User Guide

So your MIDIbit just arrived. Let's get it set up for use and walk through some common usage scenarios.

Whatever we want to do with the MIDIbit, we're going to need some cables to hook up our LittleBits modules to the MIDIbit's I/O. The easiest thing to do is buy a pack of '**W1 WIRE**' modules, from http://littlebits.cc/bits/wire-bit. To get started, however, we'll use a couple of the modules that come in the Synth kit.

Pull the '**W19 SPLIT**' module out of your LittleBits Synth Kit. It looks like this:

Figure 2:

Unplug the end where both wires connect, circled in red on the left of **Figure 2**, by pulling on the white connector.

NOTE: <u>NEVER</u> pull on the wires as you could damage them.

You will now have two separate output connectors. These LittleBits magnet connectors are the correct orientation for output; they connect to the input of a LittleBits module.

NOTE: <u>NEVER</u> connect these output wires to the input side of the MIDIbit as this could damage your MIDIbit and/or LittleBits modules.

For input connectors, you can disconnect the wires from your mixer bit in a similar way to the split wires above. These LittleBits magnet connectors are the correct orientation for input; they connect to the output of a LittleBits module.

NOTE: <u>NEVER</u> connect these input wires to the output side of the MIDIbit as this could damage your MIDIbit and/or LittleBits modules.

Updating the firmware

Next, let's make sure we have the very latest firmware installed.

Go to www.usbtri.be/firmware/MIDIbit_firmware.html and download the latest firmware file to a directory on your computer. Take note of where you save it.

Take the black plastic link, from its storage position and slide it onto both pins of the PROG connector

Plug a USB cable into the MIDIbit's USB connector and then into the computer. The MIDIbit will show up as a USB flash drive. Delete the firmware that is on there and then drag-and-drop the new firmware on to it.

NOTE: You **MUST** delete the old one first and not just try to overwrite it.

Next, if you intend to use the MIDIbit with a computer, press the Reset button and follow the next section **Playing some notes via USB**. Alternatively, if you wish to use your MIDIbit without a computer, disconnect the USB lead from the computer, connect it to a USB power adapter and skip ahead to the **Playing some notes via DIN**.

Demonstrating the Outputs

In this section we'll walk through some very simple examples in order to demonstrate the various output functions.

Playing some notes *(via USB)*

With the latest firmware installed, as described above, and your MIDIbit connect to the computer, we're ready to start making some noise.

Start your DAW. Open the MIDI preferences window and, in the Output section, locate the MIDIbit (it will be called either MIDIbit or USB Audio Device, depending on the operating system you use) and enable the interface for MIDI output. Consult the manual for your DAW if you are not sure how to do this.

Take one of your output connectors, the ones from the Split module, and plug it into the MIDIbit's Note output. Now snap an Oscillator module to the magnet connector, on the end of the wire, and the Speaker module to the output of the oscillator.

Playing notes from your DAW will now sound the Oscillator. You'll need to adjust the Pitch and the Tune controls, on the Oscillator module, to tune it to the correct frequency.

Playing some notes *(via DIN)*

With the latest firmware installed, as described above, and your MIDIbit connect to a USB power supply, we're ready to start making some noise.

Plug your MIDI source (keyboard, sequencer, etc.) into **[2] MIDI IN**, referenced in **Figure 1**.

Take one of your output connectors, the ones from the Split module, and plug it into the MIDIbit's Note output. Now snap an Oscillator module to the magnet connector on the end of the wire and the Speaker module to the output of the oscillator.

Playing notes from your MIDI source will now sound the oscillator. You'll need to adjust the Pitch and the Tune controls, on the Oscillator module, to tune it to the correct frequency.

The Velocity output

Let's add the Filter module, and modulate the cutoff using MIDI velocity values.

Break the chain of modules by disconnecting the Speaker from the output of the Oscillator. Snap the Filter module to the output of the Oscillator and the Speaker to the output of the filter. Now snap the magnet connector of your other output wire, the second one from the Split module, to the 'Freq In' input of the Filter and plug the other end into the MIDIbit's Velocity output.

Playing notes will still sound the Oscillator but now the Oscillator sound passes through the Filter module. Try playing notes of varying velocity to hear how it modulates the Filter cutoff. You'll need to adjust the Cutoff and the Peak controls, on the filter module, to get your preferred sound.

The Mod Whl output

Now we're going to modulate the filter cutoff using the Mod Wheel. If you're using a MIDI controller keyboard, chances are you have a mod wheel next to the keyboard, usually alongside the pitch bend control. If not, you can send MIDI continuous controller (CC) number 1. CC#1 is what the mod wheel sends.

First off we need to adjust out connections. On the MIDIbit, unplug the connector from the Velocity output and connect it to the Mod Whl output.

Playing notes will still sound the Oscillator and the sound still passes through the Filter module. Now, however, the Filter is modulated by adjusting the mod wheel on our MIDI source. Again, you might need to adjust the Cutoff and the Peak controls, on the Filter module, to get your preferred sound.

The Gate Output

For this example we need to swap the Filter module for the Envelope module. The Envelope module should connect to the output of the Oscillator module and the Speaker module should connect to the output of the Envelope module.

On the MIDIbit end, we also need to move the wire from the Mod Whl output to the Gate output.

Now, turn the Attack control fully anti-clockwise and the Decay control fully clockwise and start playing notes. The Envelope is being triggered every time a note is played. Adjust the Attack and Decay controls to find a sound you like.

The Clock Output

This time we'll move the wire from the Gate output to the Clock output.

The Clock output only triggers when the MIDIbit receives MIDI sync messages so we need to set up the MIDI source to send sync. Consult the manual for your DAW or MIDI hardware if you re unsure how to do this. Some hard/software requires you to start playback in order to send sync.

The Envelope is being triggered every 1/16th step, in sync with the MIDI clock. Start playing notes and adjust the Attack and Decay controls to find a sound you like.

Demonstrating the Inputs

In this section we'll walk through some very simple examples in order to demonstrate the various input functions.

For these examples, we want to separate the Mixer module as well as the Split. Unplug the two wires from the mixer end, the end with the two knobs on. You'll end up with two wires with pink magnet connectors on one end and nothing on the other end.

The Note, Velocity and Gate Inputs

These three inputs are best demonstrated all together. This is because a MIDI note message is made up of two components, a note number and a velocity. The note number determines the frequency of the note to be played and the velocity determines its amplitude. We need to use the Gate input to tell the MIDIbit when to start and stop the note.

The Synth kit doesn't quite contain enough wires so we need to do a bit of swapping around. Make up three wires, as shown in the photograph below. For the last wire, you need to disconnect the Mixer magnet connector, circled in red, and connect one of the Split magnet connectors, so you end up with the wires exactly as shown below.

Figure 3:
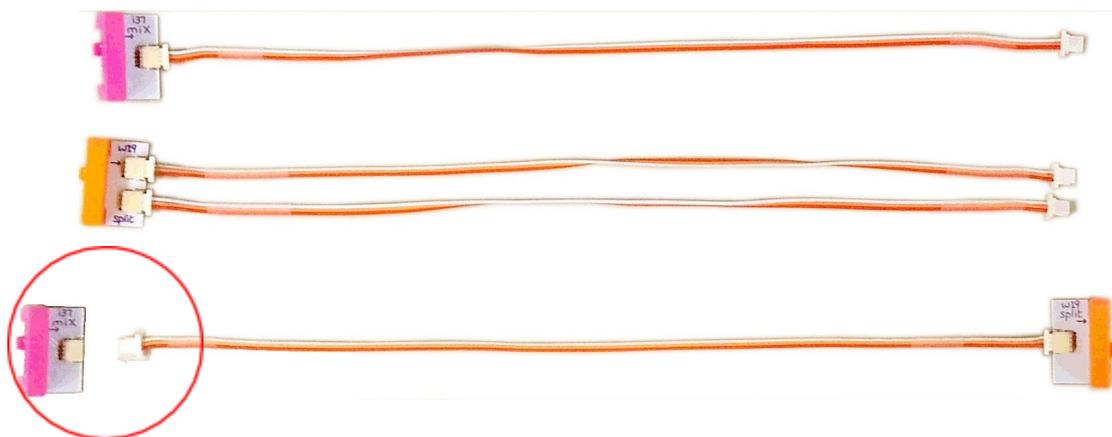
Take your '**P1 Power**' module and snap it to the input of an Oscillator module.

Now, take the double Split wire, the second from the top in '**Figure 3**', and snap it to the output of the Oscillator. Connect the two wire ends to the Note and Velocity inputs on the MIDIbit. Set this Oscillator to Saw wave and set its knob to 3 o'clock.

Continued on the next page…

Next, snap the Mixer wire, at the top in '**Figure 3**', to the output of another Oscillator module and connect the free end to the MIDIbit's Gate input.

The remaining Split wire, at the bottom in '**Figure 3**', can now be snapped to the input of the second Oscillator module and its free end connected to the MIDIbit's Gate output. Switch this second Oscillator to Square wave and set its knob to 3 o'clock.

Switch on your Power module and hold down a note. The first oscillator is providing the Note and Velocity inputs with analogue voltages. The second Oscillator is triggering the Gate input, causing the MIDIbit to sample the Note and Velocity inputs. The MIDIbit will output, over MIDI, a stream of varying notes with varying velocities. Route these notes to an external soft/hardware synth to hear the results.

The Mod Whl Input

The Mod Whl input is sampled periodically and, when the analogue voltage at the input changes, sends a MIDI CC#1 message containing the sampled value. This could be used, for example, to add physical control to software. Try connecting up a LittleBits Dimmer or Slide Dimmer module and using the MIDI messages to adjust channel volume in you DAW.

For this example, we're going to use an Oscillator module to provide an analogue value.

Connect the Power module to the input of an Oscillator module and one of the Mixer wires to the output. Connect the other end of the Mixer wire to the Mod Whl input on the MIDIbit. Set the Oscillator to Saw wave, turn the knob fully anticlockwise and switch on your Power module.

The MIDIbit will output a stream of MIDI CC#1 messages via MIDI.

The Clock Input

For this example, we're going to use an Oscillator module to provide pulse train.

Connect the Power module to the input of an Oscillator module and one of the Mixer wires to the output. Connect the other end of the Mixer wire to the Clock input on the MIDIbit. Set the Oscillator to Square wave, turn the knob fully anticlockwise and switch on your Power module.

The MIDIbit will output sync messages via MIDI. Try varying the knob on the Oscillator to raise or lower the tempo.

User Defined Settings

Although the MIDIbit's outputs come predefined as Note, Velocity and Mod Whl and all respond to MIDI channel 1, they can in fact be independently set to respond on any MIDI channel and as any of those three output types. This means we could have three note outputs each on a different channel, for example, or two note outputs and a velocity output all on MIDI channel 16. Any combination is possible.

Due to the fact that the MIDIbit board has no physical input controls, we modify these settings via MIDI CC messages. The MIDI implementation chart is shown on the following page. For clarity, we'll call the Note output 'Output 1', Velocity 'Output 2' and Mod Whl 'Output 3'.

Let's say that we want to change the MIDI channel that 'Output 2' responds to. By default it is set to 1. Lets change it to 7, just as an example.

Using the chart below, we can see that Output 2 MIDI Channel is modified by CC#22 and the range of useable values is 0…15, representing MIDI channels 1 through 16.

To change 'Output 2' from channel 1 to channel 7, we send a value of 6 on MIDI CC#22. To change it to channel 16, we'd send a value of 15 on MIDI CC#22.

To change 'Output 3' function from 'Mod Whl' to Note, we send a value of 0 on MIDI CC#25. To change it to 'Velocity', we'd send a value of 3 on MIDI CC#25.

For a full list of channel functions and their corresponding numbers, please see '**Table 2 - Channel Function Chart**', which you'll find after '**Table 1 – MIDI Implementation Chart**', on the next page.