Changing Nano settings

Altimeter Cloud

All of the Nano's settings live in one file on its drive, `device_settings.txt`. You can edit it in any text editor, or change the settings from your browser with the Nano USB Settings tool.

Heights are in metres. This page describes firmware 2.00; your version is shown in `device_information.html`.

Settings at a glance

Select a setting to jump to its description.

Setting	Default	Range
IDENTIFICATION		
Device name device_tag	"MyNano"	Up to 20 characters
Competitor number competitor_tag	"" (empty)	Up to 32 characters
Extra competitor numbers competitor_tag_2, _3	"" (empty)	Up to 32 characters
Device type device	"NanoV1"	Do not change
LAUNCH AND RECORDING		
Launch detection height launch_detect	30	1 to 199 m
Start-up lock startup_lock	0	0 to 999 s
Launch protection launch_protection	2000	0 to 10000 mG
Recording stop recording_stop	1	1, 2 or 3
Maximum log length max_samples	38000	4000 to 38000
SAMPLING AND LOGGING		
Logging rate sample_speed	417 Hz	104, 208, 417 or 833 Hz
Sample ratio sample_ratio	1	1 to 50
Hybrid mode hybrid_mode	8	0 or 1 (off), or 2 to 40
Log format log_format	1 (ACLZ)	0 = CSV, 1 = ACLZ
Include pressure include_pressure	0	0 or 1

MOTION SENSOR		
High speed sensor high_speed_sensor	1	0, 1 or 2
Orientation orientation	9 (auto)	9 = auto, 1 to 6
Sensor sync sync_enable	2	0 or 1 = off, 2 = on
POWER AND LED		
Energy mode emode	1	1 or 2
After landing maintain_power	0	0 to 3
Start-up readout show_altitude	1	0 or 1
LED brightness led_brightness	5	1 (brightest) to 10
MAINTENANCE		
Phone compatibility android_compat	0	0 or 1
Factory reset factoryreset	0	0 or 1

Changing settings

In the settings file

1. With the power switch off, connect the Nano by USB. It appears as the ALTCLOUD drive.
2. Open `device_settings.txt` in a plain-text editor and change the values you need. Keep the quotes, colons and commas as they are; text values stay in quotes and numbers don't.
3. Save, eject the drive, then unplug the Nano. The new settings are read the next time it powers on.

IMPORTANT

If the file has a typo, or any value outside its range, the Nano replaces the whole file with the defaults at the next power-on. If your changes seem to have vanished, that is why.

With the Nano USB Settings tool

The Nano USB Settings tool gives you a drop-down for every setting and only accepts valid values. It needs firmware 1.60 or later and Chrome, Edge or Opera on a desktop or laptop.

1. Connect the Nano with a USB data cable and click Connect altimeter. Pick the entry that mentions TinyUSB.
2. Change what you need and save. Anything refused is outlined in red with the reason.
3. The LED blinks purple three times, then green once when the change is accepted. It takes effect the next time the Nano starts.

The default file

A new Nano writes these values.


```
{
  "Important": "Check the manual for correct values",
  "device_tag": "MyNano",
  "competitor_tag": "",
  "competitor_tag_2": "",
  "competitor_tag_3": "",
  "device": "NanoV1",
  "android_compat": 0,
  "log_format": 1,
  "emode": 1,
  "factoryreset": 0,
  "high_speed_sensor": 1,
  "hybrid_mode": 8,
  "include_pressure": 0,
  "launch_detect": 30,
  "launch_protection": 2000,
  "led_brightness": 5,
  "maintain_power": 0,
  "max_samples": 38000,
  "orientation": 9,
  "recording_stop": 1,
  "sample_ratio": 1,
  "sample_speed": 417,
  "show_altitude": 1,
  "startup_lock": 0,
  "sync_enable": 2
}
```


Identification

The device name and all three competitor numbers are written into every flight log and covered by its digital signature, so they can't be changed afterwards without failing verification. Editing the settings file only affects future flights.

Device name device_tag

Valid values: Up to 20 characters

A name for this altimeter. It's shown on the flight page when you upload a log to the Altimeter Cloud.

Competitor number competitor_tag

Valid values: Up to 32 characters

Your FAI or NAR competition number, or a code issued on the day. Because it's in the signed log, the log proves who flew it and that it was recorded after the code was issued. Leave it empty if you're not competing.

Extra competitor numbers competitor_tag_2, _3

Valid values: Up to 32 characters

If you fly in more than one competition, add your other numbers here and the Nano is ready for all of them. The USB Settings tool accepts up to 20 characters for each.

Device type device

Valid values: Do not change

Leave this as "NanoV1". If it's anything else, none of your settings are applied and the file is reset.

Launch and recording

Launch detection height launch_detect

Valid values: 1 to 199 m

How far above the pad, in metres, the rocket must climb before a launch can be confirmed. It has to stay above it for 1 second with sustained thrust, or for 2.5 seconds on height alone. The log still starts from the pad, because the Nano keeps a buffer of the last few seconds while it waits. 25 to 50 m suits most flights.

Start-up lock startup_lock

Valid values: 0 to 999 s

Ignores any launch for this many seconds after power-on, giving you time to close up the rocket. 0 turns it off. While the lock is holding, the LED glows red between the normal blips, and the glow stops once it has passed.

Launch protection launch_protection

Valid values: 0 to 10000 mG

Lets the Nano confirm a launch quickly, once the rocket is above the launch detection height, if it also sees sustained thrust along the rocket's axis. The value is total acceleration in milli-G: a Nano sitting still reads about 1000, so the default of 2000 asks for 1 G of real thrust. Knocks and handling on the pad don't count, and a short burn that misses it still confirms on height alone after 2.5 seconds, with nothing lost.

Set 4000 if the rocket gets knocked about on the pad, or 0 to switch the check off.

Recording stop recording_stop

When the Nano stops recording after landing. It also stops if the log fills or the battery falls to 3.05 V, and everything recorded is saved.

Value	What it does
1	After 8 seconds of steady altitude (default)
2	After 16 seconds of steady altitude
3	Only when the log is full

Maximum log length max_samples

Valid values: 4000 to 38000

The most samples one flight log can hold, including the data from before lift-off. CSV logs have a lower limit, see log format.

Sampling and logging

Logging rate sample_speed

Valid values: 104, 208, 417 or 833 Hz

How many times a second the Nano logs in flight. Higher rates capture more detail but use more battery and fill the log sooner. Every motion sensor sample is stored, and the barometer runs at 80 Hz at every rate.

Logging rate	Log length with hybrid mode off
104 Hz	About 6 minutes

208 Hz	About 3 minutes
417 Hz	About 90 seconds
833 Hz	About 45 seconds

Hybrid mode, on by default, makes these much longer.

Sample ratio sample_ratio

Valid values: 1 to 50

Saves one sample in every N; 1 saves them all. The log never drops below 10 samples a second, so a higher value is applied at that limit. With hybrid mode on, hybrid mode takes over after apogee.

Hybrid mode hybrid_mode

Logs the important parts of the flight at the full rate and the rest at a lower one, so a long flight still fits. The climb, apogee, the 5 seconds after apogee, the last 20 m before landing and any jolt over 7 g (a main parachute opening, for example) are always logged in full.

Value	What it does
0 or 1	Off, every sample is logged
2 to 40	On, saving one sample in N between the important parts. The default of 8 gives about 52 Hz at 417 Hz.

For example, a 5 km flight with a 20 second climb, logged at 417 Hz, records for about 8.5 minutes instead of 90 seconds. At 208 Hz it is about 20 minutes.

Log format log_format

Value	What it does
0	CSV. Opens in a spreadsheet straight from the drive, but limited to 22,000 samples.
1	ACLZ, the Nano's compressed log, which we recommend. The same data at the same precision as a CSV in about a fifteenth of the space, plus the barometer altitude exactly as recorded, before any processing. It also carries a signature for the CSV it expands to, so a CSV rebuilt from it can still be verified. Upload it to the Altimeter Cloud to view it, and download either format from there. (default)

See the flight log format page for more detail.

Include pressure include_pressure

Value	What it does
0	No pressure column (default)
1	Adds a pressure column (hPa) to CSV logs, worked out from the altitude when the log is saved. The CSV limit drops to 20,000 samples.

Motion sensor

High speed sensor high_speed_sensor

Samples the motion sensor faster than the logging rate and averages it down, to counter vibration affecting the readings. The logged acceleration, rotation and angles come out cleaner.

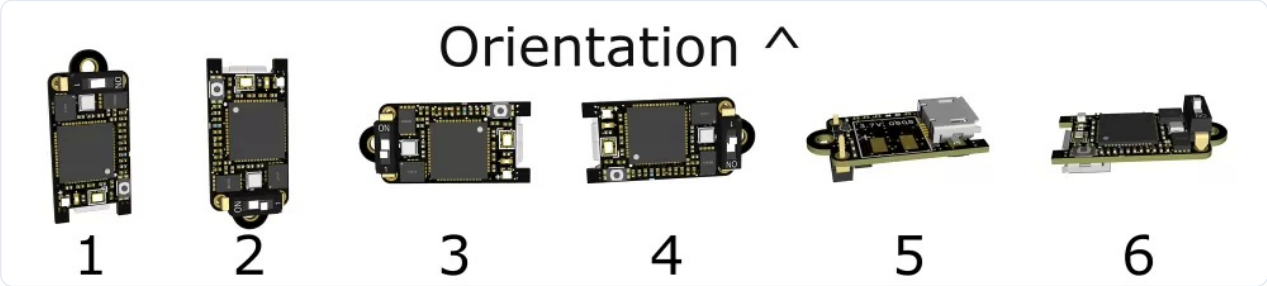
Value	What it does
0	Off
1	Motion sensor at 1,667 Hz (default)
2	As 1, with the gyro at 3,333 Hz

It costs a percent or two of battery life, so it's worth leaving on.

Orientation orientation

How the Nano is mounted, so the flight angles come out right. Use the number that matches the diagram, with the arrow pointing towards the nose.

Value	What it does
1	Upright, micro-USB port facing down
2	Upright, micro-USB port facing up
3	On its side, status LED on the bottom edge
4	On its side, status LED on the top edge
5	Flat, face down with the battery facing up
6	Flat, face up with the battery facing down
9	Automatic. Worked out from gravity on the pad, snapping to whichever of the six positions is nearest (the closest 90 degree alignment), updated if it is held still in another position, and locked in at launch. (default)



Sensor sync sync_enable

With this on, the accelerometer refines the lift-off time to the start of thrust, stepping over any igniter spike, and the barometer readings, which lag slightly behind the motion sensor, are lined up with it.

Value	What it does
0 or 1	Off
2	On (default)

Power and LED

Energy mode emode

How far the Nano cuts its power use once the pad has been calm for a while. Any movement puts it straight back to the full rate, and the record it keeps for the launch is the same either way.

Value	

	What it does
1	Normal. Wakes 52 times a second. (default)
2	Maximum saving. Wakes 26 times a second for longer battery life.

After landing maintain_power

What the Nano does once the flight is saved.

Value	What it does
0	Flashes red, then sleeps. Shake it firmly for a second or two to see the flight number and apogee again. (default)
1	Blinks the apogee until the battery is flat
2	Blinks the apogee for 4 minutes, then sleeps
3	Blinks the apogee for 10 minutes, then sleeps

See altitude blinking for how to read the blinks.

Start-up readout show_altitude

Value	What it does
0	Skips the readout
1	Blinks the last flight number and apogee at power-on (default)

A short press of the button on the pad shows the readout either way.

LED brightness led_brightness

Valid values: 1 (brightest) to 10

1 is brightest and 10 is dimmest. A dimmer LED saves a little power.

Maintenance

Phone compatibility android_compat

Some phones and tablets won't open a drive they have seen before.

Value	What it does
0	Appears as the same drive every time (default)
1	Appears as a new drive at each power-on

Factory reset factoryreset

Value	What it does
0	Normal (default)
1	Wipes the drive and restores every default at the next power-on, then goes back to 0

Other ways to reset are on the factory reset page.

Checking your changes

After a power-on, open `device_settings.txt` again. If your values are still there, they were accepted. If it's back to the defaults, something in it was wrong, so check it against the table above.

STANDARD SETTINGS CHECK

If any setting other than the device name and competitor numbers differs from its default, the Nano shows a 5 second pink, purple and blue sweep at start-up. Handy for checking a Nano is on standard settings at a competition.

Locked settings

The sea-level pressure (1013.25 hPa), temperature (15 °C) and barometer filtering are fixed in the firmware. Older files may still contain keys such as `sealevel`, `fixed_temp` or `kalmanfilter`; these are ignored.