Calibrating the IMU

Altimeter Cloud

The Nano's motion sensor (IMU) measures tilt and rotation through the flight. Calibrating it teaches the Nano what level and still look like for your particular board, which keeps the angles, tilt and rail angle accurate.

It takes a couple of minutes and you only need to do it once, though you can repeat it whenever you like. An uncalibrated Nano still flies and logs normally, but its angles are less accurate and the flight info page says it wasn't calibrated.

REVISION 4 AND LATER
Calibration applies to boards with the motion sensor fitted. Revision 1 to 3 boards have nothing to calibrate and no calibration file on the drive.

Starting a calibration

1. Connect the Nano by USB and open `device_calibration.txt` on its drive.
2. Change the 0 on the first line to 1, save the file and eject the drive.
3. Unplug the USB cable and switch the Nano on. Instead of getting ready for a flight, it starts calibrating straight away.

Running it on battery keeps the cable out of the way while you turn the board through each position. The Nano sets the first line back to 0 itself when it has finished. You can also start a calibration from the Nano USB Settings tool.

Step 1: Gyroscope

Lay the Nano flat on something solid and free from vibration, and don't touch it.

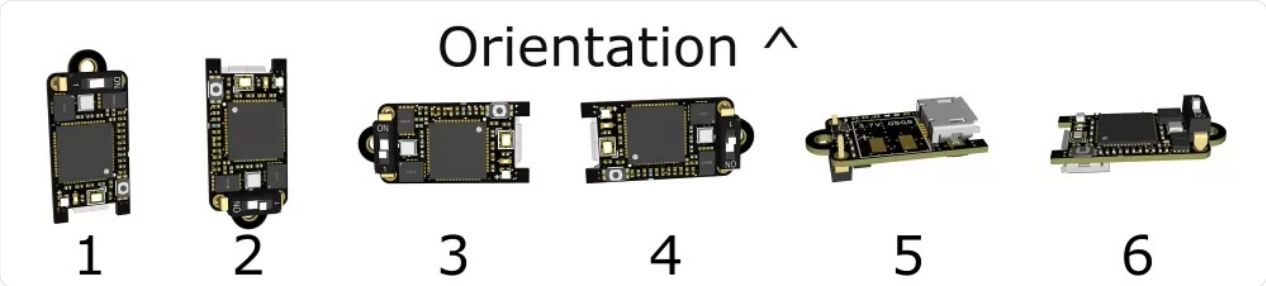
LED	What to do
Solid red, 3 seconds	Step away
Flashing red, about 11 seconds	Keep it completely still while it measures
Amber	It moved. Let it finish, then run the calibration again
Three green flashes	Done, moving on to the accelerometer

Step 2: Accelerometer

Next you place the Nano in six positions, one for each face, so it can measure gravity in every direction. It always asks for them in the same order, and shows each position's colour for 2 seconds before it starts.

Colour	Position
Blue	Lying flat, component side up

Purple	Lying flat, component side down
Cyan	On its side, component side towards you, micro-USB to the right
Yellow	On its side, component side towards you, micro-USB to the left
White	Standing upright, component side towards you, micro-USB at the bottom
Green	Standing upright, component side towards you, micro-USB at the top



While you line each position up, the LED tells you how it's going:

LED	Meaning
Red	Wrong way up
Pink	Nearly there, but not square
Steady cyan	Lined up and measuring. Hold it still
Three green flashes	Position captured, move to the next one

The rhythm is the same each time: line it up until the light turns cyan, hold still until the green flashes, then move on. There's no rush in between.

When it has finished

After the sixth position the Nano flashes blue five times and restarts. If it's plugged in, its drive disappears and comes back. The calibration is stored in the Nano's own memory and is kept when you switch it off.

To check it worked, open `device_information.html` and look for Calibrated on the calibration line, or reopen `device_calibration.txt`, which now lists the measured values with the first line back at 0.

The Nano also records how square and how still each position was held, and saves that calibration quality with every flight, so you can see it on each flight info page.

GOOD TO KNOW

You only need to calibrate once. From firmware 2.00 the Nano also fine-tunes its calibration while it waits on the pad before each launch, so it stays accurate from flight to flight. It's still worth redoing if the board has taken a hard knock, or if your tilt or orientation readings start to look wrong.