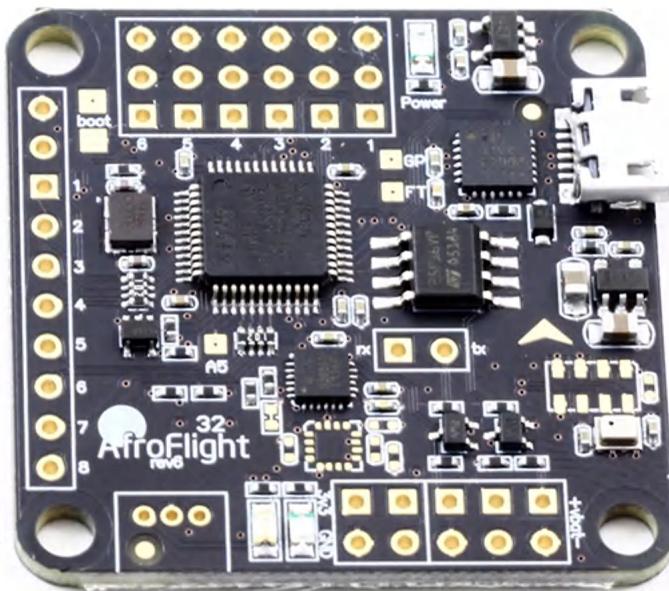
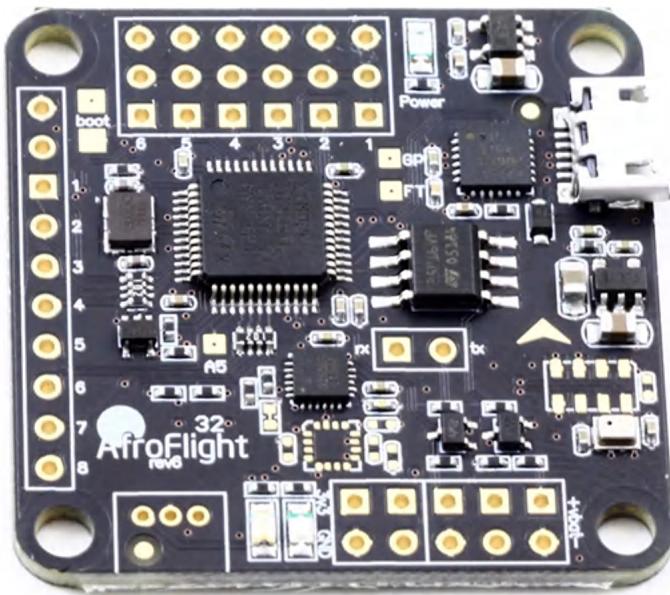


NAZE32 REV6 MANUAL



quad QUESTIONS

WARNINGS & NOTES



WARNING Do not use this hardware for serious business, commercial aerial photography, or anything else where its usage could endanger the end user, spectators, inanimate objects, aircraft flying overhead, etc.

NOTE While the flight controller firmware and configuration software is based on the MultiWii system, the processor is not Atmel AVR, and this hardware cannot be programmed through the Arduino development environment or any AVR development tools. For more information on STM32 development, see the following link: <http://code.google.com/p/afrodevices/wiki/STM32Development>

NOTE This hardware is provided as-is and end-user is expected to have reasonable technical knowledge to complete set-up and reasonable R/C experience to operate multi-rotor aircraft.

**quad
questions**
Naze32 rev6 manual v1.2 .COM

BOARD LAYOUTS ACRO VS. FULL

*board colors vary

Acro Board

STM32 F1
32bit
processor

Mems
MPu6500
invensense
gyro/acc

CP210x USB to serial

16mbit
onboard
memory

Full Board

Magnetometer
+ upgraded
Barometer & Memory

BMP 280
Barometer

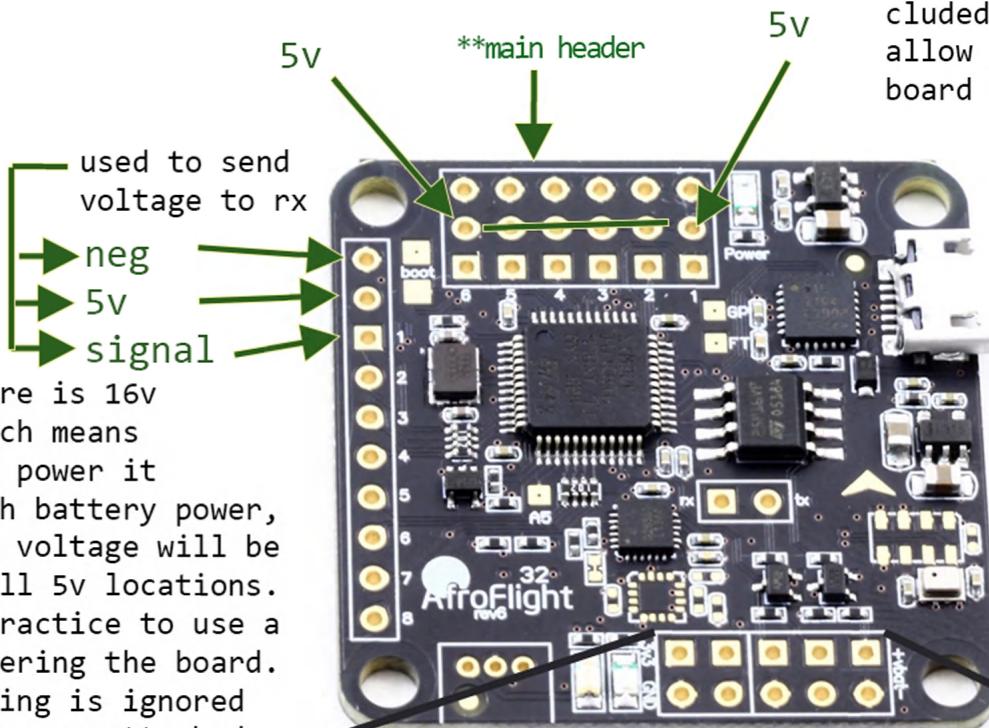
128mbit
on board memory

ms5611 Barometer

Quad
Questions
Naze32 rev6 manual v1.2 .COM

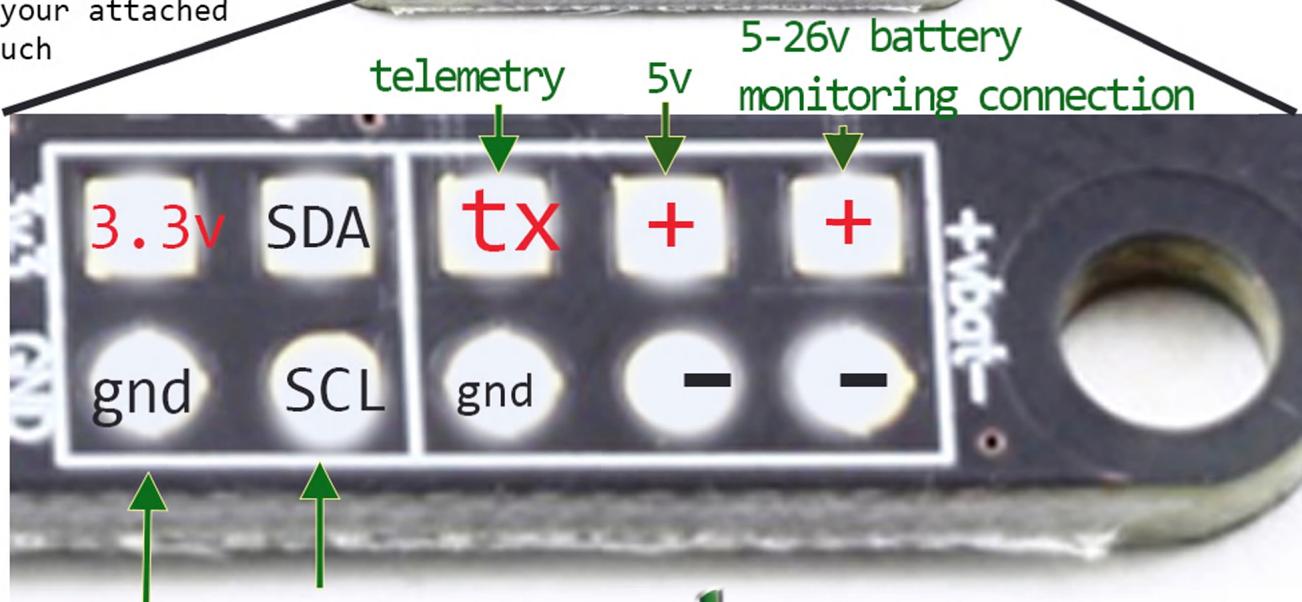
POWER SCHEME

Provide 5v power to board either via BEC or step down voltage regulator. Many escs have becs included and therefore allow you to power the board from your esc.



* The hardware is 16v tolerant which means that you can power it directly with battery power, however this voltage will be present at all 5v locations. It is best practice to use a BEC when powering the board. If this warning is ignored you will fry your attached 5v hardware such as receivers sensors, etc.

**The Battery monitoring connection does not power the board. To power the board 5v must be connected to a 5V connection such as via a servo lead to the main header.

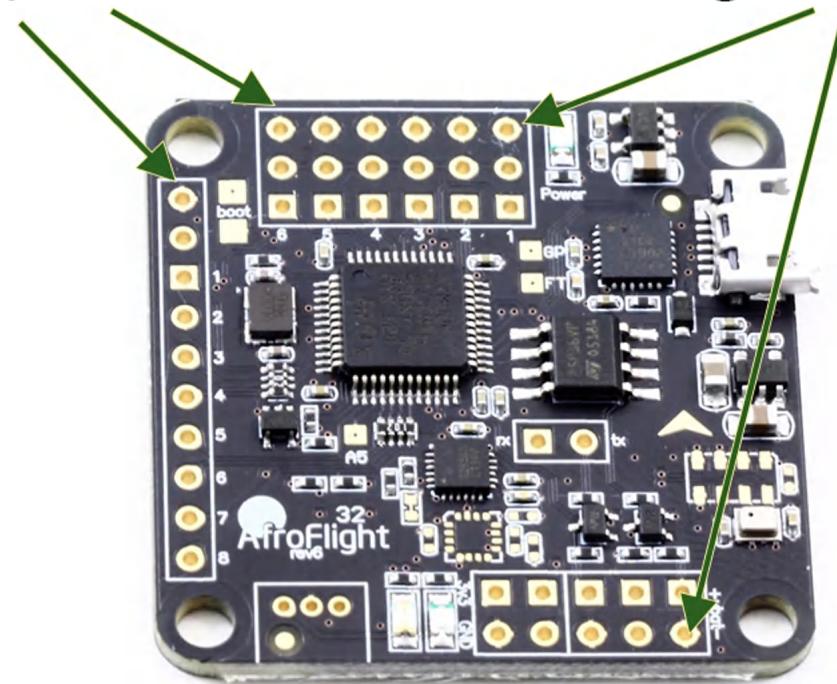


The I2C bus can be used for additional sensors or debugging. I2C bus runs at 3.3V only, do not connect 5V sensors here (such as I2C sonar, etc).



GROUNDED

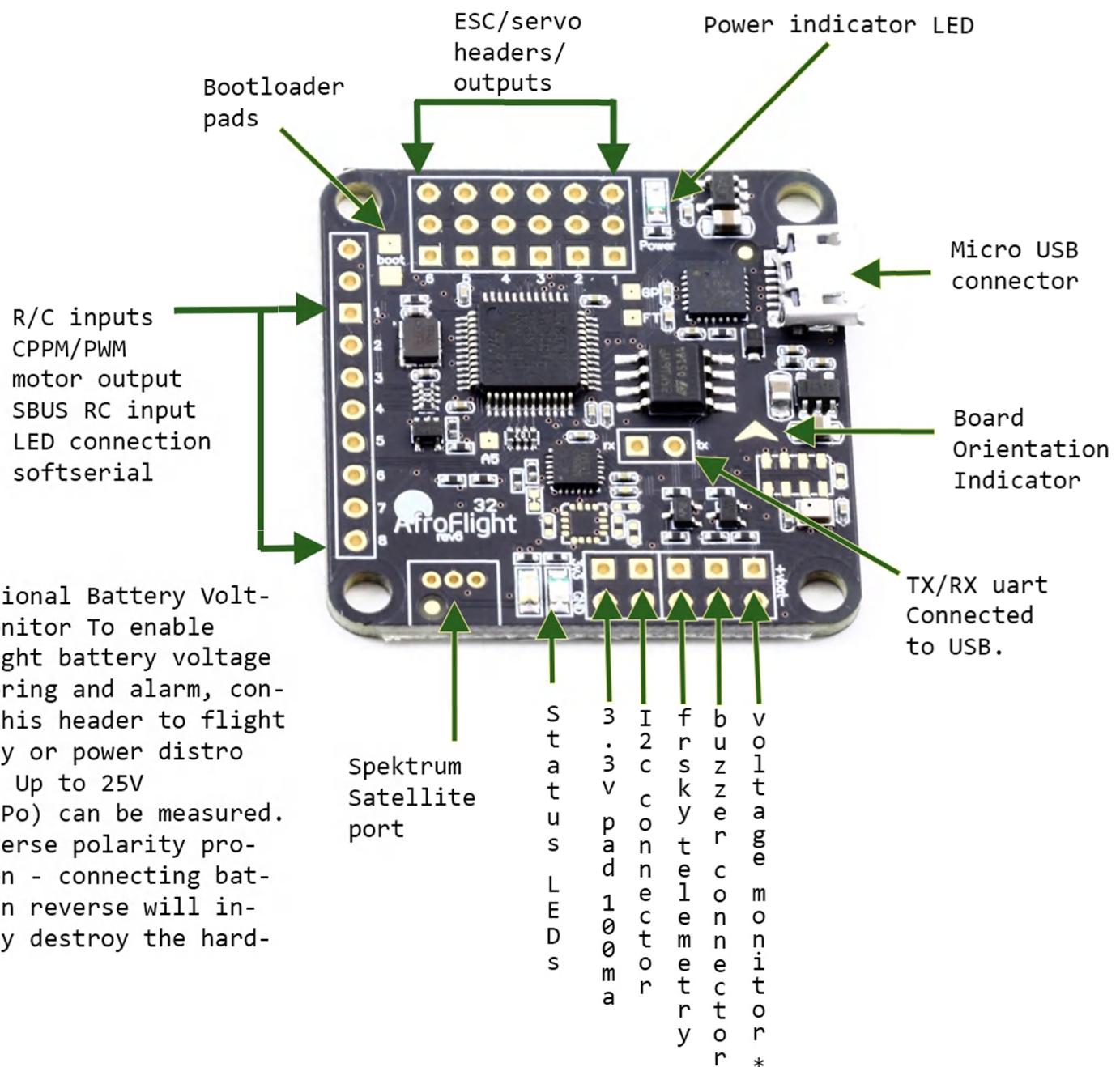
The NEG pads are on outer edge of board



Warning: there is no reverse voltage polarity protection built into this board, so if you connect your power backwards you will instantly destroy the hardware.

נaze QUESTIONS

GENERAL INPUTS



The naze32 is a static sensitive device. Use caution when handling and make sure that you follow proper anti static handling procedures.

QUAD
QUESTIONS
Naze32 rev6 manual v1.2 .COM

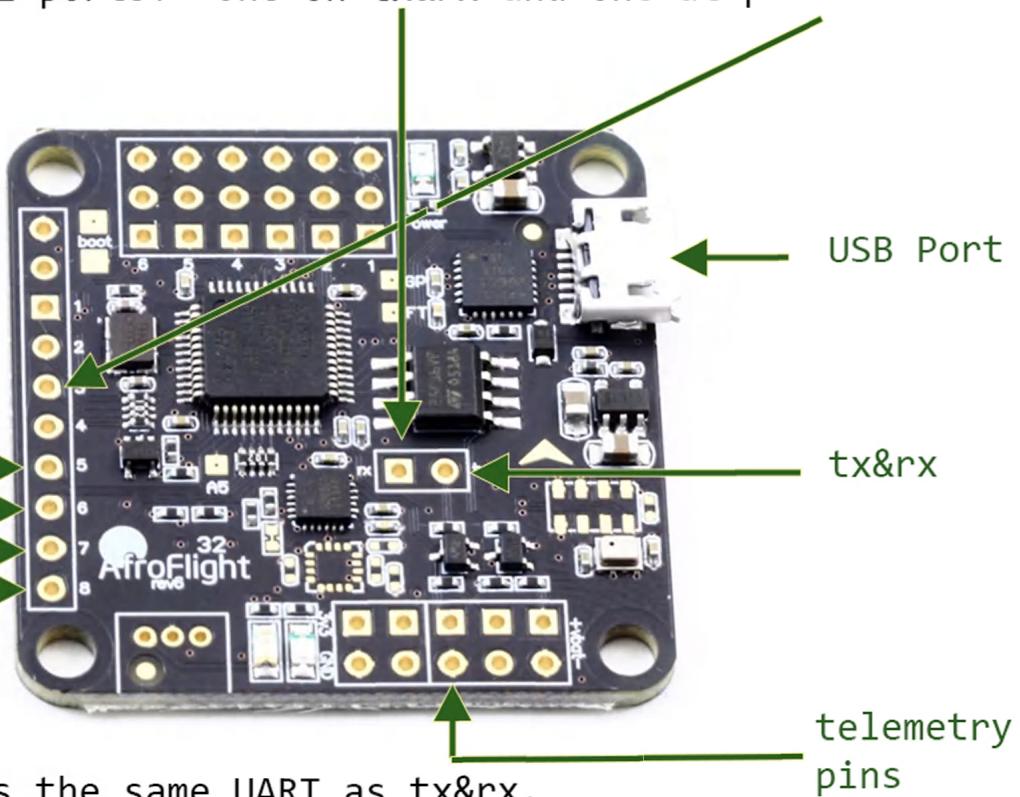
PARTS

UART AND SOFTSERIAL

The Naze32 features 2 dedicated hardware UART serial ports. One on tx&rx and one at pins 3&4

When “feature softserial” is enabled in the software, it will create software emulated serial ports on pins 5&6, & 7&8.

5=rx 1
6=tx 1
7=rx 2
8=tx 2



If a serial device is connected to tx/rx it wont work when the usb is connected and vice versa, if there is a device connected to tx & rx there will be problems with the usb connection, so disconnect devices attached here when connecting the Naze32 to USB.

Also, Frsky telemetry is connected to this same UART1, if you want to use the tx & rx pins, you will have to move your telemetry to a soft serial port or UART2. If there is no connection to tx&rx, the telemetry will not work when usb is connected.

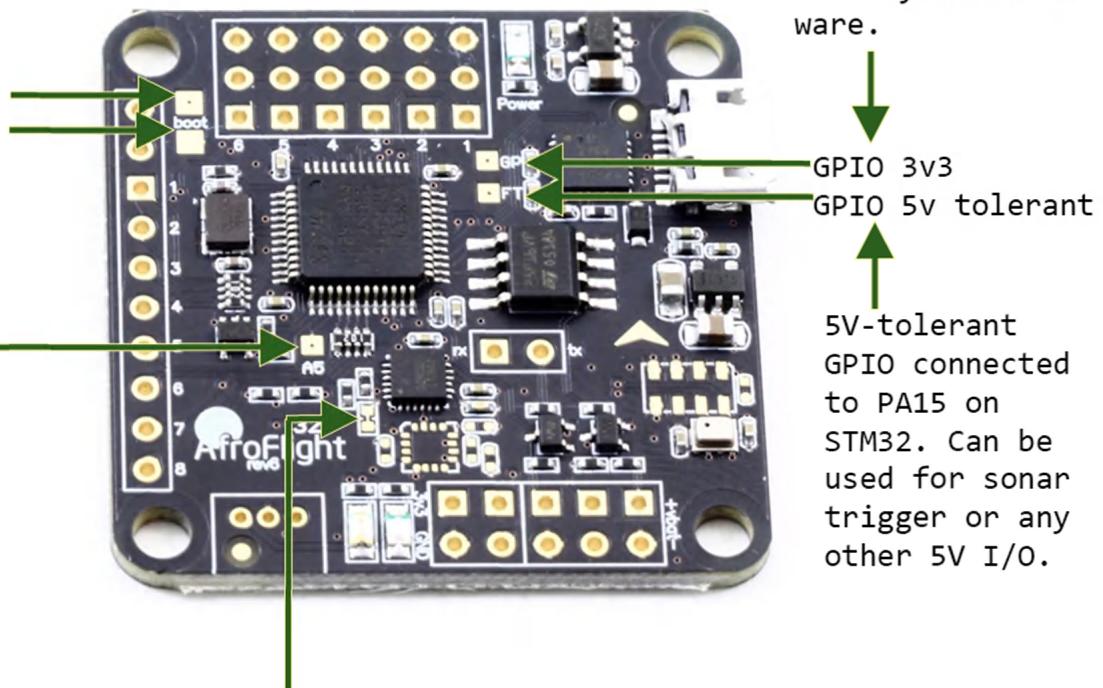
The hardware will not output to the telemetry pins when connected via usb, so if you are using the telemetry pins, you will not see telemetry values until the board has been armed.

**quad
quad
QUESTIONS**
Naze32 rev6 manual v1.2 .COM

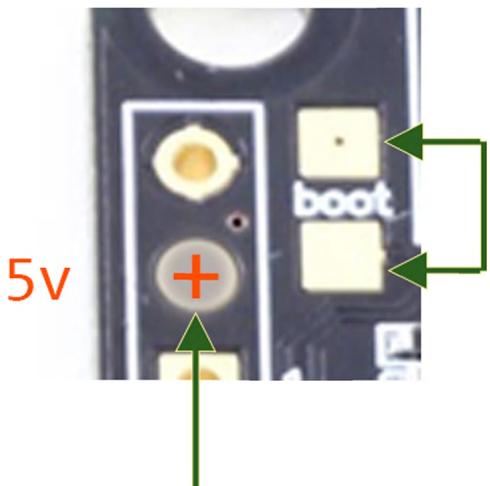
ADDITIONAL FEATURES

*Bootloader pads can be shorted out in the event that the board cannot be flashed with the bootloader flasher. Make sure “no reboot sequence” is checked in the firmware flasher if these pads are shorted.

3.3V ADC input connected to ADC12_IN5 on STM32. Not 5V tolerant.

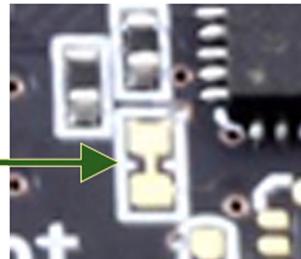


You can cut this trace to disable the onboard magnetometer on the full version.



*warning- if shorting bootloader pads, be sure to only short the 2 pads together, be mindful not to short the pads to the 5v pin or hardware failure will result.

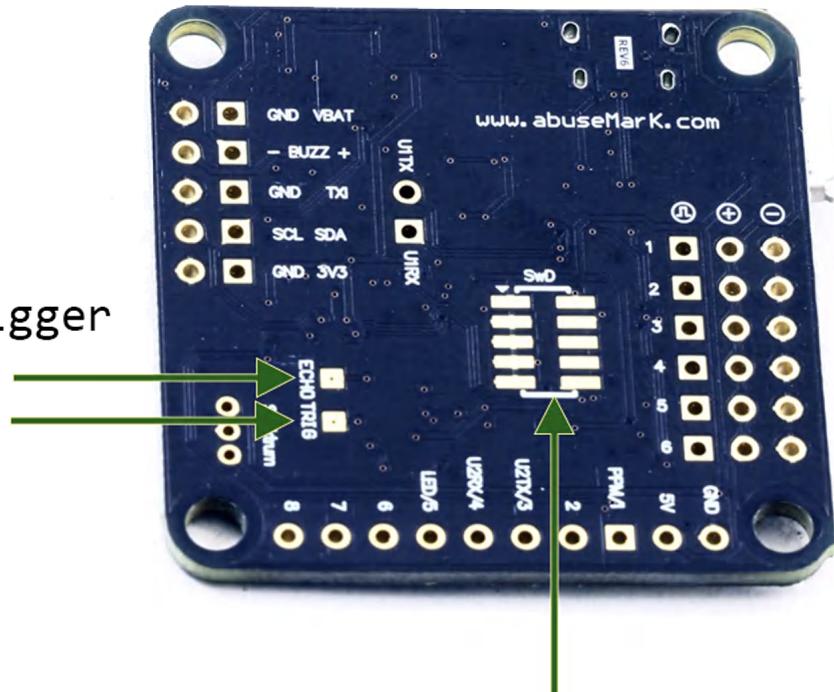
3.3V-tolerant GPIO connected to PB5 on STM32. Cannot be connected to 5V levels as this will instantly destroy the hardware.



**quad
quad
QUESTIONS**
Naze32 rev6 manual v1.2 .COM

THE BACKSIDE

Echo and trigger
Sonar pads
w/resistors
added for
direct con-
nection to
5V sonar.



Cortex Debug Connector
10 pin 0.05" debug connector connected to 'SWD' port of STM32.

18:43:37 -- Serial port successfully opened with ID: 2
 18:43:40 -- Unique device ID received - 0x66dff515650877067043228
 18:43:40 -- Running firmware released on: Aug 27 2015
 18:44:11 -- Serial port successfully closed

DRIVER DOWNLOAD

Setup Configuration PID Receiver Mode Selection Servos GPS Motor Testing Sensor Data Logging Backups CLI

Welcome to **Baseflight - Configurator**, utility designed to simplify updating, configuring and tuning of your flight controller. Demonstration mode can be accessed by selecting "Demo" in port selection area and connecting. Application supports complete family of Baseflight hardware (acro naze, naze32, naze32pro and afromini).

- Baseflight wiki can be found [here](#)
- Latest CP210x Drivers can be downloaded from [here](#)

News & Changelog

2015.07.24 - 0.68 | Backup & Restore Manager, partial restore, bugfixes ...

Backup & Restore Manager is the latest feature addition (you can find it inside **Backups** tab) featuring new experimental **partial restore** which should help a great deal with firmware upgrades now and in the future, there is also new **storage area** for backups that you can utilize instead of backing up to files.

Updating to **latest firmware** is currently **highly recommended** so you can reap all the benefits from recently added features.

Note that the minimum restorable API version is **v1**, first firmware that supports API versioning was released **February 12 2015**, older releases are **not supported**.

Improved RC fake input data from emulator (making the receiver tab look much cooler in demonstration mode).

Added missing **ADC (A5)** to the list of supported ADC input pins in the UI (reported through github, thanks **dustin**).

Added Pitch and Roll values next to the Heading in 3D view.

Bugfix for barometer graph not rendering correctly above **500 meters**.

Bugfix for emulator bug that caused unexpected behavior after restoring incompatible backup.

2015.07.20 - 0.67 | Better landing page, demo mode ...

The biggest feature in this release is probably the introduction of **demonstration mode**, which you enter by selecting "Demo" in port selection area and **connecting**.

This mode will use an internal MSP emulator for basic MSP transactions, allowing users without a board on hand or new users that are looking to buy a board that runs baseflight hardware to test the application functionality / view supported features before committing to a purchase.

Other changes include revamped interface on the landing page to better utilize remaining whitespace and in turn allow more detailed changelogs to be posted.

Several UI initialization bugfixes (mostly in Receiver and Servo tabs) and optimizations for Setup tab.

Silent release v0.66.1 contained fix for RC rate not going over 1.0 in Receiver tab (reported through support section on chrome store, thanks **Zack C**).

2015.07.11 - 0.66

- Added Airplane Setup

Project Support / Donations

This freeware utility is available free of charge to all **baseflight** users.
 If you found the utility useful, please consider [supporting](#) its development by donating.

[Donate](#)

Sponsors

- AbuseMark (Official Naze Hardware Manufacturer)

[Firmware Flasher](#)

Copyright © cTn 2015 All rights reserved, Configurator uses [open source software](#)

Port utilization: D: 0% U: 0% Packet error: 0 I2C error: 0 Cycle Time: 0

0.68.3

Download the CP210x drivers by clicking here

When connecting to Baseflight the first thing that you need to make sure to do is download the drivers so that your computer can communicate with the board. We also recommend testing the board before soldering so that a return can be made if needed. All Naze32s are tested from the factory before shipping.



Naze32 rev6 manual v1.2 .COM

/dev/cu.SLAB_US 115200 Connect Auto-Connect

18:43:37 -- Serial port successfully opened with ID: 2
 18:43:40 -- Unique device ID received - 0x66dff515650877067043228
 18:43:40 -- Running firmware released on: Aug 27 2015
 18:44:11 -- Serial port successfully closed

ENTER FIRMWARE FLASHER

Setup Configuration PID Receiver Mode Selection Servos GPS Motor Testing Sensor Data Logging Backups CLI

Welcome to Baseflight - Configurator, utility designed to simplify updating, configuring and tuning of your flight controller. Demonstration mode can be accessed by selecting "Demo" in port selection area and connecting. Application supports complete family of Baseflight hardware (acro naze, naze32, naze32pro and afromini).

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 - Added Airplane Setup

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This freeware utility is available free of charge to all **baseflight** users. If you found the utility useful, please consider **supporting** its development by donating.

[Donate](#)

Sponsors

- AbuseMark (Official Naze Hardware Manufacturer)

Copyright © cTn 2015 All rights reserved, Configurator uses [open source software](#)

Port utilization: D: 0% U: 0% | Packet error: 0 | I2C error: 0 | Cycle Time: 0 | 0.68.3

Click here to open the firmware flasher.



Connect Auto-Connect

21:41:56 -- Running - OS: MacOS, Chrome: 46.0.2490.86, Configurator: 0.68.3

LOAD NEW FIRMWARE

Setup Configuration PID Receiver Mode Selection Servos GPS Motor Testing Sensor Data Logging Backups CLI

Please load firmware file

Stable 2015.08.26 - 21:40 Available online firmware releases

No reboot sequence
 Do not verify
 Full Chip Erase
 Flash slowly

Check if you are flashing board with bootloader pins shorted
Do not verify uploaded data (saves time when flashing multiple boards)
Wipes all configuration data currently stored on the board
Use 115200 baudrate for flashing (useful for flashing via bluetooth)

Warning

Please do not try to flash **non-baseflight** hardware with this firmware flasher (it won't work).
Do not disconnect the board or turn off your computer while flashing.

Note: STM32 bootloader is stored in **ROM**, it cannot be bricked.
Note: **Auto-Connect** is always disabled while you are inside firmware flasher.

1. Click Load Firmware

3. click flash firmware.

2. Select load firmware online

Leave Firmware Flasher

Load Firmware [Local] Load Firmware [Online] Flash Firmware

Port utilization: D: 0% U: 0% Packet error: 0 I2C error: 0 Cycle Time: 0

0.68.3

You can load custom firmware by clicking "load firmware (local)"

This will allow you to run custom variants of baseflight (for advanced users)



To connect for the first time, plug in your Naze32 to the computer, once this is done, the port should be listed in the dropdown. Look for SiLab port, select it and then click “connect”.

If the dropdown shows “no ports” then you havent installed the driver properly or need to check your USB cable. You should see a blue light on the board when there is power applied.

Clicking autoconnect is the easiest way to find the right port. If you click auto-connect and then plug in your Naze32, it should automatically connect to the board.

The tabs at the top of the screen will not be clickable until you connect to the board. You can also connect to demo under the port dropdown to play around with settings.



22:00:40 -- Serial port successfully closed
 22:09:56 -- Serial port successfully opened with ID: 2
 22:09:56 -- Unique device ID received - 0x66dff515650877067043228
 22:09:56 -- Running firmware released on: Aug 27 2015

The indicator lights turn green to show that your sensors are working properly. GPS and sonar are red in this instance because they are not enabled.

Setup Configuration PID Receiver Mode Selection Servos GPS Motor Testing Sensor Data Logging Backups CLI

Calibrate Accelerometer Place board or frame on leveled surface, proceed with calibration, ensure platform is not moving during calibration period

Calibrate Magnetometer Move multirotor at least 360 degrees on all axis of rotation, you have 30 seconds to perform this task

Reset Settings Reset / Restore settings to default

Author: creyc

Calibrate Acc. Click this only when the quad is level
 Calibrate Mag. Do this in open air away from metallic objects
 Reset Settings- use this to reset all settings to default.

Heading: -35 deg
 Pitch: -30 deg
 Roll: 19 deg

Info

Battery voltage: 0 V
 Capacity drawn: 0 mAh
 Current draw: 0.00 A
 RSSI: 0 %

GPS

3D Fix: False
 Sats: 0
 Latitude: 0.0000 deg
 Longitude: 0.0000 deg

The info and GPS boxes give information from the sensors on the board. Batt voltage is measured from the VBat pins and current draw and rssi

Reset Z axis, offset: 43 deg

Reset z axis- This button only resets the 3d graphic model in relation to the actual model. with the model in front of you facing away from you, click reset z axis to make the 3d rendering match what the model is doing.

Port utilization: D: 4% U: 2% | Packet error: 0 | I2C error: 0 | Cycle Time: 3503 | 0.68.3

If you get several errors, check your USB cable- these values are mostly used for bluetooth debugging.



Set these to match your battery chemistry (initial values are setup for Lipo batteries)

CONFIGURATION TAB PG 3.

Use these values to setup your current sensor. (battery current monitoring must be enabled)

Current Sensor

3.3	Minimum Cell Voltage
3.5	Warning Cell Voltage
4.3	Maximum Cell Voltage
110	Voltage Scale

OFF ADC input pin for an external current sensor

400 Scale the output voltage to millamps [1/10th mV/A]

0 Offset in millivolt steps

 Enable support for legacy Multiwii MSP current output

Battery Voltage

Board Alignment

0	Roll Adjustment [degrees]
0	Pitch Adjustment [degrees]
0	Yaw Adjustment [degrees]

Looptime can be set here. Min looptime with ACC is 1000. Warning This value effects your PIDS

Port utilization: D: 0% U: 0% Packet error: 1 I2C error: 0 Cycle Time: 3474

0.68.3

To change the board orientation, adjust these settings. For example, to rotate the board counter clockwise 90 degrees in the Yaw axis, you could use either a value of -90 or 270.

It is extremely important to set this up properly. You can verify that it is setup by making sure that the model moves according to the actual movements of the quad.

Misc

3500 Looptime [microseconds]

25 Maximum angle permitted for arming [degrees]

Save

This is the maximum angle allowed for arming. If you have troubles arming your quad in rough terrain, adjust this setting.

***Make sure to set the board alignment before you try to fly for the first time.**

***also, calibrate your acc if the board is realigned.**

***If you have problems arming on a level surface, ACC calibration is a good place to start.**



quad
questions
Naze32 rev6 manual v1.2 .COM

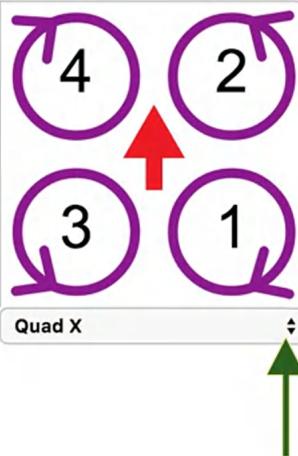
Port /dev/cu.SLAB_US 115200 Disconnect Auto-Connect Gyro Accel Mag Baro GPS Sonar

22:33:24 -- You need to connect before you can view any of the tabs
 22:33:26 -- Serial port successfully opened with ID: 4
 22:33:26 -- Unique device ID received - 0x66dff515650877067043228
 22:33:26 -- Running firmware released on: Aug 27 2015

Setup Configuration PID Receiver Mode Selection Servos GPS Motor Testing Sensor Data Logging Backups CLI

CONFIGURATION PG1

Mixer

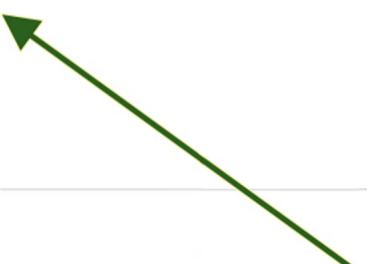


This is where you make most changes to your setup including changes to your mix, changes to your general setup.

Click here to change your mix

Throttle

1150 Minimum Throttle
 1500 Middle Throttle [RC inputs center value]
 1850 Maximum Throttle
 1200 Failsafe Throttle
 1000 Minimum Command
 OFF Brushed Motors



Serial Receiver

SPEKTRUM1024
 SPEKTRUM2048
 SRUS

Port utilization: D: 0% U: 0% Packet error: 1 I2C error: 0 Cycle Time: 3518

0.68.3

Min throttle- this value should be set for your escs. BLheli and Kiss escs work well with a the stock minimum throttle of 1150, simonK firmware should be set at 1064, other escs vary- its best to start low and turn this value up until your motors start reliably.

middle throttle- The center value for your RC input

max throttle-max value for the escs at full power

failsafe throttle-the throttle value set when failsafe is initiated.

MINCOMMAND is the signal the sent to the ESC when unarmed.

Features

- Enable PPM input (and disable PWM input)
- Enable Battery voltage monitoring
- Enable in-flight level calibration
- Enable Serial-based receiver
- Don't spin the motors when armed
- Enable servo gimbal
- Enable 3rd serial port
- Enable LED ring support
- Enable GPS (PPM or 3rd serial port required)
- Enable failsafe settings on PPM/PWM signal loss
- Enable sonar
- Enable FrSky- compatible telemetry output
- Enable Battery current monitoring
- Enable VARIO
- Enable 3D mode (for use with reversible ESCs)
- Enable GPS Return to Home for Fixed Wing
- Enable Oneshot (Syncs PWM output with the main loop)
- Enable FastPWM (lowers the PWM pulse length to 1/8th)

Accelerometer & Magnetometer

0 Accelerometer Roll Trim
 0 Accelerometer Pitch Trim
 0 Magnetometer Declination [degrees]

GPS

NMEA Type
 115200 Baudrate

Brushed Motors-setting to 8000 will use brushed mode at 8kHz switching frequency. Up to 32kHz is supported. Note, that in brushed mode, minthrottle is offset to zero. -must use external fets



Features

- | | |
|--|--|
| <input type="checkbox"/> Enable PPM input (and disable PWM input) | Enable this for use with ppm receivers. |
| <input checked="" type="checkbox"/> Enable Battery voltage monitoring | Enable this to allow batt monitoring on vbat pins |
| <input type="checkbox"/> Enable in-flight level calibration | Enable Level calibration during flight. |
| <input type="checkbox"/> Enable Serial-based receiver | Enable for use with sbus receiver- utilizes UART2 |
| <input type="checkbox"/> Don't spin the motors when armed | Stops motors when armed at minthrottle- useful for beginners. |
| <input type="checkbox"/> Enable servo gimbal | Use this to enable gimbal output-uses servo 1& 2 for gimbal** |
| <input type="checkbox"/> Enable 3rd serial port | Use this to enable soft serial on pins 5,6 and 7,8 |
| <input type="checkbox"/> Enable LED ring support | Enables LED ring support-output on pin 5. |
| <input type="checkbox"/> Enable GPS (PPM or 3rd serial port required) | Enables GPS on Pins 3 & 4 |
| <input type="checkbox"/> Enable failsafe settings on PPM/PWM signal loss | Enables failsave throttle setting on PPM/PWM loss from receiver |
| <input type="checkbox"/> Enable sonar | Enables Sonar |
| <input type="checkbox"/> Enable FrSky- compatible telemetry output | Enables Frsky Telemetry output. (inverted on telemetry pins)*** |
| <input type="checkbox"/> Enable Battery current monitoring | Enables Current monitoring**** |
| <input type="checkbox"/> Enable VARIO | Enables vario over telemetry-for audible beeps when altitude changes |
| <input type="checkbox"/> Enable 3D mode (for use with reversible ESCs) | Enables 3d mode, sets throttle midpoint at 0- use for acrobatic tricks |
| <input type="checkbox"/> Enable GPS Return to Home for Fixed Wing | self explanatory |
| <input type="checkbox"/> Enable Oneshot (Syncs PWM output with the main loop) | set this to enable Oneshot |
| <input type="checkbox"/> Enable FastPWM (lowers the PWM pulse length to 1/8th) | set this if enabling oneshot |

Accelerometer & Magnetometer

- | | | |
|----------------------------------|------------------------------------|--|
| <input type="button" value="0"/> | Accelerometer Roll Trim | set your acc roll trim (acc stick commands change these values) |
| <input type="button" value="0"/> | Accelerometer Pitch Trim | Set your acc pitch trim (acc stick commands change these values) |
| <input type="button" value="0"/> | Magnetometer Declination [degrees] | set this for your locale (important for accurate GPS Measurements) |

*Inflight level calibration procedure

1. You arm the function with a stick combo and take off as usual
 2. you either trim the hover mode using the trims on the rx until it is perfectly level and not drifting or you use the acromode until it is leveled
 3. you now hit the "arm" switch (usually aux1/aux2) and turn off the engine. Don't worry the code does not turn off the engines - there is a failsafe feature.
 4. The copter now takes 50 measurements of the current angle and stores them in ram.
 5. After landing you have to transfer the new values into the eeprom with a stick combo.
- ** When gimbal is enabled, motor outputs shift by 2, so motor 1 is on servo3, motor2 is on servo 4 and so on.
- *** Telemetry can be output to a soft serial (must be inverted and programmed via CLI)
- ****RC inputs (assuming you are using PPM) or you can use the ADC on the bottom of the board, this way baseflight will keep track of the current and send the data via MSP to the OSD.

Serial Receiver

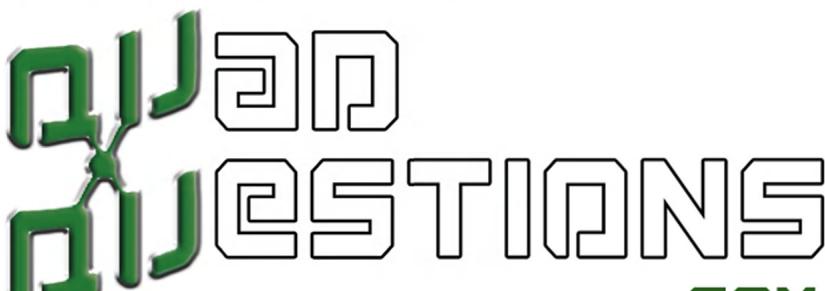
SPEKTRUM1024
SPEKTRUM2048
SBUS
SUMD

Select your serial receiver type here.
Not used if "enable serial based receiver" is unchecked.

GPS

<input type="button" value="NMEA"/>	Type	Select the GPS Type here
<input type="button" value="115200"/>	Baudrate	Select GPS baudrate (configured in GPS modules settings)
<input type="button" value="Auto-detect"/>	Ground Assistance Type	

Select Ground assistance type.
(auto is fine for most circumstances)



Naze32 rev6 manual v1.2

01:58:44 -- Serial port successfully opened with ID: 21
 01:58:46 -- Unique device ID received - 0x66dff515650877067043228
 01:58:46 -- Running firmware released on: Aug 27 2015
 01:58:53 -- ASCII scraps: M>IZ

PID PAGE

the essential PIDS for flight are
 ROLL, PITCH, YAW, and LEVEL.

Setup

Configuration

PID

Receiver

Mode Selection

Servos

GPS

Motor Testing

Sensor Data

Logging

Backups

CLI

Name	Proportional	Integral	Derivative
ROLL	4.0	0.030	23
PITCH	4.0	0.030	23
YAW	8.5	0.045	0
ALT	5.0	0.000	0
VEL	12.0	0.045	1
Pos	0.11	0.00	
PosR	2.0	0.08	0.045
NavR	1.4	0.20	0.080
LEVEL	9.0	0.010	100
MAG	4.0		

Roll rate	Pitch rate	Yaw rate	TPA
0.00	0.00	0.00	0.00

These values should be turned up for acrobatic flying and as you get better. Keep the rates down if you are a beginner. We like to set these to around .7 for fast flips and acrobatic quads.

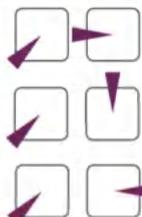
TPA or Throttle PID Attenuation- does just that. It attenuates the PIDs at higher throttle levels, so if your quad flies nice, but shakes under full throttle, give it some TPA

Profile

1



You can set multiple profiles in Baseflight. This is nice because you can have 3 different sets of settings. If the profile gets changed you won't be able to fly unless you setup that new profile, so keep this in mind. This is the first thing to check when you are having arming issues.



Profile 1

You can select the profile with stick inputs when unarmed using these commands.

Profile 2

Profile 3

PID tuning is beyond the scope of this manual, however, some basics are: Start by tuning acro or gyro rate mode, auto level should be tuned last.

P- adjusts snappiness of the quad to your input. If it is squishy, increase P until you get shakes then back off 10-20%

I- How the quad reacts to outside forces, wind, off-balance weight such as a battery, etc. If the quad drifts when an angle is set, turn this up. The quad shouldn't drift. If I is too high, it will oscillate a bit more slowly than P.

D- The speed at which the quad returns to a position, so for auto level for instance, if D is high, it snaps back to level when you let off the stick. When D is turned down, it slows the response of the reaction back to level when you let off of the stick. D can also be used to tune out oscillation after movement.

Refresh

Save

Port utilization: D: 0% U: 0%

Packet error: 1

I2C error: 0

Cycle Time: 3487

0.68.3

Typically, if the stock values don't work or allow you to fly, then you have got some other issues going on that you should look into adjusting. The Naze32 works by looking at many factors, sensor inputs, user inputs, and all of these factors are calculated and a motor output is "written". This happens over and over again at a high rate of speed. (loop-time) The PID gains adjust this calculation and tuning the PIDS is essential to really dialing in your quad. Every quad is different, and all require slightly different settings. Also, every pilot's opinion of how a quad should fly is also different. Be sure to consider this when tuning, it is subjective and there are many different ways to do it.

PID tuning videos on YouTube, and Google searches should help you get your quad dialed in. Please discuss at quadquestions.com



Naze32 rev6 manual v1.2 .COM

01:59:15 -- Serial port successfully closed
 02:25:55 -- Serial port successfully opened with ID: 22
 02:25:57 -- Unique device ID received - 0x66dff515650877067043228
 02:25:58 -- Running firmware released on: Aug 27 2015

RECEIVER TAB

Setup Configuration PID Receiver Mode Selection Servos GPS Motor Testing Sensor Data Logging Backups CLI

1 Profile
 0.50 Throttle MID
 0.00 Throttle Expo
 0.90 RC Rate
 0.65 RC EXpo
 AETR1234 Channel Map
 Disabled RSSI on AUX

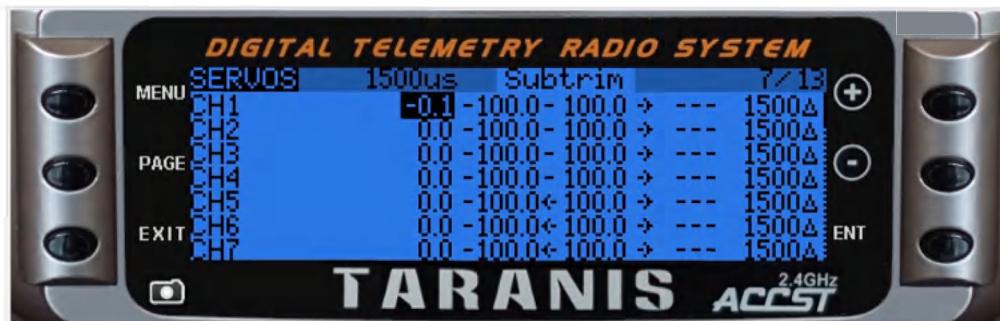
Roll	1500
Pitch	1500
Yaw	1500
Throttle	1500
AUX 1	1500
AUX 2	1500
AUX 3	1500
AUX 4	1500

Channel Map- AETR1234 stands for the 8 channel inputs 12345678 so that means that AETR1234 has ailerons on channel 1, elevator on channel 2, and so on. This is important because many stock radio mixes differ from one another. The Taranis X9D plus for example has a channel output of AETR but others are TAER which has throttle on channel 1

It is very important to set your radio servos so that they idle at 1000, center at 1500 and max at 2000. The trims on the radio should remain centered when setting these up. On the Taranis, this is done on the Servos tab

Mapping your tx outputs to channels should be done in the mixer in your radio, so if you want to have a specific switch control aux 1, you would have to set this up in your radio.

50 ms



Refresh Save

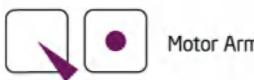
You should set your radio up with no expo and then let the flight controller software setup your expo and rates for you. This is handy because it allows you to have different expos and rates setup on different profiles, so you could for instance have one profile setup for filming, which has smooth expo, rates, pids, etc, and then have an acrobatic profile that is aggressive, and then have a racing profile with another set of settings.

To make sure your servos aren't reversed, you should see these values when moving your sticks:
 pitch up (right stick up)=2000
 Roll Right(right stick right)=2000
 throttle full=2000
 yaw right=2000



Profile: 1	AUX 1			AUX 2			AUX 3			AUX 4		
Name	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH
ARM	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
ANGLE	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
HORIZON	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
BARO	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
VARIO	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
MAG	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HEADFREE	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
HEADADJ	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CAMSTAB	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
GPS HOME	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
GPS HOLD	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
BEEPER	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CALIB	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
OSD SW	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Arm- if not set to a switch, arming will happen with the left stick down and to the right.
If the arm switch is set, arming via stick command is disabled.



Flight modes:

Angle=autolevel- the quad levels when stick is neutral

.

Horizon=autolevel plus Acro mode at edges of stick movements, so hard right would cause flips, centering stick causes autolevel.

no angle or horizon selected=gyro rate.

*Many people have problems when first starting out because they don't select level mode.

Baro=alt hold

vario=vario sent via telemetry

Mag=heading hold

Headfree (Full board only)- orients the quad to the user so no matter which direction the quad is facing, pitch forward is always away from you and pitch back is always towards you. This works in conjunction with HEADADJ which allows you to set the new yaw origin.

Camstab=Camera Stabilization (works if gimbal is enabled)

GPS HOME= GPS return to home (use at your own risk)

GPS HOLD= GPS hold

Beeper= Sounds buzzer when activated

Calib- Write in flight level calib to eeprom

OSDSW- Turn off OSD (if using minimosd)

When setting the modes, a check box sets the mode to a switch. So, a typical flight mode selection switch, with low being angle mode, mid being horizon and high being rate mode would look something like this:

Profile: 1	AUX 1		
Name	LOW	MED	HIGH
ARM	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
ANGLE	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HORIZON	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
BARO	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
VARIO	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
MAG	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HEADFREE	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HEADADJ	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CAMSTAB	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CALIB	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
OSD SW	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



22:57:53 -- Unique device ID received - 0x667ff515650877067051425
 22:57:53 -- Running firmware released on: Aug 27 2015
 22:58:33 -- Backup saved successfully
 22:58:57 -- Backup saved successfully

Setup Configuration PID Receiver Mode Selection Servos GPS Motor Testing Sensor Data Logging Backups CLI

Profile: 1	AUX 1			AUX 2			AUX 3			AUX 4		
Name	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH
ARM	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ANGLE	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HORIZON	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
BARO	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
MAG	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
HEADFREE	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
HEADADJ	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
BEEPER	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
OSD SW	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Save

Port utilization: D: 4% U: 1% | Packet error: 0 | I2C error: 0 | Cycle Time: 1202 | 0.68.2

A typical switch setup, arm on switch 1, alt hold and heading hold on switch 2, flight modes on 3, and heading hold again /OSDsw on switch 4.

You can see that all switches are in the mid position, so this quad is flying horizon with altitude hold and heading hold active.



03:27:25 -- Serial port successfully closed
 03:39:06 -- Serial port successfully opened with ID: 34
 03:39:09 -- Unique device ID received - 0x66dff515650877067043228
 03:39:09 -- Running firmware released on: Aug 27 2015

SERVOS TAB

Setup Configuration PID Receiver Mode Selection Servos GPS Motor Testing Sensor Data Logging Backups CLI

Model: Gimbal / Tilt Servos

Servo 0

Min	Max	Middle	Rate (%)
1020	2000	1500	30

Direction of movement

	Roll	Pitch	Yaw	Throttle	AUX 1	AUX 2	AUX 3	AUX 4
Reverse	<input type="checkbox"/>							

Servo 1

Min	Max	Middle	Rate (%)
1020	2000	1500	30

Direction of movement

	Roll	Pitch	Yaw	Throttle	AUX 1	AUX 2	AUX 3	AUX 4
Reverse	<input type="checkbox"/>							

Enable Live Mode:

Save

Servos- lets you set your servo movement. You can set it to the throw of your sticks depending on your check-box, so if aux 1 is checked, you can set the servo to follow the switch when camstab is not enabled.

To reverse the movements, set the rate % to a negative value.

This screen will not be available if Gimbal is not enabled.



GPS

Port utilization: D: 3% U: 1% | Packet error: 1 | I2C error: 0 | Cycle Time: 3544

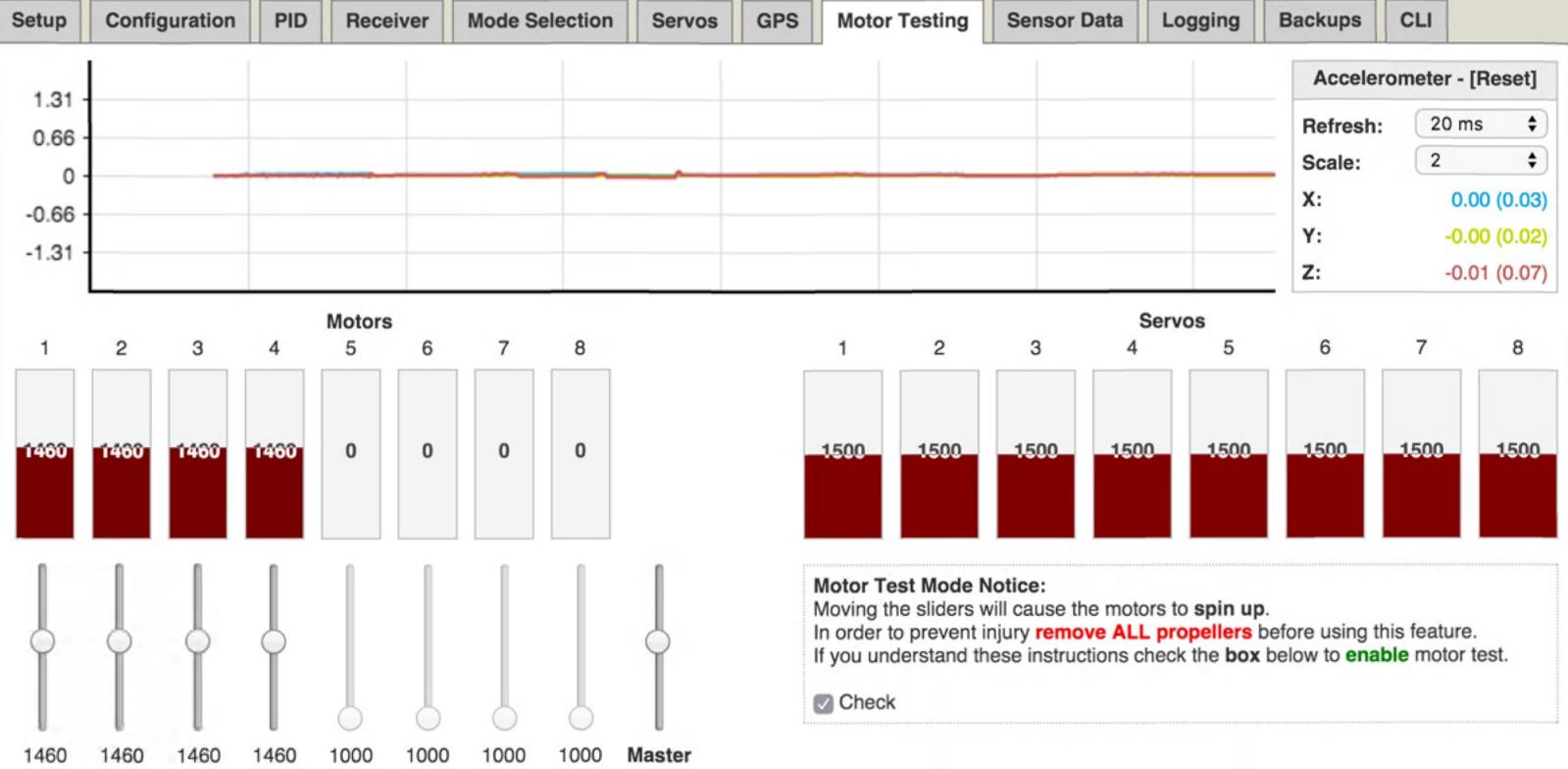
0.68.3

This page can help you to view and troubleshoot your gps if installed. If the GPS is hooked up but the GPS box on the top right of Baseflight is red, try swapping your TX and Rx lines.



MOTOR TESTING

03:47:14 -- You need to connect before you can view any of the tabs
 03:51:01 -- Serial port successfully opened with ID: 37
 03:51:01 -- Unique device ID received - 0x66dff515650877067043228
 03:51:01 -- Running firmware released on: Aug 27 2015



**WARNING-NOT REMOVING YOUR PROPS WILL
 RESULT IN INJURY OR DEATH WHEN USING
 THIS PAGE- YOU HAVE BEEN WARNED.**

Port utilization: D: 8% U: 2% | Packet error: 1 | I2C error: 0 | Cycle Time: 3514

Use This page to test your motors. Make sure to remove your props. This is the first place you should go to test your motor rotation. This is also a good place to visually inspect what your motors and servos are outputting. The motor value will take into account your mixing, so if the quad is not level, and in angle mode, these values might not all be the same. You can use the sliders to spin motors individually, or you can use the master slider to spin all of the motors at once.



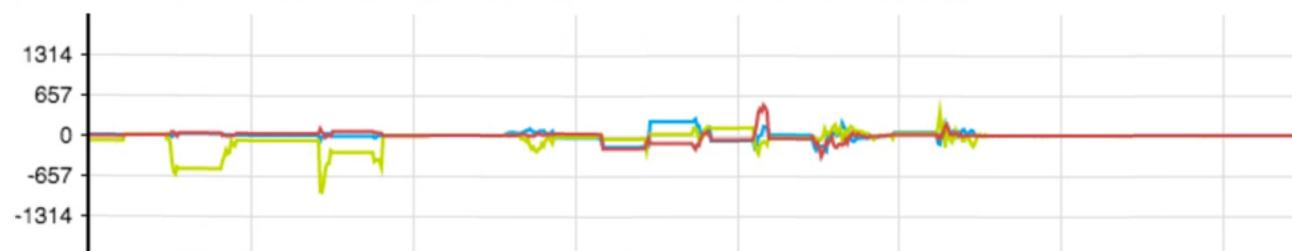
Quad
Questions
Naze32 rev6 manual v1.2 .COM

RAW SENSOR DATA

Setup Configuration PID Receiver Mode Selection Servos GPS Motor Testing Sensor Data Logging Backups CLI

Keep in mind that using fast update periods and rendering multiple graphs at the same time is resource intensive. We recommend to only render graphs for data that you are interested in while using reasonable update periods.

Gyroscope Accelerometer Magnetometer Barometer Kinematics Debug



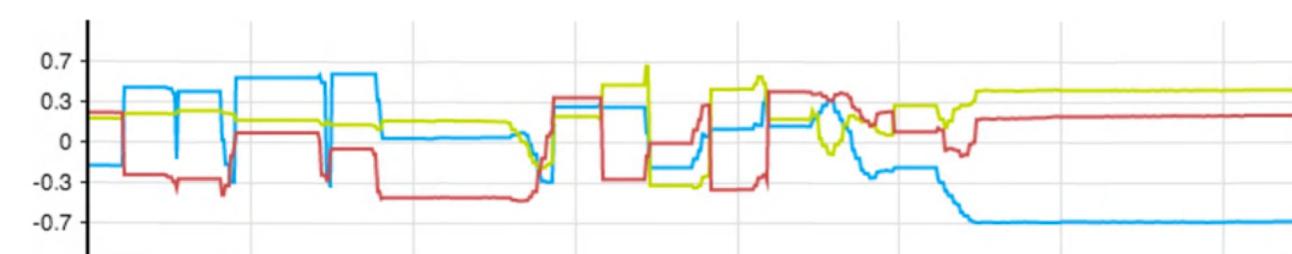
Gyroscope - deg/s

Refresh: 40 ms
Scale: 2000
X: -0.24
Y: -4.88
Z: 0.49



Accelerometer - g

Refresh: 100 ms
Scale: 1
X: 0.53
Y: 0.05
Z: -0.92



Magnetometer - Ga

Refresh: 50 ms
Scale: 1
X: -0.65
Y: 0.42
Z: 0.22



Barometer - meters

Refresh: 100 ms
X: 0.05

You should use the raw sensor data page to check your sensors. When moving the board, you should see movement on the accelerometer, gyro, magnetometer, barometer, etc.

If you have an item that is flat-lined at 0, even with lots of movement of the board, then that is indicative of an issue with the sensor. You can see in the above example that there was rapid movement of the board showing that the sensors were working, followed by the board sitting still which is shown by the flat lines.

QUAD
QUESTIONS
Naze32 rev6 manual v1.2 .COM

04:23:49 -- You need to **connect** before you can view any of the tabs
 04:23:58 -- Serial port **successfully** opened with ID: 11
 04:23:59 -- Unique device ID **received** - 0x66cff505650877067201939
 04:23:59 -- Running firmware released on: Aug 27 2015

Setup Configuration PID Receiver Mode Selection Servos GPS Motor Testing Sensor Data Logging Backups CLI

Data will be logged in this tab **only**, leaving the tab will **cancel** logging and application will return to its normal "configurator" state.
 You are free to select the global update period, data will be written into the log file every 1 second for performance reasons.

MSP_RAW_IMU 9 columns (accel[x, y, z], gyro[x, y, z], mag[x, y, z])
 MSP_ATTITUDE 3 columns (x, y, z)
 MSP_ALTITUDE one column
 MSP_RAW_GPS 7 columns
 MSP_ANALOG 4 columns
 MSP_RC 8 columns by default
 MSP_MOTOR 8 columns by default
 MSP_DEBUG 4 columns

100 ms ▾

Samples Saved: 0
 Log Size: 0 Bytes

Logging tab- useful for logging in Baseflight when your aircraft is connected to computer via blue tooth

Select Log File Start Logging

Port utilization: D: 0% U: 0% | Packet error: 2 | I2C error: 0 | Cycle Time: 3502 | 0.68.3



04:27:21 -- Serial port successfully closed
 04:27:24 -- Serial port successfully opened with ID: 12
 04:27:25 -- Unique device ID received - 0x66cff505650877067201939
 04:27:25 -- Running firmware released on: Aug 27 2015

BACKIJPS

Setup Configuration PID Receiver Mode Selection Servos GPS Motor Testing Sensor Data Logging Backups CLI

Backup & Restore manager can save your configuration to a file or inside application storage (backups are saved locally). Manager also comes with improved back-end which can perform **partial restore** (between incompatible API versions). You can select any of your saved configurations by clicking on them inside the **Stored Backups** area.

You are running firmware with **API Version: 4**

Stored Backups

Name: sparrow kiss 1960 fu
 Date: 2015.10.12 - 22:58
 Version: 4

Backups can be stored and reopened here. Self explanatory and a great tool if you work with many different setups.

Restore [From File]

Backup [To File]

Backup [To Storage]

Port utilization: D: 0% U: 0% | Packet error: 2 | I2C error: 0 | Cycle Time: 3503 |

0.68.3



04:30:21 -- You need to **connect** before you can view any of the tabs
 04:30:22 -- Serial port successfully opened with ID: 13
 04:30:22 -- Unique device ID **received** - 0x66cff505650877067201939
 04:30:22 -- Running firmware released on: **Aug 27 2015**

THE CLI

Setup **Configuration** **PID** **Receiver** **Mode Selection** **Servos** **GPS** **Motor Testing** **Sensor Data** **Logging** **Backups** **CLI**

Note: Leaving CLI tab or pressing Disconnect will **automatically** send "exit" to the board, which will make the controller save all the changes and **restart**.

Entering CLI Mode, type 'exit' to return, or 'help'

```
# dump
Afro32 CLI version 2.3 Aug 27 2015 / 12:37:56Current Config: Copy everything below here...
aux 0 0
aux 1 0
aux 2 0
aux 3 0
aux 4 0
aux 5 0
aux 6 0
aux 7 0
aux 8 0
aux 9 0
aux 10 0
aux 11 0
aux 12 0
aux 13 0
aux 14 0
aux 15 0
aux 16 0
aux 17 0
aux 18 0
aux 19 0
aux 20 0
aux 21 0
aux 22 0
aux 23 0
mixer QUADX
servo 1 1020 1500 2000 30
servo 2 1020 1500 2000 30
servo 3 1020 1500 2000 100
servo 4 1020 1500 2000 100
servo 5 1020 1500 2000 100
servo 6 1020 1500 2000 100
servo 7 1020 1500 2000 100
servo 8 1020 1500 2000 100
feature -PPM
feature -VBAT
feature -INFLIGHT ACC CAL
```

Write your command here

Port utilization: D: 0% U: 0% | Packet error: 2 | I2C error: 0 | Cycle Time: 3498

0.68

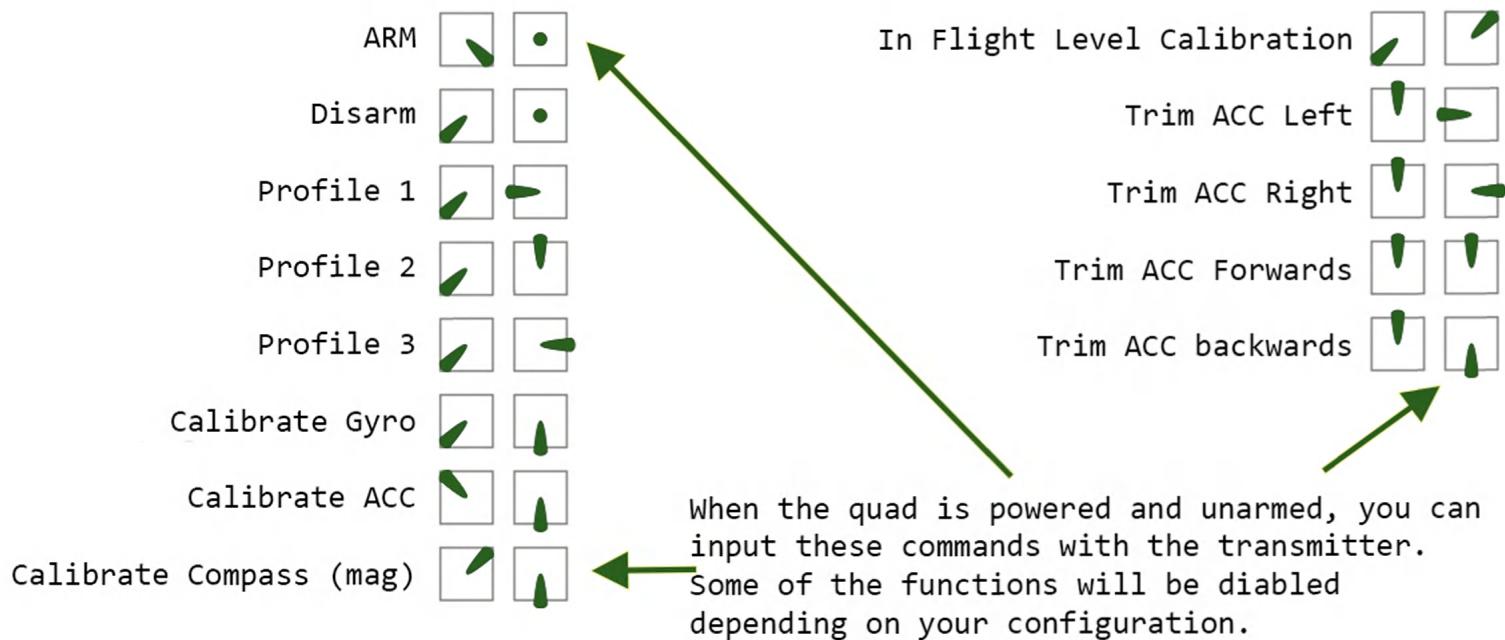
The CLI is an excellent tool for power users, you can quickly load settings, and configure the quad for your needs. When working with support, you can go to the CLI, type "dump" and the copy and paste all of your settings into an email- this is also a handy way to take notes of your setup. We recommend that you get familiar with the CLI and do some searches for Multiwii CLI commands to find out all of the neat things that you can do.



Naze32 STICK COMMANDS

Stick commands can be used to initiate actions without the need of a computer, these actions include things like Calibrate Accelerometer, Change profiles, Calibrate mag and more. In order to use stick commands, the quad must be powered and un-armed.

Mode 2 Stick Functions



The autolevel mode requires a well calibrated Acc. If it is not calibrated, the quad will drift when it is hovering. You should trim the ACC to make up for the drift and leave your transmitter trims center. To trim the quad, hover 2-3 feet off of the ground and then center your sticks (use throttle to maintain altitude) if the quad is drifting right, land, then disarm, then use this stick command.

You will need to hold the stick command and watch the lights on the Naze32. You will have to watch the lights flash several times before there is any noticeable change in the ACC trim. We usually go about 5 flashes, then arm and test again. Repeat as needed.

Do not move the Naze32 when first plugging it in and during the first few seconds of power up. The GYRO must be idle or the initial calibration will be off. You can watch the lights on the board during power up, they will flash when the initial measurements are taken and then they will turn solid when the board is ready to arm.

**QUAD
QUESTIONS**
Naze32 rev6 manual v1.2 .COM

CLI COMMANDS:

CLI commands can be found here:

<https://github.com/multiwii/baseflight/wiki/CLI-Variables>

ESC CALIBRATION

The Rev6 hardware is sharing the 5v power from the USB connection and allowing the ESCs to power up as soon as USB is connected. Please be very careful as this can lead to a motor spinning at full speed when the flight battery is connected if you use the old method of calibration. The following workaround will allow you to calibrate ESCs properly and safely. Please note that the flight battery is never connected during this procedure.

- 1 disconnect all ESCs from the flight control board
- 2 props off, flight control board plugged into computer, configurator open, flight battery not connected
- 3 on the configuration tab, set minimum command to 1050 and save
- 4 go to motors tab, check motor test mode box at bottom, raise master slider to full
- 5 plug just one ESC into any of the motor outputs 1-4, wait a few seconds for ESC beeps to finish
- 6 un-check motor test mode box - values should drop back down to 1050
- 7 wait a few seconds for beeps to finish, unplug ESC from control board
- 8 repeat steps 4-7 for the remaining ESCs
- 9 on the configuration tab, set minimum command back to 1000 and save.

FINAL CAVEATS

This hobby is in its infancy and it is supported and developed by a community of open source contributors and innovators that are designing the hardware that goes along with it. PLEASE PURCHASE OFFICIAL HARDWARE--- There is rampant copying going on right now and the innovation that has made our great hobby what it is will be lost if the pioneers cannot innovate anymore, so boycott copied hardware, and please contribute to these projects to help the technology continue to develop. If you have any questions, please go to Quadquestions.com and post a question. We are happy to answer, and will be quick to respond.

Have fun flying!

Anthony & team
QuadQuestions.com
412-229-QUAD

