Turbo Ace MATRIX

Quadcopter User Manual

V11

Table of Contents

INTRODUCTION

1.1 Welcome to the World of Quadcopters

The MATRIX is spawning a new era in super quadcopter design. Its larger & powerful motors, propellers and batteries offer up to three times the flight time and payload of a traditional quad. The extra payload and flight time allow you to carry a variety of cameras to produce unmatched cinematic quality video. Sporty low-profile architecture, its triple carbon fiber deck supports an extra wide 1000mm wingspan that folds down to fit inside an optional aluminum carrying case (no dismounting and remounting of propellers, landing skids or gimbal required). The MATRIX's ideally positioned camera mount on the nose offers wide angle views unobstructed by propeller shadows, reflections and landing skids. Its well-balanced center of gravity, with battery and gimbal position flexibility, greatly reduces swinging and improves the video quality of the traditional under-mounted battery/gimbal design.

Quadcopters are loosely classified into several categories - from toys for amusement to complex units for professional video, science & research. Now, a new class of quadcopter is emerging for commercial applications. The Turbo Ace MATRIX is the clear leader in this group with a list of outstanding features: advanced PC interface (so you can update or customize the flight controller), cutting edge auto-stabilizing mode for videographers, anti-vibration mounts, dynamically balanced motors for high definition video production, and a host of other upgrades to improve reliability. Unlike most quadcopters, the MATRIX is fully assembled and tested in the USA for outdoor flight and it is ready to produce high quality video right out of the box. If you are starting from scratch, the MATRIX RTF package even includes a paired transmitter that is fully programmed and calibrated. If you already have a transmitter, all you need is an ARF package. For additional cross-training, you can choose from our optional professional Phoenix flight simulator, an easy-to-fly helicopter, and/or a mini Walkera QR X350 quad. As with all Wow Hobbies' featured RC helicopters, MATRIX parts, upgrades and accessories are fully supported online and locally in the USA.

1.2 Important Instructions

* **Read the entire Matrix Instruction Manual** on your included USB flash drive before you operate the Matrix.

* Follow the instruction manual for a **tied down flight test on a bench**. This is the safest way to make sure the Matrix quadcopter has not been damaged during shipping.
* Foldable Matrix aluminum arms operate on guiding carbon tracks with keyed circular locks on each end. To release the arm from the folded or operating ends of the track**, please unscrew the arm bolt counter-clockwise for a height of 1/8" before the lock will release**. If the bolt is not unscrewed to a sufficient height, you may risk scratching the carbon track.
* Prior to each takeoff, make sure the GPS antenna/compass is erected from the folded position and screwed down.
* When mounting a propeller, use loctite and make sure the propeller clamp sits flat against the top of the propeller. Even new propellers may need to be balanced if vibration shows on video. Use a blade balancer with heavy gauge tape adhered to the underside of the blade for balance. In bright sunlight, the GoPro 3 may show rolling shutter jello. Use ND8 filter if necessary to slow down its shutter speed.
* Battery must be positioned by moving it backward and forward until the front and back weights are balanced from the center point of the Naza flight controller. You can lift the matrix up with a finger on each side of the matrix to check the balance (see manual for details). The battery can be placed either on top or bottom of the Matrix.
* Camera must be balanced like a seesaw on a brushless gimbal, otherwise the gimbal motors will be stressed and vibrate.

Maintaining the Matrix's LiPo Batteries

* Matrix batteries are made up of 6 cells and each cell must be maintained between 3.7V to 4.2V. The total voltage for Matrix batteries should be maintained between 22.2V (3.7Vx6) and 25.2V (4.2Vx6) without load. It's very important to **keep each cell above 3.7V**. A cell is at risk of being damaged or life shortened at 3.67V per cell without load.
* Each Matrix battery includes a yellow charging/discharging plug and a white balancing plug. Both plugs must be plugged in to charge the battery. The yellow plug with thicker gauge wires enables a faster charge rate, while the white plug with 1 small red wire and 6 small black wires enables the charger to balance charge 6 individual cells. When all 6 cells reach approximately 4.2V each for a total of 25.2V, the charger will automatically stop.
*** A battery meter is one of the easiest way to monitor voltage for any LiPo battery.** There are seven pins on the battery meter. One of the pins is marked with a "-" symbol, which should line up with the black wire of the battery's white balancing plug. The first number displayed is the total voltage of the battery, followed by each individual cell.

Before & After Each Flight

* Attitude mode is the most reliable way to fly for experienced pilots, as it is not susceptible to GPS interference. GPS mode is commonly used by beginners, but once more experience is acquired, attitude mode is highly recommended (you can still use GPS mode as a backup). When orientation is lost, do not panic. Just flip to GPS mode and let go of the cyclic stick, and GPS will take over. Do not to attempt to recover the craft with the cyclic stick. There is a certain time of the year in which solar flare may interfere with GPS. To recover the craft in such a case, switch to manual (not attitude) mode. Please be aware that if the Matrix has passed through airport X-ray screening, near a magnet or has been relocated more than 30 miles from where it was originally calibrated, the GPS may need to be recalibrated depending on the geographic latitude at which you are located (see manual).
* Before each flight, always turn on the transmitter first, then plug in the Matrix battery. Then, you need to allow enough time for the flight controller and GPS to warm up and initialize. The Naza Lite takes approximately 2 minutes to warm up. The yellow LED light will turn off when the Naza Lite is ready for use.
*** After each flight, always unplug the Matrix battery** first, then turn off the transmitter. If you forget, the quadcopter and/or transmitter will continue to drain power and the battery will be damaged.

Dos

* Do initialize the Matrix & takeoff from a large, leveled surface.
* Do implement a pre-flight checklist & use it consistently before takeoff.
* Do unplug the Matrix battery when maintaining or upgrading the quadcopter.
* Do dismount propellers if battery is plugged in while updating the flight controller.

Don’ts

* Don’t operate near people or pets & do not allow people to approach an operating quadcopter.

* Don’t use magnets (e.g. magnetized screwdrivers & tools) in close proximity to the GPS antenna/compass.

* Don’t attempt to catch a quadcopter.

1.3 Quick Start

The MATRIX has a convenient foldable arm / landing skid design. When you first remove it from the box, please make sure that the GPS antenna (See diagram 2.5) is

erected and properly tightened by turning the top locking cylinder in a clock-wise direction. Next, loosen the arm screws located on top of the folding track. These screws are keyed so they must be loosened and raised by about 1/8 of an inch in order for the arms to fold, unfold the arms, and tighten them back in a clock-wise manner. Make sure the round key located on the bottom of the screw is securely locked into the circular key on the track. When it is properly locked in, it will prevent the arms from accidentally folding during flight. Next, if you wish to fold the landing skid, you may loosen the 2 side screws on each of the 4 legs. Pull the leg down to lengthen it. Tighten the 2 screws back on each of the landing skid legs. Refer to section 5 TESTING & OPERATIONS (Please DO NOT install the propellers during the testing procedure). Attach the battery to either on top or bottom of the Matrix. Lift the Matrix up with one finger on each side from the center of Naza flight controller. Move the battery until the Matrix is leveled like a see-saw with equal weight on both sides. See Figure 3.4.4. It is important to note that the Matrix will not fly properly and may lose control and crash if the center of gravity is not balanced at the middle of the Naza flight control. Turn on the transmitter and within 2 seconds plug in the MATRIX battery to bind. If your unit comes with DJI NAZA, please observe the blinking yellow LED light located behind the quad, which indicates the controller is in warm up stage. Wait for about 2 minutes until the yellow light stops flashing. Please check the LED light description at section 5.3 and 5.4. Attitude mode is the most reliable way to fly for intermediate to advance level pilots as all GPS is susceptible to interference and sun spots activities. However, GPS remains to be the easiest and the safest way to fly for beginners. Select the attitude mode from your transmitter, if you are a trained pilot and use the GPS mode as a backup. Move both sticks of the transmitter together in one action down to the lower right or left corner to start the motors. Release right stick and immediately give the left stick about 10% throttles so the motors will not cease. It will not lift off until the throttle stick passes 50%. Have an experienced pilot test fly it on a bench while tied down. No defective claim is allowed if the unit is crashed, so please be very careful.

1.4 Features

- Extra wide 15-inch propellers for optimum flight time
- High payload
- High efficiency voltage with 6 cells Li-Po battery
- Unobstructed front positioned camera mount
- Center of gravity rolling camera compensation
- Quick foldable design for easy portability

- Advanced Multi-Counter-Rotating Rotor System designed for outstanding stability & performance
- Intelligent Programmable Flight Controller
- Built-in Altitude Hold when throttle stick is released at 50% Throttle
- Flight Controller with PC software interface
- Dual Flight Mode: Sport Flying Mode & Auto Leveling Aerial Video Mode
- Advanced Gyro with 6-DOF Motion & MEMS Sensor Technology
- Full Compatibility with Standard 2.4GHz Systems
- 4 Dynamically Balanced C4234 Brushless Motors with outstanding power and minimal vibration
- 4 Independent 40A ESCs for Outstanding Performance, Reliability & Ease of Maintenance
- Square Anti-Twist Mount Impact-Resistant Propellers with low noise operation
- High Payload suited for professional camera & video equipment
- Optional Single Axis Quadruple Anti-Shock Camera Mount (available)
- Optional High Capacity 8000mAh Batteries for extended flight (available)
- Optional FPV Integration (available)
- Optional Sports Mode for faster flight capability

1.5 Specifications

Three models: MATRIX Lite, MATRIX Silver, and MATRIX Black

- Dimensions including propellers: 1000 mm × 392 mm × 135 mm
- Motor: 4 x 42mm Outrunner Brushless Motors
- ESC: 4 x 40A Electronic Speed Controllers
- Propellers: 2 x CW and 2 x CCW, 15 inches carbon
- Receiver & Transmitter Requirements: 2.4GHz 6 to 14 Channel RX/TX Pair
- Standard Battery: LiPo 6S (22.2v) 5300mAh 20C 1P. Flight time 15 min
- Optional Battery: LiPo 6S (22.2v) 8000mAh 20C 1P. Flight time 25 min
- Weight Without Battery & Camera mount:3.5 lbs
- Maximum Payload: 3.5 lbs. For proper operation and stability please limit the payload to 2.5 lbs.
- Wind Tolerance: Class 5

1.6 Flight Controller Specifications

Supported Multi-rotor	Quad-rotor I4, X4 / Hex-rotor I6, X6, IY6, Y6
Supported ESC output	400Hz refresh frequency
Recommended Transmitter	PCM or 2.4GHz with a minimum of 4 channels

Working Voltage Range	MC:4.8V~5.5V VU: 7.2V ~ 26.0 V (recommend 2S ~ 6S LiPo)
Power Consumption	MAX1. 5W (0.3A@5V) Normal:0.6W (0.12A@5V)
Operating Temperature	-10°C ~ 50°C
Assistant Software System Requirement	Windows XP sp3 / Windows 7
Max Yaw Angular Velocity	200°/s
Max Tilt Angle	45°
Ascent / Descent	±6m/s
Weight	MC:25g VU:20g GPS:21.3g
Dimensions	MC: 45.5mm x 31.5mm x 18.5mm VU: 32.2mm x 21.1mm x 7.7mm GPS & Compass 46mm(diameter)x9mm
Built-In Functions	Three Modes Autopilot Enhanced Fail-safe Low Voltage Protection S-Bus Receiver Support 2-axle Gimbal Support

1.7 Packing List

- USB 8GB Flash Drive with test flight video, application software and the MATRIX User Manual
- 1 x Turbo Ace MATRIX Quad Flyer (3 x Body Plates – Top Cover, Middle, Bottom, 4 x Motors, 4 x ESC, Flight Controller)
- 2 x CCW Propellers (1555 Type) & 2 x CW Propellers (1555R Type)
- Programming USB-to-Micro USB Cable to link to your PC
- 2 x Velcro Battery Strap (on Matrix) 1 x Velcro Battery Strap
- Batteries: Included with RTF Package but not included with ARF Package
- Receiver: Included with RTF Package but optional on ARF Package

1.8 Caution & Safety

- As the operator of the Turbo Ace MATRIX, it is your responsibility to follow all proper procedures, protocols and precautions to ensure the safe operation of the MATRIX. **The operator must wear safety glasses and any bystanders must be protected in a safe area. Do not operate the MATRIX in the proximity of**

children, pets, cars and other vulnerable property. The owner and the operator of the MATRIX assumes all liability for any damages caused in the operation of the MATRIX, including but not limited to personal injury, equipment and property damage.

- If your package includes a transmitter radio, **do not pull on the transmitter's antenna when removing it from the foam packaging tray.** Remove the transmitter by pulling on the neck strap holder.
- Since the MATRIX propellers are dismounted for shipping purposes, you must first follow the setup instructions in this user manual to mount the propellers. Any attempt to skip procedures will end in a bad crash.
- **Do not be tempted to fly a new and large RC aircraft, such as the MATRIX, out of the box, especially after shipping. Prior to its maiden flight, please tie the MATRIX down to a stationary workbench for 3 battery test flights.** Any crashed aircraft is not eligible for dead-on-arrival or any other defective equipment claims. If you are new to RC equipment, please seek the help of an experienced RC equipment operator to prevent damage and injury.
- **If you have purchased a MATRIX ARF package, you must first program the end points of each ESC then calibrate your transmitter to the MATRIX (See Section 4.2). If you are using your own transmitter you must reprogram each ESC independently. (See Section 4.1).** Any attempt to fly without proper transmitter calibration and ESC programming will result in a crash and it will invalidate any DOA claim. If you have purchased an RTF (ready-to-fly) unit with transmitter, please ignore these steps.
- Additional Velcro should be added on the flight battery to prevent the battery sliding from side to side.
- **Operator must tie down MATRIX and remove all propellers when it is hooked up to a computer.** Any incorrect settings or values may trigger an accidental motor startup. Turbo Ace, its distributors and dealers are not liable for any damages caused by mishandling of the MATRIX and its associated equipment.
- **Operator should use Loctite to secure all necessary screws on the MATRIX, excluding propeller locking screws.** Blue Loctite can be applied directly to the screw and should not come in contact with any plastic propellers or parts which will crack during flight. Please do not use red Loctite, as it can only be removed with extreme heat.

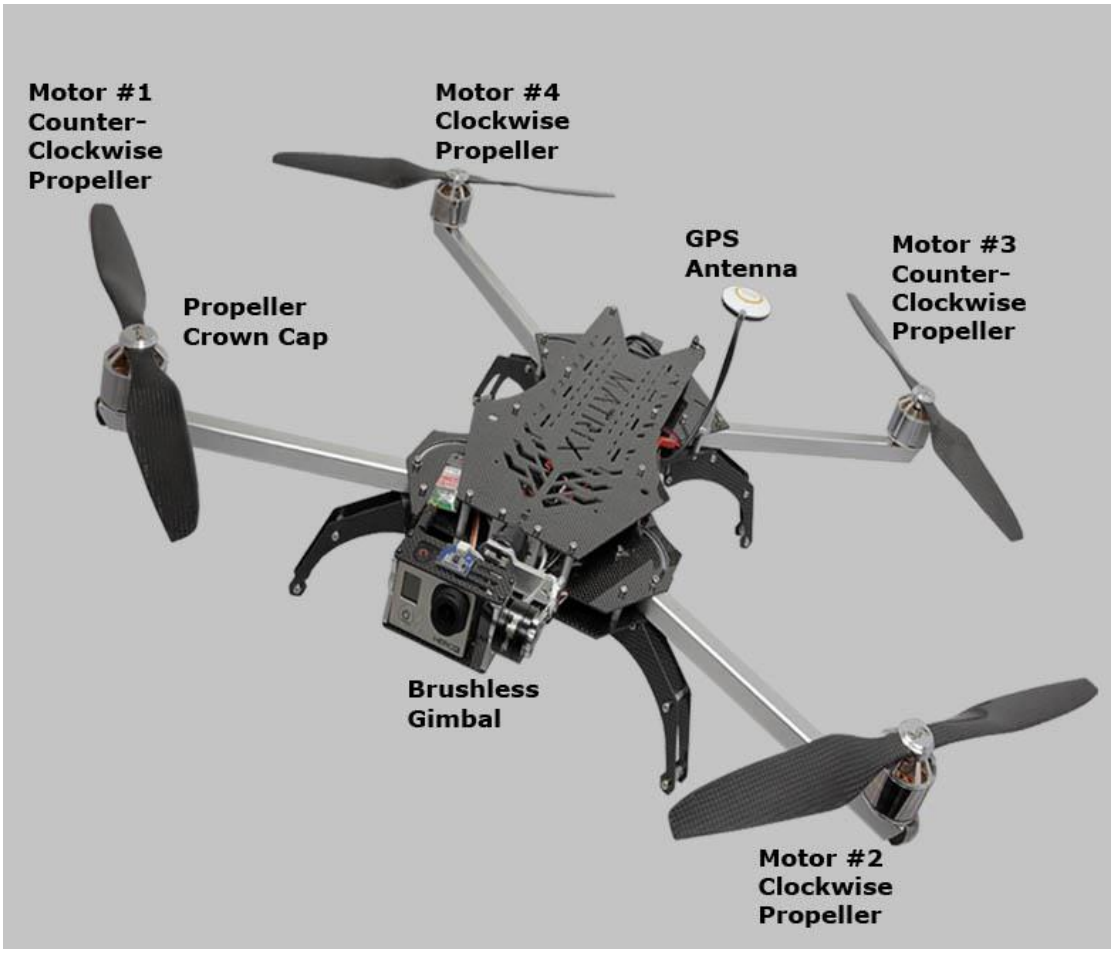
1.9 DOA Claim

Even though the main assembly with attached electronics has been assembled and tested in the USA before it is shipped to you. If your package includes a receiver or transmitter, the whole package will be tested as a complete set. If your order does not include a transmitter, you will be required to program the end points of each ESC and calibrate your transmitter.

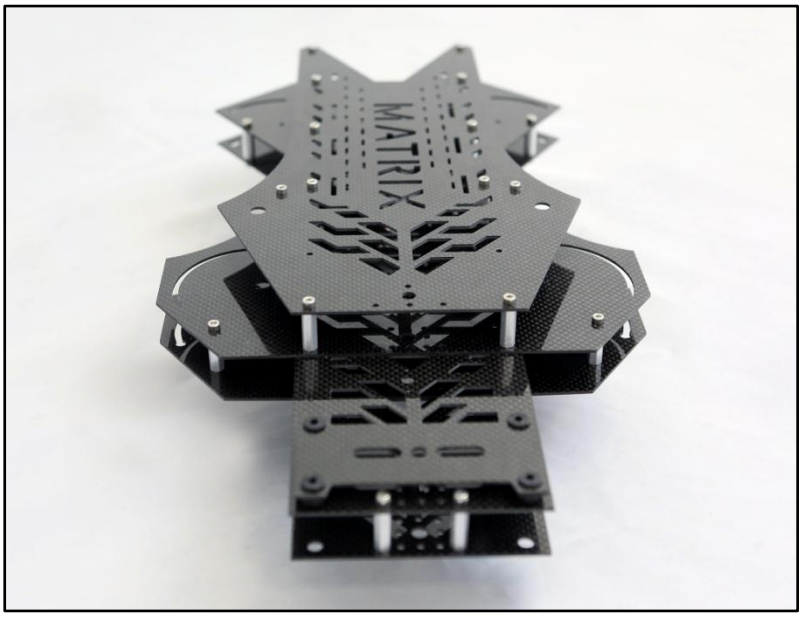
- DOA (Dead-On-Arrival) must be claimed within 24 hours of receipt.
- Do not return any products without authorization. If you need to return a product for service, you will need to acquire a Return Merchandise Authorization (RMA Number) through e-mail (support@wowhobbies.com) or our website. If we don't have a record of your request, your returned product will be rejected.
- No DOA claims can be made when you pick up your MATRIX from our store because it will be test flown live before you take it home.
- No DOA claims can be made once the device has been crashed, including, but not limited to, blades tipping on the ground or any equipment failure after shipping that was not uncovered by skipping the 3 battery test flights with the tie-down bench test.
- There is no warranty, return or exchange on all RC products.

DIAGRAMS AND PARTS

2.1 Top View



2.2 Profile View



2.3 Part Specifications

No.	Part	Specifications	QTY	Units	Remarks
1	Chassis	Carbon Fiber	1	SET	
2	Arm	High Strength Aluminum Tubing	4	PCS	
3	Skid Landing	Carbon Fiber	4	SET	
4	Motor	C4234 400KV Brushless Motor	4	PCS	
5	Propeller	1555 (Normal),1555R (Reverse) 15-inch Carbon Fiber with high fiber & low resin content	4	PCS	
6	Head Hangers	Elastic Damping, Shock Absorber Suspension	1	SET	
7	ESC	6S 40A high-Speed Electronic Controller	4	PCS	
8	Flight Control System	DJI NAZA- LITE / DJI NAZA V2	1	PCS	

2.4 Technical Parameters

Width	Diameter From Outer Edges of Motors	765 mm	±3mm
Extended Width	Diameter From Extended Propellers	1111 mm	
Motors Center to Center	Diameter From Center of Motor to Center of Motor on Opposite Side	724 mm	±3mm
Height	Bottom of Skid Landing to Top of Motor Cover (including GPS Compass)	132 mm (200 mm)	
Propeller	2 x CW & 2 x CCW	381 mm	
Battery	LiPo 6S	22.2V	
Single Weight	No battery, receiver, load	3.3 lbs	±10g
Flight Distance	Limited by Sight & the Receiver/Transmitter		
Flight Time	6S 5300mAh, 1P Battery, receiver	20 minutes	No wind hover
Wind strength	≤5	Class	

2.5 Parts List

MATRIX SETUP

3.1 Unpacking the MATRIX

Remove all MATRIX contents from the box. To avoid damaging the transmitter antenna, do not pull on it to remove the transmitter out of the box. Instead, pull on the neck strap to safely remove the transmitter from the box.

3.2 Skid Landing Leg Assembly

Figure 3.2-1 *Four sets of Skid Landings disassembled*

(1) Please skip this section if your unit comes fully assembled. Take two 15mm 3.0mm posts (Female/Female) and screw on both sides of the skid landing plates on the bottom two holes (as indicated in Figure 3.2-2).
(2) Take one inner skid bracket and screw on both sides of the skid landing plates on the top hole (as indicated in Figure 3.2-2).
(3) Repeat steps 1 – 2 for the remaining three Skid Landings.

Figure 3.2-2 *Four sets of Skid Landings assembled*

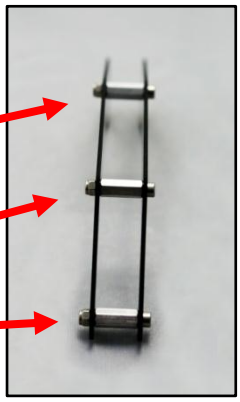


Figure 3.2-3 *One Skid Landing Leg*

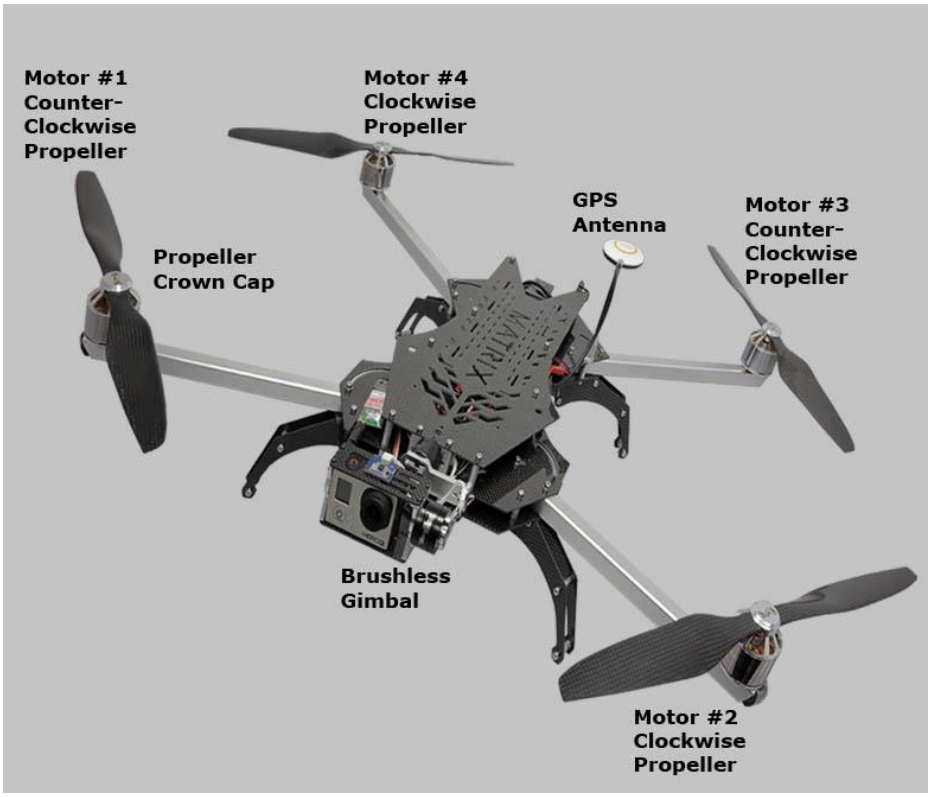
3.3 Mounting Propellers

There are a total of 4 propellers in your package.

(1) Unscrew and remove the propeller screws from the motor and remove the motor cover.

(2) Due to the precision needed to reduce vibration, the propellers are design to fit tightly on the motors. Using the figure below, insert labeled propeller to corresponding motor. Motors #1 & #3 use Counter Clockwise propellers and motors #2 and #4 use Clockwise propellers. Failure to mount the correct propeller(s) on the designated motor will result in a crash.

(3) Over tightening the motor cover screw may damage the motor aluminum threads. Repeat this for all 4 propellers.



3.4 Battery Requirements & Installation

(1) Standard Battery: 6-S LiPo, 22.2V, 5300mAh, 35C, 1P

(2) Optional Extended Flight Battery: 6-S LiPo 22.2V, 8000mAh, 25/50C, 1P

(3) Release the two wide Velcro battery straps on the tail of the MATRIX bottom plate. Make sure a Velcro strip is added to the battery and the body of the Matrix to prevent it from sliding. Secure it with the two wide Velcro battery straps.

(4) Move battery forward/backward until weight is equal from center of the Naza flight controller. You can balancing the Matrix like a see-saw by lifting it up

with fingers on each side of the Naza Flight controller until it is leveled. Your camera, propellers and all devices must be installed before balancing. See diagram 3.4-1

(5) Do not plug in the battery at this time.

Figure 3.4-1 ***Balance at center of gravity***

ELECTRONICS SETUP & ADJUSTMENT for Walkera Devo 10 Transmitter

If you have purchased an RTF package, please skip Section 4.1 through 4.5 because all settings are already complete and your MATRIX and transmitter have been paired and test flown as a set. Unless you are familiar with the settings, any changes might override the factory's setting and disable the aircraft, affecting its performance and flight reliability.

If you have purchased an ARF package, you must complete Section 4.1 ESC Programming and Section 4.2 Transmitter Calibration. MATRIX ESCs needs to reprogram independently. Also, in order for a flight controller to work properly, your specific transmitter has to be calibrated to work with each new MATRIX. Crashes will be imminent if you skip these one-time procedures to match a MATRIX with a transmitter.

4.1 ESC Programming for Transmitter (A Must Setup For ARF)

Video Instruction:
How to calibrate the ESC for MATRIX:
https://www.dropbox.com/s/zcf72jgoeng92c9/How%20to%20calibrate%20the%20ESC.MP4

Please skip this ESC programming step if you have purchased RTF unit, since all ESC have been re-programmed. Please follow the steps below very carefully, as they will only take a few minutes.

(1) Very important: Remove all 4 propellers from the motors for safety.
(2) Double check to make sure all ESC connectors are marked/labeled (#1 through #4 matching the connectors on the flight controller #1 through #4) so that you will be able to keep track of the corresponding connectors when you need to put them back later.
(3) Disconnect all 4 ESC connectors from the NAZA flight controller so they may not interfere with each other's programming.
(4) Move the throttle stick all the way down. Now turn on the transmitter.

(5) Disconnect X3 on NAZA flight controller and plug into AUX1 on the receiver.

(6) Insert one of the labeled ESC connectors into the receiver's throttle channel port while watching for the correct polarity. Black/dark brown wires are usually on the edge of the receiver. Please verify polarity in your receiver manual if you are not using the stock Walkera receiver.

(7) Move the throttle stick all the way up.

(8) Within 3 seconds, connect the battery to the MATRIX's battery plug (The MATRIX battery plug is still connected to all 4 ESCs but only one ESC should be connected to the receiver at a time.)

(9) When the ESC makes 1 beeping sounds, immediately move the throttle stick all the way down. The ESC will then make 2 beeping. (If you did not hear the 1 beeping sounds when entering programming mode or you did not hear 2 beeping after the ESC have completed its programming then you need to move throttle all the way down and disconnect the battery from the MATRIX battery plug and repeat from step #6 to #9 for the ESC.) If you did not experience any problems, then you have completed programming on this ESC which now retains the high and low end point data in its memory. Disconnect the battery from the MATRIX's battery connector then disconnect the ESC connector from the receiver.

(10) Repeat this process for each ESC from Step#6 through Step#9. Please make sure you have programmed all 4 ESCs by starting from the #1 labeled ESC and finishing with #4 labeled ESC. Your transmitter power should remain in the power on position throughout the entire process of programming all 4 ESCs.

(11) After you have successfully re-programmed all 4 ESCs, unplug the battery from the MATRIX battery plug then turn off the transmitter.

(12) Insert the 4 ESC connectors, labeled #1 through #4 back to corresponding M1 through M4 ports on your NAZA flight controller. The black/dark brown wire (-) for each of the ESC connectors are closest to the red NAZA label of the flight controller.

4.2 Transmitter Calibration for Transmitter (Required Setup For ARF)

Video Instruction:
How to set up your transmitter calibration for MATRIX:
https://www.dropbox.com/s/s4vhtkqq1v3r0px/How%20to%20set%20up%20your%20transmitter%20calibration%20for%20X830.MP4
How to set up your autopilot and voltage setting for MATRIX:
https://www.dropbox.com/s/vfaa6tcf8v4qdc2/How%20to%20set%20up%20your%20autopilot%20and%20voltage%20setting%20for%20X830.MP4

If you have purchased your MATRIX with a transmitter (RTF package) please skip this section because we have already completed the calibration. If you are using a transmitter that has never been paired with your new MATRIX, you will need to calibrate your transmitter to the MATRIX flight controller using the following procedure. Any change to the quadcopter or setting change to the transmitter might require transmitter calibration.

(1) **Very important!! Remove all 4 propellers from the motors for safety.**
(2) Tie down your MATRIX
(3) Turn on your transmitter radio.
(4) Connect battery to the MATRIX battery connector.
(5) Connect the provided Programming USB Cable from your PC computer's USB port (XP or WIN7 or WIN8) to the Micro USB port on the MATRIX communication port (on the LED side panel of the MATRIX). (If the computer does not recognize the USB, the USB driver is located in the provided 8GB USB flash drive)
(6) Double click on the NAZAInstaller.exe located in the provided 8GB USB flash drive and install the NAZA ASSISTANT SOFTWARE.
(7) Double click on the application file named NAZA ASSISTANT SOFTWARE. Wait for the program to start up.
(8) Click **MOUNTING** Use to input the distance between GPS and Main Flight Controller.
(9) Click **MOTOR MIXER**
MIXER TYPE: Please select **Quad-rotor X** and remember to click WRITE after you update any settings (WRITE is #7 on top of FIGURE 4.2)
(10) Click **TX CALI**

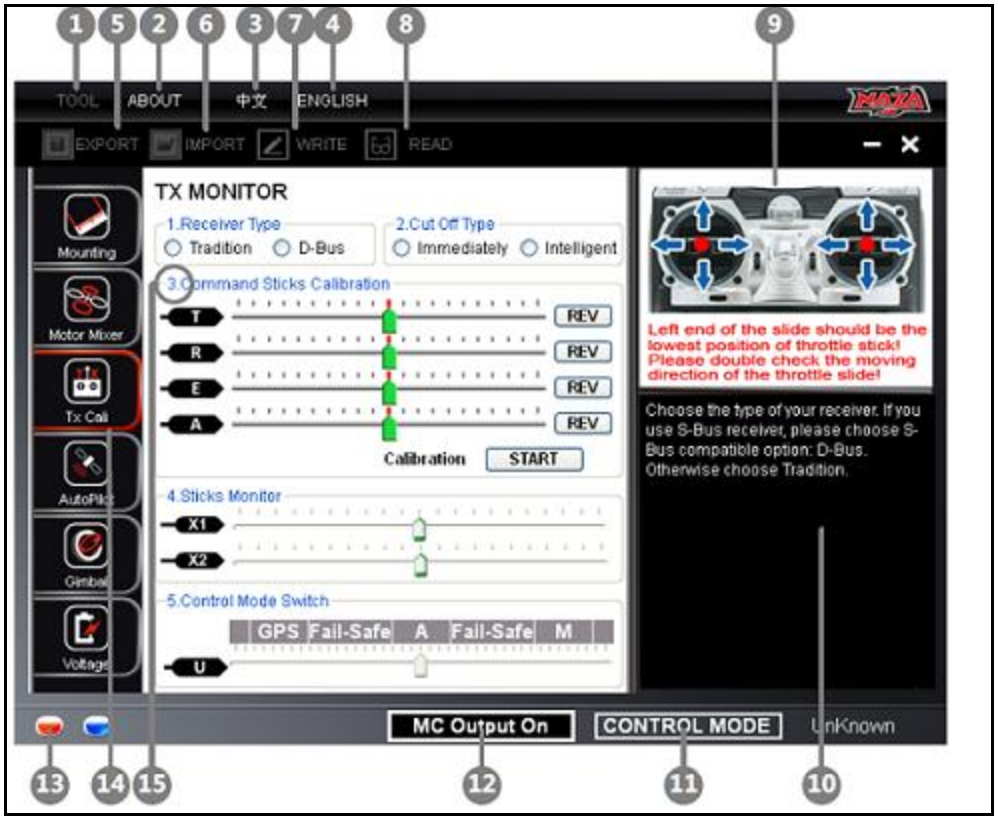


Figure 4.2-1 *NAZA Assistant Software Program Screenshot*

(1) RECEIVER TYPE: Please choose "**TRADITION**" for Walkera or Spektrum or Futaba receiver.

(2) CUT OFF TYPES: Default setting from WOW is "IMMEDIATELY".

(3) COMMAND STICKS CALIBRATION: Click **START** to begin the calibration process. Please make sure to move both sticks to their end points. This means you are moving both sticks all the way up, down, left and right. (Note: If a transmitter stick is moved left or down, one of the on-screen sliders will move to the left. If a transmitter stick is moved right or up, one of the on-screen sliders will move to the right. If slider is moved at the opposite direction, click the NORM or REV to reverse the direction of the slider movement)

- Throttle/Yaw Stick controls "T" (Throttle): Stick down and "T" slides left (reduce Power) & stick up and "T" slides right (increase Power).

- Throttle/Yaw Stick controls "R" (Rudder): Stick left and "R" slides left (nose to the left) & stick right and "R" slides right (nose to the right).

- Directional Stick controls “E” (Elevator): Stick down and “E” slides left (tilts back) & stick up and “E” slides right (tilts forward)

- Directional Stick controls A (Aileron): Stick left and “A” slides left (leans left) & stick right and “A” slides right (leans right).

After Calibration, place all sticks at the center which will turn all sliders green. At this point click **FINISH** to end.

(4) STICKS MONITOR is not used at this time.

(5) CONTROL MODE SWITCH: (Please see Section 4.7 MATRIX Wiring Connection Chart)

Setting the GPS Attitude and Attitude and Manual Mode on the Mix on Walkera Devention Transmitter:

Setting the GPS, Attitude and Manual Mode on the Mix Switch on MATRIX:

(1) The NAZA Assistant screen should show a Control Mode Switch with GPS | Fail Safe | A | Fail Safe | M. (The “GPS” represent the GPS Mode, the “A” represent “Attitude Mode” and the “M” represent “Manual Mode”.) You need a 3 position switch for the Control Mode Switch. For example: When using Devention 10 and RX 1002, the Control Mode Switch is assigned to the MIX SWITCH on the transmitter. This is done by connecting the Receiver’s Gear channel to the Flight Controller’s “U” channel (See FIGURE 4.2). Then press ENT on the Devo 10→Model Menu→Device Output→Gear and select MIX SW by press L or R and make sure Function shows ACTIVE.

(2) Now you need to make sure when the MIX SWITCH is flipped forward (away from you) the switch will change the flight controller to “GPS Mode”. If the Control Mode Switch (See FIGURE 4.2 bottom) slider is closer to “M” or “A”, then the Control Mode Switch slider is in the wrong position. To bring the slider closer to “GPS”, press ENT button on your transmitter→Function Menu→Reverse Switch→Gear and reverse your GEAR SWITCH setting (which is now set to your MIX SWITCH setting) by pressing L or R. This change will bring the Control Mode Switch slider closer to “GPS”.

(3) Move your MIX SWITCH to the middle position to set the midpoints for the middle position first. If the “A” segment turns blue please skip to Step #5.

(4) If the “A” segment does not turn blue, press ENT on your transmitter→Function Menu→Sub Trim→Gear and adjust your GEAR

SWITCH's midpoint by pressing the L or R button until "A" segment turns blue.

(5) Flip the MIX SWITCH forward (away from you). If the "GPS" segment turns blue then skip to Step #7.

(6) If the "GPS" segment does not turn blue, press ENT on your transmitter→Function Menu→ Travel Adjust→Gear. Use the UP/DN button to select -100.0% and adjust your GEAR SWITCH's endpoint by pressing the L or R button until "GPS" segment turns blue.

(7) Flip the MIX SWITCH backward (towards you). If the "M" segment turns blue then skip to Section 4.2.11.

(8) If the "M" segment does not turn blue, press ENT on your transmitter→Function Menu→ Travel Adjust→Gear. Use the UP/DN button to select +100.0% and adjust your GEAR SWITCH's endpoint by pressing the L or R button until "M" segment turns blue.

(9) If FIXED ID BIND is used, transmitter can be turn on and off to bind and re-bind, which will make fail safe testing easier (see Section Fixed ID Bind). To test Fail-Safe, press ENT on your transmitter→Function Menu→ Fail Safe→Gear. Use the UP/DN to adjust the Fail-Safe setting for Gear to around -44% and turn off transmitter to check/test if fail safe turn blue on screen (if fail safe does not turn blue, re-bind the transmitter and adjust Fail-Safe setting for Gear until fail safe turn blue while transmitter is off.) This procedure will make sure fail-safe is active while transmitter is off or circumstances signal lost during flight.

AUTO PILOT

(1) BASIC PARAMETERS: Recommend setting for Pitch set to 130%, Roll set to 120%, Yaw set to 90% and Vertical set to 120% and ATTITUDE GAIN is Pitch set to 100% and Roll set to 100%. REMOTE ADJUST is set to INH. Basic Gain and Attitude Gain should never set to lower than 90%, otherwise crash might result.

(2) ENHANCED FAILED-SAFE METHODS (GPS module is required). The recommended settings for enhanced failed-safe methods are GO-HOME and LANDING. (Please refer to DJI NAZA User Manual's page 21 for enhanced failed-safe methods).

(3) INTELLIGENT ORIENTATION CONTROL (IOC): (GPS module is required). Check the box next to "3. Intelligent Orientation Control". If GPS is installed, the settings for Devention 10 and RX 1002 are as follows. Assign

the intelligent orientation control to the Flight Mode Switch on the transmitter, by pressing ENT on the Devention10→Model Menu→Device Output→Flap (AUX 1) and selecting FMOD SW by pressing L or R (Make sure Type Select is Airplane mode, pressing ENT on the Devention10→model menu→type select→airplane) and making sure that Function shows as ACTIVE.

(1) The NAZA Assistant screen should show INTELLIGENT ORIENTATION CONTROL with Home Lock | Course Lock | Off. You need a 3 position switch for the Intelligent Orientation Control Switch. For example: When using Devention 10 and RX 1002, the Intelligent Orientation Control Switch is assigned to the Flight Mode Switch on the transmitter. This is done by connecting the Receiver's Flap (AUX 1) channel to the Flight Controller's "X2" channel. Then press ENT on the Devo 10→Model Menu→Device Output→Flap (AUX 1) and select FMOD SW by pressing L or R and making sure the Function shows as ACTIVE.

(2) Now you need to make sure when the FMOD SW is flipped forward (toward the ground) the switch will change the Intelligent Orientation Control to "Off". If the slider is closer to "Course Lock" or "Home Lock", then the Intelligent Orientation Control Switch slider is in the wrong position. To bring the slider closer to "Off", press ENT button on your transmitter→Function Menu→Reverse Switch→Flap (AUX 1) and reverse your Flap (AUX 1) SWITCH setting (which is now set to your FMOD SW setting) by pressing L or R. This change will bring the Intelligent Orientation Control Switch slider closer to "Off".

(3) Move your FMOD SWITCH to the middle position to set the midpoints for the middle position first. If the "Course Lock" segment turns blue, please skip to Step #5.

(4) If the "Course Lock" segment does not turn blue, press ENT on your transmitter→Function Menu→Sub Trim→Flap (AUX 1) and adjust your Flap's (AUX 1) midpoint by pressing the L or R button until "Course Lock" segment turns blue.

(5) Flip the FMOD SWITCH forward (toward the ground). If the "Off" segment turns blue then skip to Step #7.

(6) If the "Off" segment does not turn blue, press ENT on your transmitter→Function Menu→ Travel Adjust→Flap (AUX 1). Use the UP/DN button to select +100.0% and adjust your Flap (AUX 1)'s endpoint by pressing the L or R button until "Off" segment turns blue.

(7) Flip the FMOD SWITCH backward (towards the sky). If the "Home Lock" segment turns blue, then skip Step #8.

(8) If the "Home Lock" segment does not turn blue, press ENT on your transmitter→Function Menu→ Travel Adjust→Flap (AUX 1). Use the UP/DN button to select -100.0% and adjust your GEAR SWITCH's endpoint by pressing the L or R button until "Home Lock" segment turns blue.

Home Lock only activates while MATRIX is about 30 feet (10 meters) away from the home position (Takeoff Position). To change the Home Lock position during flight, please refer to the DJI User Manual for detailed instructions and functions of HOME LOCK and COURSE LOCK.

4.3 Transmitter & Receiver Compatibility Table (For ARF Only)

The MATRIX prefers a 2.4GHz system, but also supports 35MHz, 40MHz, and 72MHz.

No.	Brand	Transmitter	Receiver
1	Walkera	DEVENTION 10	RX1002
2	Spektrum	DX8	AR8000
3	JR	DSX7	RD721
4	JR	9XII	
5	WFLY	FT06-C	FRP06
6	Futaba	14SG	R7008SB
7	Futaba	6EX	R146iP
8	Futaba	10C	
9	Sanwa	RD8000	92777
10	Hi-TEC	Eclipse7	FRP06

4.4 Receiver, Flight Controller & Auto-stabilization Setup

FIGURE 4.4

(1) Connect Channel #T wire from the flight controller to the THROTTLE channel of the receiver. Watch for polarity.

(2) Connect Channel #E wire from the flight controller to the ELEV channel of the receiver.

(3) Connect Channel #A wire from the flight controller to the AILE channel of the receiver.

(4) Connect Channel #R wire from the flight controller to the RUDDER channel of the receiver.

(5) Connect Channel #U wire from the flight controller to the GEAR channel of the receiver.

(6) Connect Gyrox brushless gimbal tilt control cable to the AUX 4 channel of the receiver.

(7) Connect Channel #X2 wire from the flight controller to the AUX 1 channel of the receiver.

(8) Connect Channel #X3 wire from the flight controller to the LED Versatile Unit (PMU).

Setting up MATRIX to ensure a smooth flight with GPS or Attitude mode

To ensure the smooth flight of your Turbo Ace MATRIX, please make sure that you setup and fly the MATRIX in GPS or Attitude mode. In order for GPS or Attitude mode to function, first it is important to make sure the mix switch on your radio is all the way forward. Please refer to Section 4.2 Transmitter Calibration. If you own a Walkera radio such as the Devo 10, you will need to reverse the gear channel in your radio so that when you flip the gear switch forward, it enables GPS or Attitude Mode.

If you are experiencing difficulties in handling the aircraft, it may be because it is not in GPS or Attitude Mode.

You may skip the following setup instructions if you have purchased the Turbo Ace MATRIX with a transmitter radio, as we have already completed all the setup for you. If you have purchased a MATRIX without a radio, please see the following to make sure your radio is setup correctly.

Setting up and checking Turbo Ace MATRIX flight mode for GPS or Attitude Mode.

Plug in a 3 pin cable connector to the "INPUT" channel U of the NAZA flight controller. Connect the other end of the cable to the GEAR output on your receiver with the brown wire closest to the edge of the receiver casing (If you have a receiver other than a Walkera WK2801-PRO, Devention or Spektrum, please check your receiver manual for polarity).

MATRIX with GPS module (Assign GEAR to 3 position toggle switch, WOW default MIX switch for Devention 10):

Go to your radio setup, press ENT→Model Menu→Device Output→assign GEAR to MIX SW (MATRIX without GPS). This means that every time the **MIX** switch is flipped forward on your radio, it will toggle the GEAR output of the receiver and tell the controller to perform GPS Mode. If you own a Walkera radio, the gear channel in the radio should be changed from normal to REVERSE (Please refer to section 4.2 Transmitter Calibration, for detail adjustment for GPS/Attitude/Manual mode) You can use the NAZA Assistant Software to double check the MIX switch operation after you have completed the above setup.

Turn on your transmitter radio (Warning: Always tie down the MATRIX and remove all propellers when you perform any setting changes to the transmitter or NAZA Assistant Software. Failure to do so may cause serious issues, as the MATRIX motor may start up if an incorrect value is entered). Connect the provided Programming USB-to-Micro USB cable from your PC computer's USB port (XP or WIN7) to Micro USB port on the MATRIX communication port (on the LED side panel of the MATRIX). Please connect this cable after the transmitter is bound to the receiver.

Double click on the NaZaInstaller.exe located in the provided 8GB USB flash drive to install the NAZA ASSISTANT SOFTWARE

After completion of the installation of the NAZA ASSISTANT SOFTWARE, double click on the application file named NAZA ASSISTANT SOFTWARE. Wait for the program to start up.

Select the TX Calibration tab at the left column of the screen.

MATRIX with GPS
You will see the 5 mode tabs: GPS, Fail Safe, A, Fail Safe, M. When you flip the MIX switch on your radio, you will see the selection flipping between GPS and A and M. When the MIX switch is flipped forward, you will see GPS is selected which enables GPS Mode. The GPS Mode is the mode you should be using to fly your MATRIX. M mode has no stabilization and will make it very difficult to operate the aircraft.
IMPORTANT: Make sure that the MIX switch on your radio is in the forward/middle position before taking off and during the entire flight. (Please refer to section 4.2 Transmitter Calibration if GPS and A and M mode do not turn blue on the screen when you flip the MIX switch).

4.5 Transmitter Settings (For ARF Only)

(1) Aircraft Mode: Fixed-wing airplane mode. **Do not use helicopter mode**
(2) Rudder: 0% to 100% with No Mixing
(3) Curve: Channel 1, 2, 3 & 4 all set to zero
(4) Gyro: Fine tune to maximize stability
(5) Move both throttle stick and throttle trim by looking at the LCD screen to the middle position- Very important, otherwise motors will not start
(6) Use transmitter rudder trim to adjust heading (yaw) (if changes are made to trim settings recalibration is required)
(7) For added stability on the MATRIX, you may choose to set the dual rate to 55%

Please double check all settings, tie down the MATRIX to a bench, and test fly it to check the settings. Some transmitters use random bind, which means you have to plug in the battery to the MATRIX within 2-3 seconds after the radio is turned on. Please observe the LED light located at the back of the MATRIX cover (Please refer to Section 5.3 LED light description). Most receivers flash before binding and remain solid after binding, so please make sure your receiver has been properly bound to your transmitter. Do not launch the MATRIX on its maiden flight until all operations are confirmed as normal, especially after shipping. Tie it down to a bench for a preflight

check. Failure to do so may cause serious damage to the MATRIX and/or people around it. Factories and dealers will not be liable for any damages from the operation of this aircraft.

4.6 Transmitter Flight Control & Gain Adjustments (For ARF Only)

We do not recommend any inexperienced users to adjust the flight control or Gain values using the DJI NAZA Assistant software. It is a steep learning curve for these adjustments, which we have already fine-tuned and completed for you. Improper settings may cause the MATRIX to lose control and may result in serious damage. If the original factory settings are altered in any way, with the exception of transmitter calibration adjustments for ARF packages, it will automatically void the 24-hour "No Dead on Arrival" guarantee. Dead on arrival returns are strictly checked for setting changes and tampering. Although it can be mastered over time, the MATRIX flight controller adjustments are quite sophisticated and complicated. Do not attempt to change these settings until you are familiar with the setup. Please go to online forums to learn about the flight control settings, as we do not provide any technical support for these settings.

When you have purchased the ready to fly unit, there are 3 control modes which we have setup on your flight controller and transmitter, GPS and ATTITUDE and MANUAL. GPS Mode has the best auto stabilization and ability to perform GPS Lock, making the aircraft very easy to fly, which is more appropriate for videographic and photographic applications. Attitude Mode has some auto stabilization and ability to perform altitude hold and makes the aircraft easier to fly, which is also suitable for videography and photography applications. Manual Mode is suited for experienced pilots to gain more manual control in adverse. Do not switch to the MANUAL mode if you are a beginner.

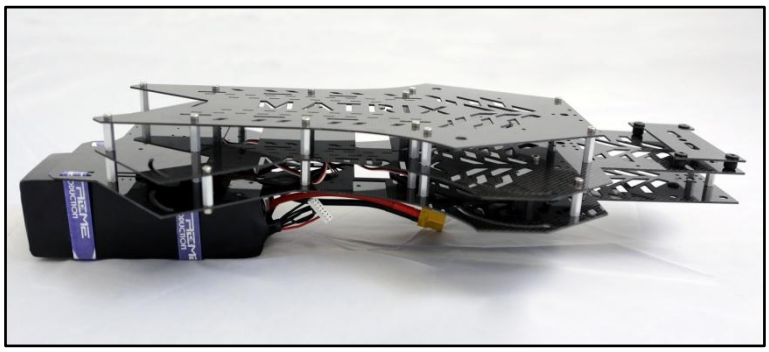
MATRIX with GPS: The three modes can be switched during flight by toggling the MIX switch on top of your radio. In the ready to fly MATRIX, we have set this switch on your radio to GPS MODE when it is toggle forward and ATTITUDE MODE when it is toggled middle and MANUAL MODE when it is toggled backward. Before takeoff, please make sure all the front panel switches on your transmitter are flipped forward and all switches such as the flight mode/hold switches on the side panel are pushed down.

The basic gain and attitude gain values of the MATRIX can be adjusted in the AUTOPILOT section when you run the DJI NAZA ASSISTANT SOFTWARE. The default setting for BASIC GAIN is Pitch set to 130%, Roll set to 120%, Yaw set to 90% and Vertical set to 120% and ATTITUDE GAIN is Pitch set to 100% and Roll set to 100% (**Warning**: BASIC GAIN should never be set lower than 90%). Again, it is very important to remember to tie down the aircraft and remove all the propellers when you are programming the fight controller with the supplied Programming USB-MicroUSB cable. Failure to do so may cause accidental motor start up with incorrect values entered and may result in serious injury. Always remember to tie down the MATRIX to a bench for test flights after you have changed any settings. (If the motor does not spin after perform the CSC, please re-calibrate/perform the Command Sticks Calibration).

4.7 MATRIX Wiring Connection Chart for Devo 10 & RX1002

MATRIX with GPS module	Devo 10 & RX1002			INDICATES ONLY ONE CAN BE ACTIVATED
RX1002	NAZA FC	TX Setting Output	Gimbal Servo	MATRIX
ELEV	E			
AILE	A			
THRO	T			
RUDD	R			
GEAR	U	GEAR→MIX SW		GPS - ATTITUDE MODE - MANUAL
AUX1	X2	AUX1(FLAP)—> F. MOD		OFF - COURSE LOCK - HOME LOCK
AUX2				
AUX4		AUX4		TILT CONTROL FOR GIMBAL
BATT				TELEMETRY (OPTIONAL)

ELECTRONICS SETUP & ADJUSTMENT for Spektrum DX 8 Transmitter



If you have purchased an RTF package, please skip Section 4.1 through 4.5 because all settings are already complete and your MATRIX and transmitter have been paired and test flown as a set. Unless you are familiar with the settings, any changes might override the factory's setting and disable the aircraft, affecting its performance and flight reliability.

If you have purchased an ARF package, you must complete Section 4.1 ESC Programming and Section 4.2 Transmitter Calibration. MATRIX ESCs needs to reprogram independently. Also, in order for a flight controller to work properly, your specific transmitter has to be calibrated to work with each new MATRIX. Crashes will be imminent if you skip these one-time procedures to match a MATRIX with a transmitter.

4.1 ESC Programming for Spektrum DX 8 Transmitter (A Must Setup For ARF)

Video Instruction:
How to calibrate the ESC for MATRIX:
https://www.dropbox.com/s/qwvt489g9j6zs7x/Calibration%20for%20Spektrum%20ESCs.MP4

Please skip this ESC programming step if you have purchased RTF unit, since all ESC have been re-programmed. Please follow the steps below very carefully, as they will only take a few minutes.

(1) IMPORTANT: Remove all 4 propellers from the motors for safety.

(2) Double check to make sure all ESC connectors are marked/labeled (#1 through #4 matching the connectors on the flight controller #1 through #4) so that you will be able to keep track of the corresponding connectors when you need to put them back later.

(3) Disconnect all 4 ESC connectors from the NAZA flight controller so they may not interfere with each other's programming.

(4) Move the throttle stick all the way down. Now turn on the transmitter.

(5) Disconnect X3 on NAZA flight controller and plug into AUX 1 on the receiver.

(6) Insert one of the labeled ESC connectors into the receiver's throttle channel port while watching for the correct polarity. Black/dark brown wires are usually on the edge of the receiver. Please verify polarity in your receiver manual if you are not using the stock receiver. (Make sure the Receiver and Transmitter radio are bound)

(7) Move the throttle stick all the way up.

(8) Within 3 seconds, connect the battery to the MATRIX's battery plug (The MATRIX battery plug is still connected to all 4 ESCs but only one ESC should be connected to the receiver at a time.)

(9) When the ESC makes 1 beeping sounds, immediately move the throttle stick all the way down. The ESC will then make 2 beeping. (If you did not hear the 1 beeping sounds when entering programming mode or you did not hear 2 beeping after the ESC have completed its programming then you need to move throttle all the way down and disconnect the battery from the MATRIX battery plug and repeat from step #6 to #9 for the ESC.) If you did not experience any problems, then you have completed programming on this ESC which now retains the high and low end point data in its memory. Disconnect the battery from the MATRIX's battery connector then disconnect the ESC connector from the receiver.

(10) Repeat this process for each ESC from Step#6 through Step#9. Please make sure you have programmed all 4 ESCs by starting from the #1 labeled ESC and finishing with #4 labeled ESC. Your transmitter power should remain in the power on position throughout the entire process of programming all 4 ESCs.

(11) After you have successfully re-programmed all 4 ESCs, unplug the battery from the MATRIX battery plug. Insert the 4 ESC connectors, labeled #1 through #4 back to corresponding M1 through M4 ports on your NAZA

flight controller. The black/dark brown wire (-) for each of the ESC connectors are closest to the red NAZA label of the flight controller.

4.2 Transmitter Calibration for Spektrum DX 8 Transmitter (A Must Setup For ARF)

Video Instruction:

1. How to set up fail safe for Spektrum transmitter for X830: https://www.dropbox.com/s/pw2nogpjubwaubj/3.%20Failsafe%20SPK.MP4
2. How to set up Spektrum transmitter calibration for X830: https://www.dropbox.com/s/z64exwcmna634j6/4.%20TX%20Calibration%20Settings%20SPK.MP4
3. How to fine tune Spektrum for X830: https://www.dropbox.com/s/8ybfe61e6o8bxae/5.%20Fine%20Tune%20SPK.MP4
4. How to set up the gain setting for X830: (Default setting is not recommended for carry heavy equipment) https://www.dropbox.com/s/2pkkn3ipc73tbwy/7.%20Gain%20Setup.MP4
5. How to set up the voltage setting for X830: https://www.dropbox.com/s/clsrg9ixxp8b2xn/9.%20Voltage%20Setup.MP4

If you have purchased your MATRIX with a transmitter (RTF package) please skip this section because we have already completed calibration. If you are using a transmitter that has never been paired with your new MATRIX, you will need to calibrate your transmitter to the MATRIX flight controller using the following procedure. Any change to the quadcopter or setting change to the transmitter might require transmitter calibration.

(1) **Important!! Remove all 4 propellers from the motors for safety.**
(2) Tie down your MATRIX
(3) Turn on your transmitter radio.
(4) Connect battery to the MATRIX battery connector.
(5) Connect the provided Programming USB Cable from your PC computer's USB port (XP or WIN7 or WIN8) to the Micro USB port on the MATRIX communication port (on the LED side panel of the MATRIX). (If the computer does not recognize the USB, the USB driver is located in the provided 8GB USB flash drive)
(6) Double click on the NAZAInstaller.exe located in the provided 8GB USB flash drive and install the NAZA ASSISTANT SOFTWARE.

(7) Double click on the application file named NAZA ASSISTANT SOFTWARE. Wait for the program to start up.

(8) Click **MOUNTING** Use to input the distance between GPS and Main Flight Controller.

(9) Click **MOTOR MIXER**

MIXER TYPE: Please select **Quad-rotor X** and remember to click WRITE after you update any settings (WRITE is #7 on top of FIGURE 4.2)

(10) Click **TX CALI**

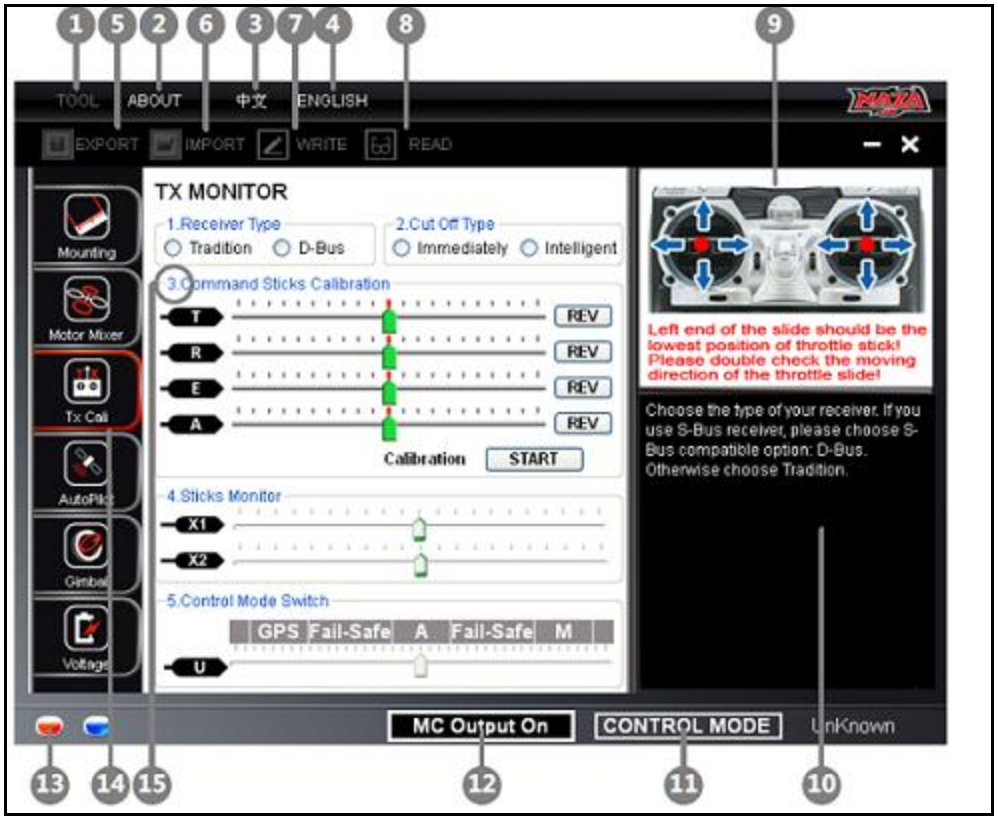


Figure 4.2-1 ***NAZA Assistant Software Program Screenshot***

(11) RECEIVER TYPE: Please choose "**TRADITION**" for Walkera or Spektrum or Futaba receiver.

(12) CUT OFF TYPES: Default setting from WOW is "IMMEDIATELY".

(13) COMMAND STICKS CALIBRATION: Click **START** to begin the calibration process. Please make sure to move both sticks to their end points. This means you are moving both sticks all the way up, down, left and right. (Note: If a transmitter stick is moved left or down, one of the on-screen sliders will move to the left. If a transmitter stick is moved right or up, one of the on-screen sliders will move to the right. If slider is moved at the opposite direction, click the NORM or REV to reverse the direction of the slider movement)

- Throttle/Yaw Stick controls “T” (Throttle): Stick down and “T” slides left (reduce elevation) & stick up and “T” slides right (increase elevation).

- Throttle/Yaw Stick controls “R” (Rudder): Stick left and “R” slides left (nose to the left) & stick right and “R” slides right (nose to the right).

- Directional Stick controls “E” (Elevator): Stick down and “E” slides left (tilts back) & stick up and “E” slides right (tilts forward)

- Directional Stick controls A (Aileron): Stick left and “A” slides left (roll left) & stick right and “A” slides right (roll right).

After Calibration, place all sticks at the center which will turn all sliders green. At this point click **FINISH** to end.

(14) STICKS MONITOR is not used at this time.

(15) CONTROL MODE SWITCH: (Please see Section 4.7 MATRIX Wiring Connection Chart)

Setting the GPS Attitude and Attitude and Manual Mode on the Flap Switch on Spektrum DX8 Transmitter

Setting the GPS, Attitude and Manual Mode on the Flap Switch on MATRIX:

(1) The NAZA Assistant screen should show a Control Mode Switch with GPS | Fail Safe | A | Fail Safe | M. (The “GPS” represent the GPS Mode, the “A” represent “Attitude Mode” and the “M” represent “Manual Mode”.) You need a 3 position switch for the Control Mode Switch. For example: When using Spektrum DX8 and AR8000, the Control Mode Switch is assigned to the Flap switch on the transmitter. This is done by connecting the Receiver’s AUX1 channel to the Flight Controller’s “U” channel (See FIGURE 4.2). Hold down roller while turning on the Spektrum DX8→scroll down to “Switch Select”→scroll down to “Flap” press roller→change to “AUX 1” (If you cannot find Flap in the list, you will need to change the model type to “Airplane”, in order for “Flap” to show up in the selection.

(2) Now you need to make sure when the Flap Switch is flipped forward (away from you) the switch will change the flight controller to “GPS Mode”. If the Control Mode Switch (See FIGURE 4.2 bottom) slider is closer to “M” or “A”,

then the Control Mode Switch slider is in the wrong position. To bring the slider closer to "GPS". Turn on transmitter→Click on roller→scroll down to "Servo Setup"→scroll to "travel" and click on roller, which will have a flashing box→scroll to "Reverse", click the roller to make the flashing box become solid →scroll down to "Throttle" and change to "AUX 1"→scroll down to the NOR and REV box→ click the roller to reverse the AUX 1 channel (which is now set to your Flap Switch setting). This change will bring the Control Mode Switch slider closer to "GPS".

(3) How to set up fail safe for Spektrum transmitter, please following the instruction in the video link below
https://www.dropbox.com/s/pw2nogpjubwaubj/3.%20Failsafe%20SPK.MP4

(4) Move your Flap Switch to the middle position to set the sub trim for the middle position first. If the "A" segment turns blue please skip to Step #6.

(5) If the "A" segment does not turn blue, Click on roller→scroll down to "Servo Setup"→scroll to "travel" and click on roller, which will have a flashing box→scroll to "subtrim", click the roller to make the flashing box become solid →scroll down to "Throttle" and change to "AUX 1"→scroll down to the 0 and adjust the until "A" segment turns blue.

(6) Flip the Flap Switch forward (away from you). If the "GPS" segment turns blue then skip to Step #8.

(7) If the "GPS" segment does not turn blue, Click on roller→scroll down to "Servo Setup"→scroll to "travel" and click on roller, which will have a flashing box→ scroll down to "Throttle" and change to "AUX 1"→scroll down to the 100% and adjust the value until "GPS" segment turns blue.

(8) Flip the Flap Switch backward (towards you). If the "M" segment turns blue then skip to Section 4.2.11.

(9) If the "M" segment does not turn blue, Click on roller→scroll down to "Servo Setup"→scroll to "travel" and click on roller, which will have a flashing box→ scroll down to "Throttle" and change to "AUX 1"→scroll down to the 100% and adjust the value until "M" segment turns blue. Make sure to test the failsafe by turn off your transmitter and the slider should move to failsafe and turn blue and the throttle will go to midpoint on the screen.

AUTO PILOT

(1) BASIC PARAMETERS: Recommend setting for Pitch set to 130%, Roll set to 120%, Yaw set to 90% and Vertical set to 120% and ATTITUDE GAIN is Pitch set to 100% and Roll set to 100%. REMOTE ADJUST is set to INH.

Basic Gain and Attitude Gain should never set to lower than 100%, otherwise crash might result.

(2) ENHANCED FAILED-SAFE METHODS. (GPS module is required.) Recommended setting for enhanced failed-safe methods is to set it to GO-HOME and LANDING. (Please refer to DJI NAZA User Manual's page 21 for enhanced failsafe methods.)

(3) INTELLIGENT ORIENTATION CONTROL (IOC): (GPS module is required.) Check the box next to "3. Intelligent Orientation Control". If GPS is installed, the settings for Spektrum DX 8 and AR8000 as follows. Assign the intelligent orientation control to the F MODE Switch on the transmitter, connecting the Receiver's Gear channel to the Flight Controller's "X2" channel (See FIGURE 4.2). Hold the roller while turning on the Spektrum DX8→scroll down to "Switch Select"→scroll to "Gear" change to "Inh"→scroll to "F MODE" change to "Gear".

(4) Now you need to make sure when the F MODE Switch is flipped forward (toward the ground) the switch will change the Intelligent Orientation Control to "Off". If the slider is closer to "Course Lock" or "Home Lock", then the Intelligent Orientation Control Switch slider is in the wrong position. To bring the slider closer to "Off". Turn on transmitter→click on roller→scroll to "Servo Setup"→scroll to "Travel", click on roller, which will have a flashing box→ scroll down to "Reverse"→scroll down to "Throttle" and change to "Gear"→scroll down to NOR & REV to reverse your Channel Gear setting to "REV" (which is now set to your F MODE Switch setting). This change will bring the Intelligent Orientation Control Switch slider closer to "Off".

(5) Move your F MODE Switch to the middle position to set the midpoints for the middle position first. If the "Course Lock" segment turns blue please skip to Step #4.

(6) If the "Course Lock" segment does not turn blue, click on roller→scroll to "Servo Setup"→scroll to "Travel" and change to "subtrim"→scroll down to "Throttle" and change it to "Gear"→scroll down to "0"→adjust the value until "Course Lock" segment turns blue.

(7) Flip the F MODE Switch forward (toward the ground). If the "Off" segment turns blue then skip to Step #6.

(8) If the "Off" segment does not turn blue, click on roller→scroll to "Servo Setup"→scroll to "Travel"→scroll down to "Throttle" and change it to "Gear"→scroll down and adjust the value until "Off" segment turns blue.

(9) Flip the F MODE Switch backward (towards the sky). If the "Home Lock" segment turns blue.

(10) If the “Home Lock” segment does not turn blue, click on roller→scroll to “Servo Setup”→scroll to “Travel”→scroll down to “Throttle” and change it to “Gear”→scroll down and adjust the value until “Home Lock” segment turns blue.

Home Lock only activates while MATRIX is about 30 feet (10 meters) away from the home position (Takeoff Position). To change the Home Lock position during flight, please refer to the DJI User Manual for detailed descriptions and functions of HOME LOCK and COURSE LOCK.

4.3 Transmitter & Receiver Compatibility Table (For ARF Only)

The MATRIX prefers a 2.4GHz system, but also supports 35MHz, 40MHz, and 72MHz.

No.	Brand	Transmitter	Receiver
1	Walkera	DEVENTION 10	RX1002
2	Spektrum	DX8	AR8000
3	JR	DSX7	RD721
4	JR	9XII	
5	WFLY	FT06-C	FRP06
6	Futaba	14SG	R7008SB
7	Futaba	6EX	R146iP
8	Futaba	10C	
9	Sanwa	RD8000	92777
10	Hi-TEC	Eclipse7	FRP06

4.4 Receiver, Flight Controller & Auto-stabilization Setup

FIGURE 4.4

(1) Connect Channel #T wire from the flight controller to the THROTTLE channel of the receiver. Watch for polarity.

(2) Connect Channel #E wire from the flight controller to the ELEV channel of the receiver.

(3) Connect Channel #A wire from the flight controller to the AILE channel of the receiver.

(4) Connect Channel #R wire from the flight controller to the RUDDER channel of the receiver.

(5) Connect Channel #U wire from the flight controller to the AUX 1 channel of the receiver.

(6) Connect Gyrox Brushless gimbal tilt control cable to the AUX 3 channel of the receiver.

(7) Connect Channel #X2 wire from the flight controller to the GEAR channel of the receiver.

(8) Connect Channel #X3 wire from the flight controller to the LED Versatile Unit (PMU).

Setting up MATRIX to ensure a smooth flight with GPS or Attitude mode

To ensure the smooth flight of your Turbo Ace MATRIX, please make sure that you setup and fly the MATRIX in GPS or Attitude mode. In order for GPS or Attitude mode to function, first it is important to make sure the flap switch on your radio is all the way forward. Please refer to Section 4.2 Transmitter Calibration. If you own a Spektrum radio such as the DX8, you will need to reverse the gear channel in your radio so that when you flip the gear switch forward, it enables GPS or Attitude Mode. If you are experiencing difficulties in handling the aircraft, it may be because it is not in GPS or Attitude Mode.

You may skip the following setup instructions if you have purchased the Turbo Ace MATRIX with a transmitter radio, as we have already completed all the setup for you. If you have purchased a MATRIX without a radio, please see the following to make sure your radio is setup correctly.

Setting up and checking Turbo Ace MATRIX flight mode for GPS or Attitude Mode.

Plug in a 3 pin cable connector to the "INPUT" channel U of the NAZA flight controller. Connect the other end of the cable to the AUX 1 output on your receiver with the brown wire closest to the edge of the receiver casing (If you have a receiver other than a Walkera, Devention or Spektrum, please check your receiver manual for polarity).

MATRIX with GPS module (Assign AUX 1 to 3 position toggle switch, WOW default Flap switch for Spektrum DX 8):
Hold down roller while turning on the Spektrum DX8→scroll down to “Switch Select”→scroll down to “Flap” press roller→change to “AUX 1” (If you cannot find Flap in the list, you will need to change the model type to “Airplane”, in order for “Flap” to show up in the selection. This means that every time the **Flap** switch is flipped forward on your radio, it will toggle the AUX 1 output of the receiver and tell the controller to perform GPS Mode. For Spektrum radio, you will need to change from normal to reverse on the AUX 1 channel in your radio so that when you flip the Flap switch forward on the radio, you are activating the GPS mode. The reason to setup the radio this way is to ensure everything is in the correct default mode when all the switches on your radio are all the way forward (away from you). You can use the

NAZA Assistant Software to double check the Flap switch operation after you have completed the above setup.

Turn on your transmitter radio (Warning: Always tie down the MATRIX and remove all propellers when you perform any setting changes to the transmitter or NAZA Assistant Software. Failure to do so may cause serious issues, as the MATRIX motor may start up if an incorrect value is entered). Connect the provided Programming USB-to-Micro USB cable from your PC computer's USB port (XP or WIN7) to Micro USB port on the MATRIX communication port (on the LED side panel of the MATRIX). Please connect this cable after the transmitter is bound to the receiver.

Double click on the NaZaInstaller.exe located in the provided 8GB USB flash drive to install the NAZA ASSISTANT SOFTWARE

After completion of the installation of the NAZA ASSISTANT SOFTWARE, double click on the application file named NAZA ASSISTANT SOFTWARE. Wait for the program to start up.

Select the TX Calibration tab at the left column of the screen.

MATRIX with GPS
You will see the 5 mode tabs: GPS, Fail Safe, A, Fail Safe, M. When you flip the Flap switch on your radio, you will see the selection flipping between GPS and A and M. When the Flap switch is flipped forward, you will see GPS is selected which enables GPS Mode. The GPS Mode is the mode you should be using to fly your MATRIX. M mode has no stabilization and will make it very difficult to operate the aircraft.
IMPORTANT: Make sure that the Flap switch on your radio is in the forward/middle position before taking off and during the entire flight. (Please refer to section 4.2 Transmitter Calibration if GPS and A and M mode do not turn blue on the screen when you flip the Flap switch).

4.5 Transmitter Settings (For ARF Only)

(1) Aircraft Mode: Fixed-wing airplane mode. **Do not use helicopter mode**
(2) Rudder: 0% to 100% with No Mixing
(3) Curve: Channel 1, 2, 3 & 4 all set to zero
(4) Gyro: Fine tune to maximize stability

(5) Move both throttle stick and throttle trim by looking at the LCD screen to the middle position- Very important, otherwise motors will not start
(6) Use transmitter rudder trim to adjust heading (yaw) (will require recalibration if rudder is adjusted via trim and or subtrim is used)
(7) For added stability on the MATRIX, you may choose to set the dual rate to 55%

Please double check all settings, tie down the MATRIX to a bench, and test fly it to check the settings. Some transmitters use random bind, which means you have to plug in the battery to the MATRIX within 2-3 seconds after the radio is turned on. Please observe the LED light located at the back of the MATRIX cover (Please refer to Section 5.3 LED light description). Most receivers flash before binding and remain solid after binding, so please make sure your receiver has been properly bound to your transmitter. Do not launch the MATRIX on its maiden flight until all operations are confirmed as normal, especially after shipping. Tie it down to a bench for a preflight check. Failure to do so may cause serious damage to the MATRIX and/or people around it. Factories and dealers will not be liable for any damages from the operation of this aircraft.

4.6 Transmitter Flight Control & Gain Adjustments (For ARF Only)

We do not recommend any inexperienced users to adjust the flight control or Gain values using the DJI NAZA Assistant software. It is a steep learning curve for these adjustments, which we have already fine-tuned and completed for you. Improper settings may cause the MATRIX to lose control and may result in serious damage. If the original factory settings are altered in any way, with the exception of transmitter calibration adjustments for ARF packages, it will automatically void the 24-hour "No Dead on Arrival" guarantee. Dead on arrival returns are strictly checked for setting changes and tampering. Although it can be mastered over time, the MATRIX flight controller adjustments are quite sophisticated and complicated. Do not attempt to change these settings until you are familiar with the setup. Please go to online forums to learn about the flight control settings, as we do not provide any technical support for these settings.

When you have purchased the ready to fly unit, there are 3 control modes which we have setup on your flight controller and transmitter, GPS and ATTITUDE and MANUAL. GPS Mode has the best auto stabilization and ability to perform GPS Lock, making the aircraft very easy to fly, which is more appropriate for videographic

and photographic applications. Attitude Mode has some auto stabilization and ability to perform attitude hold and makes the aircraft easier to fly, which is also suitable for videographic and photographic applications. Manual Mode is suited for experienced pilots to gain more manual control in adverse. Do not switch to the MANUAL mode if you are a beginner.

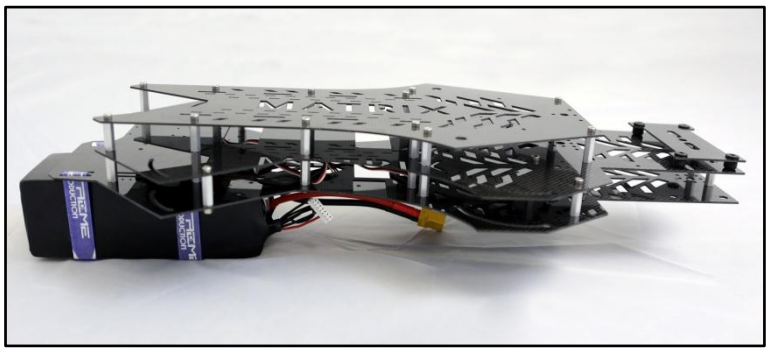
MATRIX with GPS: The three modes can be switched during flight by toggling the Flap switch on top of your radio. In the ready to fly MATRIX, we have set this switch on your radio to GPS MODE when it is toggle forward and ATTITUDE MODE when it is toggled middle and MANUAL MODE when it is toggled backward. Before takeoff, please make sure all the front panel switches on your transmitter are flipped forward and all switches such as the flight mode/hold switches on the side panel are pushed down.

The basic gain and attitude gain values of the MATRIX can be adjusted in the AUTOPILOT section when you run the DJI NAZA ASSISTANT SOFTWARE. The default setting for BASIC GAIN is Pitch set to 130%, Roll set to 120%, Yaw set to 90% and Vertical set to 120% and ATTITUDE GAIN is Pitch set to 100% and Roll set to 100% (**Warning**: BASIC GAIN should never be set lower than 90%). Again, it is very important to remember to tie down the aircraft and remove all the propellers when you are programming the fight controller with the supplied Programming USB-MicroUSB cable. Failure to do so may cause accidental motor start up with incorrect values entered and may result in serious injury. Always remember to tie down the MATRIX to a bench for test flights after you have changed any settings. (If the motor does not spin while perform the CSC, please re-calibrate/perform the Command Sticks Calibration).

4.7 MATRIX Wiring Connection Chart for Spektrum DX 8 & AR8000

MATRIX with GPS module	DX 8 & AR8000			INDICATES ONLY ONE CAN BE ACTIVATED
AR8000	NAZA FC	TX Setting Output	Gimbal Servo	MATRIX
ELEV	E			
AILE	A			
THRO	T			
RUDD	R			
AUX1	U	AUX 1→Flap SW		GPS - ATTITUDE MODE - MANUAL
AUX3		AUX3		TILT CONTROL FOR GIMBAL
Gear	X2	Gear→F. Mod		OFF - COURSE LOCK - HOME LOCK
BATT				TELEMETRY (OPTIONAL)

ELECTRONICS SETUP & ADJUSTMENT for Futaba 14SG Transmitter



If you have purchased an RTF package, please skip Section 4.1 through 4.5 because all settings are already complete and your MATRIX and transmitter have been paired and test flown as a set. Unless you are familiar with the settings, any changes might override the factory's setting and disable the aircraft, affecting its performance and flight reliability.

If you have purchased an ARF package, you must complete Section 4.1 ESC Programming and Section 4.2 Transmitter Calibration. MATRIX ESCs needs to reprogram independently. Also, in order for a flight controller to work properly, your specific transmitter has to be calibrated to work with each new MATRIX. Crashes will be imminent if you skip these one-time procedures to match a MATRIX with a transmitter.

4.1 ESC Programming for Futaba 14SG Transmitter (A Must Setup For ARF)

Video Instruction:
How to calibrate the ESC for MATRIX:
https://www.dropbox.com/s/z09ojui7ptd4rxr/1.%20Futaba%20Esc%20Programing.MP4

Please skip this ESC programming step if you have purchased RTF unit, since all the ESCs have been re-programmed. Please follow the steps below very carefully, as they will only take a few minutes.

(1) Very important: Remove all 4 propellers from the motors for safety.

(2) Double check to make sure all ESC connectors are marked/labeled (#1 through #4 matching the connectors on the flight controller #1 through #4) so that you will be able to keep track of the corresponding connectors when you need to put them back later.

(3) Disconnect all 4 ESC connectors from the NAZA flight controller so they may not interfere with each other's programming.

(4) Move the throttle stick all the way down. Now turn on the transmitter.

(5) Disconnect X3 on NAZA flight controller and plug into port 8 on the receiver.

(6) Turn on Futaba radio→double tap "LNK"→go to "Reverse"→go to THR and set it to "REV"

(7) Insert one of the labeled ESC connectors into the receiver's throttle channel (wow default port 3) port while watching for the correct polarity. Black/dark brown wires are usually on the edge of the receiver. Please verify polarity in your receiver manual if you are not using the stock receiver.

(8) Move the throttle stick all the way up.

(9) Within 3 seconds, connect the battery to the MATRIX's battery plug (The MATRIX battery plug is still connected to all 4 ESCs but only one ESC should be connected to the receiver at a time.)

(10) When the ESC makes 1 beeping sounds, immediately move the throttle stick all the way down. The ESC will then make 2 beeping. (If you did not hear the 1 beeping sounds when entering programming mode or you did not hear 2 beeping after the ESC have completed its programming then you need to move throttle all the way down and disconnect the battery from the MATRIX battery plug and repeat from step #7 to #10 for the ESC.) If you did not experience any problems, then you have completed programming on this ESC which now retains the high and low end point data in its memory. Disconnect the battery from the MATRIX's battery connector then disconnect the ESC connector from the receiver.

(11) Repeat this process for each ESC from Step#7 through Step#10. Please make sure you have programmed all 4 ESCs by starting from the #1 labeled ESC and finishing with #4 labeled ESC. Your transmitter power should remain in the power on position throughout the entire process of programming all 4 ESCs.

(12) After you have successfully re-programmed all 4 ESCs, unplug the battery from the MATRIX battery plug

(13) Now reverse the throttle back to normal on Futaba radio→double tap "LNK"→go to "Reverse"→go to THR and set it to "NORM"

(14) Insert the 4 ESC connectors, labeled #1 through #4 back to corresponding M1 through M4 ports on your NAZA flight controller. The black/dark brown wire (-) for each of the ESC connectors are closest to the red NAZA label of the flight controller.

4.2 Transmitter Calibration for Futaba 14SG Transmitter (A Must Setup For ARF)

Video Instruction:

1. How to connect Futaba RX and setup Futaba TX for Matrix:
   https://www.dropbox.com/s/vztqrvhplxq3h80/2.%20Futaba%20RX%20Setup.MP4
2. How to set up fail safe for Futaba transmitter for Matrix:
   https://www.dropbox.com/s/63n1ylwy4lnvl7y/6.%20Futaba%20Control%20Mode%20Failsafe.MP4
3. How to set up Futaba transmitter calibration for Matrix:
   https://www.dropbox.com/s/wws2w6pyba91ra9/5.%20Futaba%20TX%20Callibration.MP4
4. How to set up the gain setting for Matrix:
   (Default setting is not recommended for carry heavy equipment)
   https://www.dropbox.com/s/2pkkn3ipc73tbwy/7.%20Gain%20Setup.MP4
5. How to set up advanced setting for Matrix:
   https://www.dropbox.com/s/76vv670q6jb99lu/8.%20Advanced%20Setup.MP4
6. How to set up the voltage setting for Matrix:
   https://www.dropbox.com/s/clsrg9ixxp8b2xn/9.%20Voltage%20Setup.MP4

If you have purchased your MATRIX with a transmitter (RTF package) please skip this section because we have already completed calibration. If you are using a transmitter that has never been paired with your new MATRIX, you will need to calibrate your transmitter to the MATRIX flight controller using the following procedure. Any change to the quadcopter or setting change to the transmitter might require transmitter calibration.

(1) **Very important!! Remove all 4 propellers from the motors for safety.**

(2) Tie down your MATRIX

(3) Turn on your transmitter radio.

(4) Connect battery to the MATRIX battery connector.

(5) Connect the provided Programming USB Cable from your PC computer's USB port (XP or WIN7 or WIN8) to the Micro USB port on the MATRIX communication port (on the LED side panel of the MATRIX). (If the computer does not recognize the USB, the USB driver is located in the provided 8GB USB flash drive)

(6) Double click on the NAZAInstaller.exe located in the provided 8GB USB flash drive and install the NAZA ASSISTANT SOFTWARE.

(7) Double click on the application file named NAZA ASSISTANT SOFTWARE. Wait for the program to start up.

(8) Click **MOUNTING** Use to input the distance between GPS and Main Flight Controller.

(9) Click **MOTOR MIXER**

MIXER TYPE: Please select **Quad-rotor X** and remember to click WRITE after you update any settings (WRITE is #7 on top of FIGURE 4.2)

(10) Click **TX CALI**

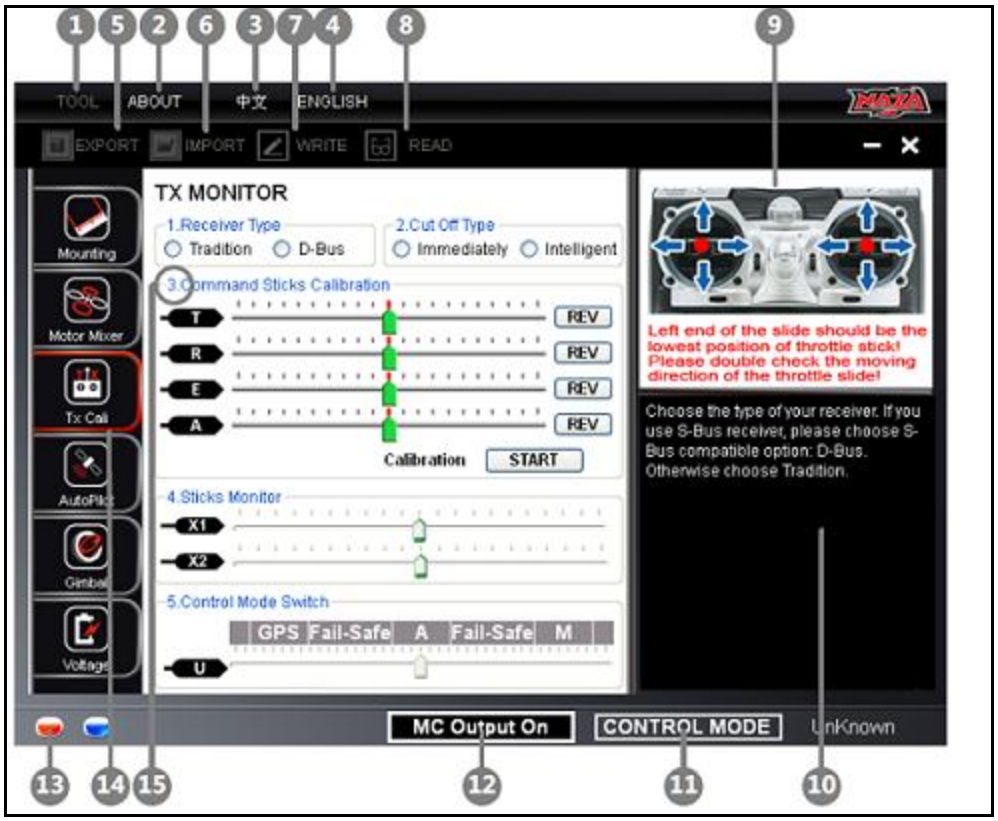


Figure 4.2-1 *NAZA Assistant Software Program Screenshot*

(11) RECEIVER TYPE: Please choose "**TRADITION**" for Walkera or Spektrum or Futaba receiver.

(12) CUT OFF TYPES: Default setting from WOW is "IMMEDIATELY".

(13) COMMAND STICKS CALIBRATION: Click **START** to begin the calibration process. Please make sure to move both sticks to their end points. This means you are moving both sticks all the way up, down, left and right. (Note: If a transmitter stick is moved left or down, one of the on-screen sliders will move to the left. If a transmitter stick is moved right or up, one of the on-screen sliders will move to the right. If slider is moved at the opposite direction, click the NORM or REV to reverse the direction of the slider movement)

- Throttle/Yaw Stick controls "T" (Throttle): Stick down and "T" slides left (reduce power) & stick up and "T" slides right (increase power).

- Throttle/Yaw Stick controls "R" (Rudder): Stick left and "R" slides left (nose to the left) & stick right and "R" slides right (nose to the right).

- Directional Stick controls "E" (Elevator): Stick down and "E" slides left (tilts leans back) & stick up and "E" slides right (tilts forward)

- Directional Stick controls A (Aileron): Stick left and "A" slides left (leans left) & stick right and "A" slides right (leans right).

After Calibration, place all sticks at the center which will turn all sliders green. At this point click **FINISH** to end.

(14) STICKS MONITOR is not used at this time.

(15) CONTROL MODE SWITCH: (Please see Section 4.7 MATRIX Wiring Connection Chart)

Setting the GPS Attitude and Attitude and Manual Mode on the SB Switch on Futaba 14SG Transmitter:

Setting the GPS, Attitude and Manual Mode on the Mix Switch on MATRIX:

(1) The NAZA Assistant screen should show a Control Mode Switch with GPS | Fail Safe | A | Fail Safe | M. (The "GPS" represent the GPS Mode, the "A" represent "Attitude Mode" and the "M" represent "Manual Mode".) You need a 3 position switch for the Control Mode Switch. For example: When using Futaba 14SG and R7008SB, the Control Mode Switch is assigned to the SB switch on the transmitter. This is done by connecting the Receiver's 5 channel to the Flight Controller's "U" channel (See FIGURE 4.2). Turn on the Futaba

14SG, double tap “LNK”→scroll down to “Function” press “RTN”→scroll down to channel 5→Change CTRL to “SB”.

(2) Now you need to make sure when the SB Switch is flipped forward (away from you) the switch will change the flight controller to “GPS Mode”. If the Control Mode Switch (See FIGURE 4.2 bottom) slider is closer to “M” or “A”, then the Control Mode Switch slider is in the wrong position. To bring the slider closer to “GPS”, double tap “LNK”→scroll down to “REVERSE” →scroll down to Channel 5→tap “RTN” and reverse your Channel 5 setting to “REV” (which is now set to your SB Switch setting). This change will bring the Control Mode Switch slider closer to “GPS”.

(3) Transmitter can be turn on and off to bind and re-bind, which will make fail safe testing easier. To setup Fail-Safe, double tap “LNK”→scroll down to “END POINT”→scroll down to Channel 5→adjust travel value until the failsafe turn blue→double tap “LNK”→scroll down to “FAIL SAFE”→scroll down to Channel 5→scroll to F/S and change to “F/S”→scroll to “POS” and hold “RTN” for 1 sec, it will set the value for failsafe itself.

(4) Move your SB Switch to the middle position to set the sub trim for the middle position first. If the “A” segment turns blue please skip to Step #6.

(5) If the “A” segment does not turn blue, double tap “LNK”→scroll down to “SUB-TRIM”→scroll down to Channel 5→change the value until “A” segment turns blue.

(6) Flip the SB Switch forward (away from you). If the “GPS” segment turns blue then skip to Step #8.

(7) If the “GPS” segment does not turn blue, double tap “LNK”→scroll down to “ENDPOINT”→scroll down to Channel 5→find the travel value and tap “RTN”→value will flash and you can change the value until “GPS” segment turns blue.

(8) Flip the SB Switch backward (towards you). If the “M” segment turns blue then skip to Section 4.2.11.

(9) If the “M” segment does not turn blue, double tap “LNK”→scroll down to “ENDPOINT”→scroll down to Channel 5→ find the travel value and tap “RTN”→value will flash and you can change the value until “M” segment turns blue. Make sure to test the failsafe by turn off your transmitter and the slider should move to failsafe and turn blue.

AUTO PILOT

(1) BASIC PARAMETERS: Recommend setting for Pitch set to 130%, Roll set to 120%, Yaw set to 90% and Vertical set to 120% and ATTITUDE GAIN is Pitch set to 100% and Roll set to 100%. REMOTE ADJUST is set to INH. Basic Gain and Attitude Gain should never set to lower than 100%, otherwise crash might result.

(2) ENHANCED FAILED-SAFE METHODS. (GPS module is required.) Recommended setting for enhanced failed-safe methods is to set it to GO-HOME and LANDING. (Please refer to DJI NAZA User Manual's page 21 for enhanced failed-safe methods.)

(3) INTELLIGENT ORIENTATION CONTROL (IOC): (GPS module is required.) Check the box next to "3. Intelligent Orientation Control". If GPS is installed, the settings for Futaba 14SG and R7008SB are as follows. Assign the intelligent orientation control to the SE Switch on the transmitter, connecting the Receiver's 6 channel to the Flight Controller's "X2" channel (See FIGURE 4.2). Turn on the Futaba 14SG, double tap "LNK"→scroll down to "Function" press "RTN"→scroll down to channel 6→Change CTRL to "SE".

(4) Now you need to make sure when the SE Switch is flipped forward (toward the ground) the switch will change the Intelligent Orientation Control to "Off". If the slider is closer to "Course Lock" or "Home Lock", then the Intelligent Orientation Control Switch slider is in the wrong position. To bring the slider closer to "Off",

double tap "LNK"→scroll down to "REVERSE" →scroll down to Channel 6→tap "RTN" and reverse your Channel 6 setting to "REV" (which is now set to your SE Switch setting). This change will bring the Intelligent Orientation Control Switch slider closer to "Off".

(5) Move your SE Switch to the middle position to set the midpoints for the middle position first. If the "Course Lock" segment turns blue please skip to Step #4.

(6) If the "Course Lock" segment does not turn blue, double tap "LNK"→scroll down to "SUB TRIM"→scroll down to Channel 6→adjust the value until "Course Lock" segment turns blue.

(7) Flip the SE Switch forward (toward the ground). If the "Off" segment turns blue then skip to Step #6.

(8) If the “Off” segment does not turn blue, double tap “LNK”→scroll down to “END Point”→scroll down to Channel 6→find the travel value and tap “RTN”→adjust the value until “Off” segment turns blue.

(9) Flip the SE Switch backward (towards the sky). If the “Home Lock” segment turns blue.

(10) If the “Home Lock” segment does not turn blue, double tap “LNK”→scroll down to “END Point”→scroll down to Channel 6→find the travel value and tap “RTN”→adjust the value until “Home Lock” segment turns blue.

Home Lock only activates while MATRIX is about 30 feet (10 meters) away from the home position (Takeoff Position). To change the Home Lock position during flight, please refer to the DJI User Manual for detailed descriptions and functions of HOME LOCK and COURSE LOCK.

4.3 Transmitter & Receiver Compatibility Table (For ARF Only)

The MATRIX prefers a 2.4GHz system, but also supports 35MHz, 40MHz, and 72MHz.

No.	Brand	Transmitter	Receiver
1	Walkera	DEVENTION 10	RX1002
2	Spektrum	DX8	AR8000
3	JR	DSX7	RD721
4	JR	9XII	
5	WFLY	FT06-C	FRP06
6	Futaba	14SG	R7008SB
7	Futaba	6EX	R146iP
8	Futaba	10C	
9	Sanwa	RD8000	92777
10	Hi-TEC	Eclipse7	FRP06

4.4 Receiver, Flight Controller & Auto-stabilization Setup

FIGURE 4.4

(1) Connect Channel #A wire from the flight controller to the channel 1 of the receiver.

(2) Connect Channel #E wire from the flight controller to the channel 2 of the receiver.

(3) Connect Channel #T wire from the flight controller to the channel 3 of the receiver. Watch for polarity.

(4) Connect Channel #R wire from the flight controller to the channel 4 of the receiver.

(5) Connect Channel #U wire from the flight controller to the channel 5 of the receiver.

(6) Connect Channel #X2 wire from the flight controller to the channel 6 of the receiver.

(7) Connect Gyrox Brushless gimbal tilt control cable to the channel 7 of the receiver.

(8) Connect Channel #X3 wire from the flight controller to the LED Versatile Unit (PMU).

Setting up MATRIX to ensure a smooth flight with GPS or Attitude mode

To ensure the smooth flight of your Turbo Ace MATRIX, please make sure that you setup and fly the MATRIX in GPS or Attitude mode. In order for GPS or Attitude mode to function, first it is important to make sure the mix switch on your radio is all the way forward. Please refer to Section 4.2 Transmitter Calibration. If you are

experiencing difficulties in handling the aircraft, it may be because it is not in GPS or Attitude Mode.

You may skip the following setup instructions if you have purchased the Turbo Ace MATRIX with a transmitter radio, as we have already completed all the setup for you. If you have purchased a MATRIX without a radio, please see the following to make sure your radio is setup correctly.

Setting up and checking Turbo Ace MATRIX flight mode for GPS or Attitude Mode.

Plug in a 3 pin cable connector to the "INPUT" channel U of the NAZA flight controller. Connect the other end of the cable to the Channel 5 output on your receiver with the brown wire closest to the edge of the receiver casing (If you have a receiver other than a Walkera, Devention or Spektrum, please check your receiver manual for polarity).

MATRIX with GPS module (Assign Channel 5 to 3 position toggle switch, WOW default SB switch for Futaba 14SG):
Turn on the Futaba 14SG, double tap “LNK”→scroll down to “Function” press “RTN”→scroll down to channel 5→Change CTRL to “SB”. This means that every time the **SB** switch is flipped forward on your radio, it will toggle the Channel 5 output of the receiver and tell the controller to perform GPS Mode. For Futaba radio, you might need to change from normal to reverse on the AUX 1 channel in your radio so that when you flip the SB switch forward on the radio, you are activating the GPS mode. The reason to setup the radio this way is to ensure everything is in the correct default mode when all the switches on your radio are all the way forward (away from you). You can use the NAZA Assistant Software to double check the SB switch operation after you have completed the above setup.

Turn on your transmitter radio (Warning: Always tie down the MATRIX and remove all propellers when you perform any setting changes to the transmitter or NAZA Assistant Software. Failure to do so may cause serious issues, as the MATRIX motor may start up if an incorrect value is entered). Connect the provided Programming USB-to-Micro USB cable from your PC computer’s USB port (XP or WIN7) to Micro USB port on the MATRIX communication port (on the LED side panel of the MATRIX). Please connect this cable after the transmitter is bound to the receiver.

Double click on the NaZaInstaller.exe located in the provided 8GB USB flash drive to install the NAZA ASSISTANT SOFTWARE

After completion of the installation of the NAZA ASSISTANT SOFTWARE, double click on the application file named NAZA ASSISTANT SOFTWARE. Wait for the program to start up.

Select the TX Calibration tab at the left column of the screen.

MATRIX with GPS
You will see the 5 mode tabs: GPS, Fail Safe, A, Fail Safe, M. When you flip the SB switch on your radio, you will see the selection flipping between GPS and A and M. When the SB switch is flipped forward, you will see GPS is selected which enables GPS Mode. The GPS Mode is the mode you should be using to fly your MATRIX. M mode has no stabilization and will make it very difficult to operate the aircraft.
IMPORTANT: Make sure that the SB switch on your radio is in the forward/middle position before taking off and during the entire flight. (Please refer to section 4.2 Transmitter Calibration if GPS and A and M mode do not turn blue on the screen when you flip the Flap switch).

4.5 Transmitter Settings (For ARF Only)

(1) Aircraft Mode: Fixed-wing airplane mode. **Do not use helicopter mode**
(2) Rudder: 0% to 100% with No Mixing
(3) Curve: Channel 1, 2, 3 & 4 all set to zero
(4) Gyro: Fine tune to maximize stability
(5) Move both throttle stick and throttle trim by looking at the LCD screen to the middle position- Very important, otherwise motors will not start
(6) Use transmitter rudder trim to adjust heading (yaw)
(7) For added stability on the MATRIX, you may choose to set the dual rate to 55%

Please double check all settings, tie down the MATRIX to a bench, and test fly it to check the settings. Some transmitters use random bind, which means you have to plug in the battery to the MATRIX within 2-3 seconds after the radio is turned on. Please observe the LED light located at the back of the MATRIX cover (Please refer to Section 5.3 LED light description). Most receivers flash before binding and remain solid after binding, so please make sure your receiver has been properly bound to your

transmitter. Do not launch the MATRIX on its maiden flight until all operations are confirmed as normal, especially after shipping. Tie it down to a bench for a preflight check. Failure to do so may cause serious damage to the MATRIX and/or people around it. Factories and dealers will not be liable for any damages from the operation of this aircraft.

4.6 Transmitter Flight Control & Gain Adjustments (For ARF Only)

We do not recommend any inexperienced users to adjust the flight control or Gain values using the DJI NAZA Assistant software. It is a steep learning curve for these adjustments, which we have already fine-tuned and completed for you. Improper settings may cause the MATRIX to lose control and may result in serious damage. If the original factory settings are altered in any way, with the exception of transmitter calibration adjustments for ARF packages, it will automatically void the 24-hour "No Dead on Arrival" guarantee. Dead on arrival returns are strictly checked for setting changes and tampering. Although it can be mastered over time, the MATRIX flight controller adjustments are quite sophisticated and complicated. Do not attempt to change these settings until you are familiar with the setup. Please go to online forums to learn about the flight control settings, as we do not provide any technical support for these settings.

When you have purchased the ready to fly unit, there are 3 control modes which we have setup on your flight controller and transmitter, GPS and ATTITUDE and MANUAL. GPS Mode has the best auto stabilization and ability to perform GPS Lock, making the aircraft very easy to fly, which is more appropriate for videographic and photographic applications. Attitude Mode has some auto stabilization and ability to perform attitude hold and makes the aircraft easier to fly, which is also suitable for videographic and photographic applications. Manual Mode is suited for experienced pilots to gain more manual control in adverse. Do not switch to the MANUAL mode if you are a beginner.

MATRIX with GPS: The three modes can be switched during flight by toggling the SB switch on top of your radio. In the ready to fly MATRIX, we have set this switch on your radio to GPS MODE when it is toggle forward and ATTITUDE MODE when it is toggled middle and MANUAL MODE when it is toggled backward. Before takeoff, please make sure all the front panel switches on your transmitter are flipped forward and all switches such as the flight mode/hold switches on the side panel are pushed down.

The basic gain and attitude gain values of the MATRIX can be adjusted in the AUTOPILOT section when you run the DJI NAZA ASSISTANT SOFTWARE. The default setting for BASIC GAIN is Pitch set to 130%, Roll set to 120%, Yaw set to 90% and Vertical set to 120% and ATTITUDE GAIN is Pitch set to 100% and Roll set to 100% (**Warning**: BASIC GAIN should never be set lower than 90%). Again, it is very important to remember to tie down the aircraft and remove all the propellers when you are programming the fight controller with the supplied Programming USB-MicroUSB cable. Failure to do so may cause accidental motor start up with incorrect values entered and may result in serious injury. Always remember to tie down the MATRIX to a bench for test flights after you have changed any settings. (If the motor does not spin while perform the CSC, please re-calibrate/perform the Command Sticks Calibration).

4.7 MATRIX Wiring Connection Chart for Futaba 14SG & R7008SB

MATRIX with GPS module		14SG & R7008SB						INDICATES ONLY ONE CAN BE ACTIVATED
R7008SB		NAZA FC		TX Setting Output		Gimbal Servo		MATRIX
1		A						
2		E						
3		T						
4		R						
5		U		SB				GPS - ATTITUDE MODE - MANUAL
6		X2		SE				OFF - COURSE LOCK - HOME LOCK
7				RD				TILT CONTROL FOR GIMBAL
BATT								TELEMETRY (OPTIONAL)

TESTING & OPERATIONS

5.1 Tie-Down Flight Test

(1) Tie down all four arms (not the skids) of the MATRIX to a heavy fixture such as a table or a work bench. Make sure there is plenty of space around the aircraft. If you have the random binding transmitter such as the Devention 10, please make sure there are no other similar radios in the vicinity during the binding process.

(2) Prior to initiating your MATRIX, make sure it is on a water level surface and do not move the MATRIX before takeoff or during the binding process. Failure to do so will result in miscalculating of the 3-Axis gyro compensation and the MATRIX will not be able to operate properly.

(3) Make sure your battery is fully charged using a battery meter (about 4.1V to 4.2V per cell on all 6 cells) Plug in the battery connector to the power input connector from the chassis. Do not run any LiPo battery to below 3.5V per cell or a total of 21.0V for the MATRIX 6 cells battery, otherwise the battery will be permanently damaged.

(4) After 2 seconds of initialization, the MATRIX will issue 5 consecutive “beep” tones.

(5) Place your transmitter flat on a table in front of you with the joystick facing up. Make sure all switches above the two control sticks on the transmitter are pushed forward and away from you and the two switches at the very top of the transmitter side panel is pushed down towards the table. Move the throttle stick (left stick) to the lowest position towards you. At this time, you do not need to move the directional stick (right stick), which is spring loaded and will always return to the middle position when released). Now you can turn your transmitter “ON”.

(6) Wait another six seconds for 5 consecutive “beep” tones from the MATRIX, which indicate that binding between the receiver and the transmitter is complete. Before moving any controls on the transmitter, it’s always good practice to find the solid LED light on the receiver & telemetry module to confirm that binding has been completed.

(7) Stay at a safe distance and execute the combination stick command (CSC) to start motors.

(8) Make sure Motor #1 and Motor #3 propellers are rotating in a CCW (counter clock wise) direction and Motor #2 and Motor #4 propellers are rotating in a CW (clockwise direction). As you increase the throttle, the propellers should speed up and vice versa.

(9) Moving the rudder stick (which also controls the throttle) to the right should decelerate CCW propellers (Motor #1 & Motor #3), thereby decreasing CW torque so the aircraft turns CCW. Moving the rudder to the left should decelerate CW propellers (Motor #2 & Motor #4), thereby decreasing CCW torque so the aircraft turns CW.

(10) Moving the directional stick to the top should decelerate the two front propellers (Motor #1 & Motor #2) and moving the directional stick to the bottom should decelerate the back propellers (Motor #3 & Motor #4). Moving the directional stick to the left should decelerate the left propellers (Motor #2 & Motor #3), and moving the directional stick to the right should decelerate the right propellers (Motor #1 & Motor #4).

(11) Move the throttle stick to lowest position and the propeller should come to a stop. Unplug the battery from the copter then turn the transmitter off.

(12) Repeat above Steps #2-11 twice more so that you complete 3 rounds of 8 to 10 minutes of tie-down flight.

5.2 Actual Flight Test & Training

(1) Pick a calm day or find a large empty indoor space. Keep all people and pets away from the flight test area and place the MATRIX on a level surface.

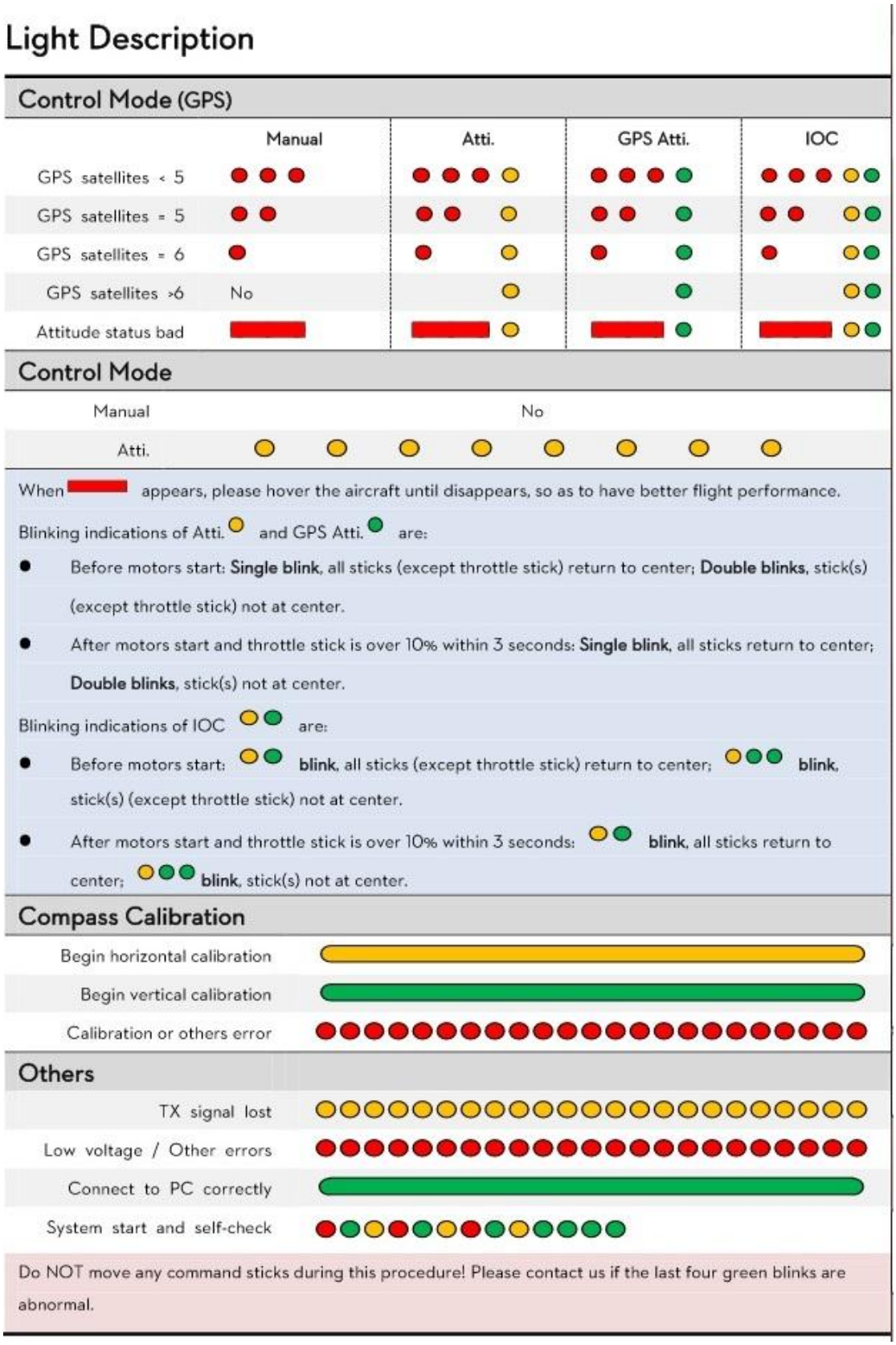
(2) Repeat Steps #2-11 under 5.1

(3) If you fly the MATRIX too close to the ground, the wash (deflected air) coming back up from the ground may cause significant flight instability. As with all propeller driven systems, you should try to keep larger aircraft at least 3 to 4 feet from the ground and avoid flying in a small room, which deflects air current. Before takeoff, you may also notice some vibration of the aircraft caused by auto stabilization from the deflected air. Once the aircraft lifts away from the ground, it will stabilize.

(4) If you are a beginner pilot, we highly recommend that you purchase a simulator training package or a trainer unit to practice. Though the MATRIX is equipped with easy to fly auto stabilization for safety, do not attempt to operate the aircraft without any flight experience. Always try to maintain the tail-in position (tail towards you) because that is the easiest orientation to keep your aircraft in control.

(5) As your skills improve, additional training includes flying in circles, figure 8s, backwards, sideways and other exercises to improve coordination.

5.3 LED Light Description for NAZA-Lite



5.4 LED Light Description for NAZA-V2

LED Description

System Status	LED Flashing
System start and self-check	
IMU abnormal data or need advanced calibration*	
Warm up after power on	
The aircraft is moved or bias of sensors too big	
Compass error too big, need recalibration.	
Transmitter (TX) signal lost, enter the FailSafe.	
TX stick(s) mid point error too big	
Low voltage alert or other abnormal alert* (e.g. Configuration error, TX data error, Enable low voltage protection without PMU, SN error or Compass abnormal work.)	
Record forward direction or home point	
Control Mode Indictor	Manual Mode: None ATTI. Mode: (stick(s) not at center) GPS Mode: (stick(s) not at center) IOC Mode: (stick(s) not at center)
GPS Signal State Indicator (GPS/Compass Module is necessary)	GPS Signal is Best(GPS Satellite number > 6): None GPS Signal is Well(GPS Satellite number = 6): GPS Signal is Bad (GPS Satellite number = 5) : GPS Signal is Worst (GPS Satellite number < 5):

Compass Calibration	LED Flashing
Begin horizontal calibration	
Begin vertical calibration	
Calibration or others error	

5.5 Battery Tips

(1) Set the alarm on your transmitter radio to a safe range. Trying to extend the flight time when the battery is low will only put your aircraft at risk. Always check your battery before each flight.

(2) Unlike other rechargeable batteries, LiPo batteries can easily be damaged if you drain them below 3.5V per cell (6 Cells x 3.5V = 21.0V). Do not force your battery to continue running when it's low. Doing so will only permanently damage your battery.

(3) Disconnect the battery plug from the MATRIX when you are done flying. Do not leave your battery plugged into the MATRIX after a flight.

(4) An inexpensive battery meter with an alarm would be a smart tool to have. Always check each battery's charge before each flight. A fully charged battery should be around 4.1V to 4.2V per cell (Multiply that by 6 for a 6 cells battery).

(5) A transmitter battery is a lot more reliable and convenient than 8 "AA" batteries for your transmitter. With a larger capacity, longer lifespan and the desired voltage, the transmitter battery is also rechargeable using the same battery charger as the helicopter battery.

5.6 Flight Time

Voltage warning settings for your MATRIX have been programmed conservatively to protect your batteries. To obtain longer flight times, on-board voltage must be observed during flight by using the telemetry function in your radio. Monitoring your batteries for maximum drain will greatly improve flight time but it requires knowledge of Li-Po battery power management. The rule of thumb is that the total operating voltage on the MATRIX cannot be drained to less than 21.0v total (3.5V per cell) during flight. After you have landed the MATRIX, the voltage reading will increase since no load is applied. The total no load voltage shall not be drained to less than 22.02v total (3.67V per cell) otherwise the battery may get damaged. Over drained batteries are not returnable, so caution must be used while operating Li-Po powered aircraft. Default setting for the NAZA Voltage Monitor:

1. Protection Switch→ON
2. Battery→ Battery Type: 6S LiPo
3. First Level Protection→ No Load is set to 22.8V, Loss is set to 0.6V and Loaded is set to 22.2V
4. Second Level Protection→ No Load is set to 19.2V, Loss is set to 0.6V and Loaded is set to 18.6V

CAMERA MOUNT SETUP

6.1 Gyrox Brushless Gimbal Setup

First, balance the gimbal and battery on the quad by adjusting the battery position. Battery should rest on the same plate as the gimbal mount (shock plate/battery mounting plate). Equilibrium can be tested by holding the quad on both sides with two fingers underneath the chassis hub cover.

Unlike servo driven gimbals, brushless gimbals require precision in order to properly balance your camera on the mounting plate. It is important to read and follow these installation instructions:

(1) Cameras heavier than a GoPro (0.5lb) will overload the brushless motors and caused them to fail. Use a camera that is equal to or lighter than a GoPro.

(2) (Skip this step if your brushless gimbal already has the GoPro fixed mount) Strap the camera down to the base plate of the mount. Allow the camera to move side to side for center of gravity adjustment. Shift the camera left or right until the center of gravity is obtained, then tighten the strap if needed. Do not power up the gimbal in the process. When the center of gravity is correct, the camera will stay level and will not tip easily to either side on the rolling axis of the mount.

(3) During initialization, remember that the camera must be leveled and the gimbal and multi-rotor cannot be handheld. Keep both perfectly still on a flat, stable surface. Apply power to the gimbal with a 3-cell Lipo 11.1v-12.6v and wait 5-10 seconds. You will notice the gimbal motors initialize and start leveling. The gimbal will then be ready for operation.

(4) If the center of gravity is off, the gimbal will buzz or shake. Shift the camera until the shaking stops.

(5) Brushless gimbals have a much quicker compensation than traditional servo-driven gimbal. Rough handling will cause your gimbal to malfunction. If this occurs, unplug the power and go through the initialization by setting it on the ground.

6.2 MATRIX CAMERA MOUNT SERVO CONTROL SETUP

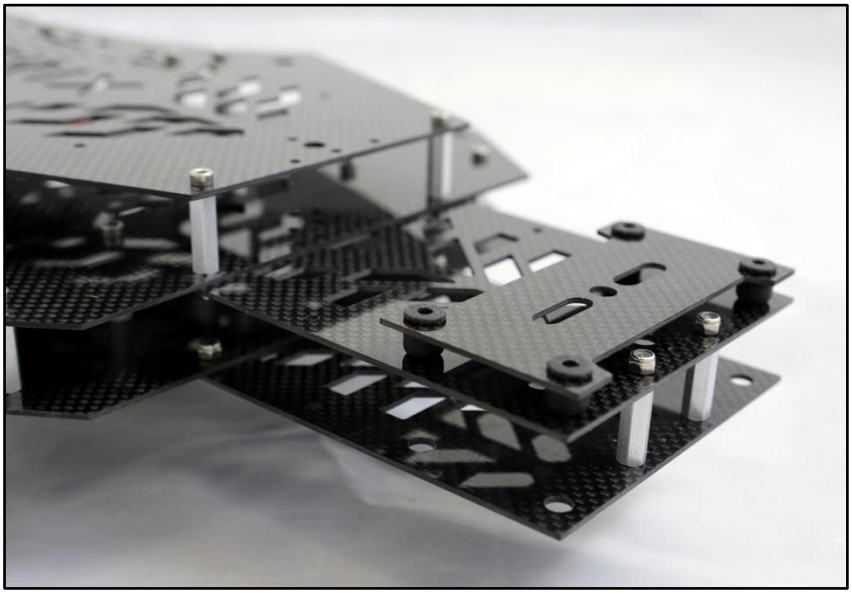


Figure 6.1-1 *MATRIX Camera Mount Plate and Shock Plate*

IMPORTANT: Only digital servos are compatible with the Naza flight controller. Using an analog servo will cause malfunctioning, produce loud buzzing noises and burn up the servo. A light buzzing sound from a digital servo is, however, normal. The MATRIX features built-in gyros for camera mount auto compensation so there is no need to purchase separate gyros for your camera mount.

6.2.1 How to set your camera TILT (PITCH) auto compensation control for the MATRIX-S flight controller, receiver and transmitter

Connect flight controller F2 to tilt (pitch) servo.
Connect receiver's (For Walkera Devo 10 is Aux 4, For Spektrum DX8 is Aux 3, or Futaba 14SG is channel 7) Channel (assuming the AUX4 channel has not been already used for flight mode control or other functions) to flight controller's X1 using a 3 wire cable with the black ground wire closest to the edge of the flight controller (some receivers' polarity for ground may be different, so see your receiver manual for more details). Go to AUTOPILOT tab in DJI NAZA Assistant Software to set all remote adjustments to INH, and go to the GIMBAL tab to click ON to enable the gimbal manual control. Additionally, when you tilt the MATRIX forwards or backwards, the MATRIX gyro will sense the tilt so the camera mount servo will also automatically compensate for that by pitching the camera in the opposite direction to

compensate. Go to the GIMBAL tab in DJI NAZA Assistant Software, and go to the 3. With Automatic Control Gain, you can increase the gain to make camera mount auto compensation movement faster or decrease the gain to make auto compensation movement slower. Moreover, if the camera mount is moving in the wrong direction, you can click the button under DIRECTION, to change between "NORM" and "REV".
For Walkera Devention 10, the AUX 4 knob can be turned to adjust the camera mount's tilt action.

6.2.2 How to set your camera auto compensation ROLL control for the MATRIX flight controller, receiver and transmitter

Connect flight controller F1 to roll servo. Now the servo will automatically compensate when the MATRIX rolls. First, tie down your MATRIX before you turn on your transmitter radio, then connect the battery to the MATRIX. Connect the provided Programming USB cable from your PC computer's USB port (XP or WIN7) to Micro USB port on the MATRIX communication port (on the LED side panel of the MATRIX). Please connect this cable after the transmitter has been bound to the receiver. Go to the GIMBAL tab to click ON to enable the gimbal manual control. Additionally, when you roll the MATRIX left or right, the MATRIX gyro will sense the roll so the camera mount servo will also automatically compensate for that by rolling the camera mount in the opposite direction to compensate. Go to the GIMBAL tab in DJI NAZA Assistant Software, and go to the 3. With Automatic Control Gain, you can increase the gain to make camera mount auto compensation movement faster or decrease the gain to make auto compensation movement slower. Moreover, if the camera mount is moving in the wrong direction, you can click the button under DIRECTION, to change between "NORM" and "REV".

6.2.3 How to adjust the compensation gain and servo direction reversal in the DJI NAZA Assistant Software

Remove all 4 propellers for safety- please do not skip this or serious accidents may occur. Turn on your radio and connect the battery (plugging in the main battery to the MATRIX is required to provide power to the gimbal servos) to the MATRIX. Make sure your transmitter throttle stick is all the way down before binding. For safety, please be very cautious to avoid moving the throttle stick of your transmitter during the entire process. Connect the USB cable from your PC to the micro USB port of the MATRIX communication port (on the LED side panel of the MATRIX). Double click

on the application DJI NAZA Assistant Software. At first launch of the application, the language may appear in Chinese- click on this Chinese tab anyway and change the language to English by clicking on the tab on the top of the screen. Sometimes when you launch an application and you don't see anything, it may be because the screen is hidden behind the previous application such as Windows Explorer, which you may have launched previously. Click on the "Gimbal" tab on the left panel of the screen. Now test the gimbal on the MATRIX by tilting it firmly on your hands. When the MATRIX tilts up the gimbal should travel and compensate in the opposite direction by tilting down. The camera should continue to lock on the subject you are shooting. If, however, the gimbal compensates in the same direction, go to 3. Automatic Control Gain under direction and click the box "NORM" or “REV” on the screen to reverse the servo travel. Test the gimbal compensation for roll action, and if compensation is in the same direction, simply click the box below direction for roll “NORM” or “REV”. Now test the gimbal for the amount of compensation. Note that the factory default compensation for tilt is set at 0.00. Each gimbal servo travels differently so adjustments may be required. If the gimbal compensation is too much or too little, you may adjust both the gimbal tilt and gimbal roll value by entering the number on the gain. When you have completed the settings, click on "Write" at the top of the program. You must click on “Write,” otherwise the data might not be loaded onto the MATRIX controller.

6.3 Flight Control Adjustment for Auto-Stabilization

Over attitude gain control may affect the vibration on the MATRIX. This type of vibration is particularly noticeable during climb out when there is a violent shake during acceleration. Also, any drastic weight change, such as loading on a DSLR camera, may require the attitude control gain adjustment. To access the adjustment, open the DJI NAZA Assistant Software, which is contained in the included flash drive. Connect the MATRIX to a Windows based PC with Windows 8 or Windows 7 or XP (For Windows to run this application, a current DirectX driver may be required). Upon initial application launch, you may see unreadable Chinese language. Just click on the top tab, and change language to English. Select the "AUTOPILOT" tab on the left column of the screen. Adjust the Basic Gain and Attitude Control Gain for Pitch, Roll, Yaw and Vertical by increments of 10. It is important that you click the "WRITE" tab, otherwise the new settings will not be stored in the flight controller.

6.4 Basic Gain and Attitude Gain Adjustment for Stabilization

Recommended settings for BASIC GAIN is Pitch set to 130%, Roll set to 120%, Yaw set to 90% and Vertical set to 120%, and for ATTITUDE GAIN is Pitch set to 100% and Roll set to 100%. **Warning**: BASIC GAIN needs to be set at a minimum of 90%. If your MATRIX is not as stable after a heavy camera or camera mount is installed, you should increase the BASIC GAIN and ATTITUDE GAIN by 15%-25% each time and re-test the performance of your MATRIX. Please refer to 4.6.3 to adjust your BASIC GAIN and ATTITUDE GAIN.

Assumptions on DJI NAZA FC design:
Assume aircraft flies stable as a general rule, which means FC outputs control signal to motor when it finds frame tilts for a stabilization recovery. We consider this non-RC tilt as an error.
According to the previous flight states, on the condition that vibration occurs during tilt, this can still be regarded as the stable state.
When the aircraft tilts to a certain direction, it will engender a tendency which could be reinforced.
Notice: Assumption 2 is not contradictory to Assumption 3.
We haven't built MATRIX mathematical modeling, which needs adjustments in Gain Tuning through personal sense. It is suggested that users grab the aircraft on the ground when tuning, which takes patience and skill. You will only get a comparatively ideal value after hours of tuning. **When setting Basic Gain and Attitude Gain Parameters, please exercise caution and always have the MATRIX tied down to a bench.**

MAINTENANCE & REPAIR

7.1 Replacing Motors (For Repairs Only)

To simplify motor replacement, the MATRIX motors can be disconnected once you remove the bottom frame, and motor wire is connected to ESC. **Please remember to reapply Loctite when putting bolts and screws back.**

(1) Make sure your battery is disconnected from the MATRIX.
(2) Identify the motor that needs to be replaced and put a marking sticker on the corresponding extension arm so you can identify which motor you are working on.
(3) Remove the bolts that secure the motor mount.
(4) Unscrew all the bottom bolts to dismount the bottom.
(5) Disconnect the three connectors for the old motor from the ESC and remove the old motor from the extension arm. All brushless motor wires have 3 wires. Prior to disconnection, please mark down the color of motor wire and the motor you're replacing.
(6) Feed the three motor connectors through the extension arm and connect three motor connectors to the ESC.
(7) Remount the new motor on the end of the extension arm using the bolts with Loctite.
(8) Please verify that the three motor wires are installed in the right positions by doing a tie-down flight test described in Section 5.1 and pay special attention to the motor that was replaced (look for the marking sticker on the extension arm). Always make sure to motor direction is correct, Motor #1 and #3 are counter clockwise, and motor #2 and #4 are clockwise.
(9) If the motor direction is correct, go to the next step. If the motor direction is incorrect, you may have made a mistake. Check your connections and make necessary corrections. Two wires connected incorrectly will cause the motor to spin in the wrong direction. Now tidy up the wires by pushing them back into the extension arm. For reverse the motor direction, just swap 2 motor wires on the ESC.
(10) If you make any changes, always repeat the tie-down flight tests in Section 5.1 until you are satisfied that everything is operating properly.

7.2 Replacing ESC (For Repairs Only)

When replacing the MATRIX ESC, you must follow a specific procedure, otherwise you may risk damage to the ESC wires, which may in turn short circuit the ESC and Flight Controller. **Please remember to reapply Loctite when putting bolts and screws back.**

(1) Make sure your battery is disconnected from the MATRIX.
(2) Remove the screw that lock the MATRIX folding arm
(3) Unscrew all the bolts from the top and bottom carbon.
(4) Disconnect the three motor connectors between the motor and ESC. Prior to disconnection, please mark down the color of motor wire and the motor you're replacing.
(5) Remove the corresponding ESC signal connector from the flight controller. Prior to disconnection and dismount the defective ESC.
(6) Trace the ESC's power supply wires back to the battery connector and disconnect the corresponding ESC's red and black bullet connectors.
(7) Carefully remove the ESC from the bottom frame. Mark the old ESC for future reference.
(8) Replace the new ESC and connect the ESC signal connector to the flight controller (for motor #1 ESC signal connector, it's connected to M1 on the flight controller. Motor #4 connector is connected to M4, etc…)
(9) Reconnect the ESC's power supply wire, the red and black bullet connectors back to the battery connector.
(10) Connect the motor connector back to the ESC.
(11) Remount the bottom frame and mount the extension arm.
(12) Please verify that the three motor wires are installed in the right positions by doing a tie-down flight test described in Section 5.1 and pay special attention to the motor that was replaced (look for the marking sticker on the extension arm). Always make sure to motor direction is correct, Motor #1 and #3 are counter clockwise, and motor #2 and #4 are clockwise.
(13) If the motor direction is correct, go to the next step. If the motor direction is incorrect, you may have made a mistake. Check your connections and make necessary corrections. Two wires connected incorrectly will cause the motor to spin in the wrong direction. Now tidy up the wires by pushing them back into the extension arm. For reverse the motor direction, just swap 2 motor wires on the ESC.

(14) If you make any changes, always repeat the tie-down flight tests in Section 5.1 until you are satisfied that everything is operating properly.

7.3 Replacing Extension Arms (For Repairs Only)

When replacing the MATRIX extension arm, you must follow a specific procedure, otherwise you may risk damage to the motor wires, which may in turn short circuit the entire flight controller and the ESC assembly. **Please remember to reapply Loctite when putting bolts and screws back.**

(1) Make sure your battery is disconnected from the MATRIX.
(2) Remove the screw that lock the MATRIX folding arm
(3) Unscrew all the bolts from the bottom frame. Put markers on the motor wires (1, 2 & 3) and the corresponding ESC wires (1, 2 & 3) coming out of the extension arm that needs to be replaced.
(4) Identify the extension arm that needs to be replaced and put a marking sticker on the corresponding motor and ESC so you can identify which arm, motor and ESC you are working on.
(5) Remove the bolts that secure the motor.
(6) Unscrew all the bolts from the bottom frame to dismount the bottom frame.
(7) Remove the two carbon skid plates.
(8) Remove the two screws that lock the extension arm.
(9) Disconnect the three connectors for the motor from the ESC and remove the motor from the extension arm. All brushless motor wires have 3 wires. Prior to disconnection, please mark down the color of motor wire and the motor you're replacing. Yellow wires are toward the inside of the Matrix, black wires are connected to the middle of the ESC pin and red wires are toward the outside edge of the Matrix.
(10) Feed the three motor connectors through the new extension arm and connect three motor connectors to the ESC.
(11) Remount the bottom frame by put back all the bolts from the bottom frame.
(12) Attach the new extension arm back to the frame and lock the extension arm onto the frame
(13) Please remember to use Loctite for all
(14) Please verify that the three motor wires are installed in the right positions by doing a tie-down flight test with the propellers removed. Always make sure to motor direction is correct, Motor #1 and #3 are counter clockwise, and motor #2 and #4 are clockwise.

(15) If the motor direction is correct, go to the next step. If the motor direction is incorrect, you may have made a mistake. Check your connections and make necessary corrections. Two wires connected incorrectly will cause the motor to spin in the wrong direction. Now tidy up the wires by pushing them back into the extension arm. For reverse the motor direction, just swap 2 motor wires on the ESC.

(16) If you make any changes, always repeat the tie-down flight tests in Section 5.1 until you are satisfied that everything is operating properly.

(17) Very important! Before attaching the carbon landing skid plates to the CNC brackets, please first make sure the inner CNC bracket is secured to the anchor shoulder bolt. If the carbon landing skids plates are installed first, it will cause the anchor bolt to misalign and possibly strip the CNC bracket screw hole.

(18) Attach the carbon skid plates on both sides of the inner and the outer CNC brackets with the 6mm screws.

FIXED ID BIND for Walkera Devo 10 transmitter

Setting up a Fixed ID bind between your MATRIX and Devo 10

IMPORTANT: When adjusting the settings of the MATRIX (while it is turned on), make sure that the propellers are removed and that the unit is securely tied down before proceeding in order to avoid any accidental flight.

Please ignore this step if you have a Futaba or Spektrum transmitter/receiver

Start by plugging in the Walkera bind plug (comes with receiver, if purchased) to the "batt." port on the receiver, followed by plugging in the battery for the MATRIX. The red light on the receiver should blink rapidly. Wait for the MATRIX's connection tune to finish playing, then proceed by unplugging the bind plug (the red light should now blink at a slower pace); followed by the battery.
NOTE: The transmitter does not need to be on for this step.

Setting up the Fixed ID on your transmitter

First go through the steps to bind the MATRIX to your transmitter (1. Turn on the transmitter 2. Plug the battery into the MATRIX 3. The MATRIX is bound when the red light on the receiver turns solid). From the home screen of the transmitter, go into the Main Menu screen and select: Model Menu → Fixed ID → turn Status to "On"→ set the ID code to your desired value and hit enter. You will see a little menu saying "ID Match." After the menu disappears, unplug the MATRIX battery, followed by the transmitter and you're done!
IMPORTANT: ALWAYS turn off the transmitter AFTER unplugging the MATRIX). Now your MATRIX will only bind with only the transmitter that you have set up the fixed ID bind with.