Cluster HAT

How do I use the solder jumpers on the Cluster HAT?

Solder jumpers on the Cluster HAT allow you to modify the default behaviour and configuration. To change the configuration you will need to either cut the link between the pads and/or bridge the pads with solder depending on their default state (open/closed).

PWR - Power source

This solder jumper is present on all Cluster HAT versions.

- By **default** the link (either soldered or via cuttable trace on the PCB) is between the centre pad and "RPi" which takes power for the Pi Zeros from the GPIO header (USB hub IC is always powered via the USB cable).
- To power the Pi Zeros from the USB cable you will need to disconnect the link (either remove the solder bridge or by cutting the PCB trace) between RPi and the centre pad and then bridge the centre pad to the side labelled "USB". To do this you will need to use your own USB cable capable of carrying the high current required for the Pi Zeros (not supplied).
- To power the Pi Zeros from either the SMD pads on the underside of the Cluster HAT or the (unpopulated) 3.5mm pitch screw terminals at the front you will need to ensure the centre pad is disconnected from both the "RPi" and "USB" pads.

WP - (HAT EEPROM) Write Protect

Cluster HAT v1.0/1.1 - Close the solder jumper (**default**) to prevent writing to HAT EEPROM, remove the solder bridge to allow writes.
Cluster HAT v2.x - Solder jumper should be open (**default**) to allow writes to HAT EEPROM, to prevent writes bridge the solder jumper.

POS - Power on state

This jumper allows power to the Pi Zeros to be enabled by default when power is applied to the Cluster HAT in hardware.

Cluster HAT v2.x
- To leave the Pi Zeros powered off until commanded by software the link should be open (**default**).
- To power on the Pi Zeros as soon as power is applied bridge the solder jumper.

XA0/XA1 - I/O Expander I2C address

To allow multiple Cluster HAT to be used on the same Controller Pi (using the Butterfly board for example) the I2C address of the I/O Expanders must be unique. We strongly advise updating the HAT EEPROM I2C address in line with the Expander address.

Cluster HAT v2.4/5
- The I2C address is set by pulling the pins address pins XA0/XA1 HIGH or LOW.
- The solder jumpers are 2-way. The pad closest to the GPIO header is HIGH (3.3v) and the pad furthest away is LOW (GND), the centre pin is connected to the address line.
- By default the 2-way jumpers are both set LOW using a trace on the board. To change XA0 or XA1 to HIGH you must first cut the trace between the centre pad and GND pad (furthest away from the GPIO header) and then bridge between the centre pad and HIGH pad (closest to GPIO header).
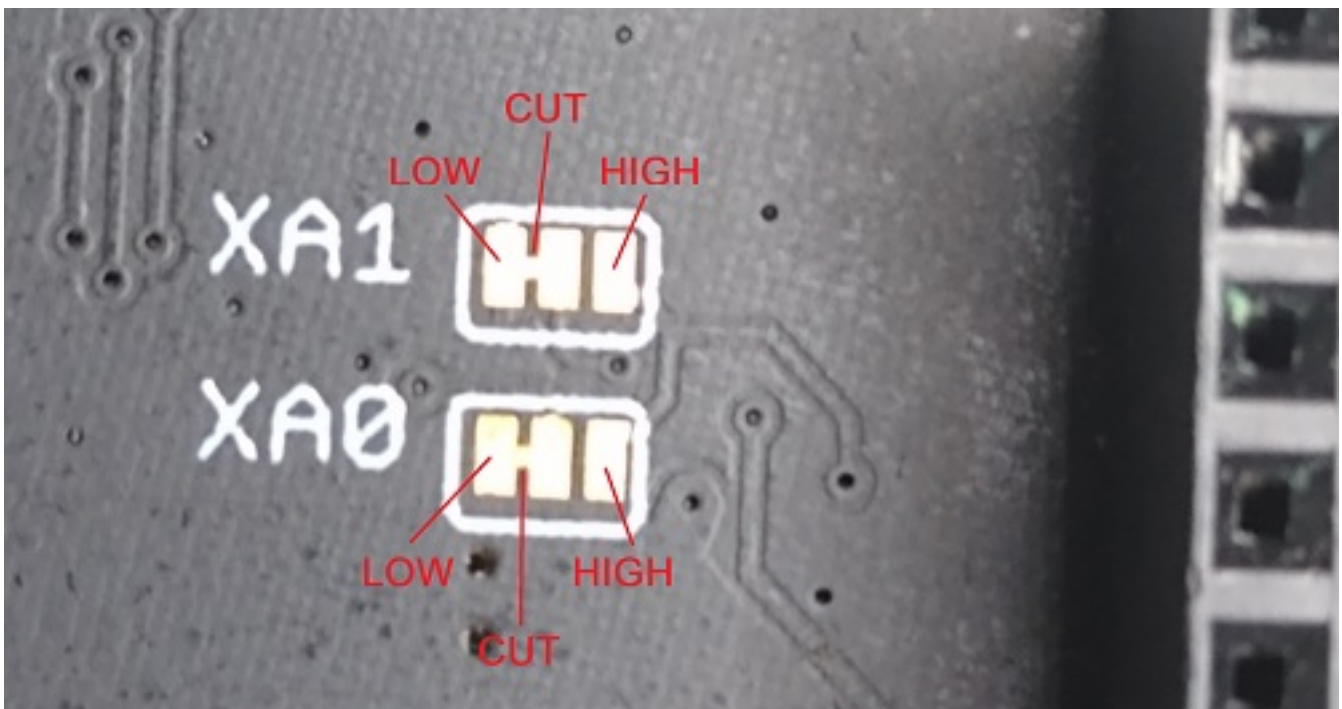
```
___
I
2
C
A
d
d
r
e
s
```

Cluster HAT

s0x20

default

)0x210x220x23

Updates to the clusterctrl software are in progress but currently to control multiple Cluster HAT you can clone the existing clusterctrl tool.

For example to control a Cluster HAT on address 0x23 you can do the following.

Cluster HAT

```
sudo cp /sbin/clusterctrl /sbin/clusterctrl23
sudo cp /etc/default/clusterctrl /etc/default/clusterctrl23
sudo sed -i "s#0x20#0x23#" /sbin/clusterctrl23
sudo sed -i "s#default/clusterctrl#default/clusterctrl23#" /sbin/clusterctrl23
```

You should now be able to control the additional Cluster HAT using "clusterctrl23 on" etc.

EA0/EA1 - HAT EEPROM I2C address

To allow multiple Cluster HAT to be used on the same Controller Pi (using the Butterfly board for example) the I2C address of the HAT EEPROM need to be unique (or disconnceted see ID_* below). We strongly advise updating the I/O Expander I2C address in line with the HAT EEPROM address.

Cluster HAT v2.4/5
- The I2C address can be set by opening / closing (bridging with solder) the solder jumpers as follows.

I
2
C
A
d
d
r
e
s
s
0
x
5
0

**d
e
f
a
u
l**

)
0
x
5
1
0
x
5
2
0
x
5
3

Cluster HAT

ID_SCL / ID_SDA - HAT EEPROM disconnect

Cluster HAT v2.5 - When using multiple HAT with a Pi it can be useful to be able to disconnect the HAT EEPROM to prevent conflicts, these solder jumpers offer this option.

- To connect the HAT EEPROM to the ID pins the solder jumper should be linked (default).
- To remove the HAT EEPROM from the HAT I2C bus cut BOTH solder jumpers.

FAN - Disconnect fan MOSFET

Cluster HAT v2.5 - If you're using GPIO BCM18 for something else you may want to disconnect it from the MOSFET.
- To connect the FAN MOSFET to the GPIO line and enable the fan header to power a fan the link should be bridged (**default**).
- To disconnect the MOSFET from the GPIO pin cut the solder jumper.

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