

NANOPIX DRONE programming in Roboton Studio

Step by step manual
for Windows users

1. Download and install

1.1 Download archive **RobotonStudioForNanopixSetup.zip** via link:

https://minibot.tech/programming_tools/RobotonStudioForNanopixSetup.zip

1.2 Download archive **NanopixGroundStation.zip** via link:

https://minibot.tech/programming_tools/NanopixGroundStation.zip

You can also find them on resources page:

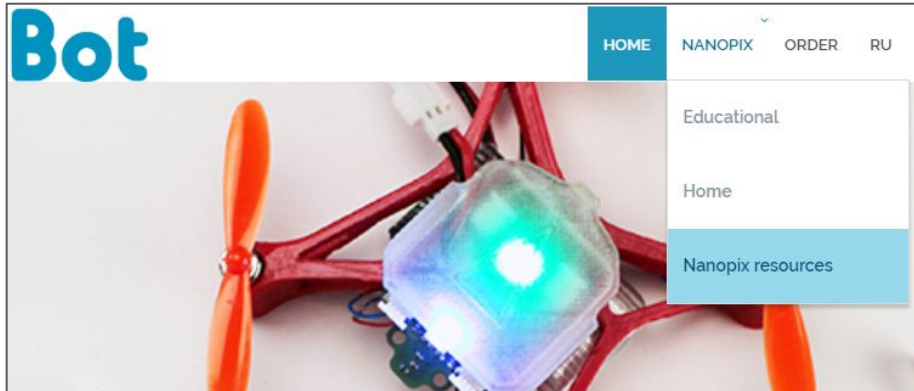
1.3 Unpack archive

RobotonStudioForNanopixSetup.zip and run the installer

RobotonStudioForNanopixSetup-x.x.exe

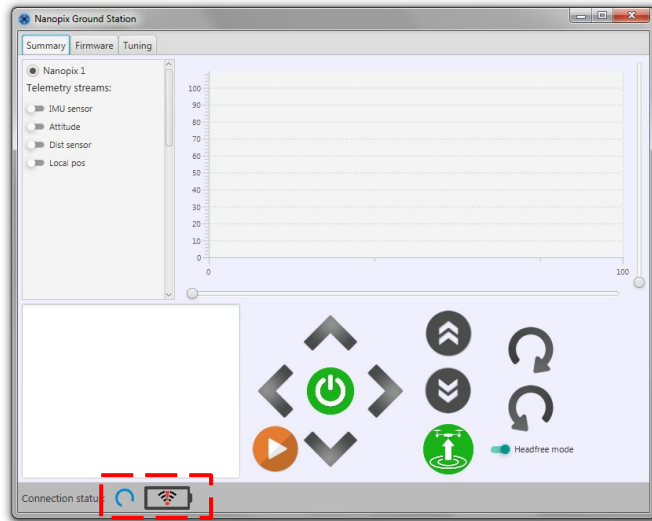
1.4 Unpack archive

NanopixGroundStation.zip and run the installer **NanopixGroundStation-x.x.exe**



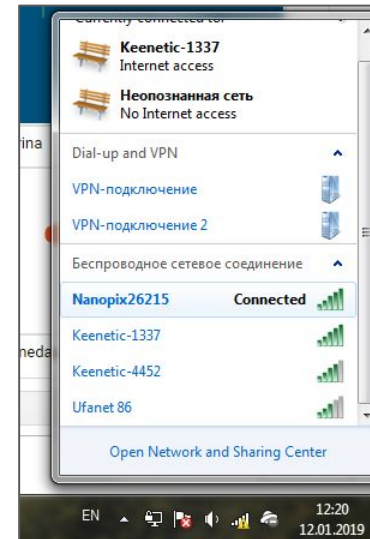
2. NanopixGroundStation setup

2.1 Run installed program NanopixGroundStation:



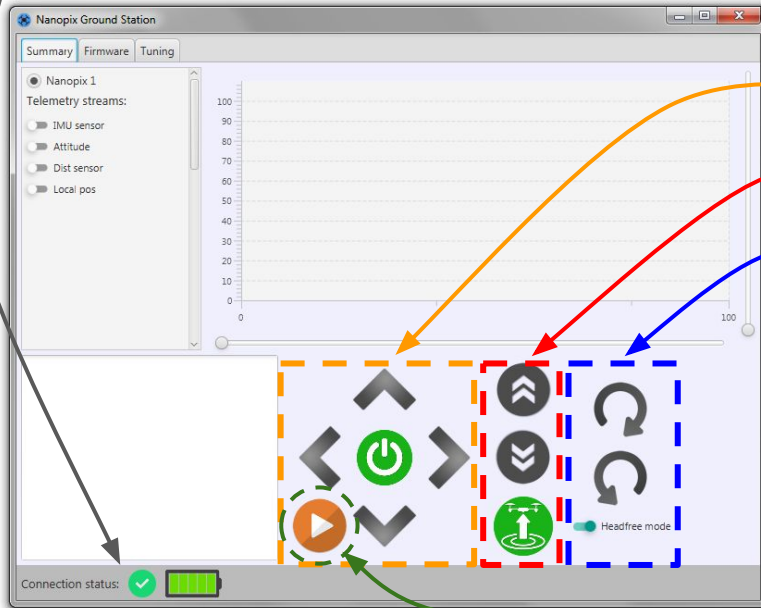
While PC is not connected with Nanopix - you will see "Disconnected" icon here.

2.2 Plug the battery to Nanopix board and connect your PC to Nanopix Wi-Fi network. It will be called like this: Nanopix<number> (default password: 12345678)



2. NanopixGroundStation setup

2.3 After Wi-Fi initialization you will see successfully connection icon in NanopixGroundStation



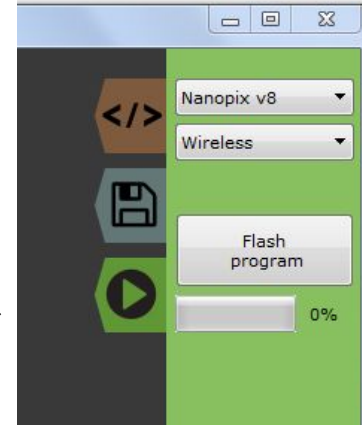
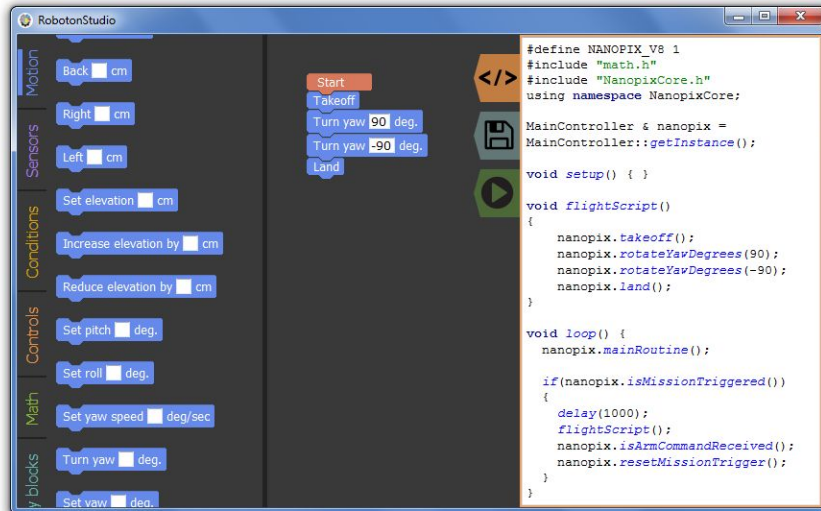
2.4 Here you can control your NANOPIX, modify parameters, calibrate, flash firmwares, etc.

UI elements for controlling the drone:

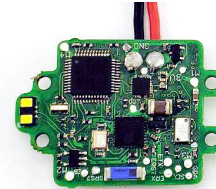
- Forward / backward / left / right movements and arm/disarm motors button
- Automatic takeoff/land and altitude control
- Yaw controls and headfree checkbox
- Mission start/stop button (mission = a program that you wrote and flash to NANOPIX)

3. Running “Roboton Studio”

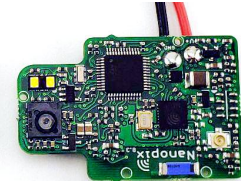
3.1 Run the installed application **RobotonStudioForNanopix** and open the **TakeoffYawRotateLand.rsp** example. Examples are located in the install folder (by default in **C:\Program Files (x86)\RobotonStudioForNanopix\examples**)



3.2 Select your board (Nanopix V8 or Nanopix V7)



Nanopix V7



Nanopix V8

4. Compile and flash

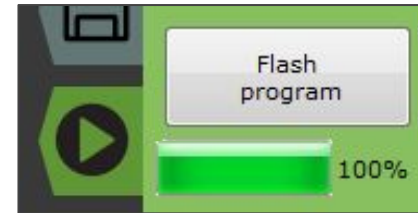
4.1 Ensure that **Nanopix Ground Station** is connected to NANOPIX:



4.2 Click “Flash program” button in Roboton Studio:



4.3 After a successful upload you will see a notification from Nanopix Ground Station:

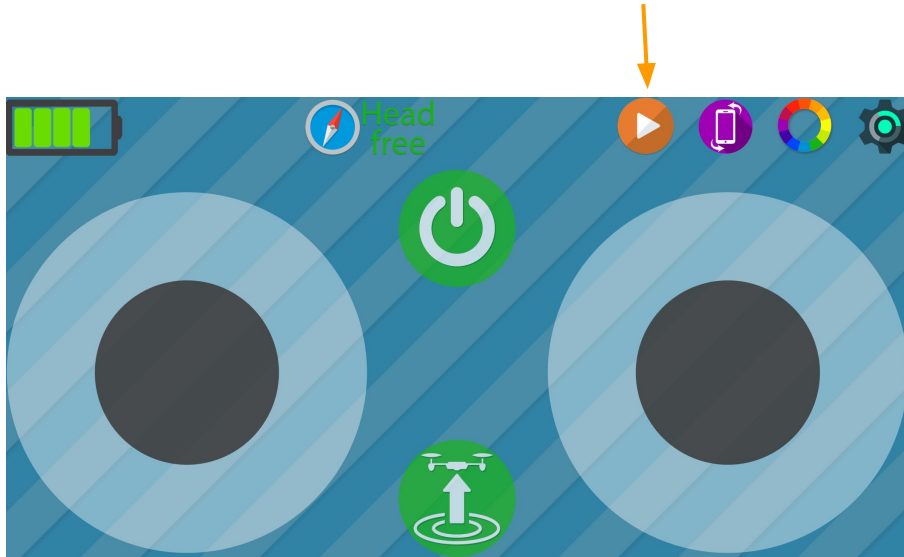


4.4 After a successful upload, the drone will reboot and you will need to reconnect the computer to the Nanopix network again, if it does not do it automatically. Then you can run the script with that button in the Nanopix Ground Station:

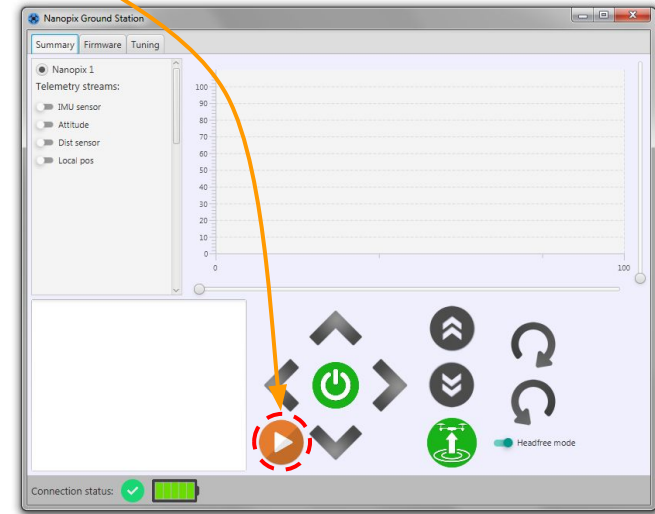


5. Run flashed program

5.1 You can start your mission from Android/iOS application. Click this button to start:



5.2 Another way to start the mission - do it via Nanopix Ground Station. Click this button to start:

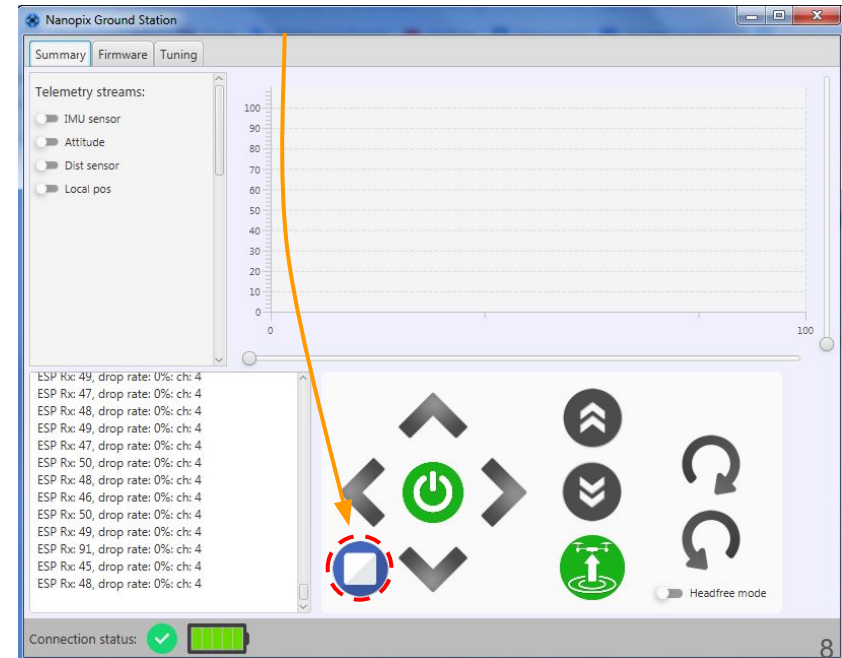


6. Run your mission

6.1 Mission will start 1 second after pushing the button.

In this example (TakeoffYawRotateLand) NANOPIX will take off, then rotate 90 degrees clockwise, then rotate back to initial yaw, then land.

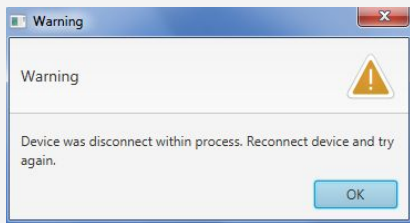
6.2 If you want to flash new firmware (mission) to NANOPIX - stop current mission (if running):



Troubleshooting

Program **does not flash to NANOPIX**

- Flashing started, but interrupted with error:



- This should fix it:
 - try again
 - reboot NANOPIX via replug battery connector

Flashing can't start

- This should fix it: ensure that Nanopix Ground Station connected to the drone and shows 'green' status:



Wi-Fi connected but **Nanopix Ground Station doesn't show anything**

- This should fix it: disable antivirus or add this app to exceptions
or
- This should fix it: disable Windows Firewall or add app to exceptions

Can't connect to NANOPIX Wi-Fi network

- **Forgot network password**
This should fix it: plug battery to NANOPIX and leave it for 5 minutes. After that NANOPIX will automatically reset the password to default 12345678 .

Troubleshooting

The smartphone is losing Wifi connection with NANOPIX drone all the time
(Android 8+ frequent problem)

Before Wi-Fi connection disable next things:

1. mobile data
2. hotspot Wi-Fi point

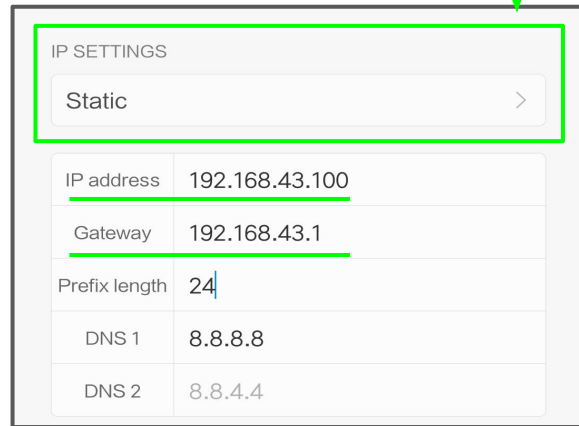
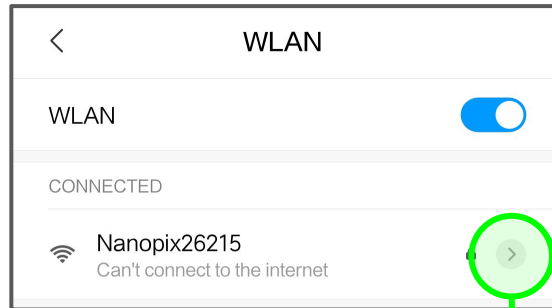
This should fix it:

- If your smartphone loses internet-less connections, try to disable such behavior in Wi-Fi settings.

Or / and

- Try to setup static IP for NANOPIX Wi-Fi network Nanopix<number>:
change DHCP to Static. Enter the next IP and Gateway:
 - IP address: 192.168.43.100
 - Gateway: 192.168.43.1

1. Open Wi-Fi settings and setup static IP address:



Blocks description.

'Motion' tab



Takeoff

The block automatically **takes off** the drone **to a height of 60 centimeters**, after reaching this height the block completes its circle and the program proceeds to the next block.

Land

The block carries out an **automatic landing** (from any height) and turns off the engines. After turning off the engines, the program proceeds to the next block.

Forward cm

Right cm

Back cm

Left cm

Movement blocks are for flying in the direction stated the **centimetres set**. After the maneuver is finished the program proceeds to the next block.

Set elevation cm

The block sets the drone target altitude. Last takeoff point is zero-level altitude. Block is waiting of movement finish. Important!

Important! The block sets the absolute value, not relative

Increase elevation by cm

Reduce elevation by cm

The blocks increase or decrease the **relative** altitude for the centimetres set. After the maneuver is finished the program proceeds to the next block.

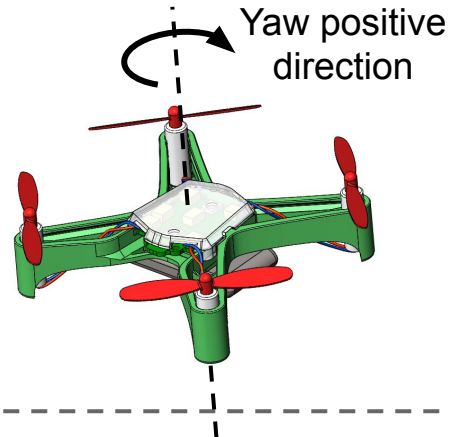
Blocks description.

'Motion' tab



Turn yaw deg.

The block turns the drone for the degrees set. Positive values - clockwise turn. After the turn is finished the program proceeds to the next block.



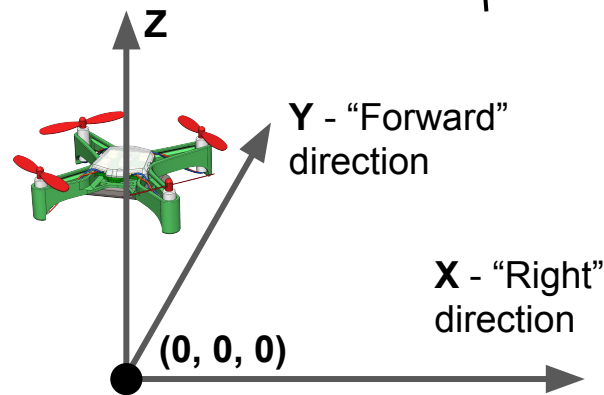
Shift dX: dY: cm

Shift dX: dY: cm non-blocking

The blocks change the coordinates **regarding the current location**. By default, the block waits for the maneuver to end, the Блок по умолчанию ожидает завершения маневра, блок без ожидания сразу переключает программу на следующий блок.

Headfree is OFF (by default) - the coordinate system rotates together with the aircraft (the direction it's headed to).

Headfree in ON - the coordinate system is constant.



Coordinate origin (0, 0, 0) corresponds to the take off point

Blocks description.

'Motion' tab

Set yaw deg.

The block turns the drone till the absolute value of the turn degree regarding the direction of the take off. The block waits, till the maneuver is over.

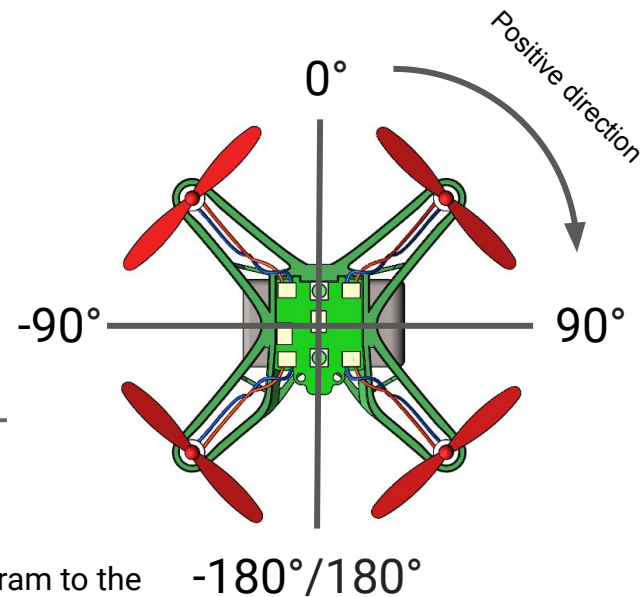
Set position X: Y: cm

The block waits, till the maneuver is over.

Set position X: Y: cm non-blocking

The block right away forwards the program to the next block (without waiting for the end).

The blocks set the coordinates of the drone **regarding the initial coordinate system (= take-off point).**



Blocks description.

'Motion' tab, manual control blocks

Set pitch deg.

Set target attitude **pitch** angle in degrees. This block don't waiting, program immediately proceed to the next block.

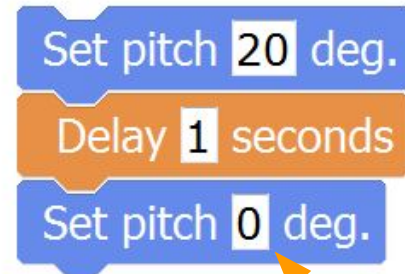
Set roll deg.

Set target attitude **roll** angle in degrees. This block don't waiting, program immediately proceed to the next block.

Set yaw speed deg/sec

Set target yaw speed in degrees per second. This block don't waiting, program immediately proceed to the next block.

A recommended way of using these blocks:



Important: these functions do not wait for the end of the maneuver (non-blocking) and are active until another function is called. To stop movement use block this blocks with zero argument.

Blocks description.

'Sensors' tab

Blocks from "Sensors" tab allows to receive current state: coordinates, altitude, attitude, external sensors data, etc.

Elevation

Roll

Joystick throttle

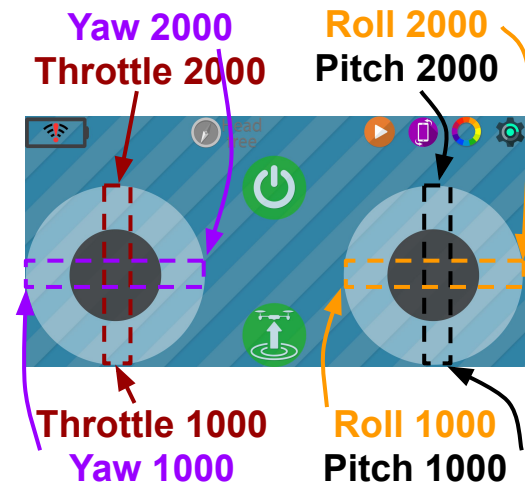
Joystick yaw

Joystick roll

Joystick pitch

- Elevation - returns current drone's altitude (in centimeters)
- Roll - returns current roll angle (in degrees)
- Joystick throttle - value of vertical axis of left stick.
- Joystick yaw - value of horizontal axis of left stick.
- Joystick roll - value of horizontal axis of right stick.
- Joystick pitch - value of vertical axis of right stick.

These blocks return value in range [1000, 2000], default value is 1500.



Blocks description.

'Sensors' tab



Position X

Position Y

Position Z

Accelerometer X

Accelerometer Y

Accelerometer Z

Battery voltage

- Position X, Y, Z - in metres, in the coordinate system regarding the take-off point. In case of usage of the external positioning system -- in its coordinate system, float value.
- Pos speed X, Y, Z - in metres per second, in the same coordinate system as the position, float value.
- Accelerometer X, Y, Z - normalized accelerometer sensor values, $\text{m/sec}^2 * (1 / 9.81)$. Value range is $[0, 1]$, float value.
- Gyrosensor X, Y, Z - rotation speed sensor values, degrees per second, float value.
- Battery voltage (in volts), float value.
- ARM command was received - returns **true** if from the ARM command was sent from the remote control (engine start)

Pos speed X

Pos speed Y

Pos speed Z

Gyrosensor X

Gyrosensor Y

Gyrosensor Z

ARM command was received

Blocks description.

'Control' tab



Start the motors

Start or stop the motors.

Stop the motors

Important: if called during the flight, it will lead the drone to a collision (= it will fall down).

Write

Print string or number to logs. You can see logs in several ways. In App you can enable logs via **x5** taps to battery icon. Log output in Nanopix Ground Station is enabled by default.

Front led R: G: B:

These blocks set the color and the brightness of the two LED's on the Nanopix board, range for arguments is [0...255].

Back led R: G: B:

