

# Backlash Compensation and Camera Calibration

Backlash Compensation and camera calibration are necessary steps. Backlash Compensation should be completed prior to camera calibration.

## 1. Backlash compensation

Backlash compensation very simple; please refer to OpenPnP's official manual and video.

<https://github.com/openpnp/openpnp/wiki/Backlash-Compensation>

<https://youtu.be/S5SQE79FWIM>

## 2. Camera Lens Calibration

When initializing OpenPnP settings, we need to calibrate the camera lens, Because the lens has distortion, it needs to be corrected by software.

Video: Initialize openpnp settings on microsmt pnpv3

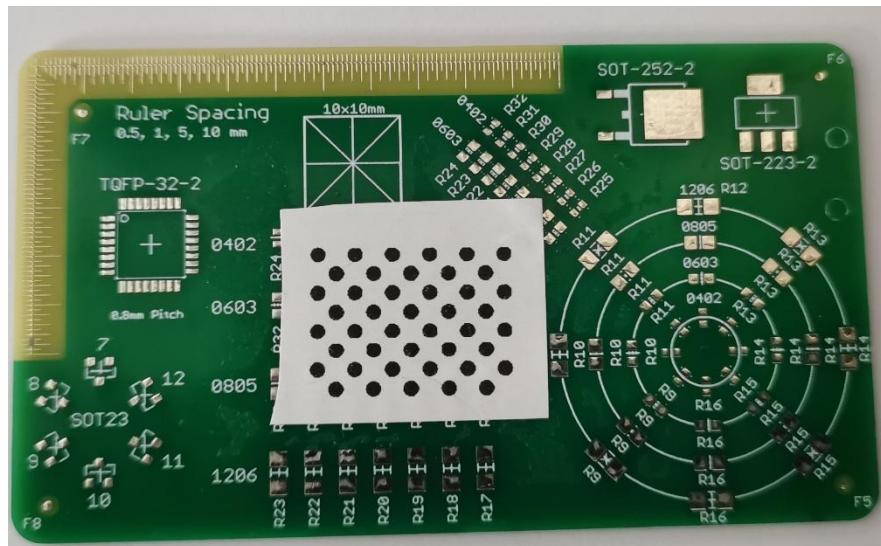
<https://youtu.be/P4USYtvI7yl>

. When this video was filmed, we only used one type of camera. Therefore, we have already completed the lens calibration for users before factory shipment, so this step does not appear in the Initialize video.

With the increase in camera types, the lens calibration value may be incorrect. Therefore, if you find the demo board deformed in the camera, you need to re-perform the lens calibration.

First, print the **Calibration Card** in the SD card (you can also find it in the link) and shrink it to fit entirely within the camera's field of view.

<https://github.com/microsmt/Microsmt-PNP-hardware/blob/main/Calibration%20card.png>



Then refer to the demonstration video.

[Video: Camera Lens Calibration](#)

[https://youtu.be/GvGhAD6\\_fjw](https://youtu.be/GvGhAD6_fjw)

### 3. Advanced Camera Calibration

Manual calibration is a bit cumbersome, so OpenPnP provides a more powerful advanced calibration function. Let's learn how to use the advanced calibration function for the top camera.

Refer to the official manual of OpenPnP.

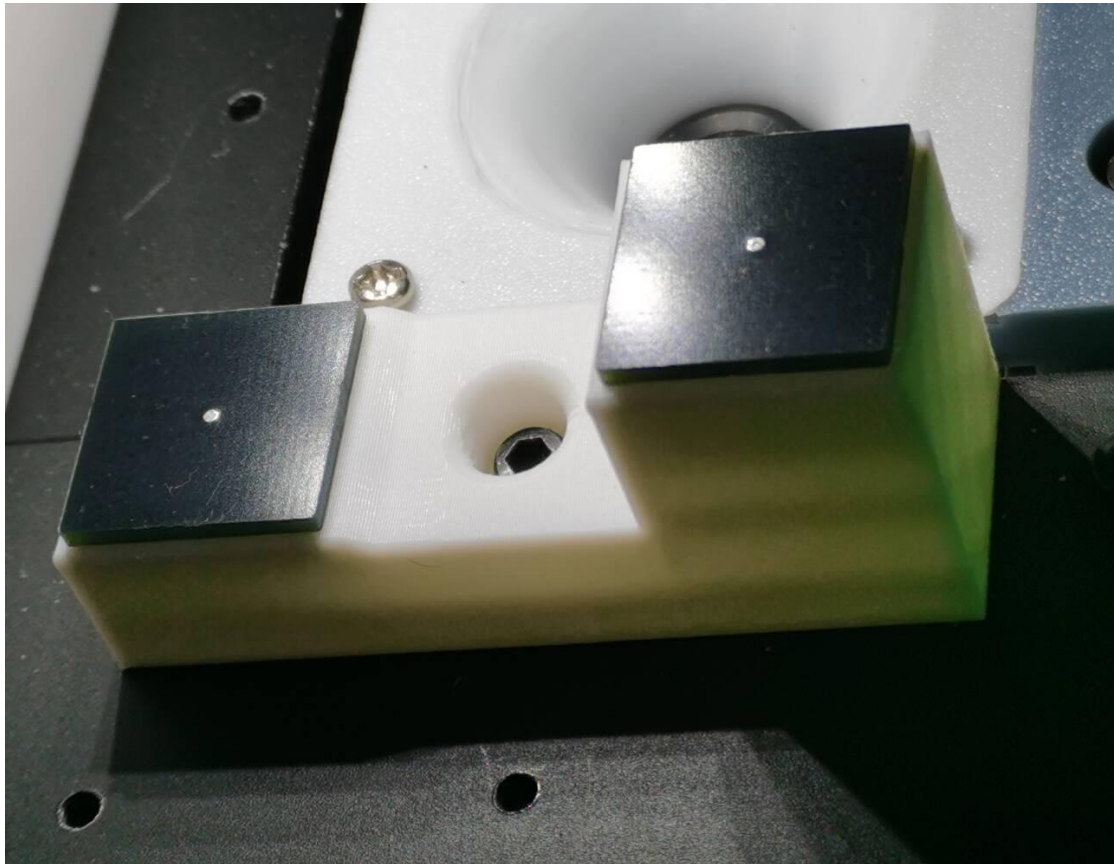
<https://github.com/openpnp/openpnp/wiki/Advanced-Camera-Calibration>

First, we need to print the new fiducial including the primary fiducial and

secondary fiducial. The primary fiducial also serves as the homing fiducial.

The primary fiducial is located on the working plane with a height of  $Z = -21$ .

The height difference between the two fiducials is 12, so the height of the secondary fiducial is  $Z = -33$ .



Refer to the demonstration video.

[Video: Advanced calibration for top camera](#)

[https://youtu.be/pxEjjD\\_eYbk](https://youtu.be/pxEjjD_eYbk)