Getting Started

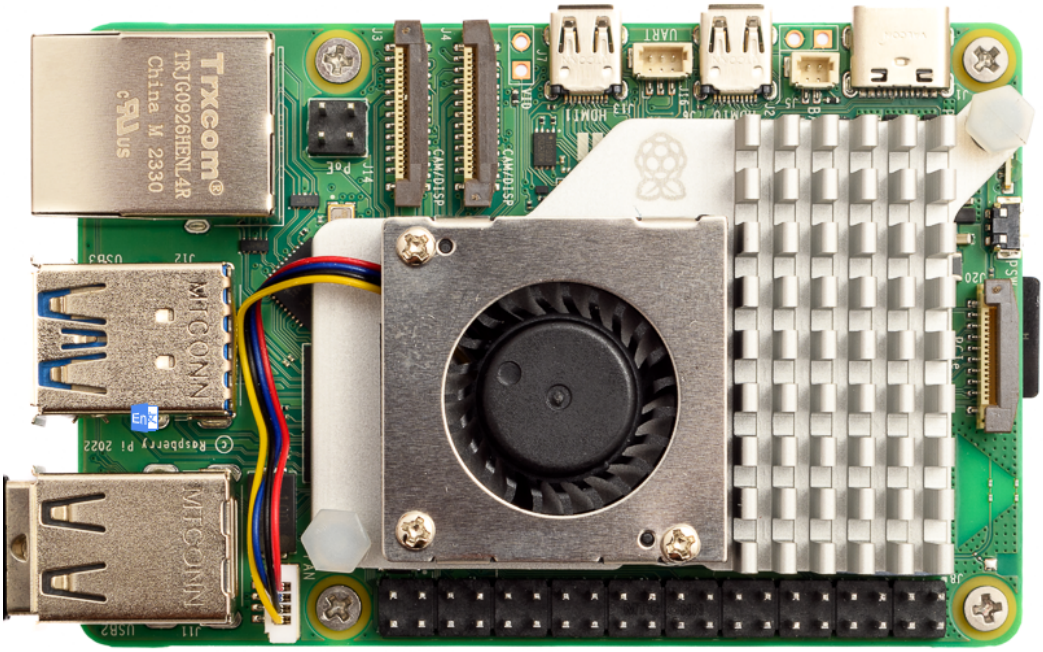
This section will teach you how to set up a Raspberry Pi 5 with the Hailo-8L AI accelerator.

What you need

- Raspberry Pi 5
- Raspberry M.2 M-Key HAT
- Hailo8 M.2 module (also supports Hailo-8L)
- Thermal pad (included in the kit)
- Optional: Heatsink
- Optional: Official Raspberry Pi camera (e.g., Camera Module 3 or High Quality Camera)
- Optional: USB camera

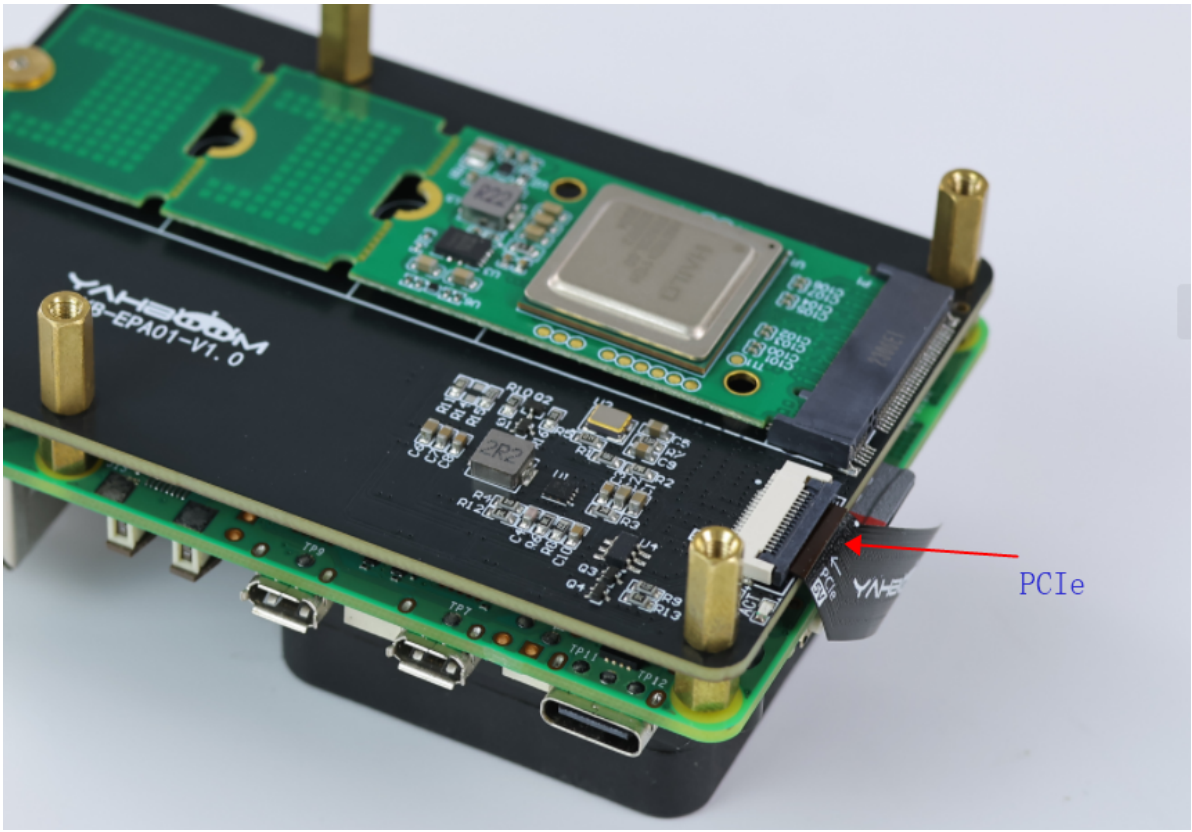
Hardware:

We used a Raspberry Pi 5 model with the official active cooler (optional: Cool Pi heatsink) and a 27W USB-C power supply. We recommend using the official USB-C power supply to ensure that the motherboard can provide sufficient power to the M.2 HAT.

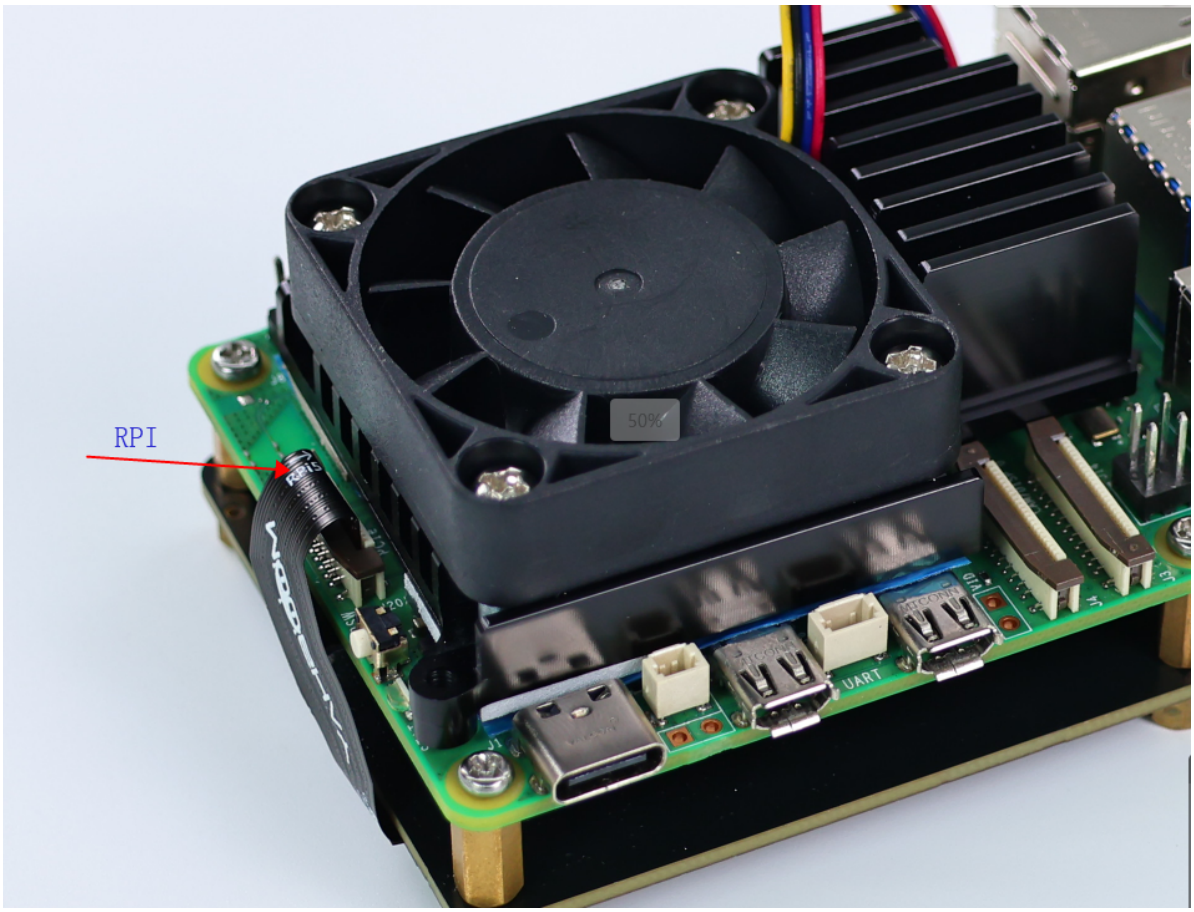


Raspberry Pi M.2 M-Key HAT can be used with Hailo-8L M.2 key M or B+M (also supports Hailo-8), wiring diagram with Raspberry Pi 5.

The pcle end of the connection cable is connected to the m.2HAT.



The rpi5 end of the connection cable is connected to the interface of the Raspberry Pi 5.



For CSI camera connection, please refer to the Raspberry Pi 5 camera case.

Software:

Note: The SD card of the Raspberry Pi 5 needs to contain a bootable image. You can refer to the image burning in the Raspberry Pi 5 tutorial we provided

The interface that appears after the boot is successful

Update the system

Note: (The following steps are only required for DIY in your own environment. If you use the image we provide directly, you do not need to rebuild it)

```
sudo apt update
sudo apt full-upgrade
```

```
pi@raspberrypi:~ $ sudo apt update
Hit:1 https://mirrors.aliyun.com/docker-ce/linux/debian bookworm InRelease
Hit:2 http://deb.debian.org/debian bookworm InRelease
Hit:3 http://deb.debian.org/debian-security bookworm-security InRelease
Hit:4 http://archive.raspberrypi.com/debian bookworm InRelease
Hit:5 http://deb.debian.org/debian bookworm-updates InRelease
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
11 packages can be upgraded. Run 'apt list --upgradable' to see them.
pi@raspberrypi:~ $ sudo apt full-upgrade
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
Calculating upgrade... Done
The following packages were automatically installed and are no longer required:
  libcamera0.1 libraspberrypi0 libssl1.1 libwpe-1.0-1 libwpebackend-fdo-1.0-1
Use 'sudo apt autoremove' to remove them.
The following packages will be upgraded:
  gir1.2-gtk-3.0 gtk-update-icon-cache gtk2-engines-pixbuf libgtk-3-0
  libgtk-3-common libgtk2.0-0 libgtk2.0-bin libgtk2.0-common pipanel
  raspberrypi-sys-mods wpasupplicant
11 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
Need to get 23.3 MB of archives.
```

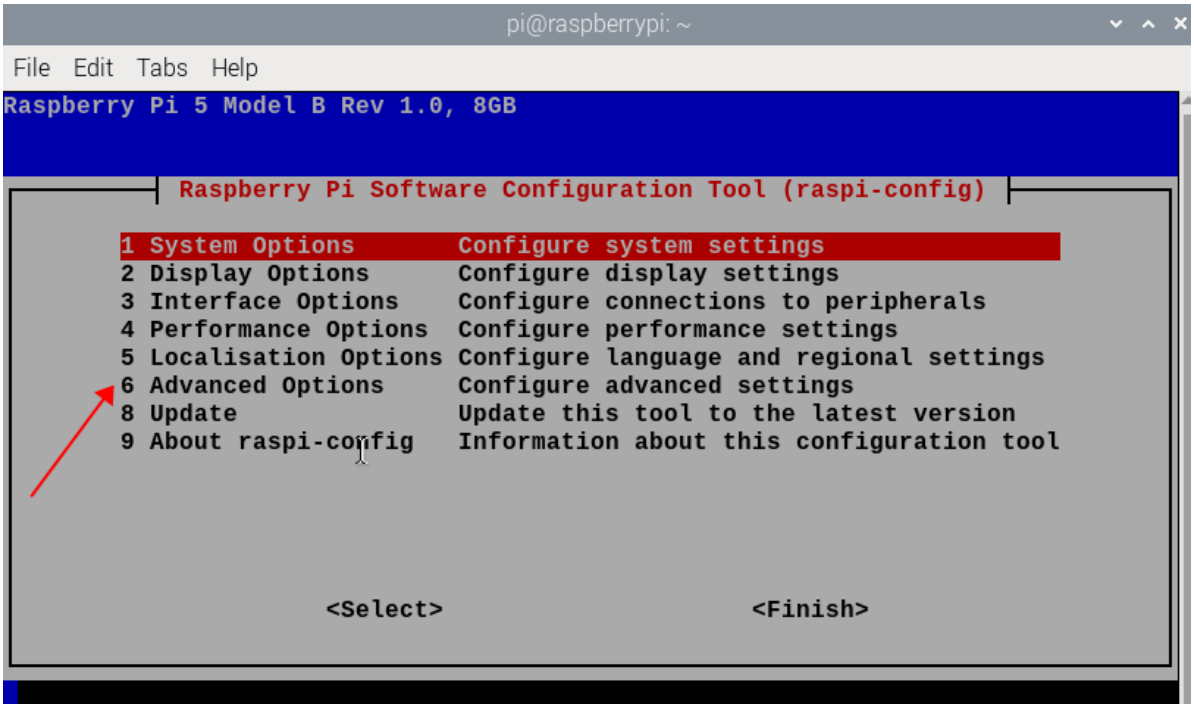
This will update your system to the latest Raspberry Pi kernel, which includes Hailo driver support.

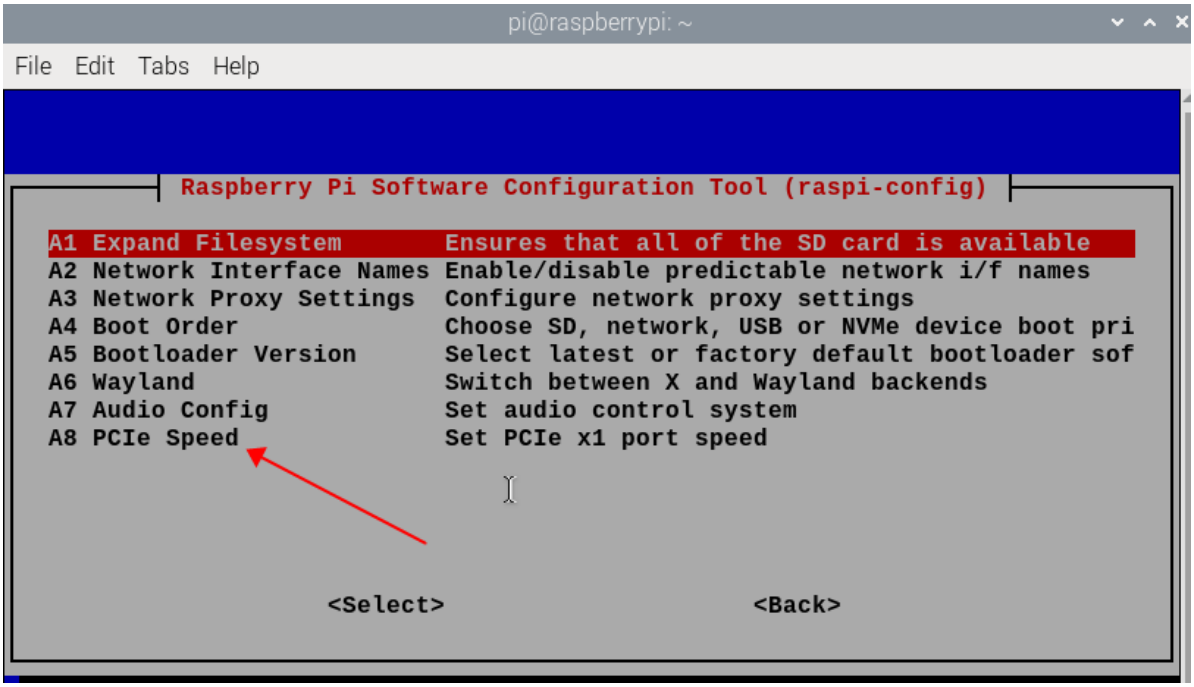
Set PCIe to Gen3

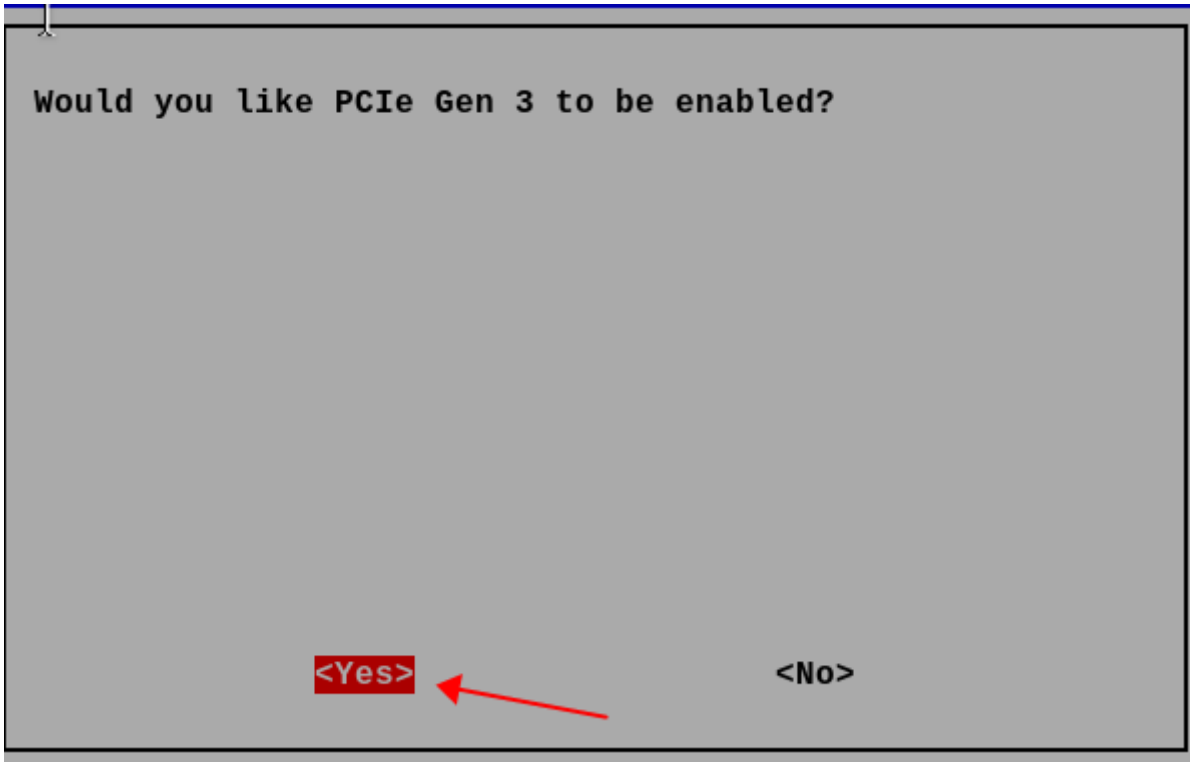
To achieve optimal performance of the Hailo device, it is necessary to set PCIe to Gen3. While using Gen2 is an option, it will result in reduced performance.

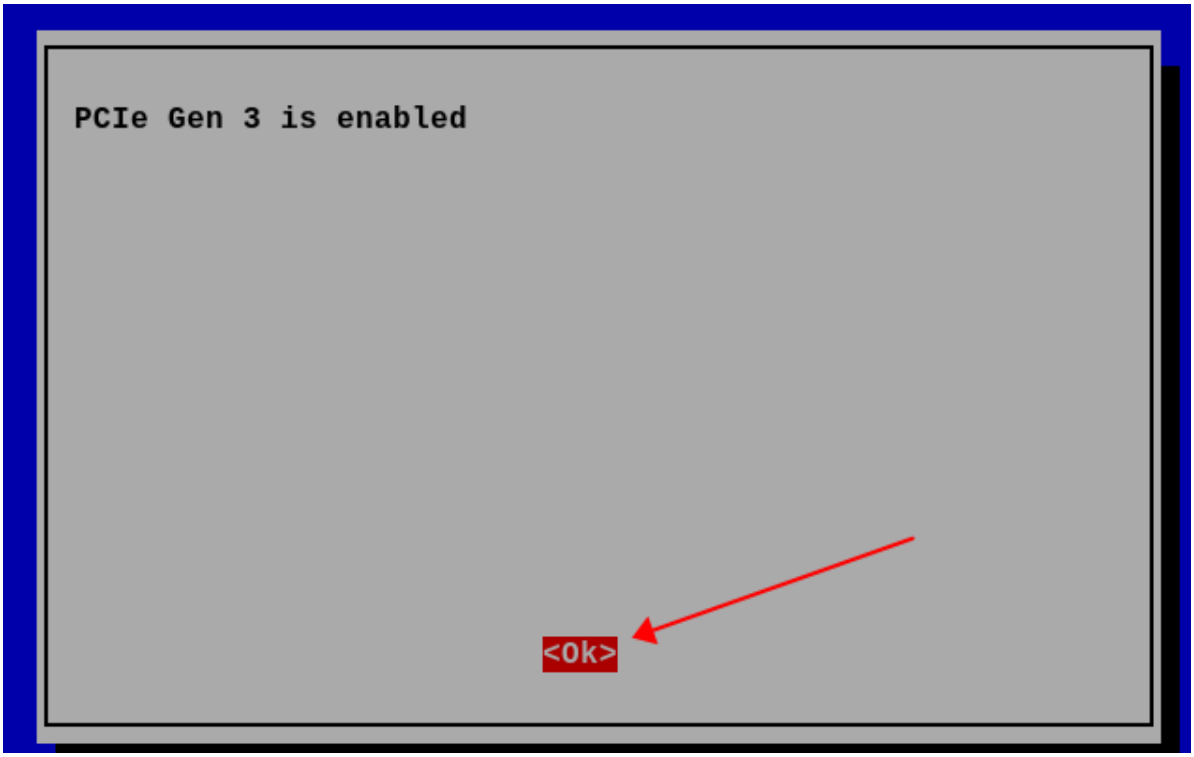
Open the Raspberry Pi Configuration Tool:

```
sudo raspi-config
```









Select option 6 Advanced options and then select option A8 PCIe speed. Select "Yes" to enable PCIe Gen 3 mode. Click "Finish" to exit.

Install hailo software

Install all necessary software to make the Raspberry Pi AI Kit work properly. To do this, run the following command from a terminal window:

```
sudo apt install hailo-all
```

The following picture shows that the installation has been successful

```
pi@raspberrypi:~ $ sudo apt install hailo-all
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
hailo-all is already the newest version (3.28.2+1).
The following packages were automatically installed and are no longer required:
  libcamera0.1 libraspberrypi0 libssl1.1 libwpe-1.0-1 libwpebackend-fdo-1.0-1
Use 'sudo apt autoremove' to remove them.
0 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
pi@raspberrypi:~ $
```

This will install the following software components:

- Hailo firmware
- HailoRT runtime software. For more information.
- Hailo post-processing software demonstration stage.

Restart your Raspberry Pi.

```
sudo reboot
```

Test TAPPAS Core installation by running the following command:

Hailotools:

```
gst-inspect-1.0 hailotools
```

Expected Result:

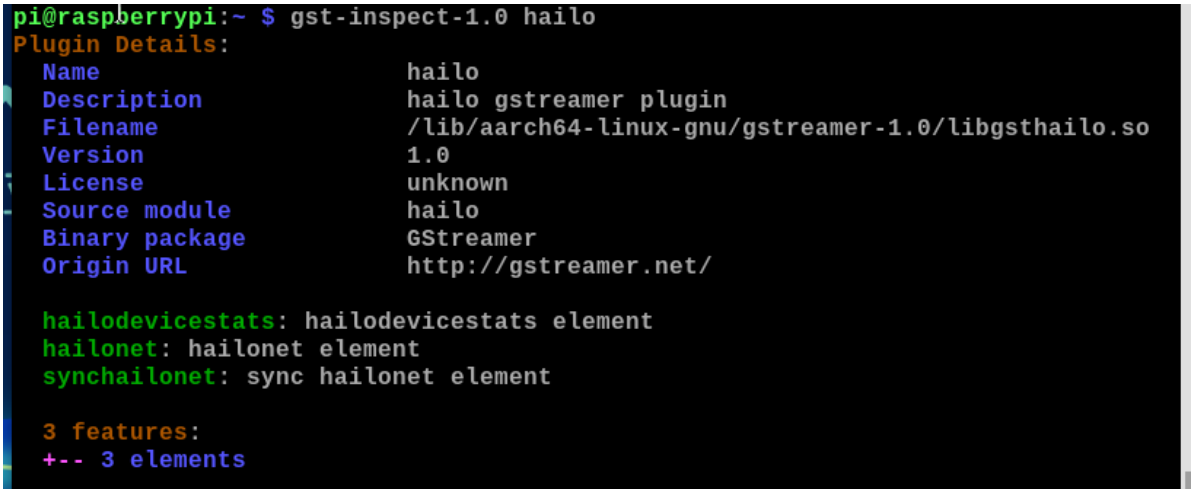
```
Plugin Details:
  Name                     hailotools
  Description              hailo tools plugin
  Filename                 /lib/aarch64-linux-gnu/gstreamer-1.0/libgsthailotools
.so
  Version                  3.28.2
  License                  unknown
  Source module            gst-hailo-tools
  Binary package           gst-hailo-tools
  Origin URL               https://hailo.ai/

  hailoaggregator: hailoaggregator - Cascading
  hailocounter: hailocounter - postprocessing element
  hailocropper: hailocropper
  hailoexportfile: hailoexportfile - export element
  hailoexportzmq: hailoexportzmq - export element
  hailofilter: hailofilter - postprocessing element
  hailogallery: Hailo gallery element
  hailograytonv12: hailograytonv12 - postprocessing element
  hailoimportzmq: hailoimportzmq - import element
  hailomuxer: Muxer pipeline merging
  hailonv12togray: hailonv12togray - postprocessing element
  hailonvalve: HailoNValve element
  hailooverlay: hailooverlay - overlay element
  hailoroundrobin: Input Round Robin element
  hailostreamrouter: Hailo Stream Router
  hailotileaggregator: hailotileaggregator
  hailotilecropper: hailotilecropper - Tiling
  hailotracker: Hailo object tracking element
```

Hailonet:

```
gst-inspect-1.0 hailo
```

Expected Result:



If found or not, try to delete GStreamer registry: `hailo``hailotools`

```
rm ~/.cache/gstreamer-1.0/registry.aarch64.bin
```

Known Issues

The following issues should be handled by the TAPPAS Core installation deb, but if you encounter them you can fix them manually.

PCIe Page Size Issues

Some hosts do not support certain PCIe descriptor page sizes. If you receive an error like this:

```
[HailoRT] [error] CHECK_AS_EXPECTED failed - max_desc_page_size given 16384 is
bigger than hw max desc page size 4096
```

Make sure that `/etc/modprobe.d/hailo_pci.conf` exists and contains the following line:

```
options hailo_pci force_desc_page_size=4096
```

Check the configuration:

```
cat /etc/modprobe.d/hailo_pci.conf
# expected result:
options hailo_pci force_desc_page_size=4096
```

Unable to allocate memory in static TLS block

In some cases (especially aarch64), you may encounter the following error, which prevents some GStreamer plugins from loading correctly. The error message is:

```
bash
(gst-plugin-scanner:67): GStreamer-WARNING **: 12:20:39.178: Failed to load
plugin '/usr/lib/aarch64-linux-gnu/gstreamer-1.0/libgstlibav.so': /lib/aarch64-
linux-gnu/libgomp.so.1: cannot allocate memory in static TLS block
```

This should be fixed by adding the following to your file: `.bashrc`

```
echo 'export LD_PRELOAD=/usr/lib/aarch64-linux-gnu/libgomp.so.1' >> ~/.bashrc
```

If you have already encountered this error, you can fix it by running the following command:

```
export LD_PRELOAD=/usr/lib/aarch64-linux-gnu/libgomp.so.1
rm ~/.cache/gstreamer-1.0/registry.aarch64.bin
```