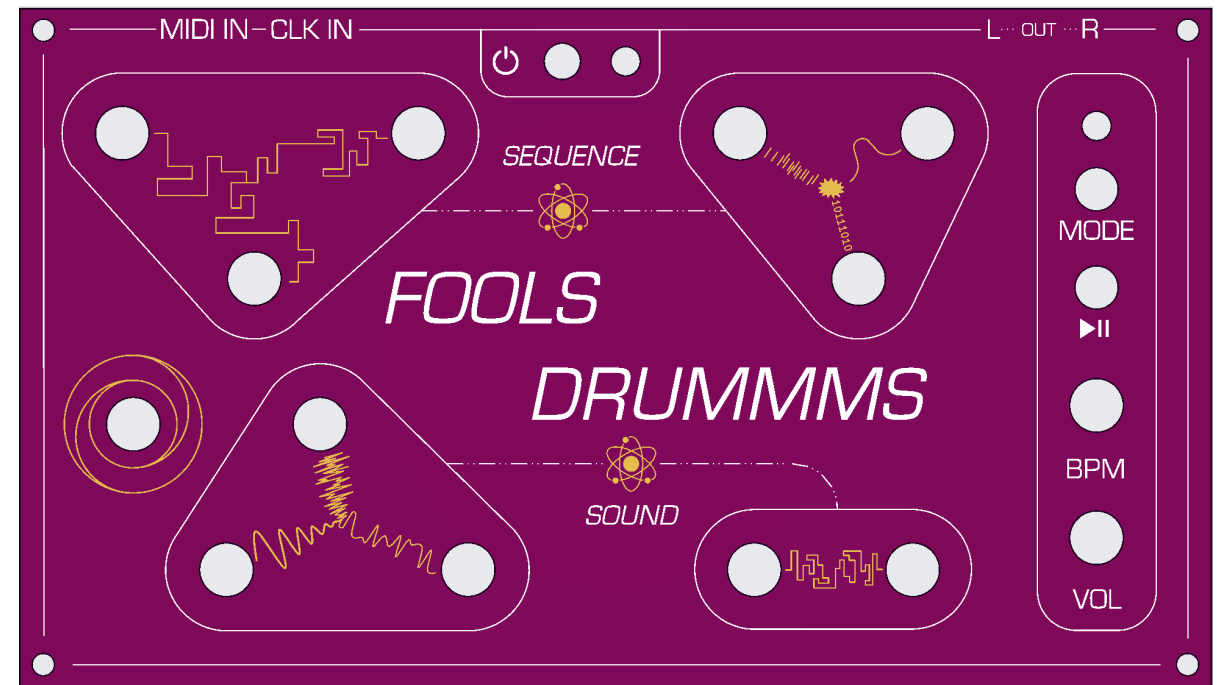# MANUAL (V1.0)

This guide is here to explain the basics of playing the fools drums. More details on how it actually works can be found on www.fools-paradise.com/drumbadum (still needs finishing up though). You could also completely ignore this document and just let your ears be the guide.

The sound engine consists of 3 algorithms which can be played simultaneously. The algorithms are in essence a bass-drum type sound, an FM type sound and a white noise sound, each with various parameters that are set to create (a lot of) variation.

The interface is built up in 5 sections (outlined with a white line) + a bonus knob. I will go into detail in the next pages, but essentially the top half relates to the sequencer and the bottom to the sound:

1. Top left: sequence definition
2. Top right: sequence randomization and locking
3. Bottom left: sound randomization
4. Bottom right: sound definition
5. FX knob (left): master FX and stutttter amount
6. Right: bpm, volume, start/stop, mode

MANUAL (V1.0)

External interface

The machine is powered using a simple micro-usb cable (5V). Your average mobile phone charge cable and adapter does the trick.

There are 2 ways to sync the device to external gear. Either take in MIDI or a CLOCK signal:
- MIDI is synced with a type A TRS jack which is becoming the standard. Check this site for more info on MIDI over TRS: https://minimidi.world/.
- CLOCK IN excepts a trigger/gate type of signal and is aimed at modular synth users. It expects a trigger on each beat.

The machine's clock is prioritized as follows: if it notices a midi clock, then this takes precedent. If not, it will check if there is a CLK IN signal and if so it uses this. If both are missing then it goes to the internal clock.

Lastly there is audio out, which is a LEFT and RIGHT out at line level (no mono summing).
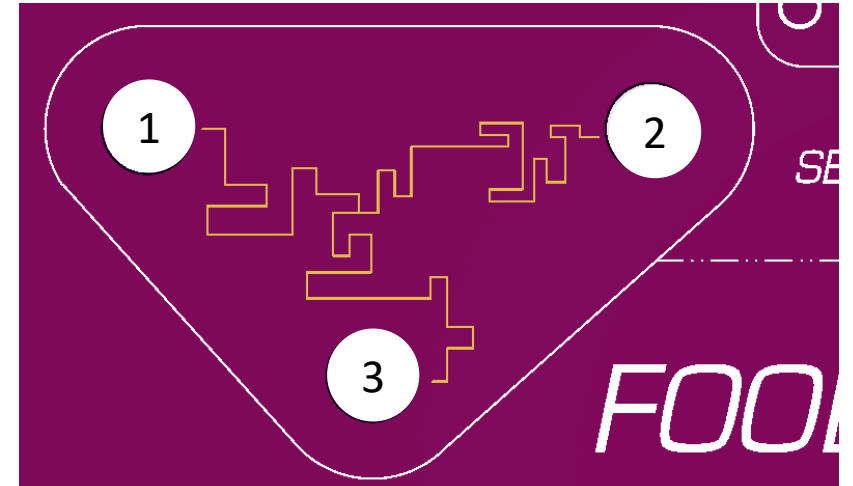
MANUAL (V1.0)

Sequence definition

The combination of the 3 knobs in the top left section will produce the base sequence of the machine.

Knob 1 sets the basic rhythm of the sequence. The position of the knob corresponds to a preprogrammed groove. An example is e.g. a 'son clave' rhythm, which in 16 steps goes like this: | x - - x | - - x - | - - x - | x - - - |
In the machine this is translated as such that on each hit (denoted with 'x') we always have a hit and this hit is accented.

The position of the other knobs in this section define which sound is played on each hit. Since these hits define the groove of the rhythm, it is more likely that the hit is a bassdrum or a FM synth than a white noise hit. In addition these other 2 knobs affect which sounds fill the space between the 'accented hits' and (in part) the probability that these intermediate hits will be heard. More on this in the next section.

Note that none of the knobs function as a dial from 0-100. The position of knobs 2 & 3 corresponds to a 16 step pattern of pre-programmed random values between 0 and 100. So as a user you have to tweak until you find a pattern that works for you, don't rely on the position of the knobs. However the sequence is deterministic, so if you switch the machine off and on again and leave the knobs as they are, the same sequence will start playing again. Hope that makes sense.

MANUAL (V1.0)

Sequence randomization

These 3 knobs will affect the level of randomization applied to the sequence.
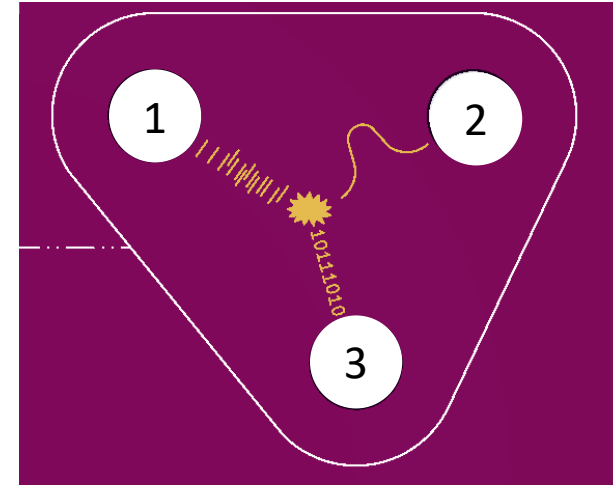
Knob 1 influence the amount of so-called artifacts in the sequence. These artifacts fill the space between the 'groove' notes or whatever you want to call them from the previous section. Turning it clockwise increases the probability of a note being hit. Thus the further you turn the more dense the pattern. Which sound is hit is defined by knob 2 of the previous section.

Knob 2 influences randomization of a whole bunch of things. The further you turn, the more random the pattern becomes. It only affects hits that are not part of the basic groove, these hits will remain constant throughout as to maintain a pattern. All the other sounds are in principal defined by the 'sequence definition' knobs (not completely though, but that is too much detail for here). So this knob adds randomization to this sound selection.

Knob 3 is the Turing machine knob and is called as such because it is based on the Music Thing Modular Turing machine (check it out). Turning it fully CW or CCW locks and repeats the last 16 steps of the sequence. So if you are playing and like a sequence that just came out of the machine you can quickly lock it and it will repeat. More features to this knob are to be added soon. IMPORTANT; if this knob is turned either CW or CCW when switching the machine on, you will only hear silence. Reason being that there are no last 16 steps of the sequence, so it's looping emptiness.

MANUAL (V1.0)

Sound definition

These 2 knobs will affect the parameters of each sound algorithm.
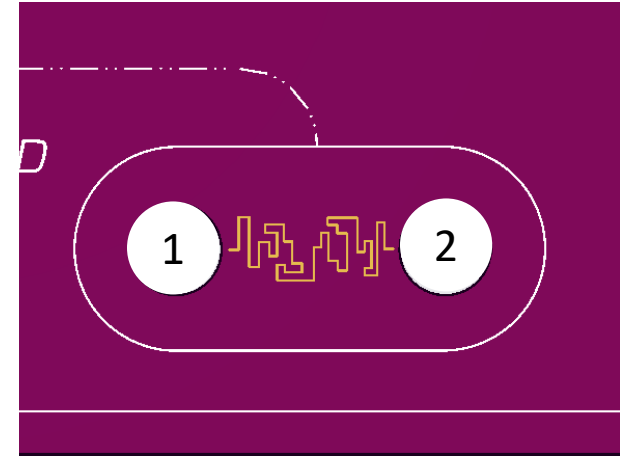
The combination of these 2 knobs will output a value between 0-100 which is then passed to each parameter. For instance the bassdrum has parameters; frequency, decay time, overdrive (amongst others). Based on the combination of these each parameter is assigned a (different) value between 0-100 which is then mapped accordingly.

Knob 1 is mapped, similarly to knobs 2 and 3 from the sequence definition, to a 16 step pattern of pre-programmed random values between 0 and 100 which in turn map to the parameters. All you need to know as that turning this knob sets the base values for the parameters.

Knob 2 is more complicated, but in essence it affects the probability that a parameter is changed between hits. It has strong interplay with the next section on sound randomization.
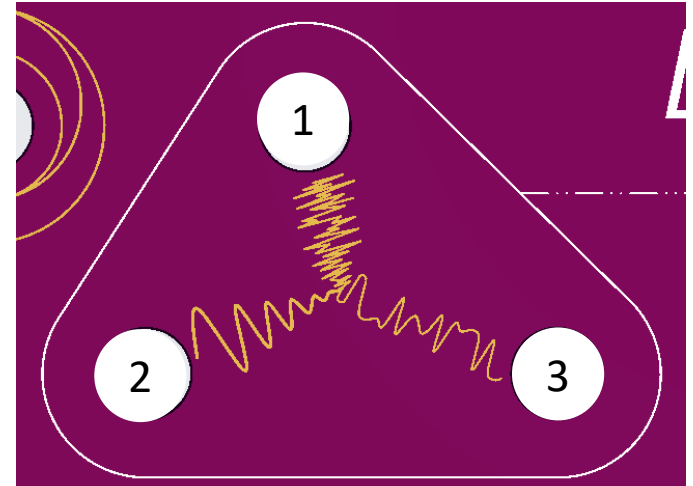
MANUAL (V1.0)

Sound randomization

These 3 knobs will affect the level of randomization applied to the sound.

Each knob does the same thing however applied to different instruments. Knob 1 applies to the whitenoise, knob 2 to the bassdrum and knob 3 to the FM hit.

Turning these knobs clockwise increases the randomness parameter for each sound. Turned all the way to the left, means each hit will sound the same. Turning it to the right will add randomness. This randomness is not linear but referenced to knob 2 from the previous 'sound definition' section. So it's the combination of all these knobs that affect variation.
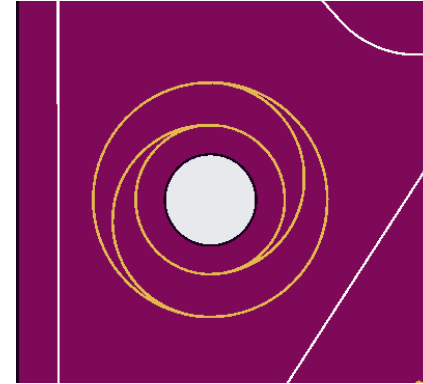
MANUAL (V1.0)

FX knob

This knob covers the effects to the master out. Turning it CW increases how often you will hear effects and stutters

There are 4 effect algorithms programmed into the drumbadum:
- Wavefolder
- Comb filter (slightly offset delay between L & R for stereo sound)
- Ring modulation
- Artifacts (Offsetting the soundwave by random values)

The effects are applied independently to each step in the sequence. This means that at each step 1 or more of the effects are applied and the further the knob is turned, the higher the chance an effect is applied.
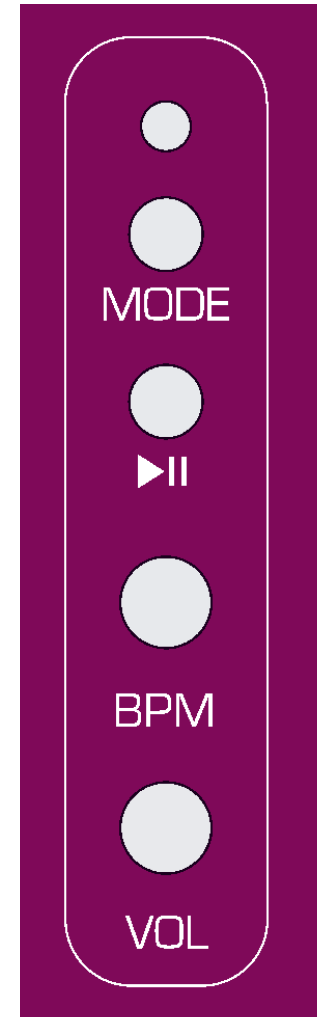
MANUAL (V1.0)

Controls

The controls section consists of 2 buttons and 2 knobs. Holding down the MODE button puts the machine into an alternative control mode. This means that the function of some of the knobs is altered, more on this on the next page.

Start/stop button is pretty obvious. It always starts at step 1, so the icon on the frontplate that shows the 'pause' symbol is incorrect actually, it should be stop.

BPM changes the BPM. It ranges from about 40-200 BPM. When synced to another device this knob does nothing

VOL changes the volume.

MANUAL (V1.0)

ALT MODE

Holding the mode button puts the machine in 'alt mode'. Now you can tweak some other settings as you please. Note that these settings aren't saved so upon restart they are reset.

The following knobs have a new function:
- BPM: this button now sets the tempo division. The standard is 4 steps between beats (or 16 steps a bar). This knob can now change this to either 2 or 8 steps per beat, thus essentially halving or doubling the speed.
- The 3 sound randomization knobs (bottom left set of 3): these now change the volume of the instrument in the mix. Turning it all the way to the left will mute the instrument.

When releasing the mode knob you go back to the normal operation. Any pot you turned in 'alt' mode needs to be turned to the position it was before, for it to work again. This means you won't have any surprise changes to the sequence when releasing the mode button.