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# Connect – Device Handbook

Version: 1.0 2022-05-18 JJS

Thanks for taking part in Connect. We hope you enjoyed the workshops, and that the puppet you made has a long and happy life in your home. Please do send us pictures of your puppets! Email: [jonathan.sanderson@northumbria.ac.uk](mailto:jonathan.sanderson@northumbria.ac.uk).

You can follow along with the project at **nustem.uk/connect**.

Contents

[Connecting to a WiFi network 2](#_Toc103764992)

[Coding 3](#_Toc103764993)

[Setting up 3](#_Toc103764994)

[Restoring the previous code 4](#_Toc103764995)

[Getting started 4](#_Toc103764996)

[Adding mood behaviours 5](#_Toc103764997)

[Connect Bits 6](#_Toc103764998)

[Uploading code 6](#_Toc103764999)

[Next steps 7](#_Toc103765000)

[Broken puppet? We can help! 7](#_Toc103765001)

[Recycling your puppet 7](#_Toc103765002)

[I want to do more like this! 7](#_Toc103765003)

## A picture containing text, person, indoor, hand Description automatically generatedConnecting to a WiFi network

Power up your Kniwwelino board **while holding down the ‘B’ button**.

The lights will scroll a message ‘WiFi AP: ‘ then a string of nonsense.

A picture containing text, indoor

Description automatically generated

A picture containing text, person, indoor

Description automatically generatedNow open the WiFi connection settings on your phone, tablet or laptop, and connect to the network name that starts ‘Kniwellino\_’

A picture containing text, indoor

Description automatically generatedAfter a few moments, the WiFi Connection Manager screen should appear.   
Press ‘Configure WiFi’

Choose your home WiFi network, and enter the password. Then tap ‘save’.

Your Kniwwelino should now restart, connect to your home network, and show a smiley face.

If something goes wrong, unplug the Kniwwelino, wait a few seconds, and plug it back in again.

Your phone (or tablet, or whatever) should go back to the network it was using before.

## Coding

### Graphical user interface, application Description automatically generatedSetting up

On a tablet or laptop, open a web browser (Chrome, Safari, or whatever). Click the address box, and type ‘[**connect.nustem.uk**](https://connect.nustem.uk/)’, then press return.

The website invites you to ‘Add Kniwwelino first’. Click the blue gear button and you’ll see a popup with a diagram of a Kniwwelino board.

Now unplug your Kniwwelino, and plug it back in **while holding down the ‘A’ button**. It’ll display a pattern of lights. Transfer the pattern to the diagram in your web browser by clicking the diagram:

A hand holding a small electronic device

Description automatically generated with low confidenceGraphical user interface, application, website

Description automatically generated

Give your device a name, then click the green + button to pair your device with the browser.

Clicking the lights can be fiddly. If you’re on an iPad you can zoom in, but **you must zoom out before tapping the green ‘+’ button**. If you don’t, open a new browser tab and re-load connect.nustem.uk there.

### Restoring the previous code

Once you’ve paired your Kniwwelino with the browser, at the top of the popup dialogue you’ll see something like this:

Graphical user interface, text, application, chat or text message

Description automatically generatedClick ‘restore last sketch’ and the page will load the most recent code that was written to the Kniwwelino.

### Graphical user interface Description automatically generated with medium confidenceGetting started

The starting code should look something like this. You can see very simple movements which will run when ‘HAPPY’ and ‘SAD’ moods are received.

There’s also a ‘home position’ setting for the servo. It’ll slowly return to this angle when it’s finished all movements.

To change the behaviour of your device, you’ll drag blocks around in the browser, then write the code to the Kniwwelino.

### Graphical user interface Description automatically generatedAdding mood behaviours

You can add behaviours for new moods by dragging container blocks in from the Moods tab.

**Don’t drag in more than one container block for a mood!** If you have two different ‘HAPPY’ mood blocks your Kniwwelino will get very confused and refuse to do anything.

Graphical user interface, text, application, chat or text message

Description automatically generated

Add movements to a mood by dragging in blocks from the Servos tab. Most of these movements work like a queue – each instruction waits for the previous one to finish. Each block does a different sort of movement.

Exceptions:

* **Queue servo [D5] wait for servo [D7] to stop moving** : allows you to have one servo wait for the other one to complete whatever it’s doing. Otherwise, two servos just move independently of one another.
* **Queue servo [D5] wait for [500] milliseconds** : adds a pause.  
   1000 milliseconds: a full second. Feels like a long time when you’re watching for it.  
   500 milliseconds: half a second, which still feels longer than you’d expect.  
   250 milliseconds: quarter of a second. Like taking a breath.  
   150 milliseconds: very short indeed.  
   50 milliseconds: So short you probably won’t notice it.
* **Move servo [D5] to [90] degrees, immediately** : this ignores the movement queue and just bangs the servo to the angle as quickly as it can, then gets on with whatever’s next. If you have two of these one after the other you’ll only see the second movement; better to use the **Queue servo [D5] move to [90] degrees, quickly** block.

### Connect Bits

Graphical user interface, text, application, chat or text message

Description automatically generatedThis is stuff which didn’t fit elsewhere!

The blocks called ‘Setup’ have to be in the Connect Setup container to work. Putting them in mood containers will break things.

* The servos normally turn themselves off after a few seconds, to avoid that annoying buzz or hum they sometimes make. If you need them to stay powered for some reason, **Keep servo active** will do that.
* **Active hours** isn’t written yet, sorry – at some point we’ll make it so you can set your device to turn itself off overnight. The lights are very bright, and a puppet springing to life at 3am is terrifying. Watch for updates on [nustem.uk/connect](https://nustem.uk/connect).
* **Upside-down**: Sometimes it’s useful to have the Kniwwelino mounted the wrong way up. This setting flips the pattern of the lights and switches the buttons around.
* **Wait** and **Repeat** blocks: we thought we’d make these easy to get at, in case you need them. They’d go in mood container blocks.

### A picture containing logo Description automatically generatedUploading code

When you’ve changed things to your liking, click the orange button.

A picture containing electronics

Description automatically generatedThe web server will sort the code out for you – ‘compiling’ it from the graphical blocks into instructions the Kniwwelino can follow – then it’ll send a message to your Kniwwelino to come and get the new code. You’ll see a flashing downwards arrow.

This usually takes about a minute. When it’s done, the Kniwwelino will restart and show the smiley face again: it’s now running the new code you assembled in the web browser.

**Don’t unplug your Kniwwelino while it’s doing this**, it could get very confused and stop doing anything much. If that happens to you, see below under ‘Broken puppet’.

## Next steps

### Broken puppet? We can help!

Cardboard is great, but it doesn’t last forever. If your puppet is looking a little tired, or you just can’t get it to behave as you want – please get in touch[[1]](#footnote-1). We’re hoping to run drop-in sessions at the Centre for Life to help you repair or retrain your puppets. Or maybe you’ve got a great idea for another puppet and want some help to make it? Great, we can do that too.

As of May 2022 we haven’t quite sorted out the details – we’ll post updates on [**nustem.uk/connect**](https://nustem.uk/connect).

We’ll be running Connect workshops across the region until July 2023, and the communication and web system will keep going long after that. More and more devices will join throughout the project, so your puppet is likely to get increasingly chatty!

### Recycling your puppet

If the workshop was fun and all, but the puppet is just gathering dust on a shelf – please don’t throw it away! We’d like to save the electronic bits from landfill if we can. Please return any unwanted bits to your school or the Centre for Life, and we’ll sort them out properly. Thanks!

### I want to do more like this!

If you really enjoyed all this – what you’ve been doing is called ‘digital making.’ There are loads of resources and groups out there which can take you further. The Centre for Life run a Maker Club, Code Clubs are scattered around all over the place, and there are other groups in schools and libraries across the region.

The Connect website ([**nustem.uk/connect**](https://nustem.uk/connect)) has a page of links and resources[[2]](#footnote-2) for where to go next, which we’ll keep updated.

The Kniwwelino devices we used for this project are unusual and a little tricky to get hold of. In most cases you’d be better off starting with a Micro:Bit kit. The website has links[[3]](#footnote-3) to online shops, and to libraries which may have boxes you can borrow.

1. jonathan.sanderson@northumbria.ac.uk [↑](#footnote-ref-1)
2. May 2022: this isn’t actually true, I haven’t written that page. Soon! [↑](#footnote-ref-2)
3. Also not true. Yet. [↑](#footnote-ref-3)