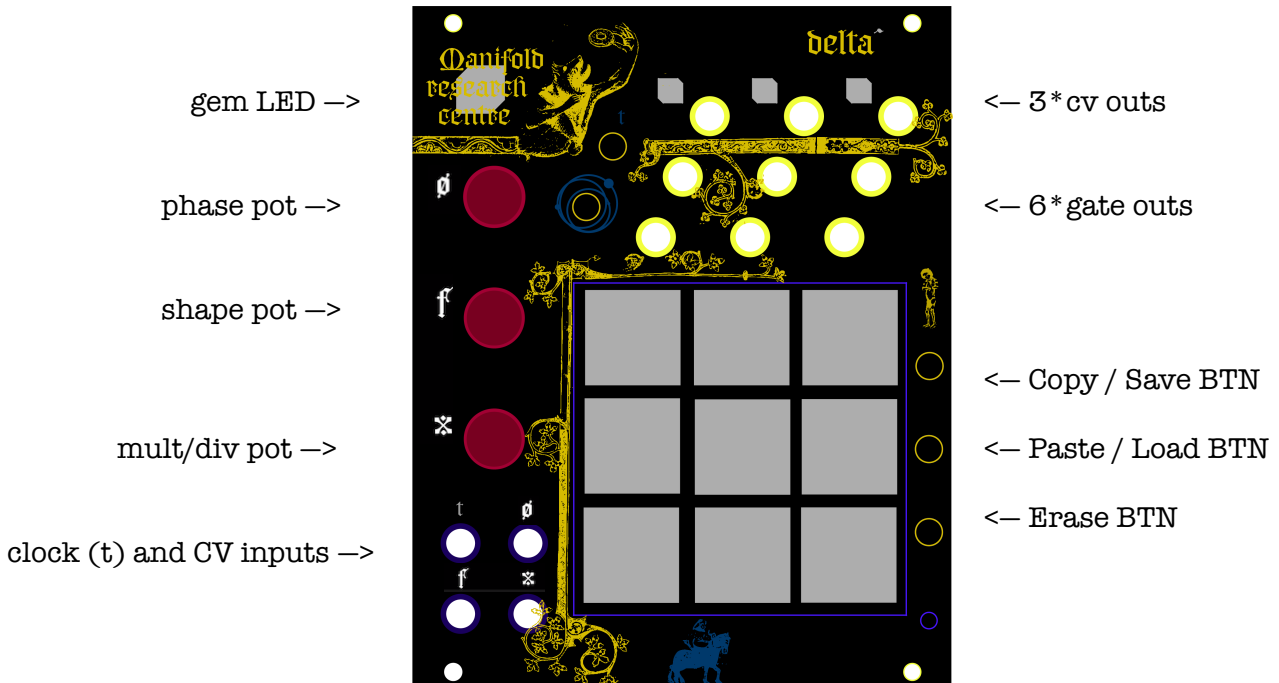delta^
manifold research centre
USER MANUAL

delta^ is a polyphonic cv and clock generator.
it consists of a 3*3 keyboard grid, where each button is a tap-tempo with its own output:
the top 3 are CV outs, while the bottom 6 are gate outs.

gem LED —>   <— 3*cv outs

phase pot —>   <— 6*gate outs

shape pot —>

                                                        <— Copy / Save BTN

mult/div pot —>   <— Paste / Load BTN

                                                        <— Erase BTN

clock (t) and CV inputs —>

CV outs:
The CV outs are 0-5V unipolar LFOs, with variable shape that goes from down-ramp
through triangle to up-ramp.

Gate outs:
The gate outs have variable PWM.

To tap a tempo, just TAP it*! The module will follow your last 2 button presses with a
maximum tap time of 4095 milliseconds (through the divider, longer TT's can be obtained,
up to 50 seconds).
Max speed is 50ms (20 Hz).

*the button press needs to be shorter than 350 milliseconds, otherwise it will be
interpreted as a long press, you'll know it very soon why you need that!

Each of the TT have three parameters that can be set independently:

1. phase ;
2. shape ;
3. divider/multiplier ;

To access these parameters press and HOLD the TT and turn the desired rotary encoder,
pressing the encoder will set your parameter to 0.

The gem led will blink at the TT speed and will show you the level of the encoders using the following colour scheme: blue for phase, green for shape and orange/purple for division/multiplication.

You can copy/paste/erase TT.
To do so press and HOLD the TT and then press copy, paste or erase buttons. You can paste and erase multiple TT slots at the same time.

You can Save/Load one preset.
To save: hold for at least 0.5s the copy BTN.
To load: hold for at least 0.5s the paste BTN.

You can quantise to an external clock and use external CVs to modulate the parameters, you have independent control of which TT receives ext. clock and Modulations.
The t algorithm works quite organically, the TT's get phase locked to the external clock (t) when the rising edge naturally encounters the "t" rising edge.

ALL EXT MODULATIONS ARE ASSIGNED THE FOLLOWING WAY:
press and HOLD the parameter button* and select which TT you want to be modulated externally, the TT will be lit in white for the duration you'll hold the t button, also, the GEM led will show you the incoming CVs and clocks.

*in case of CVs this will be the encoders,
while in the case of ext CLK it will be the (t) button.

I tried to develop this module keeping only 2 layers, in order to improve playability, and avoiding as much as possible the possibility of getting lost in sub-menus.

Gravitational Mode:

This special mode allows to introduce internal cross-modulations.
When a TT will be set as master it will influence the behaviour of its neighbours (top, bottom, left and right).
The neighbour gates will be XOR'd while the CVs will cross modulate each other.
        !! the gates don't influence the CVs, although the CVs do XOR the gates!!

 Press and hold the Gravitational mode button to activate the gravitational pull of specific TT's.

Randomisation layer:

each TT setting can also be randomised! When no TT's are held, the encoders will act as a Macro control over the amount of randomisation, pressing the encoder will generate a new set of values, while holding erase and pressing the encoder will quickly set it to 0 (the gem LED will act as a visual indicator).
This mode allow you to introduce quick changes in your patch, with the ability to return to your previous settings.
When the mult/div pot gets set to 0 or, when a new set of values are generated (by short-pressing the encoder), all TT's will be forced on the same starting point, this feature can be used to reset the sync between TT's that have some degree of time/harmonic relationship.

<u>One-shot/mute mode</u>:

if you press and Hold the erase button, you'll be able to access the one-shot/mute sub-menu, which will let you select which Taps will behave as one-shot mode.
By doing that, your tap will start blinking orange and white, you can now unleash the finger-drummer in yourself!
NOTE: By selecting a tap that is currently playing a tempo, you will mute it.
Randomisation layer settings are ignored by one-shot buttons, and the CV outs will have their own independent settings, which means you can change shape and length of the one-shot taps.

!!One-shot/mute mode is available with the firmware rev_ii . If you haven't installed it yet, you can download it at <u>manifoldresearchcentre.com/donut</u> and follow the Updates instructions!!

<u>Easy updates on teensy platform</u>:

This module is able to easily take updates, through mini usb connection.
All you need is a computer and the teensy loader app —> <u>https://www.pjrc.com/teensy/loader.html</u>

!!BEWARE!!
make sure your module is unpowered before connecting delta through USB!!

How to connect your module:
red stripe matches the white line mark on the PCB!

Power consumption:

+12v 32 mA(average) - 70 mA (peak)
-12v 11 mA
+5v not used