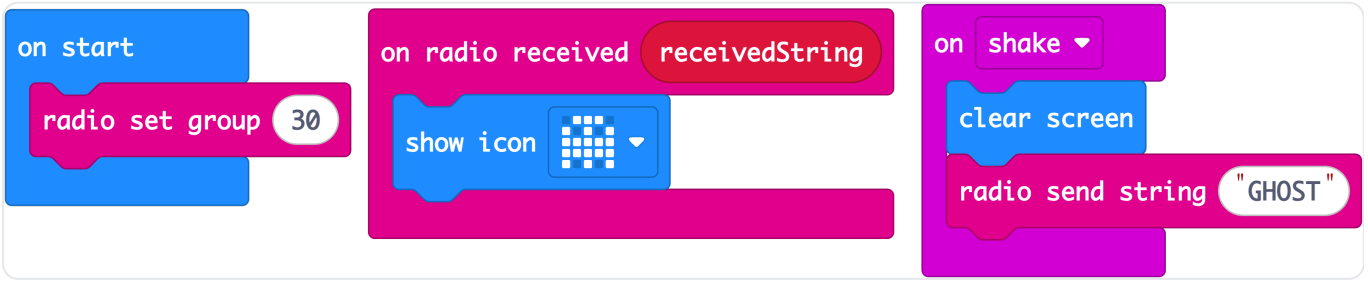
7 Send the Ghost when shaken

1. Select **Basic**, then drag a `clear screen` block into the `on shake` block.
2. Select **Radio**, then drag a `radio send string` block under the `clear screen` block.
3. Type **GHOST** into the empty box.



8 Show the ghost when a message arrives

1. Select **Basic**, then drag a `show icon` block into the `on radio received receivedString` block.
2. Select the **heart** picture and choose the **ghost** picture.

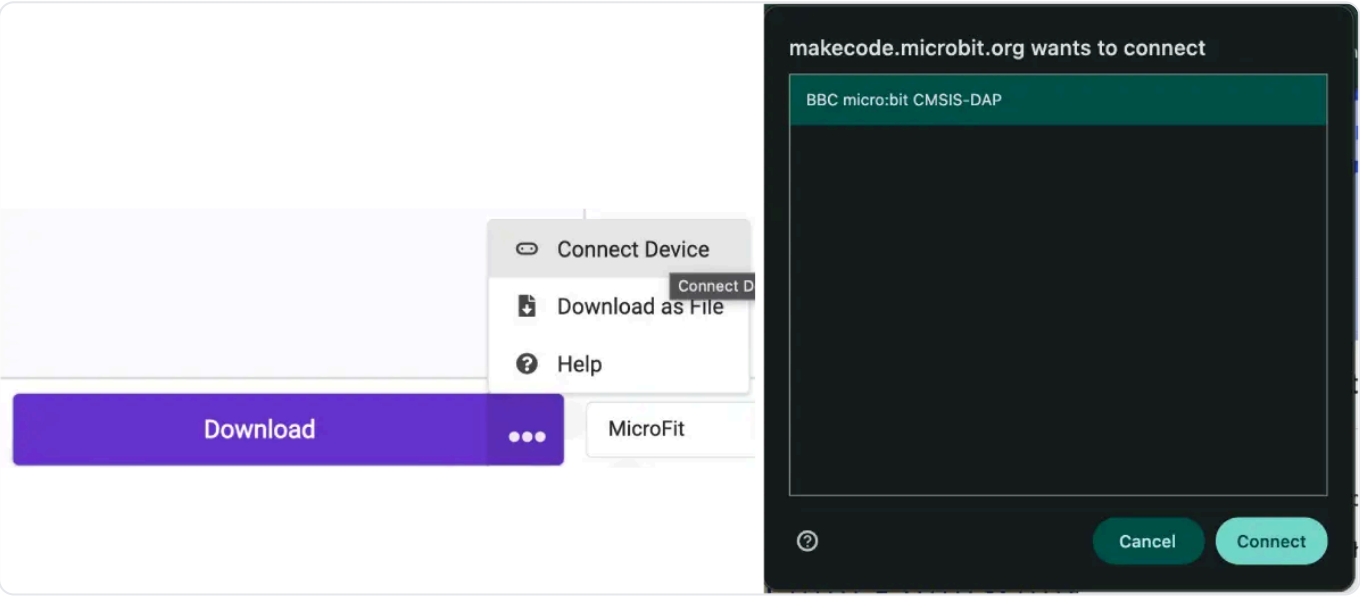


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9 Downloading Your Code

Using a Computer

1. Select the **three dots** next to **Download**.
2. Select **Connect Device**.
3. Follow the on-screen instructions to connect the micro:bit.
4. Select **BBC micro:bit xxxxx** (your micro:bit's own name will appear here), then select **Connect**.
5. Select **Download**.



Using a tablet or phone

1. Select **Download**.
2. Press the reset button on the back of the micro:bit **3 times** to put it into pairing mode.
3. Copy the pattern shown on the micro:bit into your app.
4. Select **Pair**, then select **Pair** again on the pop-up.
5. Your code will download to the micro:bit.

> **Important:** Do this for **both** micro:bits!

10 Run it and Watch

1. Unplug the micro:bits from the computer.
2. Plug a battery pack into each micro:bit.
3. Shake one micro:bit, then look at the other one. A ghost should appear!

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Don't have two micro:bits? You can test the code in the MakeCode simulator. Select the white dot next to the shake button on the simulator, then watch the ghost appear.

11 Try it yourself

🚀 Try it yourself

Challenge: Ghost Timer

Goal: Make the ghost disappear after 3 seconds.

Hint: Add a **pause (ms)** block from the **Basic** group after the **show icon** block. Then add a **clear screen** block after it. Change the pause to **3000**, because 1,000 milliseconds is one second.

Bonus: Can you make the ghost appear and disappear three times in a row? Try a **repeat** block from the **Loops** group.

Once your code works, shake the micro:bit and watch the ghost vanish. Did it work first time? That's completely normal. Coding is all about trying, testing and trying again!

12 Stuck? Quick fixes

Problem	Try this
The ghost won't download	Use a data USB cable (not a charge-only one), make sure the micro:bit is paired, and try a different USB port.
Nothing happens on the micro:bit	Check the code is on **both** micro:bits. Make sure the battery packs are switched on and charged. Press the reset button on the back of the micro:bit.
The ghost doesn't appear	Check both micro:bits use radio group **30**. Move them within a metre or two of each other, and try a firmer shake.
Another pair's ghost appears on your micro:bit	Give each pair a different radio group, such as 30 for one pair and 31 for another.
The blocks look wrong or are missing	Refresh the browser page and check you're in the *Spooky Signals* project.

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