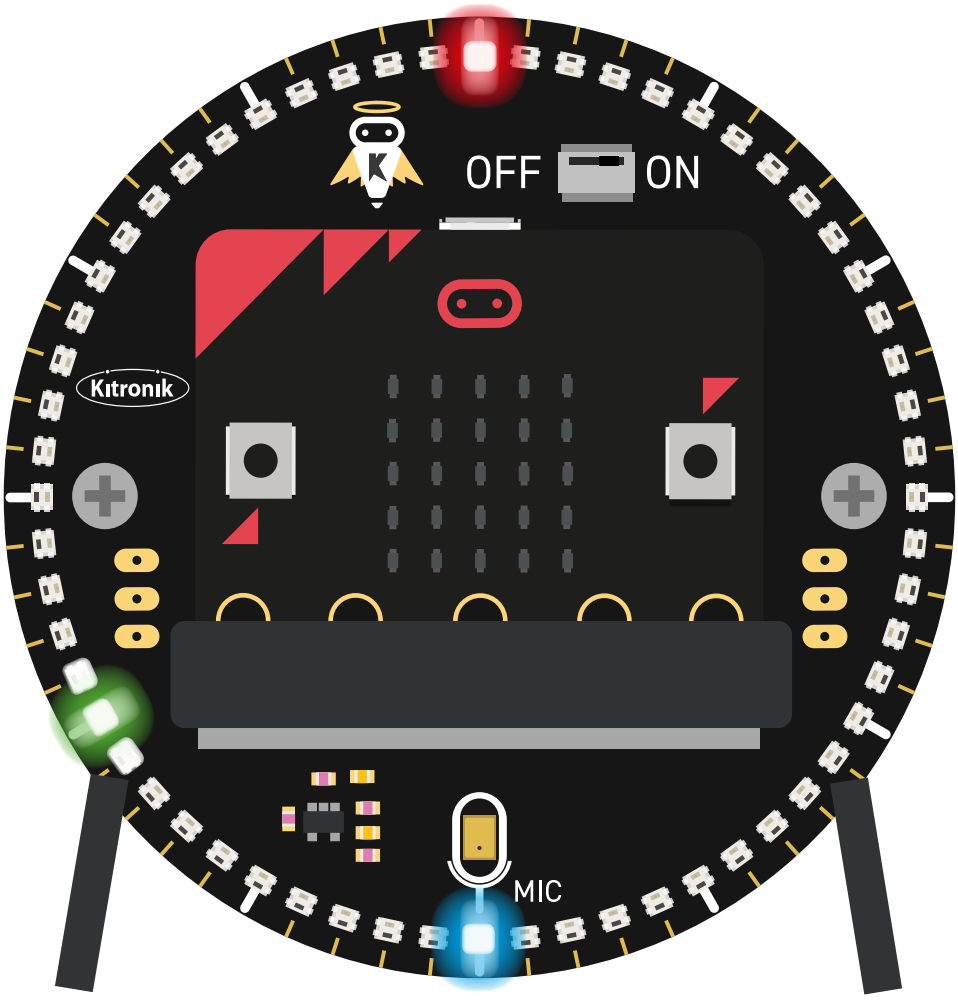
HALO HD
BASIC CLOCK TUTORIAL

KITRONIK **RESOURCES**



INTRODUCTION

Learn how to use the Halo HD's Real Time Clock (RTC) feature to make a fully functioning clock.

SETTING UP

EQUIPMENT REQUIRED:

- 1 x BBC micro:bit (www.kitronik.co.uk/5613),
- 1 x Halo HD - Alarm Clock Kit (www.kitronik.co.uk/5681)

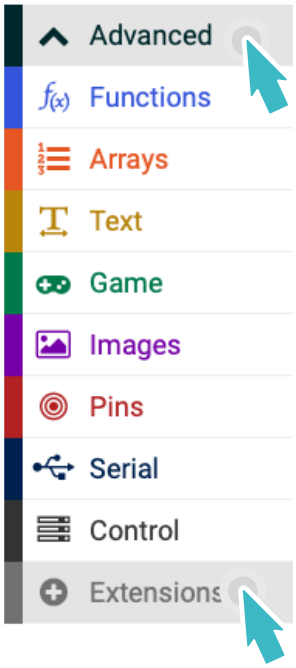
ADDING IN CUSTOM MAKECODE BLOCKS:

We have made custom coding blocks especially for the Halo HD, which helps to make coding super simple within Microsoft MakeCode.
To add these blocks, follow the steps below:

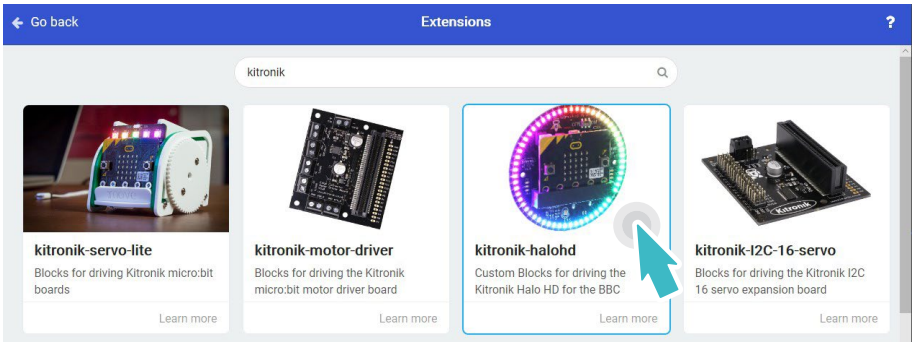
STEP 1: Bring up the MakeCode Block Editor - (makecode.microbit.org).

STEP 2: Click 'New Project'.

STEP 3: In the toolbox towards the left of the screen, select the **'Advanced'** section. Additional block categories will appear below.



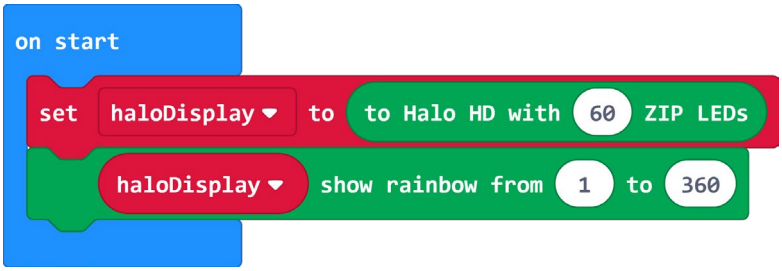
STEP 4: Select **'Extensions'.**
STEP 5: In the pop up's search bar type **'Kitronik'.**
STEP 6: Locate & select the **'kitronik-halohd'** box.



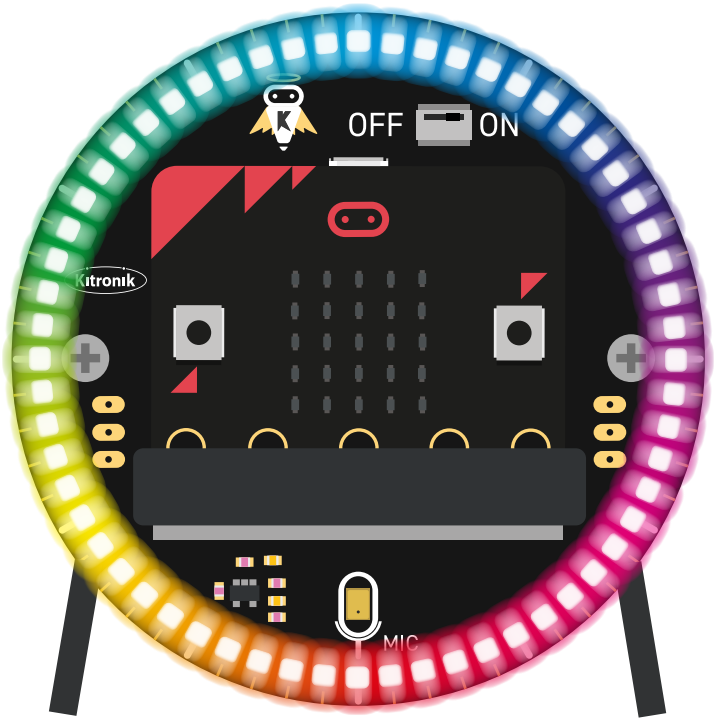
THE TUTORIAL

TESTING THE HALO HD

STEP 1: First, let's make sure the Halo HD is working correctly with a simple piece of code. Place the Halo HD setup block into the 'on start' section, followed by a 'show rainbow' block.



STEP 2: If you have a micro:bit connected, click 'Download' to transfer your code and see the Halo HD display a rainbow of colours!

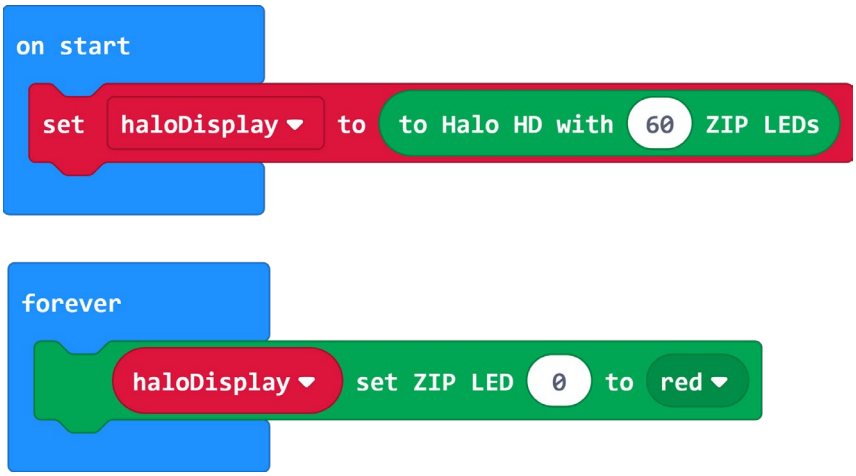


THE CLOCK

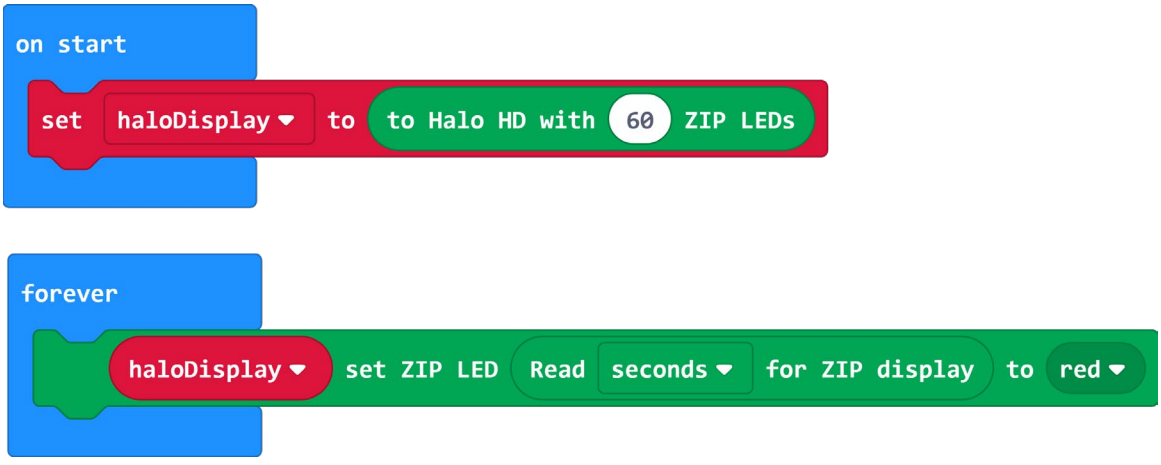
Now we know the Halo HD is working, it's time to code a clock.
The Halo HD has a component that remembers and increments the time. This is called a Real Time Clock (RTC). The RTC can be controlled from the BBC micro:bit, making it possible to set and read the time (as well as other functions).

STEP 1: Remove the 'show rainbow' block from the code.

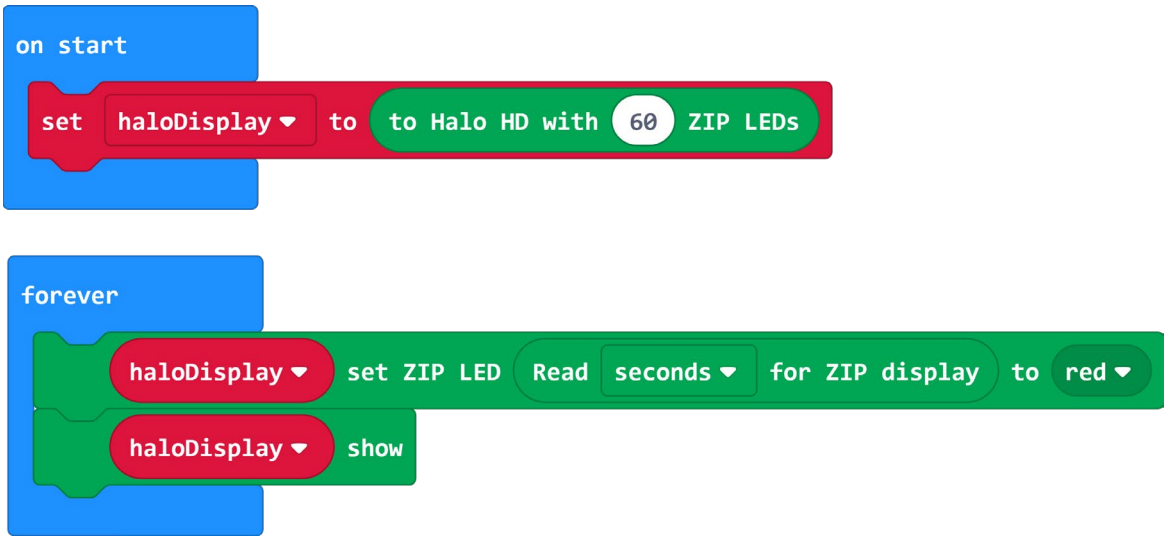
STEP 2: The Halo HD extension has a block which allows you to set a particular LED to a particular colour. Place one of these 'set ZIP LED to colour' blocks in the 'forever' loop.



STEP 3: Currently, the code will only set LED0 to red. We want this LED to move as the time changes.
Inside the Clock section of the Halo HD extension is the 'read time for ZIP display' block. Place this inside the 'set ZIP LED to colour' block LED number section and change the reading to 'seconds'.

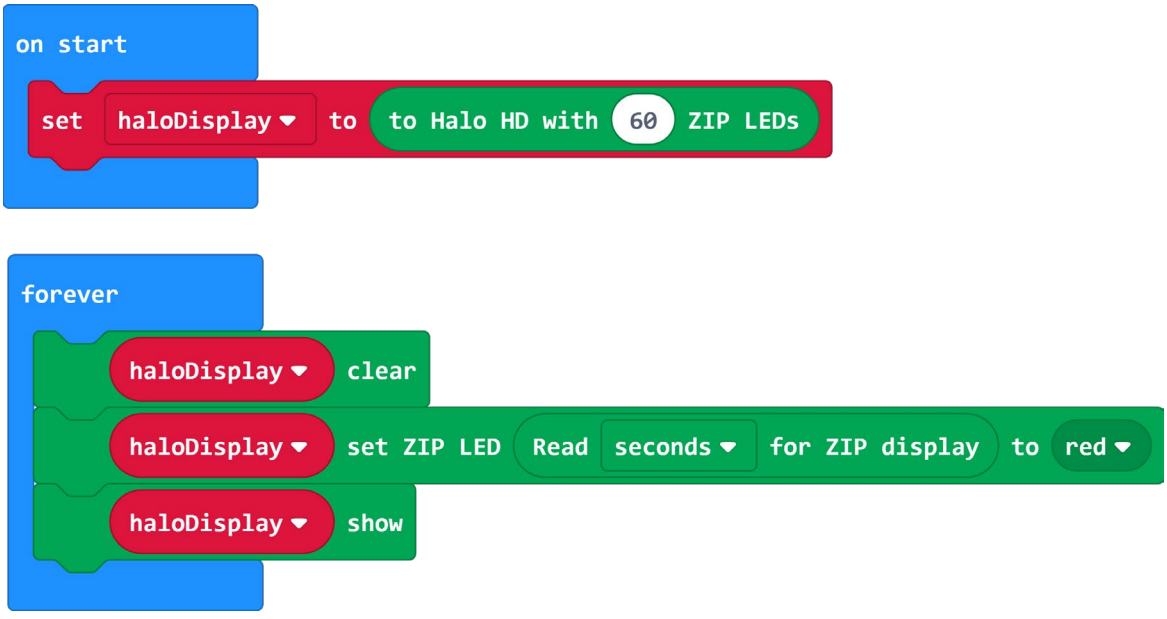


STEP 4: After setting which LED to turn on, we need to make this actually display. Add the 'show' block at the end of the code.



STEP 5: If you have a micro:bit connected, click 'Download' to transfer your code and see the Halo HD increment the seconds!

STEP 6: So, the LEDs are turning on every second, but the previous ones are not turning off. Let's change this by adding a 'clear' block to the start of the 'forever' loop.

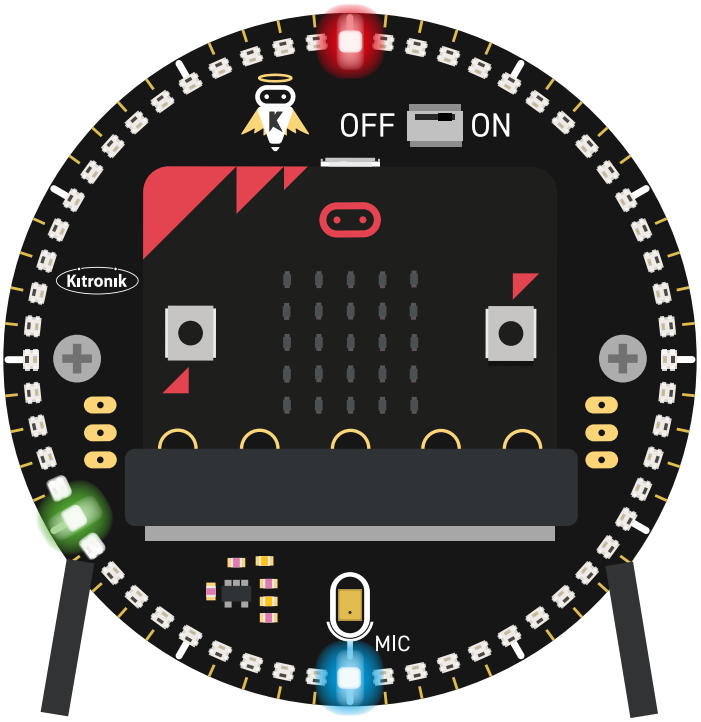


STEP 7: If you have a micro:bit connected, click 'Download' to transfer your code and let's see if this has fixed it!

STEP 8: Now we have the seconds working correctly, see if you can create the blocks for showing the hours and minutes...

HINT: It's the same blocks, but with different selections on the drop-downs. Maybe change the colours as well...

STEP 9: If you have a micro:bit connected, click 'Download' to transfer your code and check if the Halo HD is working as a clock!



SETTING THE TIME

The Halo HD is ticking the time, but not the right time. Let's use a block to correct that.
Most digital clocks will use buttons for setting the time. In this tutorial we are going to use the micro:bit buttons.

STEP 1: Place an 'on button pressed' block in the code and select 'A+B' from the drop-down.

STEP 2: From the Halo HD extension Clock section, drag and drop the 'set time' block into the 'on button pressed' slot.

STEP 3: Add the time it will be in two minutes time into the block.

STEP 4: If you have a micro:bit connected, click 'Download' to transfer your code and press A+B at the same time to set the current time.

STEP 5: Now we have a working clock. Bear in mind that every time you press A+B it will set the clock. The next tutorial will show you how to adjust the time with a button interface.

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For any further queries or support, please visit the Kitronik website: www.kitronik.co.uk/5672

Or get in touch:

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