FLEX AVIATOR

DESIGNED BY:

SUPER **PNP**

Quick Assembly Guide

Thank you for purchasing the Flex Aviator 40E!

Flex Innovations airplanes are now shipping with digital manuals. This ensures that you always have the most up-to-date information, including any future modifications, upgrades or even future product generations. It also makes your assembly and flying experience as accurate and enjoyable as possible.

You can find the most updated version of the manual at the link shown below or simply by scanning the QR code with your phone. If you would like a printed version of the manual and did not order one with your airplane you can also find information on how to order one at the same location.

If you have experience assembling Flex Innovations Super PNP aircraft then this quick assembly guide is for you. Inside you will find general assembly sequence recommendations, radio setup details and everything you need pre-flight. This assembly guide is not comprehensive and assumes a certain level of familiarity and comfort with the process.

For full details on how to put together your Flex Aviator 40E, for any last minute updates, for additional details such as parts lists please follow the link or the QR code for the complete manual.

https://www.flexinnovations.com/product/flex-aviator-40e-super-pnp/

Introduction

*Inspired by the iconic aircraft of the Golden Age of 1950s civilian aviation, the **Flex Aviator** is an extraordinary fantasy aircraft with a super-wide flight envelope, offering exceptional ease of handling for pilots of all levels — from beginners to advanced experts. New from **Flex Innovations**, the **Aura 8** system features 6-axis stabilization and takeoff assist, making the **Flex Aviator** the ideal trainer. The **computer-free** design allows pilots to effortlessly switch between two distinct **Aura flight profiles**, transitioning seamlessly from a stable trainer to an advanced aerobatic machine.*

*Designed by World Champion **Quique Somenzini**, the **Flex Aviator** is as stunning in performance as it is in appearance. It also boasts the versatility to carry a wide range of battery sizes, giving you flexibility for longer flight times and various performance needs. The experience of flying the **Flex Aviator** is truly unique — a perfect blend of vintage design and modern innovation, delivering both thrill and ease in every flight.*

Completion Items

You will need the following to complete your Flex Aviator 40E:

- 6+ channel computer transmitter
- Serial capable receiver to match your transmitter, e.g. Spektrum 4651T, Futaba R2001SB or FrSky Archer Plus RS. For a current list of compatible receivers visit:
  https://wiki.flexinnovations.com/wiki/Aura
- 1800mah - 3500mAh 6S 22.2V 45C+ Li-Po (FPZB22006S45 recommended)
- 6S Li-Po capable battery charger

General Tips for this Quick Assembly Guide

This guide will go through a recommended sequence of assembly, including most pertinent information for each step, but without any major details. It will include a small quantity of pictures wherever necessary to clarify or illustrate these steps.

This information should be enough to put the Flex Aviator 40E together but if you have any doubts please reference the full manual.

Note: Do not use thread locker when attaching plastic parts, the parts will soften and fail.

Note: If you have the night version of the Flex Aviator 40E we recommend that you dry assemble the airframe and test all the lights before bonding anything permanently in place.

Assembly Sequence

Main Landing Gear

1. Remove the front gear cover and insert the landing gear into the fuselage. Aligning the two arrows, attach the gear cover using a #2 Phillips screwdriver and four **M2x15** sheet metal screws. Note that the wider side of the landing gear plastic fairing should face the rear side of the fuselage (as shown to the right).

2. Using thread locker on the wheel collet set screws and a 1.5mm hex driver, fasten the wheels to the main landing gear. Use a collet on each side of the wheels and ensure that the wheels spin freely.

Tail Wheel

1. Locate the vertical fin assembly, tail wheel and tail wheel retaining plate. Insert the tail wheel assembly into the bottom of the rudder, being sure to orient it so that the tail wheel wire angles towards the tail as the wire moves away from the fuselage.

2. Insert the retaining plate into the cavity on the bottom of the rudder. Use a #1 Phillips screwdriver and the three **M2x6** self-tapping screws to secure it in place.

Assembly Sequence (continued)

Vertical Stabilizer

1. Test fit the vertical fin to the fuselage, making sure everything fits properly. Make any adjustments that may be necessary.

2. Assemble the parts using epoxy adhesive, keeping it away from the hinge pivot points and being sure to wipe up any excess adhesive with a paper towel and rubbing alcohol. This area of the airplane sees a lot of load so ensure that you use epoxy for this joint for the extra strength it provides.

3. Once the adhesive has cured, install the rudder hinge screw using a #2 Phillips screwdriver. Deflect the rudder in both directions by hand to check movement. While checking the movement, tighten the screw until the rudder begins to bind, then loosen the screw one quarter turn.

Horizontal Stabilizer

1. Insert and roughly center the carbon fiber horizontal stabilizer tube in the fuselage.

2. Insert both halves of the horizontal stabilizer onto the tube. Ensure that the control horn faces the bottom of the fuselage and that the elevator joiner tabs line up properly.

3. If you have the night version, connect the LED power connectors.

4. Line up the square section on the elevator halves and ensure that they properly lock into each other as you seat the two halves of the horizontal stabilizer completely. **Do not force the stabilizer into place.**

5. Once both halves of the horizontal stabilizer are seated in place secure them each using a #2 Phillips screwdriver and two **M3x10** self tapping screws on the underside of the stabilizer.

Rudder and Elevator Linkages

Install the rudder and elevator linkages now but after setup you may need to re-center servo arms and ensure that the pushrods are the correct length to set the control surfaces to their neutral positions.

1. Using M3x6 screws, Install the servo arms on the servos so that they are perpendicular to the servos and face towards the ground. Once radio setup is complete, remove these screws and re-install them with thread locker.

2. Install the linkages between the servos and the corresponding control surface using the following hardware sequence: M2x10 Machine Screw → M2 Washer →Servo Arm or Control Horn → M2 Lock Nut.

3. The following diagrams show the positions of the linkages:
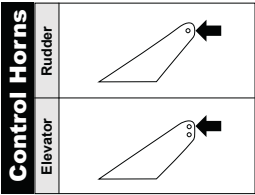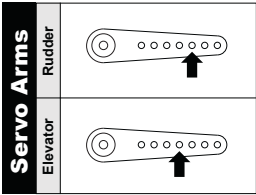
Note: Do not use thread locker on the bolts holding the push rods to the servos or the control horns!

Using thread locker will weaken the plastic, void your warranty and cause your airplane to crash!

4. The Flex Aviator uses a small amount of up elevator trim to fly level. This is shown in the picture to the right and measures 3mm at the counterbalance. Use this as a starting point when seeing your Linkage and adjust with quick trim after your maiden flight.
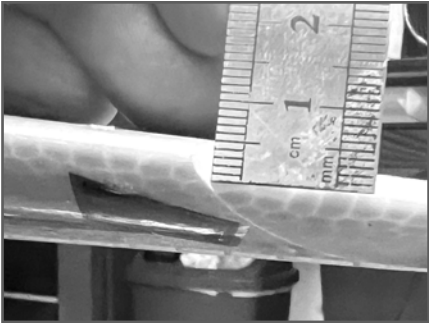
Assembly Sequence (continued)

Main Wing

1. Remove the top hatch from the fuselage by pulling the latch towards the front and lifting the hatch from the fuselage.
2. Unlock the Flex Speed-lock wing locks. Do this by pulling out on the knob (towards the center of the fuselage) and then slide the knob upwards until it stops, this is the raised/unlocked position.
3. Insert the main wing tube into the fuselage and roughly center.
4. Slide the left and right wing panels onto the tube. The servos and linkages are mounted on the underside of the wing.
5. Connect the all-in-one servo lead to the receptacle in the wing.
6. If you have a night version, connect the LED power leads.
7. Fully seat the wings into the fuselage while being careful to align the wing mounting tab with the slot in the fuselage. Be sure to avoid pinching any wires during this process.
8. Once the wing is completely seated, secure each wing to the fuselage by pushing down on the top aluminum rod of the Flex Speed-lock to lock the wing in place. When fully latched the knob in the Flex Speed-lock should seat properly in the provided notch.
9. Replace the hatch onto the fuselage.

Motor

1. Locate the motor prop-shaft assembly. Use a 2mm hex driver and blue thread-lock to attach it to the front of the motor using the five provided screws.

Note: Do not install the propeller on the airplane for now, this will be installed after radio setup and testing is complete.

Flight Profiles and Flight Modes

The Flex Aviator 40E is equipped with a Flex Innovations Aura 8 that provides two different flight profiles. The default profile is called the **Stock Profile,** *which Is recommended for beginner and intermediate pilots and the alternate profile is called the* **Expert Profile,** *which is recommended for intermediate to expert pilots.*

You can easily switch back and forth between the two profiles, without needing a computer.

Before first flight, determine which profile you would like to use. If you are a beginner, or if you are not sure which of the two will best suit you, or if you are just curious how the plane will behave in it's default configuration then use the **Stock Profile**. *If you are an experienced pilot and would like to get the most out of your Flex Aviator 40E starting with the first flight, feel free to switch profiles to the* **Expert Profile**.

Please note: flaps and preprogrammed mixes are enabled in both profiles.

The following two charts show the pre-configured flight modes of the two profiles included in the Aura 8 installed in the Flex Aviator 40E.

Flex Aviator 40E Aura - Stock Profile

This is the default, out-of-the-box profile for beginners to intermediate fliers.
The three flight modes allow great flexibility from learning to fly to aggressive sport aerobatics.
This profile is not recommended for Slow 3D. For Slow 3D maneuvers, switch to the **Expert Profile**.

Flight Mode 1: Level Assist (6 Axis - Gyro On)

- The is a beginner mode and ideal to learn to fly
- This is a self-leveling mode, when the sticks are released the plane will automatically return to straight and level flight
- Bank and pitch angles are limited, but very capable
- Rates are low and expos tuned for comfortable flight
- Gyro is set to low

Flight Mode 2: Sport (3 Axis - Gyro On)

- For general flight and basic sport aerobatics
- Rates are low and expos tuned for comfortable flight
- Gyro is set to low

Flight Mode 3: Advanced (3 Axis - Gyro On)

- For general flight and aggressive sport aerobatics
- Live Wing - Flaps work in conjunction with ailerons for added roll authority
- Rates are medium and expos are tuned for comfortable flight
- Gyro is set to low

Take-off/Launch Assist

- Can be enabled at the beginning of your flight
- Ideal to use when learning to fly or some weather or challenging field conditions

Flex Aviator 40E Aura - Expert Profile

This profile is for intermediate to expert fliers.
The three flight modes allow for a great spectrum of aerobatics.
If you intent to do 3D aerobatics, this is the profile you will use.

Flight Mode 1: Sport (3 Axis - Gyro On)

- For general flight and basic sport aerobatics
- Rates are low and expos tuned for comfortable flight
- Gyro is set to low

Flex Aviator 40E Aura - Expert Profile (continued)

Flight Mode 2: Advanced (3 Axis - Gyro On)

- For general flying and aggressive sport aerobatics
- Live Wing - Flaps work in conjunction with ailerons for added roll authority
- Rates are medium and expos tuned for comfortable flight
- Gyro is set to low

Flight Mode 3: Slow Speed 3D (3 Axis - Gyro On)

- For slow speed, 3D flight
- Live Wing - Flaps work in conjunction with ailerons for added roll authority
- Rates are highest and expos are tuned for comfortable flight
- Gyro is set to its highest setting and may oscillate if the plane if flown over ½ throttle

Take-off/Launch Assist

- Can be enabled at the beginning of your flight
- Ideal to use for some weather or challenging field conditions

How to Switch Between Stock and Expert Profiles

The following process outlines how you switch between the two included flight profiles. This process can be repeated to switch back and forth between the **Stock Profile** and **Expert Profile:**

1. Unplug the battery from the airplane and **Turn OFF** your transmitter.

2. Connect the battery to power up the Airplane. The Blue LED will flash indicating Gyro Calibration. After it stops flashing, orient the model with a straight down nose attitude and keep it still.

3. The Aura will detect this orientation, and switch the profile after a few seconds.

4. When the profile switches, the servos will power up and center. The elevator will then move 3 times to indicate the **Expert Profile** is being used or 6 times to indicate the **Stock Profile** is being used.

5. Once the elevator deflections complete, return the model to a level attitude and disconnect the battery.

6. Turn ON your transmitter and connect your battery as normal. Use your flight mode switch to check the Flight Modes act as expected and go fly!

7. To switch back to the other profile, just repeat this procedure.

Enable Take-off/Launch Assist Mode

Take-off/Launch Assist Mode is a special mode that can help beginners or during challenging take off conditions. Once Take-off/Launch Assist has been activated it will control the roll and pitch angle of your model, keeping the wings level and commanding a brisk climb out to get you to a safe altitude quickly. To enable Take-off/Launch Assist follow these steps:

1. Hold your transmitter sticks at the following positions for at least 3 seconds: Throttle low, rudder centered, full left aileron, full up elevator. The airplane must be still/stationary to enter Take-off/Launch Assist.

2. When Take-off/Launch Assist is enabled you will see the elevator go up and the ailerons move to try to keep the model level. You can now return the aileron and elevator sticks to center.

3. If you are having trouble activating Take-off/Launch Assist, make sure that all your trims are centered and keep the model level and immobile for at least 6 seconds holding the controls in the positions noted above.

4. Once Take-off/Launch Assist is active, you can proceed to take-off by advancing the throttle and using the rudder to steer. Do not move the aileron or elevator sticks from center after advancing the throttle as this will disable Take-off/Launch Assist.

5. Once you are at a comfortable altitude you can move the aileron and elevator, this will disable Take-off/Launch Assist and resume normal control.

Radio Configuration

The following table shows the radio configuration required for the Flex Aviator 40E:

	Spektrum, Futaba, JR & Graupner	FrSky	Jeti (EX-Bus)
Wing/Tail Type	1 Aileron, 1 Elevator, 1 Rudder	1 Aileron, 1 Elevator, 1 Rudder	1 Aileron, 1 Elevator, 1 Rudder
End Points (Travel Adjust or ATV)	Ail/Ele/Rud – 125%	Ail/Ele/Rud – 100%	Aileron/Ele/Rud – 100%
	Thro/CH5-CH8 – 100%	Thro/CH5-CH8 – 84%	Thro/CH5-CH8 – 80%
Reversing	**Use Default Transmitter Model Direction**		
Sub-Trim	**Verify at Zero, NOT ALLOWED**		
Trim Levers	**Verify at Zero**		
CH5 (Gear) – Flight Mode	**Assign to a 3 Position Switch**		
CH6 (Aux 1) – Flaps	**Assign to a 3 Position Switch (Do NOT use the Flap System in your Transmitter)**		
CH7 (Aux 2) – Gyro Gain Kill Switch*	**Assign to a 2 Position Switch**		
CH8 (Aux 3) – Crow Switch*	**Assign to a 2 Position Switch**		
First Flight Timer	**For your first flight, set to 4:00**		

** The default Aura program has the Gyro Gain Kill Switch disabled and the Crow disabled. See page 11 for detailed instructions on using **Quick Set** to enable the Gyro Gain Kill Switch (Ch7) or Crow (Ch8).*

Connect your serial receiver to the Aura and bind it to your transmitter. Once this is complete proceed with final configuration.

For more details on compatible receivers, on connecting and binding different receivers, flight modes and radio configuration download the complete Flex Aviator 40E manual (link on the cover page) or visit the Aura Wiki at: **https://wiki.flexinnovations.com/wiki/Aura**

Aura Configuration

DEFAULT AURA CONNECTIONS

- **S1 – Throttle**
- **S2 – Left Aileron**
- **S3 – Right Aileron**
- **S4 – Elevator**
- **S5 – Rudder**
- **S6 – Left Flap**
- **S7 – Right Flap**
- **S8 – Water Rudder (with optional floats) or LED Control**

Port B – Serial Receiver Input

Mini Port A&B – DSMX Remote Receiver Inputs
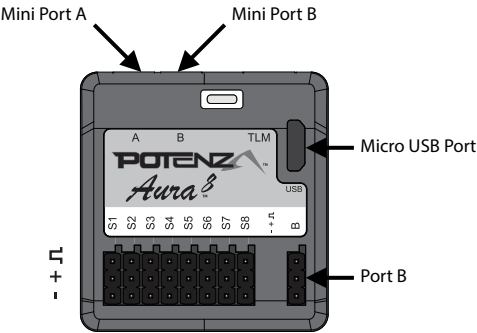
Aura Configuration (continued)

Aura 8 Auto-Detect

Once your receiver is bound, powered, and connected to the Aura, the Aura will begin the Auto-Detect process to learn what type of receiver you are using and set itself up for that specific system. Auto-Detect is indicated by a series of sweeping LEDs of various colors. After Auto-Detect is completed, verify that Aura is on and receiving data from your receiver by looking at the LEDs on the Aura.

Ready-To-Fly:

Solid Orange LED: Aura On and Calibrated

Solid Green LED: Aura receiving Valid receiver data

Possible Errors:

Flashing Orange LED: Aura Moved During Power Up

No Green LED: Aura NOT receiving receiver data

Final Radio Setup

Connecting Battery and Arming ESC

1. Turn on the transmitter. Lower the throttle stick AND throttle trim to their lowest settings.

2. Ensure the aileron, elevator and rudder gimbals are centered.

3. With the airplane on a solid surface, connect the battery to the ESC and wait. The ESC will make the motor emit a series of audible tones during its initialization process.

4. The ESC will make the motor emit a short, final tone sequence indicating that the ESC is now armed and that the motor will spin in response to throttle stick movement.

ESC Throttle Calibration

In order to map the full range of the ESC output to your throttle stick motion you will have to preform an ESC throttle calibration. **NOTE: Execute ESC throttle calibration with the propeller and spinner removed.**

1. Power on your transmitter, DISABLE any throttle hold or throttle kill switches, **completely lower the throttle trim** and set the stick to full throttle.

2. Connect the flight pack to your Flex Aviator 40E.

3. Listen for the tones coming from the ESC through the motor, after about 2 seconds you should hear two tones.

4. Pull your throttle stick back to idle.

5. Listen for the ESC arming tones from the motor.

6. Unplug the flight battery to complete calibration.

> **Note: After throttle calibration is complete it is necessary to reset the failsafe (see your radio documentation, this may require a re-bind).**

Final Radio Setup

Take this moment to finalize the position of the servo arms and pushrod lengths on your Elevators and Rudder and ensure that the motor is spinning in the correct direction (clockwise when viewed from the cockpit). Make any final control surface adjustments as necessary either mechanically or in the Aura, do not use trim or sub-trim.
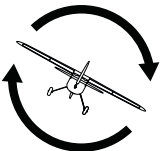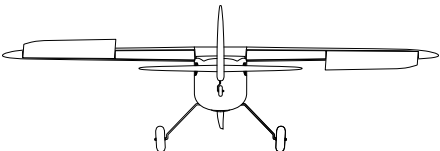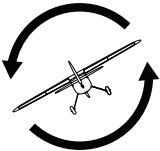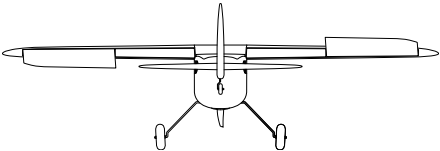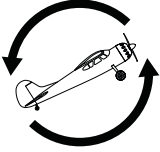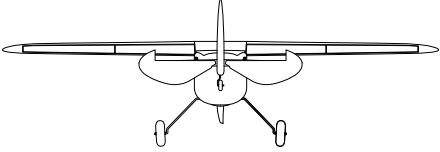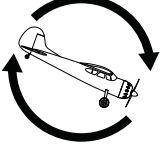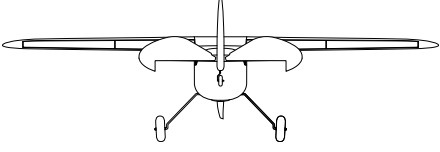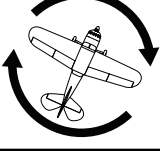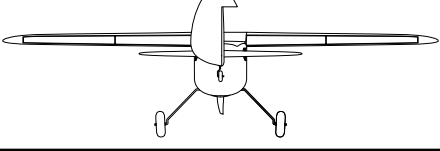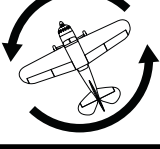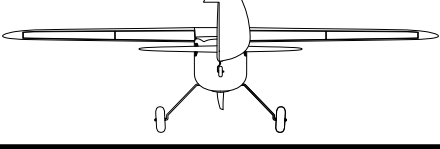
Note: Don't forget to add 3mm of up elevator (at the counterbalance) for neutral flight. See page 3 for more details.

Aura Sensor Direction Test

Perform a test of the gyro system to verify the corrections made for a given movement are correct. **If any of the tests do not result in the correct reaction from the airplane's gyro system, DO NOT FLY THE AIRPLANE, and contact us via email at support@flexinnovations.com**

Perform these tests in the high gain Flight Mode 3 (or a 6 Axis Level Assist mode) for better visibility. The Aura must be receiving control signals (Solid GREEN LED) to perform this test.

Control surface deflections are exaggerated in the pictures below for clarity. Please note the control surfaces will only move WHILE the aircraft is being ROTATED for 3 Axis Control Modes.
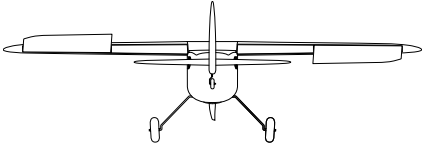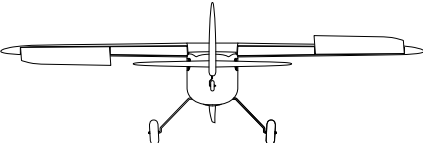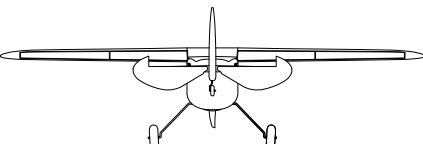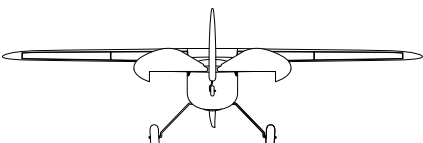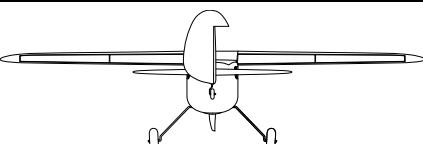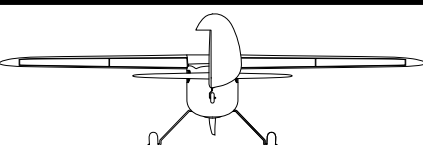
	Aircraft Movement	Proper Control Surface Deflection
AILERON		
AILERON		
ELEVATOR		
ELEVATOR		
RUDDER		
RUDDER		

Control Direction Test

Refer to the chart below to determine the proper control surface directions.

If the movement from the transmitter is reversed but the previous Sensor Direction test passed, you can reverse the Input in your transmitter or Aura Config Tool. If you are nervous or have any questions, email us at support@flexinnovatoins.com **for corrective action. Note that BOTH the Transmitter Control Direction Test AND the Flight Controller Sensor Direction Test MUST BE PASSED! IF EITHER ONE DOES NOT PASS, DO NOT FLY!**

NOTE: There is pre-configured rudder to aileron and rudder to elevator mixing programmed into the Aura. Simultaneous movement of these control surfaces with rudder input is intentional and completely **NORMAL**.

	Transmitter Command	Proper Control Surface Deflection
AILERON	**Stick Left**	
	Stick Right	
ELEVATOR	**Stick Forward**	
	Stick Aft	
RUDDER	**Stick Left**	
	Stick Right	

Completion and Flight Readiness

Once your radio and Aura 8 configuration is complete there are only a few steps left to get your Flex Aviator 40E in the air:

1. Mount the propeller to the motor using the provided washer and nut.
2. Install the spinner to the prop adapter using the provided M3 X 6mm screw.
3. Move the battery back and forth as necessary to achieve the desired CG (shown to the right).

Center of Gravity Verification

The center of gravity (CG) location for your aircraft is located in two locations depending on the flying style you wish to fly.

For general sport flying, the CG is located 3-1/32 inches (77mm) rear of the leading edge of the wing at the fuselage.

For more aerobatic capability, the CG is located 3-11/32 inches (85mm) rear of the leading edge of the wing.
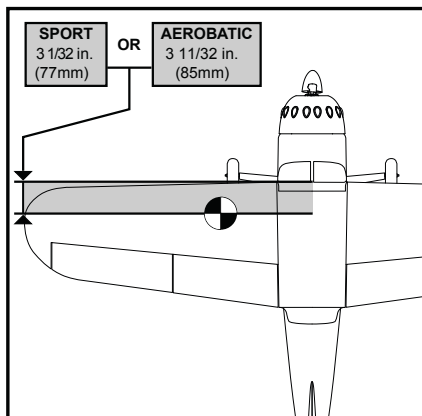
Quick Set Procedure

Step 1 - Enter Quick Set Mode
- Make sure all power is off on the Flex Aviator 40E and Remove the prop.
- Turn on your transmitter, Remove the Servo lead from Aura Port S2, Install a bind plug in Aura Port S2, Plug in the motor battery to power up the Flex Aviator 40E.
- After entering the Quick Set mode, the Orange LED will be off and the Green LED will be on **Solid**. Initially the Blue and Red LEDs will also be off.

Step 2 – Adjust Gyro Kill Switch and Crow Mode Switch
After entering Quick Set mode as described above, you toggle the Gyro Gain Kill switch (CH7) and/or Crow Mode switch (CH8) on the transmitter. To enable or disable the different options:
If you want to activate the Gyro Gain Kill switch, toggle the CH7 switch on your transmitter .
- If the Blue LED is **On**, the Gyro Gain Kill switch is **Enabled**.
- If the Blue LED is **Off**, the Gyro Gain Kill switch is **Disabled**.
If you want to activate the Crow Mode switch, toggle the CH8 switch on your transmitter .
- If the RED LED is **On**, the Crow Mode switch is **Enabled**.
- If the RED LED is **Off**, the Crow Mode switch is **Disabled**.

Step 3 - Saving your Selections
After setting the Gyro Gain Kill and Crow Mode options as desired, remove the bind plug to save your settings. The Blue, Green, and Red LEDs will briefly turn on while the Aura is saving, the return to their previous state. Completely power off the Flex Aviator 40E and Aura, Replace the Servo Lead in Aura Port S2, Power up and Fly as usual.
Note: This process can be repeated as many times as desired to enable or disable Gyro Kill and/or Crow Mode.

First Flight and Quick Trim in 3-Axis Mode

We recommend that you fly the maiden flight using **Flight Mode 2** (Sport Mode) in the **Stock Profile** or **Flight Mode 1** (Sport Mode) in the **Expert Profile**. Trim the airplane until you achieve straight and level flight. Once you land, you can execute the Quick Trim procedure below but you **MUST** start the procedure with the Flight Mode switch in the same position as when you flew and trimmed the aircraft.

1. Power off the Flex Aviator 40E. Insert a bind plug into Aura Port S3 (you will need to remove the servo lead that is currently in S3). Check that the transmitter is powered on and re-power the Aura to enter Quick Trim.
2. Wait 5 seconds for the Aura to completely initialize. Confirm Quick Trim mode is active by checking the Blue LED is slowly flashing.
3. Remove the bind plug to save your trim settings, the Blue LED will now flash quickly indicating the new trim values have been stored successfully. Power off the Flex Aviator 40E and re-install the servo into port S3.

4.   RE-center all control surface trims on the transmitter.

5.   Re-power the Flex Aviator 40E, the control surfaces should be unchanged as the new trims have been applied.

First Flight and Quick Trim in 6-Axis Mode

The 6-Axis flight mode stores separate trim settings from the 3-Axis Flight modes, for this reason we recommend that you quick trim this flight mode separately. Fly the model using **Flight Mode 1**(Level Assist) in the **Stock Profile**. Trim the airplane until you achieve straight and level flight **using ½ throttle**. Once you land, you can execute the Quick Trim procedure below but you **MUST** start the procedure with the Flight Mode switch in **Flight Mode 1**.

1.   Power off the Flex Aviator 40E. Insert a bind plug into Aura Port S3 (you will need to remove the servo lead that is currently in S3). Check that the transmitter is powered on and re-power the Aura to enter Quick Trim.

2.   Wait 5 seconds for the Aura to completely initialize. Confirm Quick Trim mode is active by checking the Blue LED is slowly flashing.

3.   Remove the bind plug to save your trim settings, the Blue LED will now flash quickly indicating the new trim values have been stored successfully. Power off the Flex Aviator 40E and re-install the servo into port S3.

4.   RE-center all control surface trims on the transmitter.

5.   Re-power the Flex Aviator 40E, the control surfaces should be unchanged as the new trims have been applied.

> **NOTE: Due to the nature of Flight Mode 1 (Level Assist), the model will tend to climb at full throttle and descend when the throttle is around or below ½. For this reason, trimming of the model should be done at a comfortable cruising speed, at around ½ throttle.**

Enjoy your Flex Innovations Flex Aviator 40E!

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