

Burrind@microbitsandbobs.co.uk

Making a Remote Sensor – Based on the tutorial at pxt.io

Damian Burrin – www.microbitsandbobs.co.uk

As we all know Microsoft developed an extended version of their Touch Develop web application for the Micro:bit that is hosted on www.microbit.co.uk but what you may not be aware of is that this is linked to the Microsoft hosting service Azure.

Microsoft have also developed an extended version of Touch Developer called Microsoft Programming Experience Toolkit (PXT) this has a really interesting extra feature that it can allow a programmer to use the Micro:bit radio service to transmit the data that is being picked up by one Micro:bit and transmit it wirelessly to another. You can then stream this data over the Internet via Microsoft Azure. This can then be either downloaded as a CSV file or even viewed live using an enhanced version of a “Web Query” (*something I was first introduced to nearly 15yrs ago as part of the KS3 national strategy*) and displayed in an updatable graph.

Yes we can make a remote sensor!

Tutorial – This is based on the free lesson on the PXT.IO website – check these out to see more additional features that PXT has to offer over the standard touch developer.

To be able to complete this tutorial you will need to have Chrome installed and have added the Chrome Micro:bit extension which is available free of charge from the Chrome store.

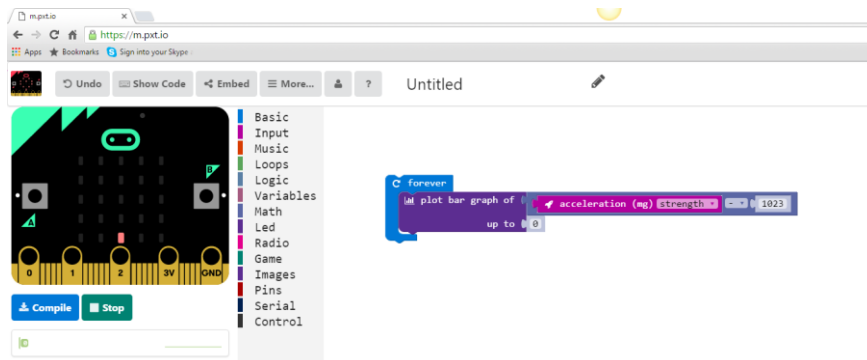
You will need either office 2016 or if you are using Office 2013/2010 you will need to add the PowerQuery Addon. This can be found on the Microsoft website or by googling Microsoft Power Query.

You will also need 2 Micro:bit devices. While Azure streaming works with Touch Developer if you want to include the radio service to make a remote sensor you will need to be using Microsoft Programming Experience Toolkit or PXT via www.pxt.io

OK Lets go!

Step 1 – Reading a sensor

Create a new project and plot the accelerometer “strength” value into a bar chart



Note I've removed 1023 from the value. When the Micro:bit is sat still it reads a strength of 1024 from the accelerometer. Removing this value means that when it's under normal gravity the graph will plot it's smallest value 1 – then when a negative or positive increase is detected this can be read as an increase or decrease in mG

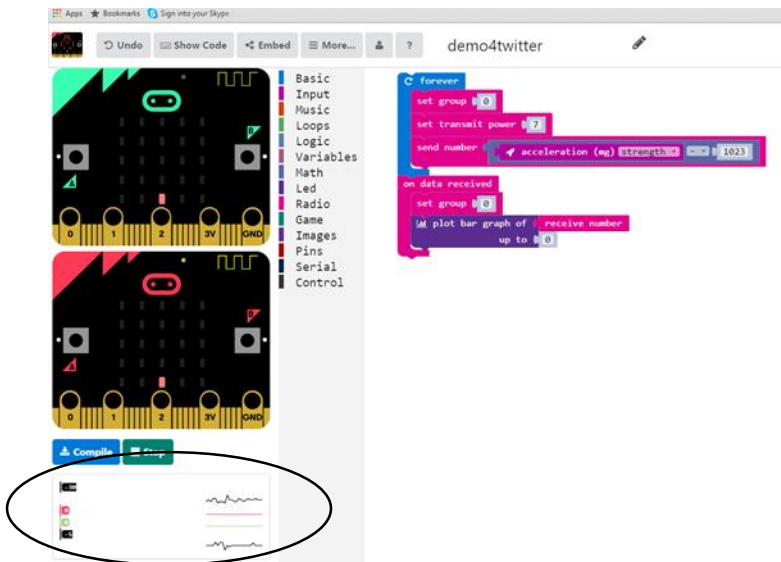
Step 2 – Compile



Notice I have compiled to the Micro:bit it now shows a simulated and live reading below the Micro:bit. At this point you can tap or throw about your Micro:bit about and you will see the live data change, you are now also ready to stream this data to Azure if you want – to do this jump to **STEP 4**

Step 3 – Making a remote sensor

Plug in a second Micro:bit. Change the code to match the image below and compile onto **both** the Micro:bits. Notice how I now have two simulated Micro:bits and two live data streams.

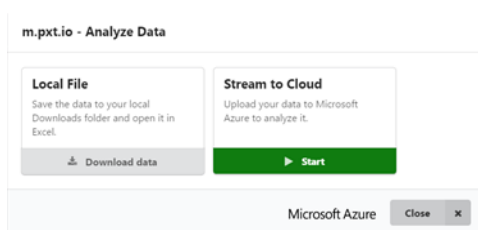


Add a battery to one of the Micro:bits and then disconnect it from your PC. If you keep one Micro:bit very still and tap the second one you should see how the graph on the second Micro:bit changes in reaction.

Step 4 – Streaming

To stream your data you will need to either have Office 2016 installed or you could install the free Power Query add-on for Office 2013.

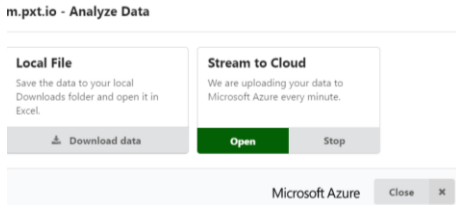
Click on the box containing the live data and then press start. This will start the streaming service, it should now say “Streaming to Cloud”



Burrind@microbitsandbobs.co.uk



Click on the “streaming to cloud” wording to open the stream and click open (at this point you could choose to download a csv of the data stream)

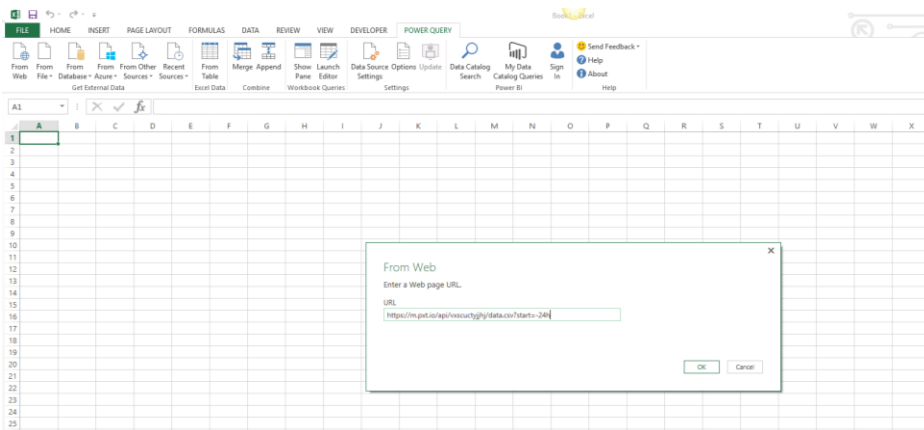


When the stream is open you will be presented with some instructions, scroll down these until you find the stream URL and copy this address.

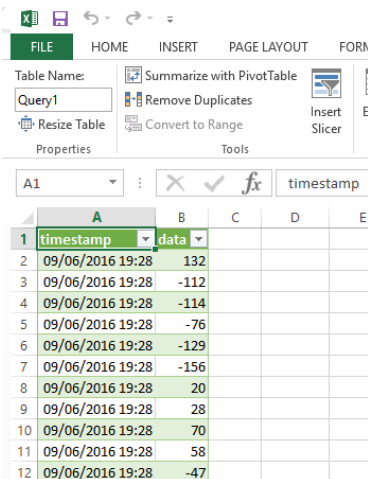


Now you are ready to link Excel with your stream to graph your live data.

From the Power Query option choose “From Web” and paste the URL into the box

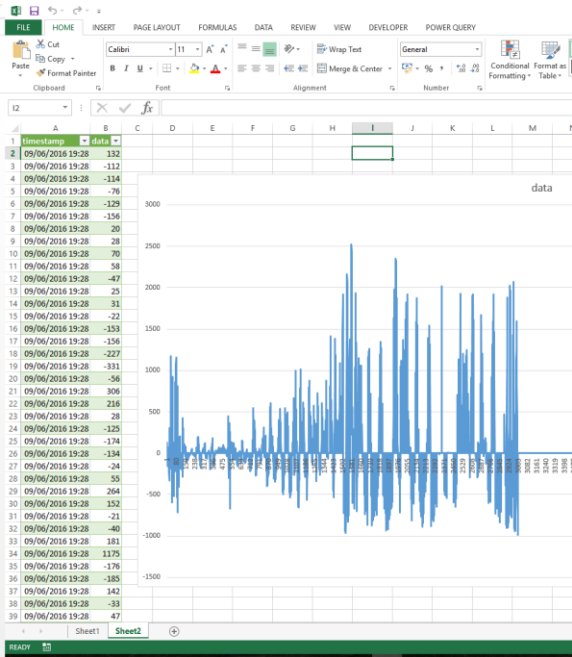


After a few seconds your data stream should appear

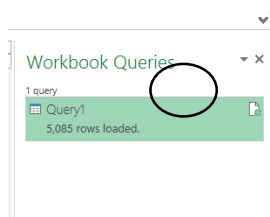


Burrind@microbitsandbobs.co.uk
Graph your data in the normal way.

The data in my stream is my daughter jumping up and down on her trampoline with Micro:bit in hand!!



You can update the data at any time by clicking the refresh button – The data is uploaded to Azure every minute.



That's it – one live streaming remote Seismograph.