Cluster HAT

How do I USBBOOT Pi Zero/Pi Zero 2 without SD cards (Cluster HAT/Cluster CTRL)?

With the Cluster CTRL images (linked from the [ClusterHAT](#) website) it's now possible to mix/match booting nodes (Pi Zeros/Compute Modules/A+) with or without SD cards.

Preparation

This guide assumes you're running a Raspberry Pi with our modified Raspbian Bullseye/Buster/Stretch ClusterCTRL images (see the [Cluster HAT](#) site for details).

For the ClusterHAT v1.x edit /etc/default/clusterctrl on the controller and uncomment the appropriate CLUSTERHATV1 line based on the USB port you have the Cluster HAT plugged into, then run "sudo clusterctrl init".

The Cluster HAT v2.x/ClusterCTRL devices don't need this step as the USB port is detected as the controller boots.

If the port is changed after boot (for v1.x you'll need to set the correct port again first) run "sudo clusterctrl init" to setup the boot directory links in /var/lib/clusterctrl/boot/ .

Setup Pi Zero file systems

Differing from the old test images the filesystems for the Pi Zeros are no longer pre-installed. This allows you to mix/match different versions and releases (Bullseye/Buster/Stretch) on the same controller.

Official ClusterCTRL usbboot archives can be found at https://dist.8086.net/clusterctrl/usbboot/

I would advise using the latest dated Bullseye release and then choose if you want Lite, Full or Standard image. There are also Buster/Stretch usbboot root filesystems available if you need to use an older release.

Once you've selected the image(s) you want to use copy the URL and download them to the controller using wget.

```
wget -P ~pi/ URL_OF_USBBOOT_ARCHIVE
```

For example to download the 2022-04-04 Lite Bullseye image you would run

```
wget -P ~pi/ https://dist.8086.net/clusterctrl/usbboot/bullseye/2022-04-04-2-buster-ClusterCTRL-armhf-lite-usbboot.tar.xz
```

For each Pi Zero (in position pX) extract the filesystem (you can mix/match different versions) and then configure it.

If you have files in the nodes root filesystem these must be removed first (replacing X with the pX number). **Ensure you have a backup of any required files first!**

```
sudo rm -rf /var/lib/clusterctrl/nfs/pX/{*,.*}
```

Cluster HAT

The error "unable to remove directories . and .." error is expected and can be ignored.

For example for P1 you would extract and configure it using.

```
sudo tar -axf ~pi/2022-04-04-2-buster-ClusterCTRL-armhf-lite-
usbboot.tar.xz -C /var/lib/clusterctrl/nfs/p1/

sudo usbboot-init 1
```

Repeat the above two commands for any other Pi Zeros 2/3/4/etc. where you want to use USBBOOT. The archives aren't specific to P1/P2/etc. (unlike the SD images) but they need to be converted by running "usbboot-init X" replacing X with the Px number. You can mix booting with SD/USBBOOT with Bullseye/Buster/Stretch releases and 32/64-bit where they support running on the Pi Zero/2 hardware.

Whilst older stretch/buster archives have default login details (user: pi pass: clusterctrl) newer images do not have a default username pr passwords. For newer bullseye usbboot archies please use the following steps (replacing pX with p1/p2/etc. and myusername/mypassword with your desired username/password) to setup a username and password before the first boot.

```
set +o history # Turn off bash history temporarily
# Replace myusername and mypassword with your details and pX with the node (p1/p2/et
c.).
echo "myusername:"$(echo 'mypassword' | openssl passwd -6 -stdin) | sudo tee /var/li
b/clusterctrl/nfs/pX/boot/userconf.txt
set -o history # Turn history back on again
```

Before powering on the Pi Zero you can enable SSH by creating the "ssh" file in the "/boot" directory.

```
sudo touch /var/lib/clusterctrl/nfs/p1/boot/ssh
```

Power the Pi Zero on as normal.

```
clusterctrl on p1
```

You can watch the boot process by tailing /var/log/daemon.log (shows rpiboot process) /var/log/kern.log (shows USB devices etc)

```
tail -f /var/log/daemon.log /var/log/kern.log
```