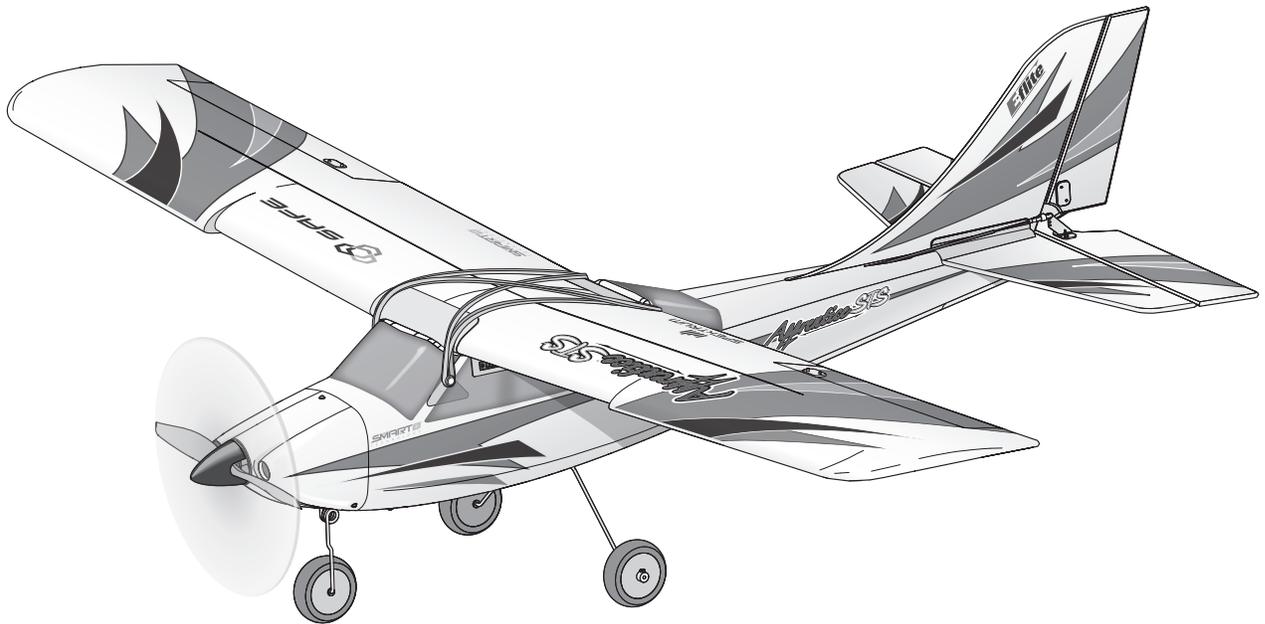


Apprentice[®] STS



Scan the QR code and select the Manuals and Support quick links from the product page for the most up-to-date manual information.

Scannen Sie den QR-Code und wählen Sie auf der Produktseite die Quicklinks Handbücher und Unterstützung, um die aktuellsten Informationen zu Handbücher.

Scannez le code QR et sélectionnez les liens rapides Manuals and Support sur la page du produit pour obtenir les informations les plus récentes sur le manuel.

Scannerizzare il codice QR e selezionare i Link veloci Manuali e Supporto dalla pagina del prodotto per le informazioni manuali più aggiornate.



EFL370001



EFL3750

Instruction Manual
Bedienungsanleitung
Manuel d'utilisation
Manuale di Istruzioni

NOTICE

All instructions, warranties and other collateral documents are subject to change at the sole discretion of Horizon Hobby, LLC. For up-to-date product literature, visit www.horizonhobby.com or towerhobbies.com and click on the support or resources tab for this product.

MEANING OF SPECIAL LANGUAGE

The following terms are used throughout the product literature to indicate various levels of potential harm when operating this product:

WARNING: Procedures, which if not properly followed, create the probability of property damage, collateral damage, and serious injury OR create a high probability of superficial injury.

CAUTION: Procedures, which if not properly followed, create the probability of physical property damage AND a possibility of serious injury.

NOTICE: Procedures, which if not properly followed, create a possibility of physical property damage AND little or no possibility of injury.



WARNING: Read the ENTIRE instruction manual to become familiar with the features of the product before operating. Failure to operate the product correctly can result in damage to the product, personal property and cause serious injury.

This is a sophisticated hobby product. It must be operated with caution and common sense and requires some basic mechanical ability. Failure to operate this Product in a safe and responsible manner could result in injury or damage to the product or other property. This product is not intended for use by children without direct adult supervision. Do not use with incompatible components or alter this product in any way outside of the instructions provided by Horizon Hobby, LLC. This manual contains instructions for safety, operation and maintenance. It is essential to read and follow all the instructions and warnings in the manual, prior to assembly, setup or use, in order to operate correctly and avoid damage or serious injury.

AGE RECOMMENDATION: Not for children under 14 years. This is not a toy.



WARNING AGAINST COUNTERFEIT PRODUCTS: If you ever need to replace your Spektrum receiver found in a Horizon Hobby product, always purchase from Horizon Hobby, LLC or a Horizon Hobby authorized dealer to ensure authentic high-quality Spektrum product. Horizon Hobby, LLC disclaims all support and warranty with regards, but not limited to, compatibility and performance of counterfeit products or products claiming compatibility with DSM or Spektrum technology.

If you own this product, you may be required to register with the FAA. For up-to-date information on how to register with the FAA, visit <https://registermyuas.faa.gov/>. For additional assistance on regulations and guidance on UAS usage, visit knowbeforeyoufly.org/.

Safety Precautions and Warnings

As the user of this product, you are solely responsible for operating in a manner that does not endanger yourself and others or result in damage to the product or the property of others.

- Always keep a safe distance in all directions around your model to avoid collisions or injury. This model is controlled by a radio signal subject to interference from many sources outside your control. Interference can cause momentary loss of control.
- Always operate your model in open spaces away from full-size vehicles, traffic and people.
- Always carefully follow the directions and warnings for this and any optional support equipment (chargers, rechargeable battery packs, etc.).
- Always keep all chemicals, small parts and anything electrical out of the reach of children.
- Always avoid water exposure to all equipment not specifically designed and protected for this purpose. Moisture causes damage to electronics.
- Never place any portion of the model in your mouth as it could cause serious injury or even death.
- Never operate your model with low transmitter batteries.
- Always keep aircraft in sight and under control.
- Always use fully charged batteries.
- Always keep transmitter powered on while aircraft is powered.
- Always remove batteries before disassembly.
- Always keep moving parts clean.
- Always keep parts dry.
- Always let parts cool after use before touching.
- Always remove batteries after use.
- Always ensure failsafe is properly set before flying.
- Never operate aircraft with damaged wiring.
- Never touch moving parts.

Registration

Register your product today to join our mailing list and keep up to date with product updates, offers and E-flite® news.



Table of Contents

Aircraft Components	4
Aircraft Assembly	5
Spektrum DXS Transmitter	7
Flight Battery Installation, SAFE System and Electronic Speed Control (ESC) Arming	8
Center of Gravity (CG)	9
Control Direction Test	10
Before Your First Flight	10
Choose a Flying Field	11
Range Test	11
Flight Control	12
Sensor Assisted Flight Envelope (SAFE) Technology Flight Modes	13
Preflight Checklist	14
Flying	14
Trimming the Aircraft	16
Post Flight	17
Transmitter and Receiver Binding	17
Flight Training	18
Optional Landing Assist Sensor (LAS) Upgrade	19
Optional SAFE Plus GPS Upgrade	20
Optional Transmitter Setup	29
Service and Repairs	30
AS3X® System Trouble Shooting Guide	32
Troubleshooting Guide	32
Replacement Parts	33
Recommended Parts	33
Glossary of Important Terms	33
Optional Parts	33
Hardware	33
Important Federal Aviation Administration (FAA) Information	34
AMA National Model Aircraft Safety Code	34
Limited Warranty	35
Contact Information	35
FCC Information	36
IC Information	36
Compliance Information for the European Union	36

Specifications

Wingspan	59" (1500mm)
Length	42.5" (1080mm)
Weight	Without Battery: 50oz (1418g) With 3S 4000mAh Battery: 59.oz (1672g)

Included Equipment

Transmitter	Spektrum™ DXS 2.4GHz (SPMR1010)
Transmitter Batteries	4 AA Alkaline
Receiver	Spektrum™ DSMX SRXL2 Receiver with Connector Installed (SPM4650C)
Flight Controller	Spektrum™ Flight Controller (SPMA3230)
ESC	30-Amp 3S ESC with Telemetry (EFLA1030FB)
Motor	840Kv Brushless Outrunner 12-Pole Motor (EFLM7215)
Propeller	11 x 8 Electric Propeller (EFLP11080E)
Servos	(2) Aileron, 13g Micro Servo (EFLR7155) (1) Elevator, 13g Micro Servo (EFLR7155) (1) Rudder, 37g Standard Servo (EFLR7150)

Required Equipment

Flight Battery	3S 11.1V 3200-4000mAh LiPo Battery with IC3® or EC3™ Connector
Battery Charger	3-4S LiPo Battery Compatible

Optional Accessories

SPMA3180	Landing Assist Sensor (LAS)
RFL1205	RealFlight Trainer Edition RC Flight Simulator
SPMWS2000	WS2000 Wireless Simulator USB Dongle
SPMXPSA300	Smart G2 Powerstage Bundle with 3S 4000mAh Battery and S120 Charger

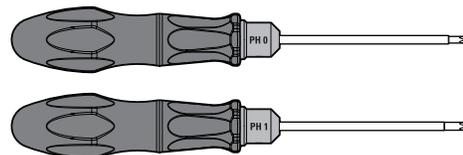
Completion Guide

Scan this QR code to see the Completion Guide for information on the recommended Powerstage battery and charger bundle. You can also view the Optional Parts list on the product page on www.HorizonHobby.com for more information on other compatible batteries, chargers and other items.



Completion Guide

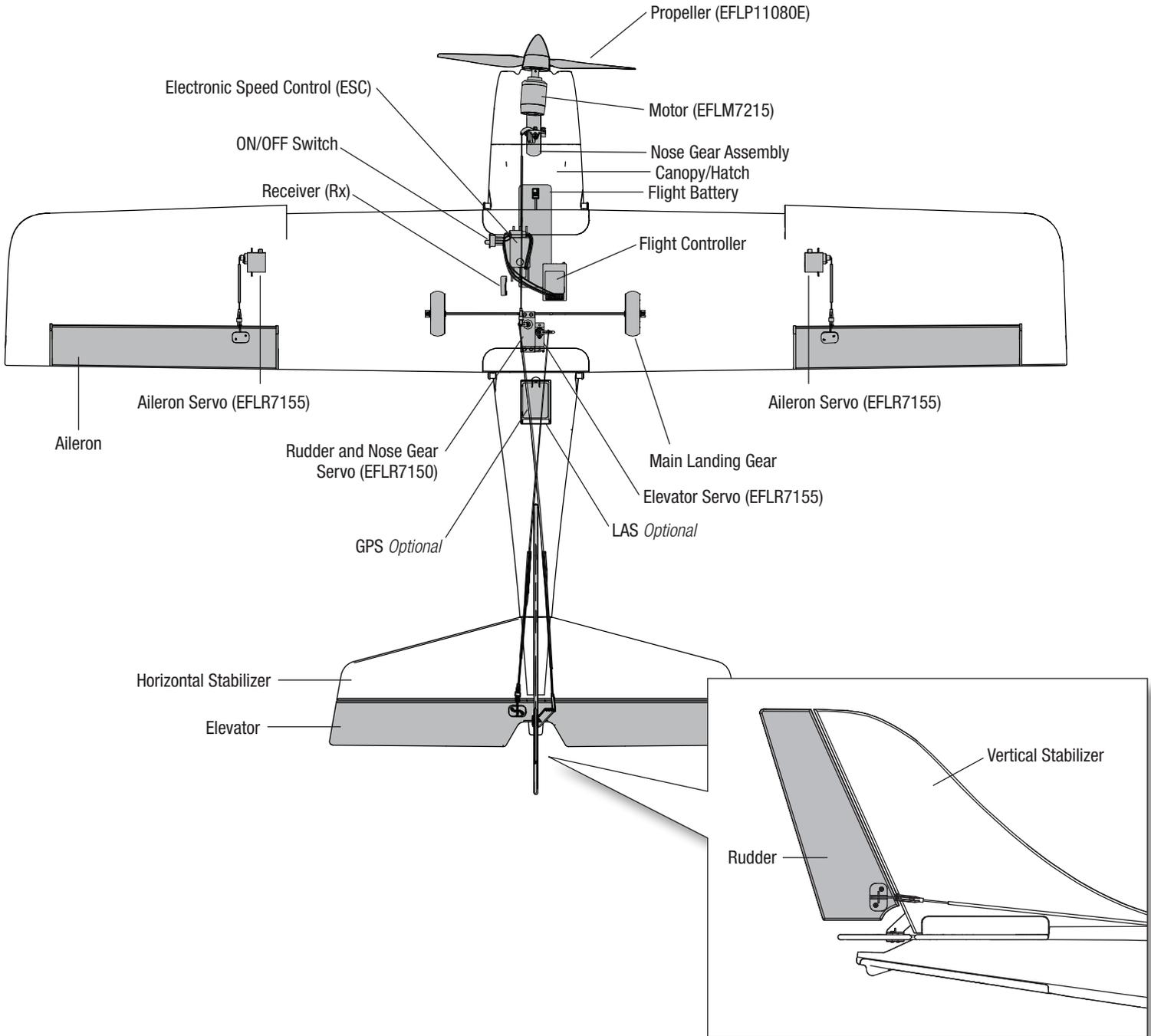
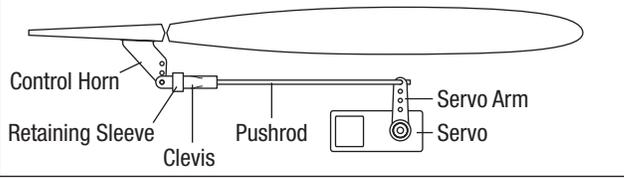
Required Tools



- Phillips Screwdrivers (PH#0, PH#1)

Aircraft Components

Typical Control Components



Aircraft Assembly

We recommend reading each section of this manual before proceeding with assembly per the steps outlined. We also recommend watching the entire assembly video by scanning this QR code or using this URL: www.horizonhobby.cc/ApprenticeSTSassembly.



Assembly Video

Landing Gear Installation

We recommend watching the "Landing Gear Installation" chapter/section of the assembly video by scanning this QR code or using this URL: www.horizonhobby.cc/ApprenticeSTSassembly.

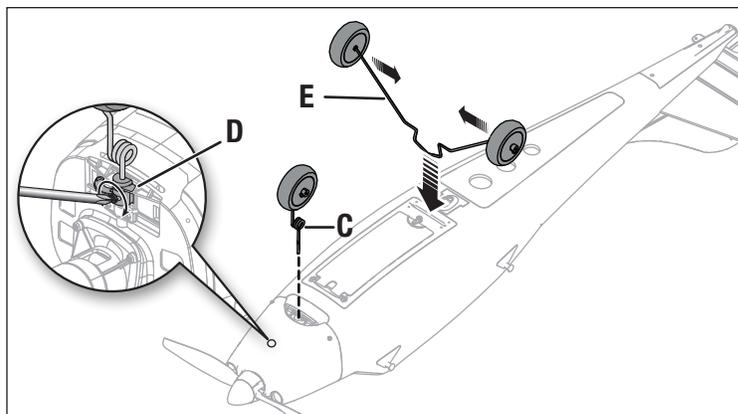
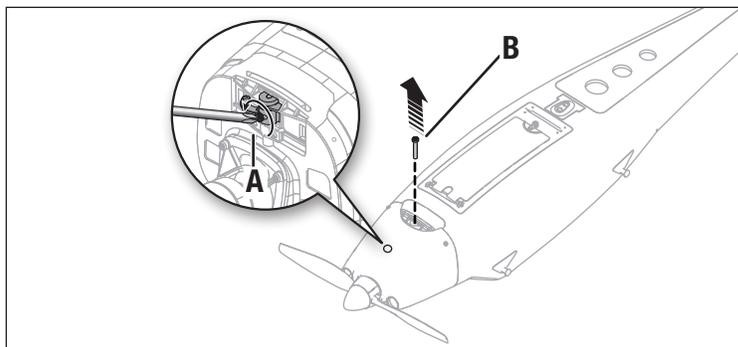


Assembly Video

1. Lay the fuselage upside down on a flat surface.
2. Insert a screwdriver through the hole on the underside of the cowl to loosen the set screw (A) in the nose gear steering arm.
3. Remove the alignment pin (B) from the nose gear steering arm hole and insert the nose gear (C) (flat spot facing forward) fully in the mount (D).

NOTE: The alignment pin is for transport and not required after the nose gear has been installed.

4. Fully tighten the set screw onto the flat spot of the strut.
5. Push together the main landing gear struts (E) together and insert the upper section into the slot in the fuselage as shown.



Tail Installation

We recommend watching the "Tail Installation" chapter/section of the assembly video by scanning this QR code or using this URL: www.horizonhobby.cc/ApprenticeSTSassembly.

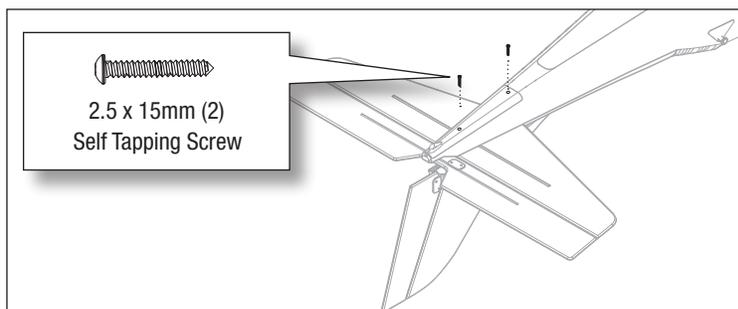
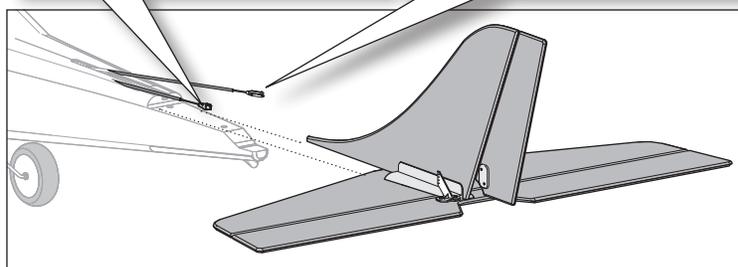
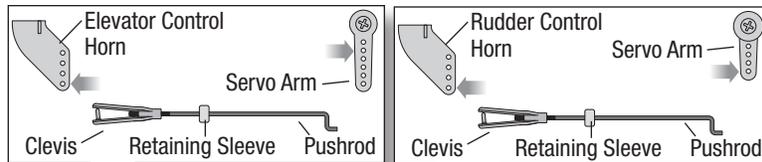
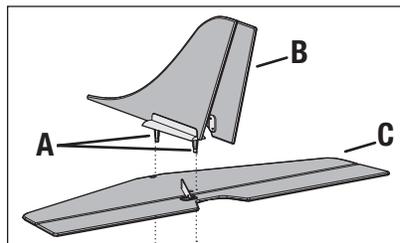


Assembly Video

1. Insert the 2 pins (A) of the vertical stabilizer (B) through the holes of the horizontal stabilizer (C), press together firmly.
2. Install the tail assembly on the fuselage under the linkages as shown.
3. Carefully align the 2 pins of the tail assembly with the fuselage holes and press fit the assembly into place.
4. From the bottom of the fuselage, use two 2.5 x 15mm self tapping screws (D) to secure the tail assembly to the fuselage. Pay close attention to where the plastic base of the vertical stabilizer meets the horizontal stabilizer while tightening the screws. Only tighten as far as to seat the tail surfaces firmly.

IMPORTANT: Do not overtighten the screws. Overtightening may cause damage to the screws and attachment points.

5. Connect the respective clevises in the outermost holes in the rudder and elevator control horns.



Wing Installation

We recommend watching the “Wing Installation” chapter/section of the assembly video by scanning this QR code or using this URL:

www.horizonhobby.cc/ApprenticeSTSassembly.



Assembly Video

The wing of the Apprentice STS is secured to the fuselage using six of the included rubber bands. This method of installation allows the wing to move, or separate from the fuselage in the event of a hard landing or crash, minimizing damage to the airframe. The use of more than six rubber bands is not recommended, as using additional bands may cause the wing to be held too securely to the fuselage.

1. Carefully apply the 2 strips of double-stick tape (A) to the root of the wing as shown. Remove the packing material from the wing tube and the tape from the ailerons. Assemble the wings on the carbon wing tube (B) so there is no gap. No epoxy is required to hold the wings together; however, if desired, epoxy may be used (instead of the tape) to adhere the wings to each other on the wing tube.
2. Ensure the wings are correctly aligned. Remove the backing from the double stick tape on the inside of each joiner. Install the narrow front leading edge joiner (C) and wide rear trailing edge joiner (D) in their respective slots on the wing as shown.
3. Connect the right and left aileron servo linkages to the outer hole of the respective control horns by using the included linkages and clevises.
4. Connect the left aileron servo connector to the servo extension labeled “AIL-L”, and connect the right aileron servo connector to the servo extension labeled “AIL-R”.

IMPORTANT: Ensure the aileron servo wires are not pinched between the wing and fuselage.

5. Install the wing on the fuselage.

CAUTION: DO NOT crush or otherwise damage the wiring when attaching the wing to the fuselage.

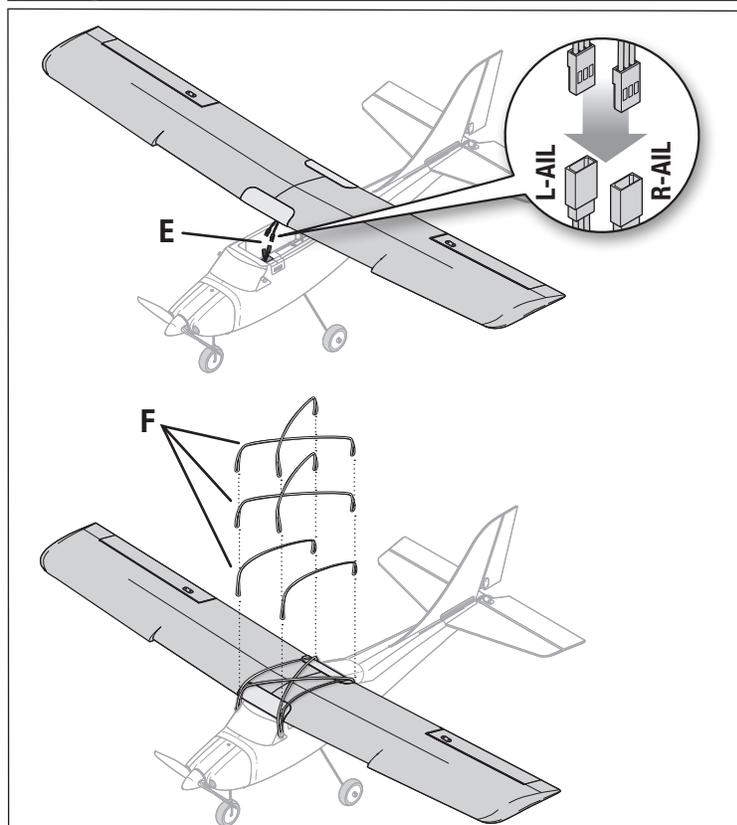
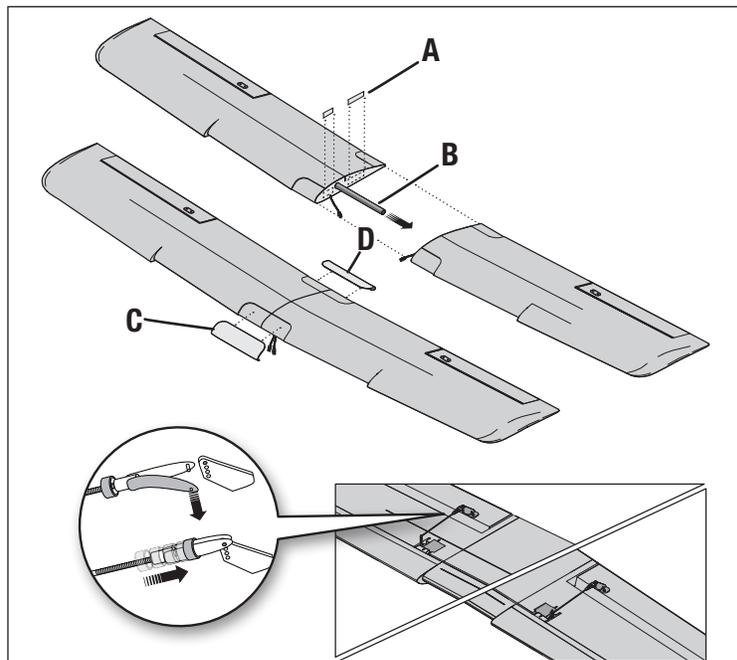
6. Install 6 rubber bands (F) on the front and back rods to complete the installation. Center the wing on the fuselage. Going from front to back over the wing, attach 6 rubber bands to secure the wing to the fuselage.

TIP: Install the first two bands diagonally, starting from the front pin to the rear pin on the opposite side of the fuselage. Install the last four bands starting from the front pin straight back to the rear pin on the same side of the fuselage.

7. Disassemble in reverse order.

We recommend removing the wing from the fuselage for transport and storage of your model. Before each flight, ensure the wing is centered, straight and secure on the fuselage.

TIP: Ensure the caps are secure on the ends of the rods. If needed, apply CA (cyanoacrylate adhesive) to secure a cap on the rod.



Spektrum DXS Transmitter

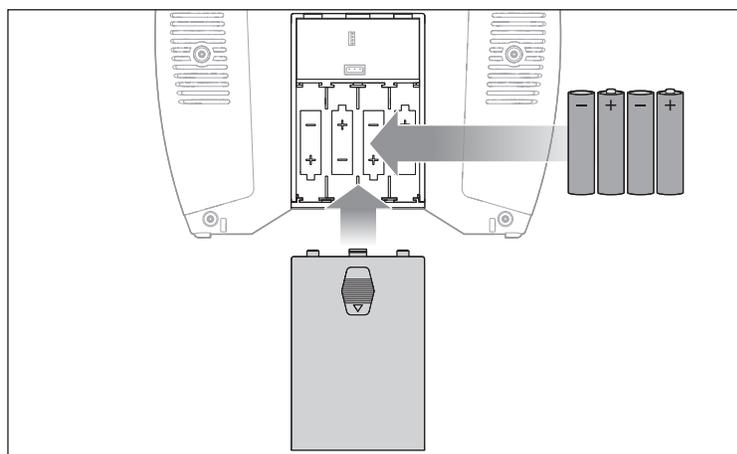
Install the Transmitter Batteries

1. Remove the battery cover.
2. Install the included four AA batteries, noting proper polarity.
3. Reinstall the battery cover.

Low Battery Alarm

When the transmitter battery voltage drops below 4.7 volts, an alarm sounds and the voltage LEDs flash. Replace the batteries immediately. If the alarm sounds while flying, land your aircraft as soon as possible.

CAUTION: If using rechargeable batteries, charge only rechargeable batteries. Charging non-rechargeable batteries may cause the batteries to burst, resulting in injury to persons and/or damage to property.



Transmitter Switches and LEDs

Button A = Trainer/Bind/Panic Button: This button is used to control the Trainer, Bind and Panic Recovery Mode functions.

See the Flight Training section for information on using the transmitter as part of a "buddy box" training system.

See the Binding section for information on re-binding your transmitter and aircraft if necessary. The included transmitter comes bound to the receiver/aircraft from the factory, therefore binding is not typically necessary.

See the Sensor Assisted Flight Envelope (SAFE) Technology section for information about panic recovery mode.

Switch F = Hi/Lo Rate Switch: This switch supports high and low rate functions on aileron, elevator and rudder channels.

We recommend using low rates when first learning to fly or for smooth and more precise maneuvering, and high rates for more aggressive maneuvers and aerobatics. In the upper, or "HI" position, servo travel is 100% on these channels. In the lower, or "LO," position, servo travel decreases to 70%.

Switch B = Flight Mode Switch: This switch is used to select the SAFE flight mode. See the Sensor Assisted Flight Envelope (SAFE) Technology section for information about the various SAFE flight modes.

Switch H = Throttle Cut Switch: This switch activates throttle cut.

With throttle cut on (switch H, position 1), throttle input from the throttle stick is deactivated. This safety feature ensures any accidental movement of the throttle stick will not activate the motor while the flight battery is connected.

With throttle cut off (switch H, position 0), any position of the throttle stick above the lowest setting will activate the aircraft motor.

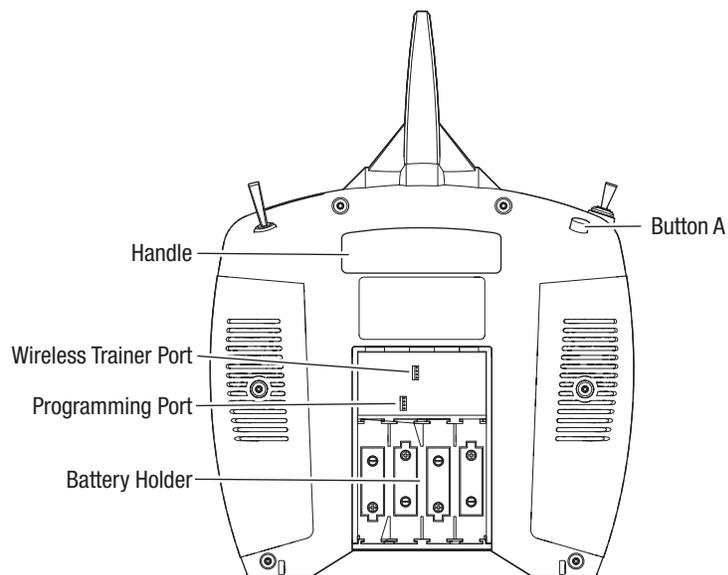
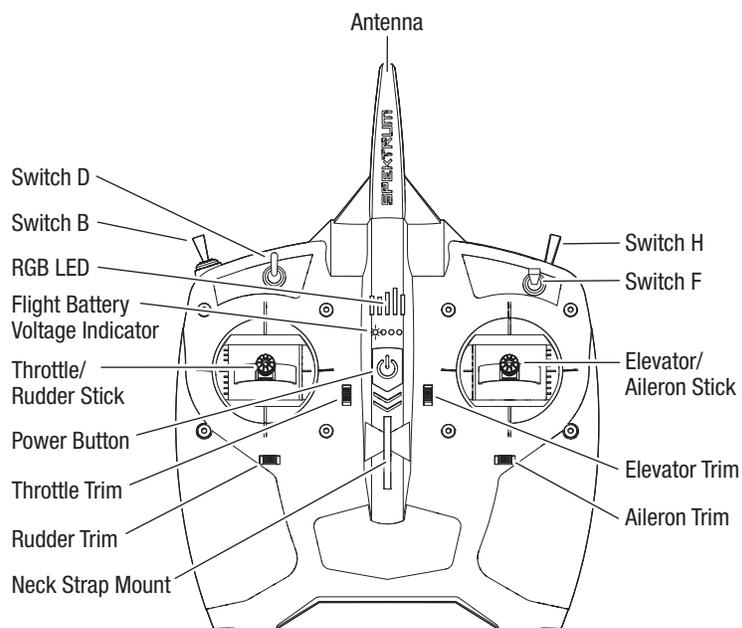
NOTICE: Always ensure the throttle stick is at the lowest setting before switching the throttle cut function off. Failure to do so will result in the motor activating.

Switch D = Channel 7 Switch: This switch is not used for this aircraft.

RGB LED and Audible Indications:

Flashing with beeps: The transmitter is in bind mode, because the bind button was held down while the transmitter was powered on. See the Binding section for more information.

Pulsates with one low tone beep every 2 seconds: The transmitter battery voltage has dropped below 4.7 volts. Replace the transmitter batteries immediately. If this happens while flying, land the aircraft as soon as possible.



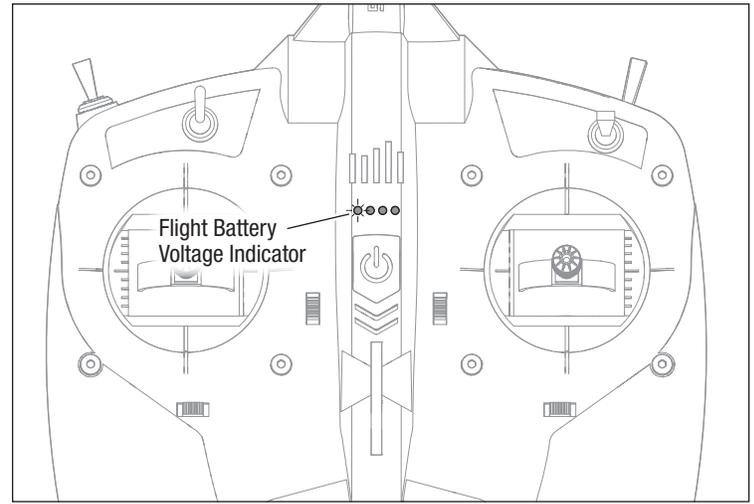
Flight Battery Voltage Indicator

The included DXS transmitter is equipped with a flight battery voltage indicator feature that works with compatible Smart technology-equipped receivers, flight controllers and telemetry-capable ESCs. This Smart technology feature gives a visual representation of the approximate flight battery voltage/power remaining via the four LED indicators on the transmitter.

- When the battery is fully charged, all four LEDs glow solid.
- When the throttle is increased, the voltage of the battery drops, causing the LEDs to indicate less voltage and usable capacity of the battery remains, via fewer LEDs glowing solid or flashing.
- When the throttle is decreased, the load on the battery decreases and the voltage of the battery increases, indicated by more LEDs glowing solid or flashing. Over time less of the usable capacity of the battery remains and less power is available, indicated by fewer LEDs glowing solid or flashing.
- When the last LED begins to flash, the flight battery low voltage alarm on the transmitter sounds before the low voltage cutoff function is triggered in the aircraft ESC (see the Flying section for a description of the low voltage cutoff function). The flight battery low voltage alarm sounds for 25 seconds. If the throttle is lowered and the flight battery voltage recovers because enough usable capacity remains in the flight battery, the alarm will stop before 25 seconds. In either case, land the aircraft as soon as practical after the alarm sounds.

To reset the flight battery low voltage warning:

1. After landing, disconnect the flight battery from the aircraft for at least 15 seconds, or until the flight battery voltage indicator LEDs on the DXS transmitter go out.
2. Connect a fully charged battery to the aircraft. The flight battery voltage indicator resets prior to the next flight.



Flight Battery Installation, SAFE System and Electronic Speed Control (ESC) Arming

1. Lay the aircraft upside down on a flat surface and make sure the switch is OFF.
2. Turn the latch (A) and open the battery hatch.
3. Lower the transmitter throttle stick to the lowest position and turn on throttle cut (switch H, position 1). With the throttle cut ON, throttle input from the throttle stick is deactivated. This safety feature ensures any accidental movement of the throttle stick will not activate the motor while the flight battery is connected.
4. Power on the transmitter and wait at least 5 seconds before proceeding.

IMPORTANT: Always power on the transmitter before connecting the aircraft flight battery to the ESC.

5. Connect the flight battery to the ESC, noting proper polarity.
6. Secure the flight battery (B) in the battery compartment using the hook and loop straps (C) so the aircraft is balanced at the correct center of gravity (CG). See the Center of Gravity section for information on measuring the CG.
7. Close the battery hatch and turn the latch to secure the hatch shut.

8. Put the aircraft on its landing gear, then power ON the Switch (D). The aircraft should be on level ground and must be kept immobile while the SAFE system initializes. If the aircraft does not initialize after about 30 seconds because of too much movement, power OFF the ESC Switch and power it on again to re-initialize the system.

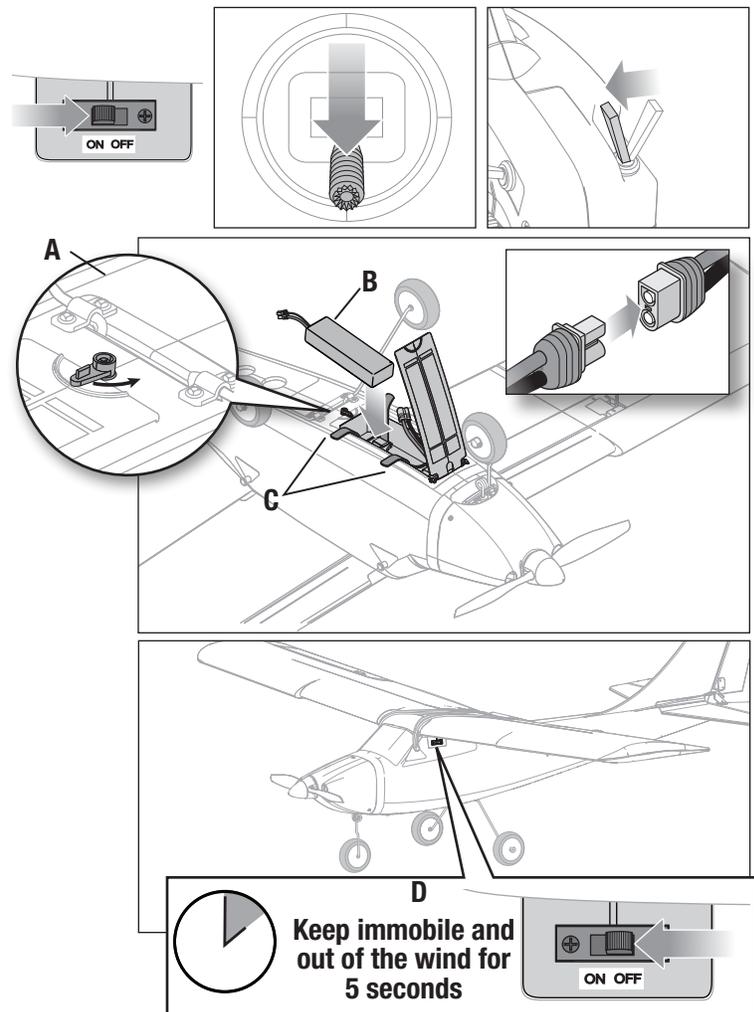
TIP: To keep the flight battery from sliding forward or backward in flight, add a strip of adhesive backed hook and loop material to the battery and the battery strap mounts. Apply the soft loop material to the battery and the coarse hook material to the battery strap mounts.

The aircraft should be upright, on level ground and kept immobile until the aircraft system finishes initialization. If the aircraft is moved and does not complete initialization within approximately 30 seconds, disconnect and reconnect the flight battery to re-initialize the system.

After the system initializes, the rudder will move side-to-side, then back to neutral to indicate the SAFE system is ready to operate.

IMPORTANT: If you turn ON the switch while the throttle is not at its lowest position, the ESC will not arm and the motor will not operate. Reduce throttle to the lowest setting for the ESC to arm.

IMPORTANT: AS3X technology in Experienced Mode is not active until you advance the throttle past 25%. Once it is active, the control surfaces may move when the aircraft is handled/moved. This is normal. The AS3X technology will remain active until the ESC is disconnected.



CAUTION: Always disconnect the Li-Po flight battery from the aircraft receiver when not flying to avoid over-discharging the battery. Batteries discharged to a voltage lower than the lowest approved voltage may become damaged, resulting in loss of performance and potential fire when batteries are charged.

Center of Gravity (CG)

We recommend watching the “Center of Gravity” chapter/section of the assembly video by scanning this QR code or using this URL:
www.horizonhobby.cc/ApprenticeSTSassembly.



Assembly Video

CAUTION: Never fly the aircraft without ensuring the center of gravity is within the acceptable range. Failure to properly balance the aircraft can result in loss of control and possible damage. Crash damage is not covered under warranty.

After installing the flight battery and before powering on the ESC, verify the center of gravity is correct. Ensure the power switch is in the OFF position. The CG should fall within 70-90mm from the leading edge of the wing, measured at the wing root. However, for the best flight characteristics, the suggested CG location is 80mm behind the leading edge of the wing, measured at the wing root as shown.

The flight battery must be secured and battery hatch must be latched closed to balance the aircraft correctly.

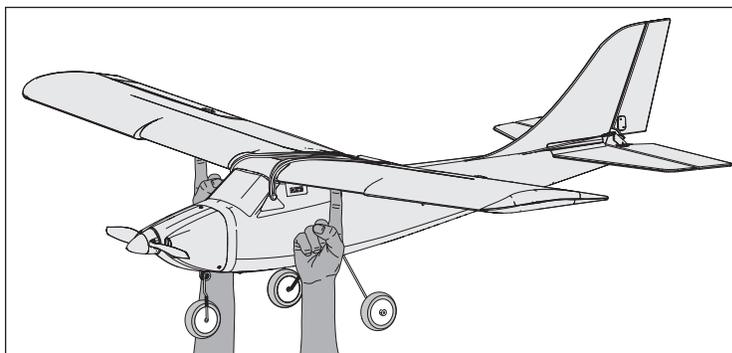
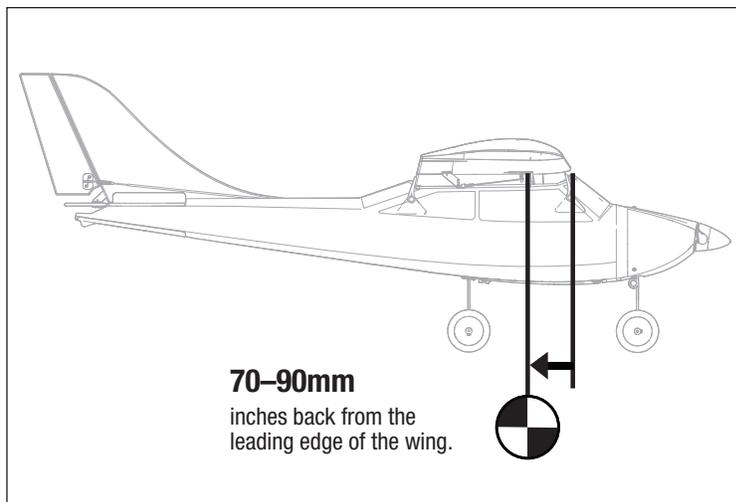
Hold the aircraft, with both index fingertips at the suggested CG location, on either side of the fuselage.

- If the aircraft stays level, the aircraft is balanced on the suggested CG location.
- If the nose tips down, move the flight battery rearward until the aircraft balances level on the suggested CG location.
- If the nose tips up, move the flight battery forward until the aircraft balances level on the suggested CG location.

When flying in beginner mode with the correct CG, the aircraft should climb gradually at full power, and fly level at 50%–60% power with no elevator input.

- If the aircraft CG is too far forward (nose heavy), up elevator is required to fly level at 50%–60% power.
- If the aircraft CG is too far aft (tail heavy), down elevator is required to fly level.

Adjust the battery position as needed.



Control Direction Test

WARNING: Do not perform this or any other equipment test without turning on throttle cut. Serious injury or property damage could result from the motor starting inadvertently.

If the control surfaces do not respond as shown, **DO NOT FLY**. Refer to the *Troubleshooting Guide* for more information. If you need more assistance, contact the appropriate Horizon Hobby Product Support department.

1. Power on the transmitter.
2. Turn on throttle cut (switch H, position 1).
3. Set the flight mode switch to Experienced Mode (switch B, position 2).

IMPORTANT: Do NOT check the controls in the Beginner or Intermediate Modes (switch B, position 0 or 1).

4. Place the model on level ground away from obstacles.
5. Power on the aircraft, and wait for it to fully initialize.
6. Move the sticks on the transmitter as shown in the table and observe the control surfaces on the aircraft. Ensure the aircraft control surfaces respond as shown and return to neutral when the control input is released.
7. Check for any binding in the control surfaces.
8. With the aircraft on a smooth surface, roll the aircraft forward by hand. Push the rudder trim button on the transmitter left or right until the aircraft tracks straight.

TIP: The transmitter emits a faint beep with each click of the trim buttons in either direction. Holding the button in either direction quickly adjusts the trim several steps until the button is released or until the trim reaches the end of its travel. If the trim button does not beep when clicked, the trim is at the far end of its travel. Center trim is indicated by a slightly louder beep.

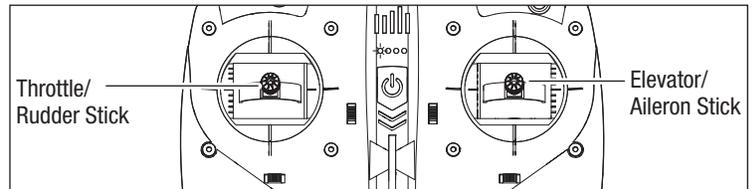
Centering the Control Surfaces

After checking for correct control surface movement and nose wheel alignment, release the transmitter sticks. Check each of the control surfaces to make sure they are centered.

TIP: The nosewheel is centered with the electronic rudder trim. The rudder is then centered manually.

For any surface that is not centered:

1. Slide the retaining sleeve off the clevis.
2. Gently pry the clevis open.
3. Slide the clevis pin out of the control horn.
4. Rotate the clevis on the pushrod to lengthen or shorten the length of the pushrod to adjust the center position of the surface.
5. When the correct position is achieved, slide the clevis pin back into the correct control horn hole.
6. Close the clevis, capturing the control horn between the sides.
7. Slide the retaining sleeve over the clevis to keep the clevis from opening.



	Transmitter Command	Control Surface Response (viewed from the rear)
Elevator		
Aileron		
Rudder		

Before Your First Flight

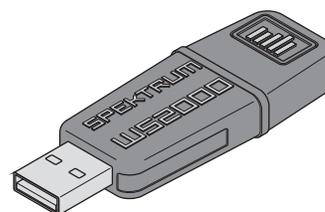
Before attempting to fly this aircraft for the first time, we recommend using the RealFlight Trainer Edition RC Flight Simulator (RFL1205, sold separately) and a Spektrum WS2000 Wireless Simulator Dongle (SPMWS2000, sold separately) along with the DXS transmitter included with the RTF Basic version to learn and practice the basics of flying. Featuring six popular Horizon Hobby trainer aircraft, including the Apprentice STS 1.5m, and built-in Virtual Flight Instructor lessons, new pilots can learn to fly successfully by practicing on a PC at home or on a laptop just about anywhere else!

We also encourage you to connect with experienced RC pilots in your area through hobby shops or at designated flying fields. And for those located in the United States, we recommend joining a national organization such as the Academy of Model Aeronautics (AMA). The AMA can provide information on local clubs, instructors and established flying sites in your area in addition to insurance coverage. Visit www.modelaircraft.org for more information.

RF TRAINER EDITION
REALFLIGHT



RealFlight
Trainer Edition



Choose a Flying Field

Consult local laws and ordinances before choosing a location to fly your aircraft.

In order to have the most success and to protect your property and aircraft, it is very important to select a place to fly that is very open. We recommend consulting your local hobby shop for information on local flying fields and clubs. For customers in the United States, visit the Academy of Model Aeronautics at www.modelaircraft.org for more information on flying clubs.

Plan on flying in an area that gives you more space than you think you need, especially during the initial flights.

The chosen flying site should:

- Have a minimum of 1300 feet (400m) of clear space in all directions.
- Be clear of people and pets.
- Be free of trees, buildings, cars, power lines or anything that could entangle your aircraft or interfere with your line of sight.

Range Test

WARNING: While holding the aircraft during the range test, always keep body parts and loose items away from the motor. Failure to do so could cause personal injury.

Before each flying session, and especially with a new model, you should perform a range check.

The included Spektrum DXS transmitter incorporates a range check mode to reduce the output power of the transmitter so you don't have to be as far away from the receiver to check the range. Follow the directions below to enter range check mode for the DXS transmitter:

1. With the throttle stick set to the lowest setting, power on the transmitter for at least 5 seconds.
2. With the help of an assistant to hold the aircraft, connect the aircraft battery to the ESC connector. Keep the aircraft immobile for 5 seconds.
3. Face the model, holding the transmitter in your normal flying position.
4. Press and hold the bind button (button A) and toggle the HI/LO rate switch (switch F) up and down twice. The transmitter RGB LED will flash and the alarm will sound, indicating the system is in range check mode. Do not release the bind button until the range check is complete.

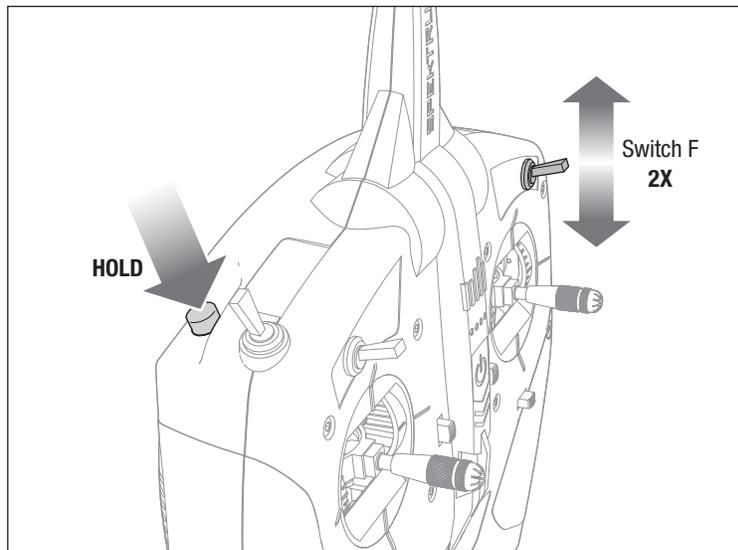
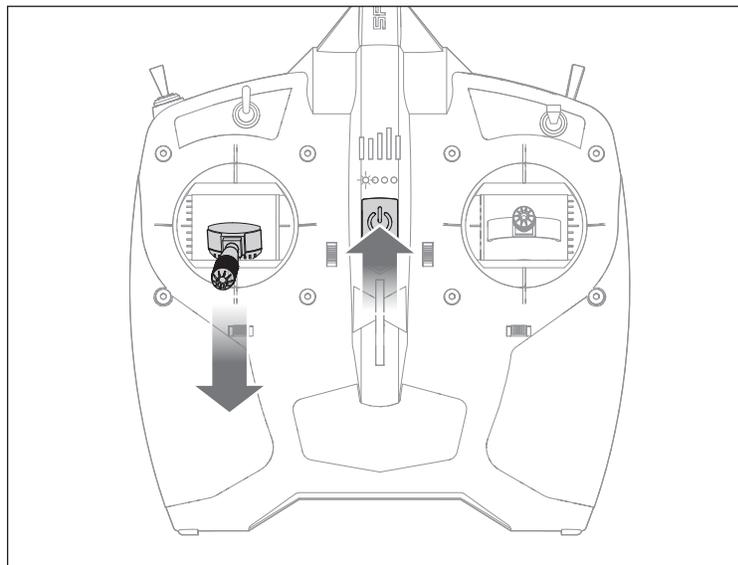
IMPORTANT: You must hold the bind button through the entire range check process. Releasing the button will exit range check mode.

5. With the model firmly restrained on the ground, stand approximately 30 paces away from the model.

TIP: In some aircraft, when the model is placed on the ground, the antenna(s) can be within inches of the ground. Close proximity of the antenna(s) to the ground can reduce the effectiveness of the range check. If you experience issues during the range check, restrain the model on a non-conductive stand or table up to 2ft (60cm) above the ground, then range check the system again.

6. Move the transmitter rudder, elevator, aileron and throttle controls to ensure they operate smoothly at approximately 30 paces. If control issues exist, do not attempt to fly. Refer to the Warranty and Service Contact Information table at the end of this manual to contact Horizon Hobby product support.
7. When the range check is successfully completed, release the bind button to exit range check mode.

CAUTION: Due to reduced output power of the transmitter, NEVER attempt to fly while the transmitter is in range check mode. Loss of control will occur.



Flight Control

IMPORTANT: Even though SAFE technology is a very helpful tool, the aircraft still needs to be flown manually. If incorrect input is given at lower altitudes or at slower speeds, the aircraft can crash. Study these control inputs and the aircraft response to each carefully before attempting your first flight. For first flights, set the SAFE® flight mode switch to Beginner Mode (switch B, position 0). For smooth control of your aircraft, always make small corrections. All directions are described as if you were sitting in the aircraft.

Throttle, Faster or Slower

- Push the throttle stick forward to make the aircraft go faster and climb.
- Pull the throttle stick back to slow down and descend.

Elevator Up and Down

- Pull the elevator stick back to make the nose of the aircraft go up.
- Push the elevator stick forward to make the nose of the aircraft go down.

Aileron Right and Left

- Move the aileron stick left to make the aircraft roll or bank left.
- Move the aileron stick right to make the aircraft roll or bank right.

TIP: Always picture yourself in the aircraft when determining which way to bank the aircraft wings.

- When the aircraft is flying away from you, banking the aircraft right or left appears normal.
- When flying toward you, the aircraft will appear to bank the opposite direction to the control input given. This will become more instinctual with experience.

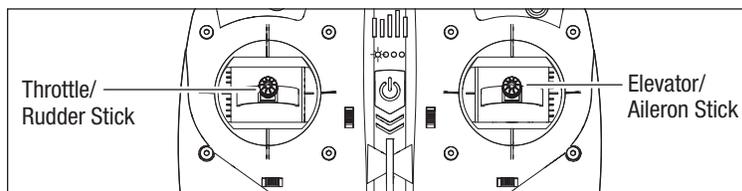
TIP: When flying toward yourself, if one of the wings drops, move the aileron stick toward the low wing to level the aircraft.

Rudder Right and Left

- Push the rudder stick left to yaw the aircraft nose to the left.
- Push the rudder stick right to yaw the aircraft nose to the right.

The rudder stick is also used to steer the aircraft left and right while taxiing on the ground.

TIP: Similar to aileron control, picture yourself in the aircraft to determine which direction to point the nose whether you are flying away from yourself or toward yourself.



	Transmitter Command	Aircraft Response
Elevator		
Aileron		
Rudder		

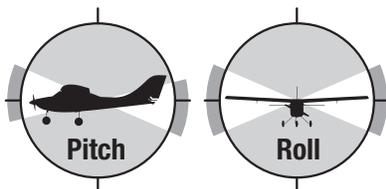
Sensor Assisted Flight Envelope (SAFE) Technology Flight Modes

At any time during a flight you can switch between Beginner, Intermediate and Experienced flight modes or use panic recovery to get your aircraft to a safe flying attitude. Change between flight modes by changing the flight mode switch position.

Beginner Mode (switch B, position 0)

Flight envelope limits: Pitch (nose up and down) and Roll (wing tips up and down) angles are limited to help you keep the aircraft airborne.

- **Self-leveling:** when the pitch and roll controls are returned to neutral, the aircraft returns to level flight.
- Stability assisted takeoff and landing.
- Throttle based climb and descent.



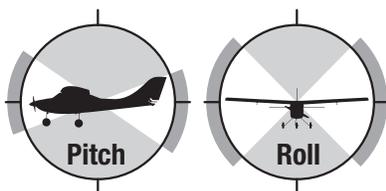
Intermediate Mode (switch B, position 1)

Lower flight envelope limits:

Pitch (nose up and down) and Roll (wing tips up and down) angles are still limited to help you keep the aircraft airborne, but you will have more freedom in pitch and roll.

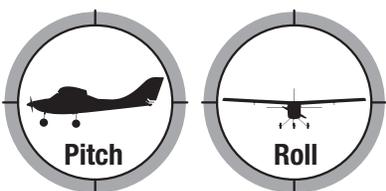
- **NO self-leveling:** self-leveling is only active in Beginner Mode.

TIP: When flying in Intermediate Mode, the Apprentice STS will automatically be in Beginner Mode when below 100 feet.



Experienced Mode (switch B, position 2)

NO flight envelope limits: There are no pitch or roll limits, and no self-leveling, so you have complete control! You can even fly inverted (upside down) and perform aerobatic maneuvers including loops, rolls and more.



Panic Recovery

This function is intended to provide you with the confidence to continue to improve your flight skills. If you become disoriented or the aircraft is in an unknown or uncomfortable attitude in any flight mode:

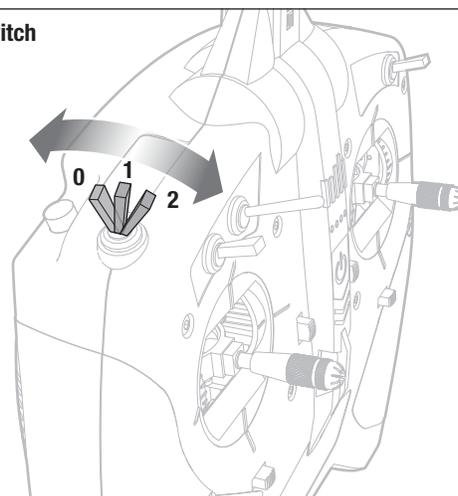
1. Press the Bind/Panic button (button A) on the transmitter and release the control sticks. The aircraft will immediately pull out of a dive and roll wings upright and level.

IMPORTANT: The aircraft will recover to a safer attitude even if sticks are held while holding the Panic button. However, release the control sticks for the quickest recovery.

2. Release the Panic button and continue your flight.

CAUTION: The panic recovery function will not avoid obstacles in the aircraft flight path. Sufficient altitude is required for the aircraft to return to straight and level flight if the aircraft is upside down when the panic function is applied.

Flight Mode Switch
(switch B)



Preflight Checklist

Find a safe open area to fly.
Charge the flight battery.
Install a fully charged flight battery in the aircraft.
Make sure all linkages move freely.
Check the Center of Gravity (CG).
Perform the control direction test.

Perform a radio system range test.
Plan flight for flying field conditions.
Set a flight time for: 4-6 minutes using a 3000mAh 3S battery pack.
Have Fun!

Flying

This aircraft is relatively easy to fly and helps you apply beginner skills to flying; however, we recommend you get help from a qualified flight instructor for your first radio controlled flights. Some model flying clubs provide flight training at their flying fields. Find a nearby flying club through your local hobby shop. In the U.S., visit the Academy of Model Aeronautics at www.modelaircraft.org for more information on clubs and flight instruction.

Takeoff

Set the flight mode switch to Beginner mode (switch B, position 0) for your first flights. Set a flight timer for 5 minutes. Adjust the flight timer for later flights, depending on your flight battery choice.

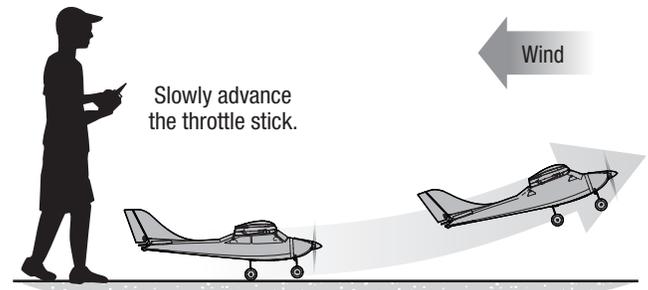
Position the aircraft on the runway, facing into the wind. Slowly advance the throttle to start the takeoff roll into the wind. Small rudder inputs may be required to keep the aircraft headed straight. As the throttle is advanced and sufficient speed is attained the aircraft will begin a slow climb out.

TIP: Rudder / nose wheel control throw is automatically set for taxi mode in beginner mode when on the ground and under 6 meters of altitude. This provides more control to taxi the aircraft and yaw control during landings. Once airborne, rudder control throw is automatically reduced to beginner flight mode.

Scan the QR code for a link to a video with tips to help successfully fly the aircraft.



Flying Video



In Flight

Continue to climb into the wind at full throttle, until the aircraft reaches about 50 feet (15 meters). Gradually turn the aircraft away from you while still maintaining altitude. Begin a turn by banking the aircraft slightly with the aileron stick. Gently pull back on the elevator stick to pull the aircraft around the turn and to maintain altitude. When the aircraft reaches the heading desired, simply apply the opposite aileron to level the wings and ease off the elevator.

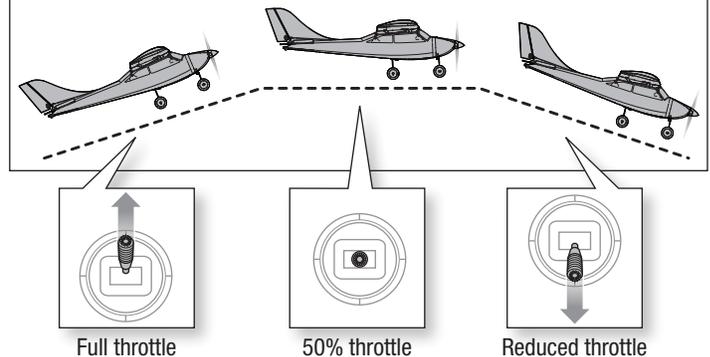
Climb to about 200 feet (60 meters) and reduce the throttle to around 50%. Adjust the throttle up or down to maintain altitude. Try not to get the aircraft too high or far away, making it difficult to see.

As you are flying:

- Fly at a high enough altitude to give yourself time to react to what the aircraft is doing.
- Make small and gentle stick movements to see how the aircraft responds.
- Practice flying in large circles, high off the ground. Flying with the nose pointed toward you is one of the hardest skills to master when learning to fly. Flying in circles will give you experience viewing the aircraft from all angles.
- If you lose orientation of the aircraft, press and hold the Panic Recovery button and release the sticks. The aircraft will return to level flight. Release the button to continue your flight.

NOTICE: If a crash is imminent, activate throttle cut or quickly lower the throttle and throttle trim. Failure to do so could result in greater damage to the airframe, as well as damage to the ESC and motor.

When properly trimmed, the aircraft's wing design causes the aircraft to climb at full throttle and descend at reduced throttle without the use of elevator.



Landing

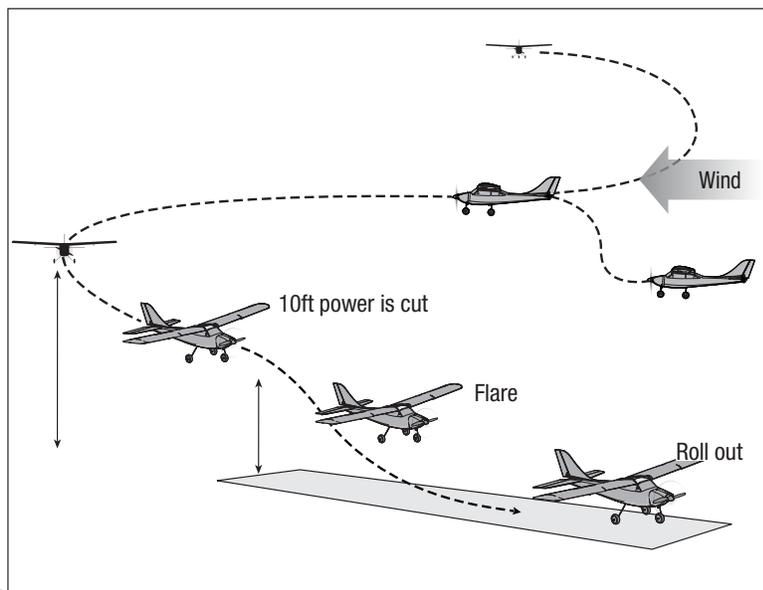
1. Reduce the throttle to around 50% to slow the airspeed.
2. Fly the aircraft downwind past the end of the runway.
3. Turn the aircraft into the wind and line the aircraft up with the runway center line.
4. Gradually decrease the throttle further to begin descending towards the runway, keeping the wings level during approach. Try to have the aircraft at approximately 10 feet (3 meters) altitude as it passes over the threshold of the runway.
5. As the aircraft passes over the threshold of the runway decrease the throttle.
6. Just as the aircraft is about to touch down, gently pull back on the elevator to raise the nose, or flare, for a gentle landing on the main landing gear. The goal is to be at a low enough speed so the aircraft will not climb when the landing flare is started.

TIP: If the aircraft bounces back into the air, either increase the throttle slightly and ease the aircraft gently back down to the runway, or increase the throttle to full power, climb out and go around to begin the landing process again.

7. Continue using the rudder stick to steer the aircraft straight down the runway, allowing the aircraft to roll to a stop.

NOTICE: If a crash is imminent, activate throttle cut or quickly lower the throttle and throttle trim. Failure to do so could result in greater damage to the airframe, as well as damage to the ESC and motor.

IMPORTANT: When finished flying, never keep the aircraft in the sun. Do not store the aircraft in a hot, enclosed area such as a car. Doing so can damage the foam.



Water Takeoff and Landing Using the Optional Float Set

IMPORTANT: We recommend flying with floats only once you are comfortable flying in Experienced mode.

Only use the floats if you are comfortable flying your aircraft and have repeatedly taken off, flown and landed with success. Flying off water poses a higher risk to the airplane because the electronics can fail if fully immersed in water.

Always ensure the optional floats (ELFA550, sold separately) are secure on the fuselage and that the float rudder linkage is correctly connected and moves freely before putting the aircraft in water.

To take off on water, steer with the rudder and slowly increase the throttle. Keep the wings level on takeoff. Hold a small amount (1/4–1/3) of up elevator and the aircraft will lift off once flying speed is reached. Avoid rapidly increasing the throttle as torque from the motor may cause the aircraft to roll to the left when on water.

To land this aircraft on water, fly the aircraft to a couple of feet off the surface of the water. Reduce throttle and add up elevator to flare the aircraft.

When taxiing, you must use throttle to move the aircraft forward, but steer with the rudder stick. The stick will turn both the aircraft rudder and a small rudder attached to the left float.

Avoid taxiing cross wind if there is a breeze, as this can cause the aircraft to flip over if wind gets under the wing. Taxi 45 degrees into the direction of the wind (not perpendicular to the wind) and use aileron to hold the upwind wing down. The aircraft will naturally try to face into the wind when taxiing.

Low Voltage Cutoff (LVC)

Low Voltage Cutoff is a function built into the electronic speed control to protect the battery from over-discharge. When the flight battery charge is low, LVC limits power supplied to the motor so the flight controls receive sufficient energy to safely land the aircraft.

When LVC engages, the aircraft will slow and the motor will begin to pulse. When the motor power decreases, land the aircraft immediately and charge the flight battery.

NOTICE: Repeated flying to the low voltage cutoff will damage the battery.

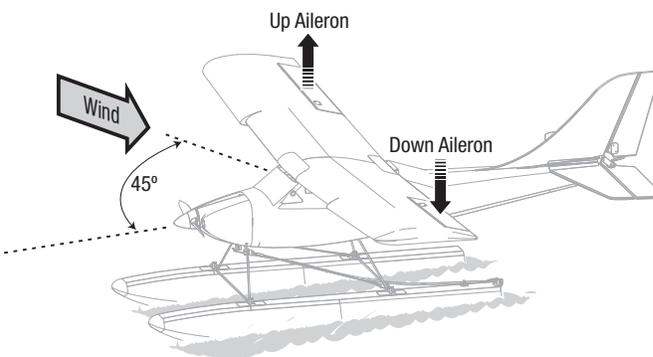
Always fully dry the aircraft after landing on water.



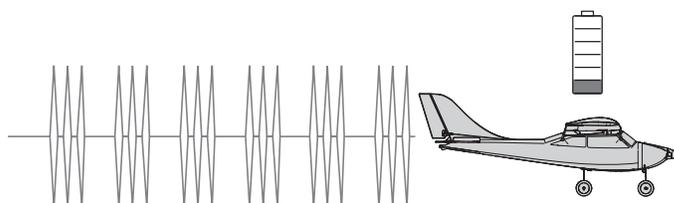
CAUTION: Never swim or go alone to get a downed model in the water.



CAUTION: If at any time water splashes in the fuselage while flying from water, bring the airplane to shore, open the battery hatch and immediately remove any water that may have gotten in the fuselage. Leave the battery hatch open overnight to let the inside dry out and to prevent moisture damage to the electronic components. Failure to do so could cause the electronic components to fail, which could result in a crash.



Taxi 45 degrees into the direction of the wind.



Trimming the Aircraft

Adjusting Trim in Flight

If your aircraft does not fly straight and level at half throttle with the sticks at neutral, fly into the wind and adjust the trim sliders as indicated in the table until the aircraft maintains a reasonably straight and level flight path.

- Trimming is best done in calm wind conditions.
- The SAFE flight mode switch should be set to Experienced mode (switch B, position 2) before adjusting the trims.

After the aircraft is trimmed in flight, land the aircraft and proceed to the Manually Adjusting Trim section to re-center the servos and set the trim mechanically.

The included DXS transmitter features electronic trim buttons. The transmitter emits a faint beep with each click of the trim buttons in either direction. Holding the button in either direction quickly adjusts the trim several steps until the button is released or until the trim reaches the end of its travel. If the trim button does not beep when clicked, the trim is at the far end of its travel. Center trim is indicated by a slightly louder beep.

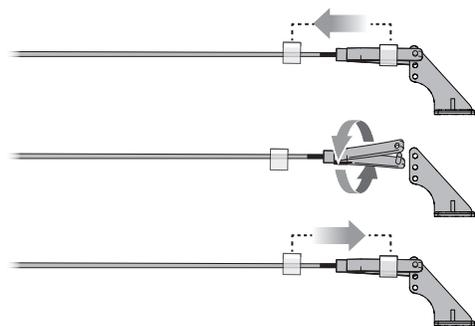
TIP: Trim the aircraft at sufficient altitude of about 100' (30 meters). Having an experienced flight instructor trim your aircraft during the first flight is recommended.

	Aircraft Drift	Trim Required
Elevator		 Elevator Trim
		 Elevator Trim
Aileron		 Aileron Trim
		 Aileron Trim
Rudder		 Rudder Trim
		 Rudder Trim

Manually Adjusting Trim

After adjusting the aircraft trims in the air, the servos should be re-centered and the pushrods adjusted to reflect the trim changes made in the air. Doing so ensures the servos will retain full throw and not overdrive in either direction.

1. After landing from the trim flight, set the throttle cut to ON (switch H, position 1).
2. Set the flight mode switch to experienced mode (switch B, position 2). Ensure the aircraft is kept immobile.
3. One at a time, take note of any offset in position of each control surface.
4. Remove the clevis from the control horn of the control surface by sliding the soft rubber tube back along the pushrod. Gently pry the clevis open and slide the pin out of the control horn.
5. Center the transmitter trim for that control surface.
6. Adjust the clevis in or out by rotating the clevis on the pushrod until the control surface position matches the corrected offset when the clevis pin is inserted in the control horn.
7. Re-insert the clevis pin in the correct hole in the control horn.
8. Snap the clevis closed, capturing the control horn between the clevis sides.
9. Slide the soft rubber tube over the clevis to keep it from opening.
10. Move to the next control surface and repeat steps 3 through 9, until all of the transmitter control surface trims are centered.



Post Flight

Disconnect the flight battery from the ESC.
Power OFF the transmitter.
Remove the flight battery from the aircraft.
Recharge the flight battery.
Repair or replace all damaged parts.
Store the flight battery apart from the aircraft and monitor the battery charge.
Make note of the flight conditions and flight plan results, planning for future flights.

IMPORTANT: When finished flying, never keep the aircraft in the sun. Do not store the aircraft in a hot, enclosed area such as a car. Doing so can damage the foam.

LiPo battery tips:

- Disconnect and remove the Li-Po battery from the aircraft after use to prevent trickle discharge.
- Charge your Li-Po battery to about half capacity for long term storage.
- During storage, make sure the battery charge does not fall below 3V per cell.
- Always read and follow all safety warnings and guidelines included with your LiPo batteries.

Transmitter and Receiver Binding

Binding is the process of programming the aircraft receiver with the identification code of the transmitter so the receiver will only connect to that specific transmitter. The included transmitter was bound to the aircraft at the factory. If the aircraft does not respond to transmitter control inputs when the batteries in the aircraft and transmitter are fully charged, the aircraft receiver and transmitter may need to be re-bound.

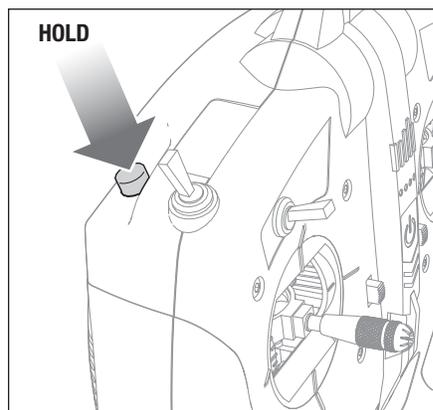
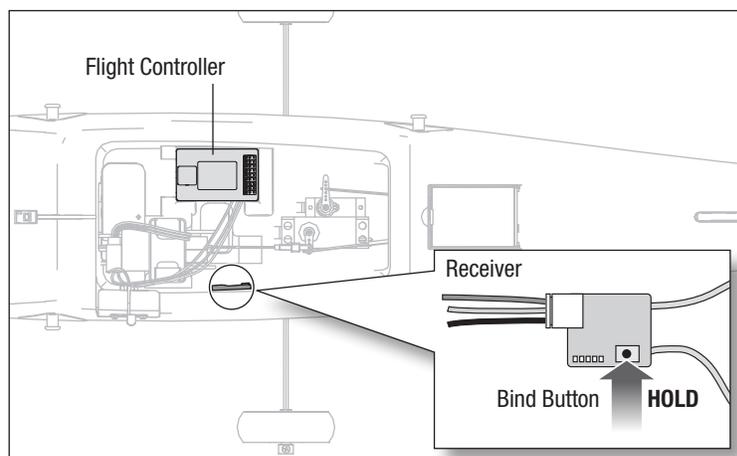
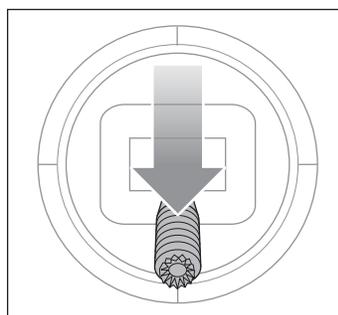
To re-bind the transmitter and receiver:

1. Power OFF the transmitter
2. Set the throttle stick to the low position and all other controls to neutral.*
Ensure the aircraft is immobile.

IMPORTANT: The throttle will not arm if the transmitter's throttle control is not put at the lowest position.

3. Connect the flight battery to the ESC. The flight controller LED will begin to flash red and blue.
4. The aircraft receiver is attached to the inside of the battery compartment, as shown in the illustration. Press and release the bind button on the receiver. The receiver LED will flash rapidly.
5. Press and hold the bind button (button A) on the transmitter while powering ON the transmitter.
6. Watch the LED on the aircraft receiver. The receiver LED will glow solid when the receiver and transmitter are bound. Once properly bound, the receiver and transmitter will retain their bind for future flights.

If you encounter problems, refer to the troubleshooting guide. If necessary, contact the appropriate Horizon Hobby product support office.



* Failsafe

The receiver stores the position of the transmitter throttle control at the time of binding as the failsafe position. If the receiver should ever lose communication with the transmitter, the failsafe function will activate. Failsafe moves the throttle channel to its preset failsafe position (low throttle) that was stored during binding. All other control channels move to put the aircraft in a slowly descending circle until radio link is re-established.

Flight Training

To the new pilot:

This aircraft is easy to fly and helps you apply beginner skills to flying; however, we recommend you get help from a qualified flight instructor for your first radio controlled flights. Some model flying clubs provide flight training at their flying fields. Find a nearby flying club through your local hobby shop. In the U.S., visit the Academy of Model Aeronautics at www.modelaircraft.org for more information on clubs and flight instruction.

To the flight instructor:

Feel free to experiment with the SAFE technology before instructing your student on this aircraft. The progressive switch positions in the SAFE technology are intended for a new pilot to learn with minimal instructor assistance. We recommend using Flight Mode Switch Position 1 to instruct a new pilot. Switch positions 0 and 2 may stabilize the aircraft more or less than desired for instruction purposes.

DXS Wireless Trainer Feature

Your DXS transmitter may be connected wirelessly to another transmitter through the SRXL2 DSMX Remote Receiver (SPM9747, sold separately).

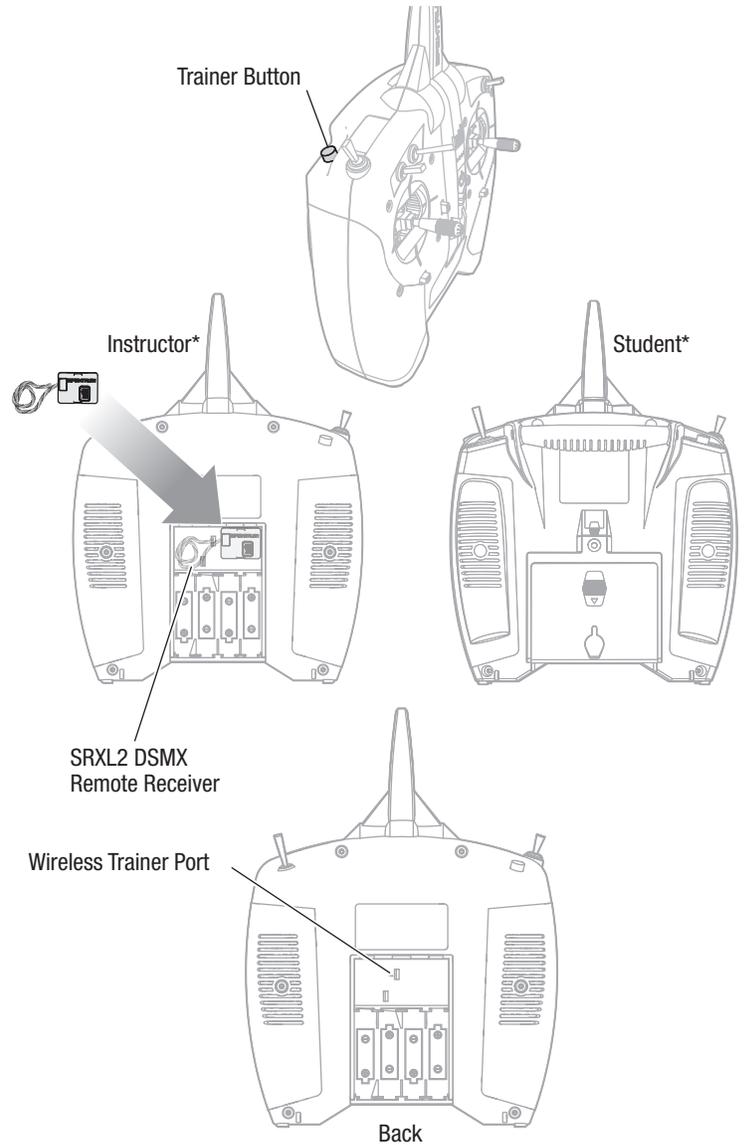
The DXS transmitter is ideal as the instructor transmitter as it is compatible with all Spektrum transmitters when using this feature. Servo reversing and trims must be the same on both transmitters.

This “buddy box” approach has helped many new pilots get the feel for aircraft control with the close assistance of a flight instructor. Connecting two transmitters enables your flight instructor to hold the master transmitter while you hold the slave transmitter. While you learn to fly, the instructor holds the trainer switch to give you control of the aircraft. If you need help, the flight instructor can release the switch to take control.

IMPORTANT: If a transmitter other than the included DXS is used as the instructor or student transmitter, refer to Buddy Box Setup section below.

Remote Receiver Installation

1. Open the battery door
2. Connect the remote receiver cable to the wireless trainer port.
3. Install the remote receiver in the cavity behind the battery door with double sided tape.



Buddy Box Setup

IMPORTANT: Use these settings for an Instructor or Student transmitter if using the buddy box option for training on any transmitter other than the included DXS. Failure to do so will prevent the SAFE technology flight modes from working correctly.

The transmitter must be configured using the Transmitter Setup and Buddy Box setup charts.

Student* Transmitter Setup	
Student Transmitter	Student Setup
DX4e, DX5e (2pos)	Factory Trainer Settings
DX4e, DX5e (3pos)	Factory Trainer Settings
DXe	Factory Trainer Settings
DX6i	Factory Trainer Settings
DX7	Factory Trainer Settings
DX6 DX7s DX7(G2) DX8 DX8(G2)	DX9 DX10t DX18 DX20 Factory Trainer Settings

Instructor* Transmitter Setup	
Instructor Transmitter	Instructor Setup
DX4e, DX5e (2pos)	Factory Trainer Settings
DX4e, DX5e (3pos)	Factory Trainer Settings
DXe	Factory Trainer Settings
DX6i	Factory Trainer Settings
DX7	Trainer to Normal
DX6 DX7s DX7(G2) DX8 DX8(G2)*	DX9 DX10t DX18 DX20 Activate Programmable Master and insure channels Thru - Aux 1 are set to student.

* Some transmitters with older versions of Spektrum Airware software may use different terminology to describe the Student and Instructor functions.

Optional Landing Assist Sensor (LAS) Upgrade

The Apprentice STS is upgradable with the addition of the optional LAS module (SPMA3180 not included) this allows the advanced SAFE features to be combined with an Landing Assist Sensor (LAS) for smoother gentler landings.

IMPORTANT: For best results when using LAS, land on grass surfaces or a light colored surface, such as light colored concrete. Black surfaces or water normally do not have enough reflection for the sensor to receive accurate readings.

Installation of the LAS module

1. Remove the wing to gain access to the flight controller compartment.
2. Rotate the aircraft to access the bottom of the fuselage.
3. Press the factory installed plug (A) to release it. Then removed it from the LAS pocket. Save the plug for flights without LAS module.
4. Feed the LAS connector through the channel in the base of the LAS pocket.
5. Align the LAS module with the wires facing the back of the aircraft. Place the LAS module into the pocket and press it to secure it into place with a click.
6. Place the aircraft on its landing gear and connect LAS connector to **Port 7** on the flight controller. For correct polarity of the plug ensure that the orange (not brown) signal wire (B) is facing towards the front of the aircraft when plugged into the flight controller.

Landing with LAS

Reduce throttle, keep the wings level and slowly reduce the altitude of the aircraft. When the aircraft's landing approach reaches an altitude of roughly 1m the LAS will level off the aircraft, manage the throttle and then flare the aircraft for touchdown.

IMPORTANT: LAS is functional for all SAFE flight modes except for Experienced Mode. When the flight mode is switched to Experienced mode the LAS is deactivated and the pilot will have zero assistance on landing, a traditional manual landing of the aircraft is necessary.

IMPORTANT: Installation of the LAS module is not auto land. The aircraft must be guided and aligned with the landing strip for landing.

LED indicator

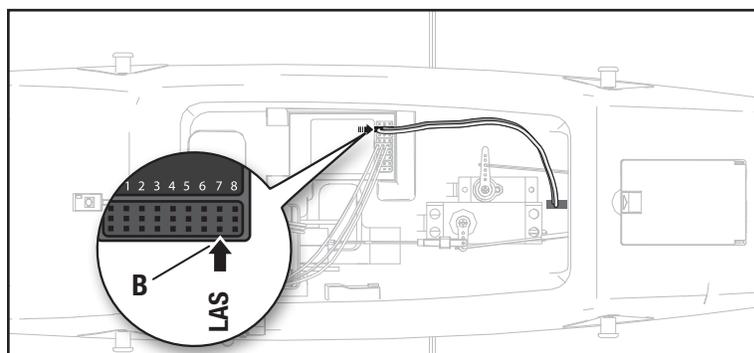
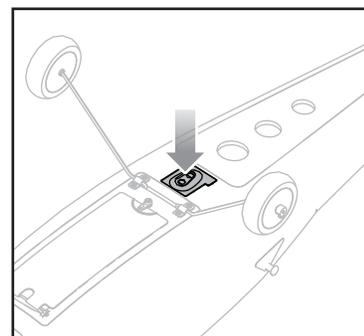
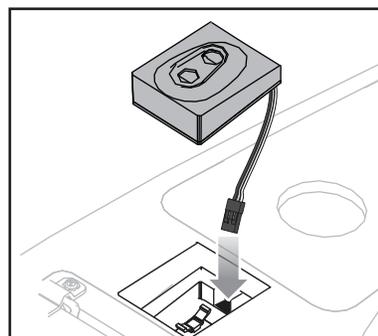
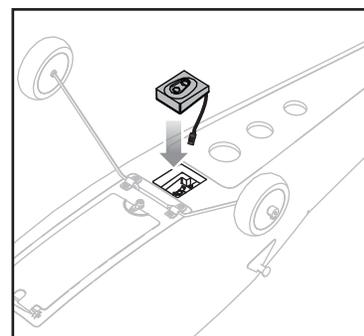
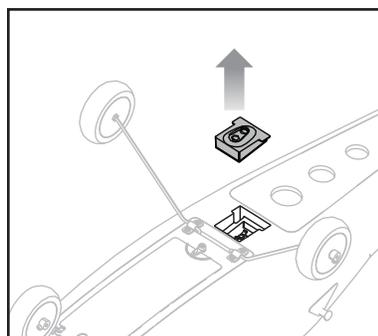
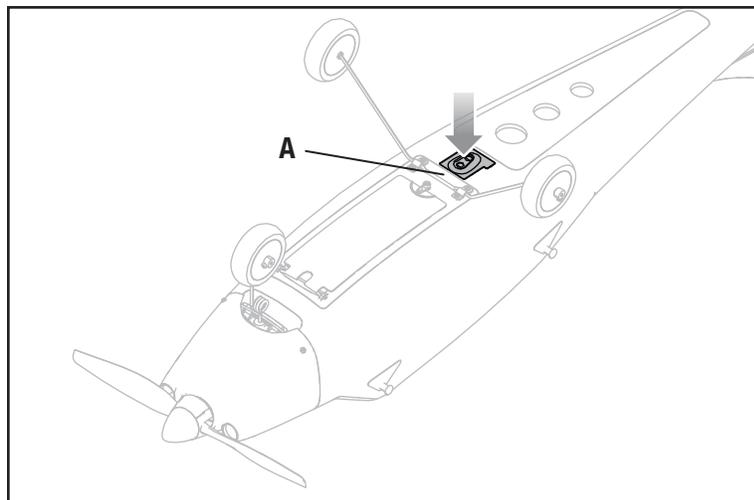
When the LAS module is installed the aircraft's LED indicator for beginner and intermediate flight modes will be followed with a purple flash to indicate that the LAS System is active.

LAS with GPS

With GPS installed LAS will assist the Auto Land mode during landing of the aircraft. When the aircraft's landing approach reaches an altitude of approximately 1m the LAS will level off the aircraft, manage the throttle and then flare the aircraft for touchdown.

TIP: If the speed of aircraft is too fast for landing or above 20% throttle setting, LAS is not effective.

TIP: If the aircraft's landing approach is too low and fast, LAS will not flare.



Optional SAFE Plus GPS Upgrade



From the Box to the Air Adding the SAFE Plus GPS Module

The Apprentice STS flight controller includes SAFE technology out of the box.

The Apprentice STS flight controller is upgradable with the addition of the optional SPMA3173 GPS module (not included) which enables advanced SAFE Plus features. With SAFE Plus, the aircraft can fly a holding pattern on its own, return home and land by itself, and prevent the model from flying too far from the pilot.

IMPORTANT: Read the information in this manual covering the optional SAFE Plus GPS upgrades, and learn the use of Holding Pattern and Autoland modes before flying with GPS. SAFE Plus features are only available with the SAFE Plus module installed and properly calibrated.

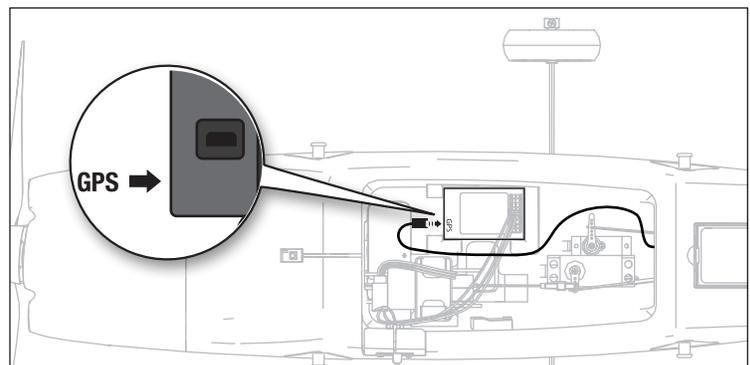
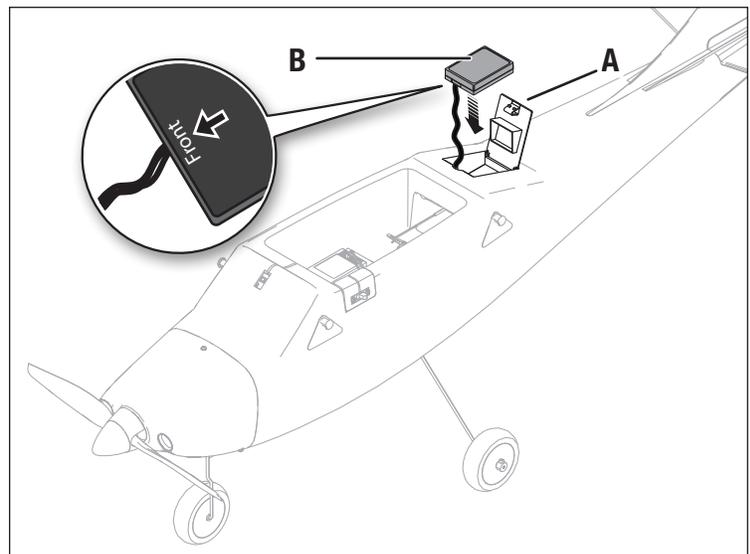
Follow the steps to add SAFE Plus functions to your aircraft.

GPS Module Installation

1. Verify the battery is not connected or installed in the aircraft.
2. Open the lid of the GPS pocket (A) and feed the cable from the GPS module (B) through the hole in the base of the GPS pocket.
3. Install the GPS module in the pocket with the label facing up and the arrow pointing forward.
4. Close the pocket door securing the GPS module in to place.
5. Pull the connector across the electronic compartment and connect it to the port labeled GPS on the front side of the flight controller. Prevent the cables from interfering with the servos.

IMPORTANT: Do not kink or cut the GPS cable. Kinks or cuts will degrade performance.*

✓	
	1. Charge the flight battery.
	2. Set up your transmitter (BNF only).
	3. Install the GPS module.*
	4. Find a safe and open area.
	5. Power the model on outdoors and perform the compass calibration.
	6. Unplug the battery after the compass calibration is complete.
	7. Power the model on and allow it to acquire a GPS lock. The elevator will move up and down until GPS lock is acquired, and then re-center.
	8. Set the home position (and flying field location for flying field mode). IMPORTANT: Do not fly at this time.
	9. Place the aircraft into Experienced mode (Mode switch position 2) for the control direction test. Place the aircraft on the ground facing away from you.
	10. Perform Control Direction Test.
	11. Place the aircraft into Beginner mode (Mode switch position 0) and cycle the throttle to activate SAFE.
	12. Perform SAFE Control Direction Test.
	13. Plan flight for flying field conditions.
	14. Set a flight timer for 8-10 minutes.
	15. Have fun!



Compass Calibration

Compass calibration might be required after installing the GPS module, before flight. The aircraft will automatically enter compass calibration on the first power up after the GPS module is installed, after binding.

IMPORTANT: The aircraft must be outside and needs to acquire a GPS lock in order to begin compass calibration. The aircraft will not enter compass calibration mode until the GPS lock is established.

Perform the compass calibration before the first flight or to correct the heading during auto landing if it varies significantly from the heading set during takeoff.

Before calibration GPS lock must be established for your location:

1. Activate throttle cut.
2. Power ON the transmitter and receiver and set the model on the ground on its wheels. The aircraft's elevator will slowly move up and down until GPS lock is established. When finished the elevator will move up and down once quickly and center.
3. Power OFF the receiver and then the transmitter.

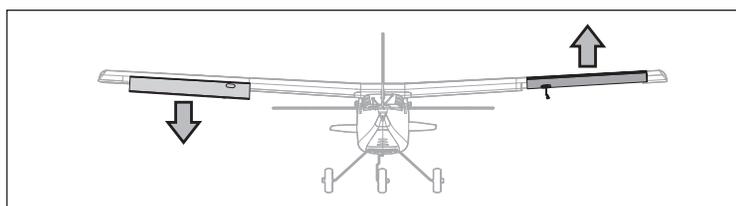
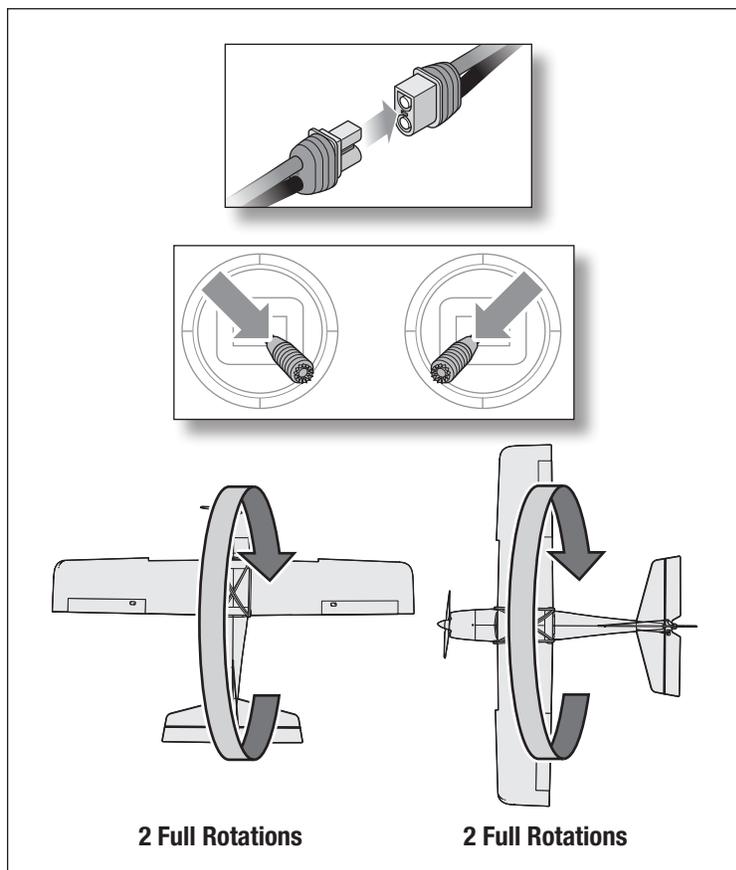
Once initial GPS lock is established Compass Calibration can be performed.

1. With the transmitter trims centered, power ON the transmitter and the aircraft while holding the transmitter sticks as shown. The aircraft will indicate the GPS is searching for satellites by cycling the elevator up and down. Continue to hold the transmitter sticks as shown.
2. After satellites are acquired, the aircraft will signal it has entered compass calibration mode by the following:
 - The ailerons will cycle left and right slowly.
 - The LED will flash red and blue.
3. Once in calibration mode, the throttle is not active and the transmitter sticks can be released. The transmitter must remain powered ON.
4. Flip the aircraft twice nose over tail as shown.
5. Turn the aircraft 90 degrees and roll the aircraft twice, as shown.
6. Turn off the transmitter.
7. Wait 3 seconds and turn OFF the aircraft.

CAUTION: Keep aircraft away from magnetic sources such as cameras, camera mounts, speakers etc. These may interfere with the GPS system and loss of control may result.

Compass Error (LED Flashing Red and Blue)

If at any time you experience no throttle response after power up and the ailerons are deflected full right and the LED is flashing red and blue, the aircraft is indicating a compass error. This may be due to a lost GPS signal or from powering on the aircraft at a new flying location. Disconnect the flight battery and perform the compass calibration procedure.



Powering ON, GPS Initialization and Establishing Home Location

CAUTION: Keep aircraft away from magnetic sources such as cameras, camera mounts, speakers etc. These may interfere with the GPS system and loss of control may result.

1. Power on the transmitter.
2. Install a fully charged flight battery, following the instructions in the *Install the Flight Battery* section.
3. Turn the airplane switch to ON. The elevator will move up and down slowly, indicating the the GPS is searching for satellites. When GPS is aquired, the elevator will move quickly and then center.
 - If you wish to change the virtual fence mode, input the transmitter stick commands as described in the *Virtual Fence Mode and GPS* section of the manual. The fence can be changed at any time before the home point is set.

IMPORTANT: The throttle is active but only slowly pulses the motor, allowing you to taxi the aircraft. Either taxi to or place the aircraft in the desired home location, pointing the nose of the aircraft into the wind and the desired takeoff direction.

4. Once the aircraft is on the ground at the desired home location, and pointed into the wind. Press and hold the HP/AL (bind) button.
 - If either of the circle Virtual Fence modes are active or if virtual fence is off, all control surfaces will wag and the throttle will now operate, indicating the aircraft is ready for flight.
 - If the Airfield Virtual Fence mode is active, only the ailerons will wag left and right. Release the HP/AL (bind) button. After setting the home location you must then indicate where the flying side of the airfield is in relation to the home location. The throttle will be inactive until the flying side direction is set. Set the flying side direction by moving the aileron stick either left or right in the direction of the flying area:

-If the flying side is off the right wing of the aircraft as it sits in the home location, push the aileron stick right to the stop and release (as shown in the example). The right aileron will move up and down indicating right direction has been set.

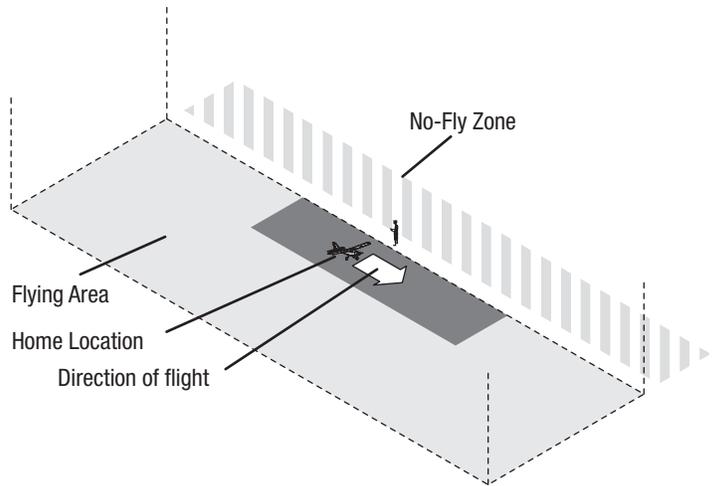
-If the flying side is off the left wing as the aircraft sits in the home location, push the aileron stick left to the stop and release. The left aileron will move up and down indicating left direction has been set.

Once the home location and flying location is set, all surfaces will wag, indicating the aircraft is ready for flight.

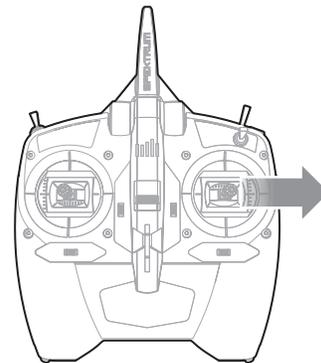
CAUTION: If the aircraft is in Airfield mode, the line that defines the no fly zone will be aligned with the center line of the aircraft, and approximately 10 meters behind you to ensure the fence does not interfere with take-offs or landings. Make sure the aircraft is point directly down the runway in one direction or the other to correctly set the Airfield mode. If the aircraft is not aligned with the runway, the no fly zone will not be set in the correct location.

Airfield Virtual Fence:

Set the home location and aircraft heading



In this example *right aileron* would be applied to set the flying field side.



Flight Modes

Beginner, Intermediate and Experienced modes still operate the same with SAFE Plus as they did with SAFE. With SAFE Plus, The Holding Pattern (HP) and AutoLand (AL) modes may be used as well.

Holding Pattern and AutoLand Trigger:

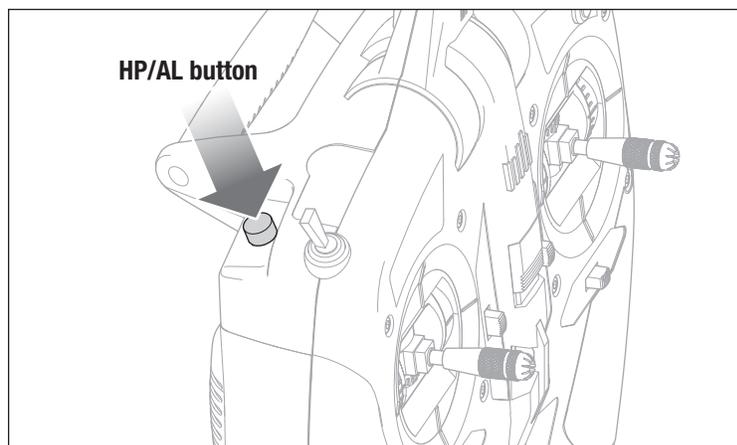
Holding Pattern: Press and release the HP/AL (Bind) button. Press and release the HP/AL (Bind) button again to exit.

AutoLand: Press and hold the HP/AL (Bind) button for 3 seconds. Press and release the HP/AL (Bind) button again to abort AutoLand.

Changing the flight mode will exit Holding Pattern or AutoLand and resume manual control in the selected flight mode.

The "I" button is used for these features on BNF models when using the recommended transmitter setup.

IMPORTANT: LAS is functional for all SAFE flight modes except for Expert Mode. When the flight mode is switched to Expert mode the LAS is deactivated and the pilot will have zero assistance on landing, a traditional manual landing of the aircraft is necessary.



Flying the Apprentice STS with SAFE Plus

- Sensor Assisted Flight Envelope (SAFE® Plus) technology is designed as flight assistance, not an autopilot. The pilot should fly the aircraft at all times.
- Start in Beginner mode (Flight Mode switch position 0). As you learn and become more confident, change modes to advance your flying skills.
- Fly your aircraft outside in no greater than winds up to 12 mph (16 km/h).
- Always launch your aircraft directly into the wind if possible.
- When flying in Autoland mode, the aircraft flight path may be adjusted with the transmitter controls, release the controls to let the GPS system resume command.
- The Apprentice STS with SAFE Plus technology added does not have obstacle avoidance technology, be prepared to guide the aircraft if it is headed toward a tree or other object.

IMPORTANT: A very large flying area is required for GPS assisted aircraft. 400 meters by 400 meters minimum. (1200' x 1200')



Virtual Fence Mode and GPS

CAUTION: Keep aircraft away from magnetic sources such as cameras, camera mounts, speakers etc. These may interfere with the GPS system and loss of control may result.

Your aircraft uses GPS to establish a home location and a virtual fence to keep the aircraft within a given distance from the home location. While flying, the aircraft will automatically turn around and fly back towards the home location if it approaches the edge of the virtual fence. Once back inside the fence, the aircraft will “wag” its wings, indicating full control has been given back to the pilot.

The Virtual Fence feature is active in all SAFE flight modes, provided the GPS function is active. There are 4 variations of Virtual Fence mode, which are selectable from the transmitter while the aircraft GPS system initializes.

Virtual Fence Off: turns off the Virtual Fence function.

Circle Virtual Fence, Small (Default): sets the virtual fence in a circle with a radius of approximately 175 meter from the home location.

Circle Virtual Fence, Large: sets the virtual fence in a circle with a radius of approximately 225 meters from the home location.

Airfield Virtual Fence: sets the virtual fence in a rectangle of approximately 400m long x 200m wide and establishes a “no fly zone” approximately 10m (about 30 feet) inside of the center line.

Virtual Fence Mode	Transmitter Stick Position
Virtual Fence OFF <ul style="list-style-type: none"> • Low throttle • Full right aileron • Full up elevator • LED Indication: Slow Yellow flash until home point is set.* 	
Circle Virtual Fence, Small (Default) <ul style="list-style-type: none"> • Low throttle • Full left aileron • Full up elevator • LED Indication: Slow yellow flash with 1 Red flash.* 	
Circle Virtual Fence, Large <ul style="list-style-type: none"> • Low throttle • Full left aileron • Full down elevator • LED Indication: Slow yellow flash with 2 Red flash* 	
Airfield Virtual Fence <ul style="list-style-type: none"> • Low throttle • Full right aileron • Full down elevator • LED Indication: Slow Yellow flash with 3 red flash* 	

LED Indication

Virtual Fence Off: Slow yellow flash until home point is set. Once home point and direction is set, a solid LED (without LAS installed).

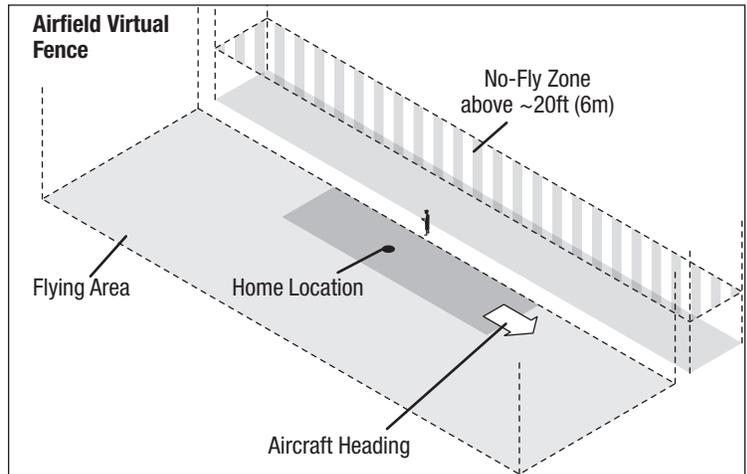
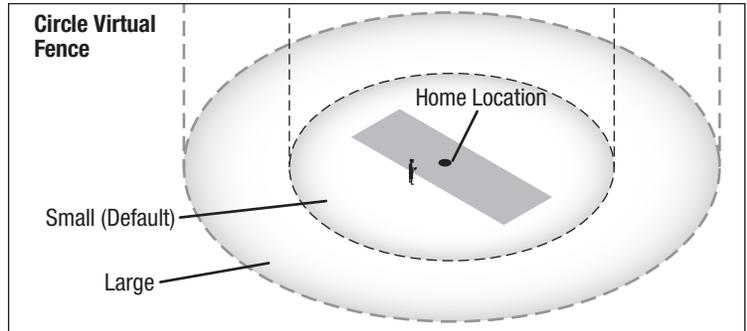
Circle Virtual Fence, Small (Default): 1 Red, 1 yellow flash until home point is set. Once home point and direction set, a solid LED (without LAS installed).

Circle Virtual Fence, Large: 2 Red, 1 yellow flash until home point set. Once home point and direction is set, solid LED (without LAS installed).

Airfield Virtual Fence 3 Red, 1 yellow flash Set home, slow yellow flash. Set direction, right or left aileron depending on direction of flying field. Home point and direction set, solid LED without LAS.

*A purple flash will follow all mode indicators to indicate LAS is installed.

LEDs are located in the center of the front windshield of the aircraft.
*A purple flash will follow all mode indicators to indicate LAS is installed.



Once a Virtual Fence mode is chosen, the aircraft will remember that mode until another mode is chosen. It is not necessary to select the Virtual Fence mode every time the aircraft is powered on.

WARNING: Never attempt to fly under the no fly zone. The bottom of the no fly zone is elevated to only allow for taxiing of the aircraft in the pit area of the airfield. Due to variances in the barometric sensor, attempting to fly in this area may cause the aircraft to suddenly fly back toward the home location, during which time the pilot will have no control over the aircraft until the aircraft reaches the home location. The pilot will have no way to avoid any obstacles between the no fly zone and the home location.

Holding Pattern (HP) Mode

If at anytime the aircraft seems too far away, press and release the HP/AL (bind) button on the transmitter.

The aircraft will maneuver to an altitude of approximately 120 feet (36m) and begin to fly a circular pattern over the home location.

If Airfield Virtual Fence mode is active, the aircraft will fly to approximately 120 ft (36m) altitude and fly a circular pattern about 100 ft (30m) in front of the home location.

The aircraft flies fully autonomously when HP mode is active. The transmitter sticks have no control.

NOTICE: As a safety precaution, Holding Pattern mode will not function when your aircraft is below an altitude of approximately 20 ft (6m).

To deactivate HP mode and regain control, press and release the HP/AL button again or change flight modes.

IMPORTANT: When the HP feature is activated, the aircraft should immediately respond to the command. If the aircraft does not respond immediately, GPS signal may have been lost. In this case, the aircraft will have to be flown back to the home location manually.

Failsafe (LED: RED SLOW FLASHING)

If at anytime the aircraft loses radio connection, the aircraft will activate Holding Pattern mode until it re-establishes radio connection. If radio connection is not regained, the aircraft will land near the takeoff location as in AutoLand mode.

If radio connection is lost while the aircraft is already in Holding Pattern Mode, the aircraft will circle for approximately 35 seconds and then set up to land as in AutoLand mode.

NOTICE: If a crash is imminent, activate throttle hold or quickly lower the throttle and throttle trim. Failure to do so could result in extra damage to the airframe, as well as damage to the ESC and motor.

Deactivating GPS in Flight

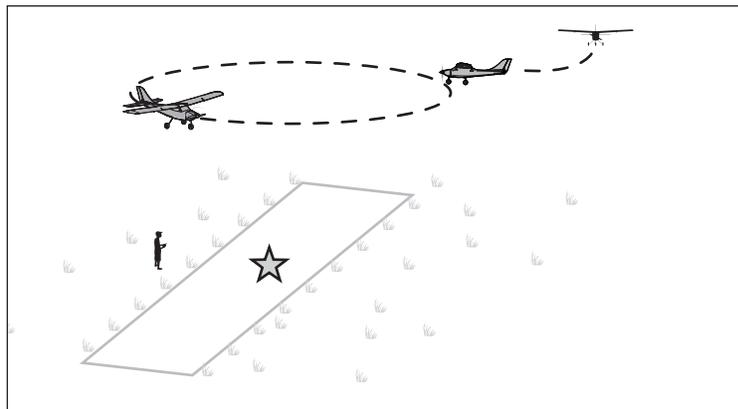
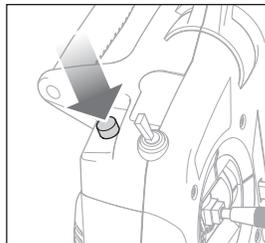
If the GPS system malfunctions while in flight, deactivate it to regain full manual control.

To deactivate the GPS in flight:

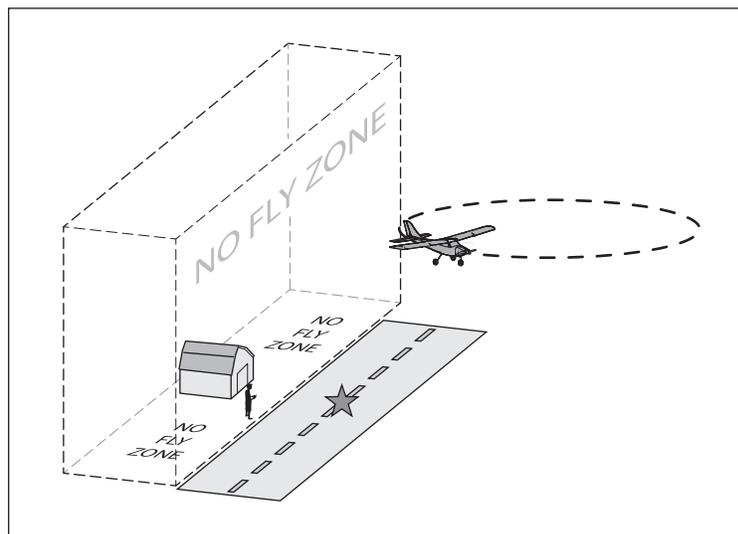
1. Press and hold the HP/AL (bind) button down and fully cycle the flight mode switch 3 times. The rudder will wag to indicate GPS is deactivated.
2. Set the flight mode switch to beginner mode for full SAFE Plus function. The GPS system will remain off until the aircraft is landed and the flight battery is unplugged and reconnected.

NOTICE: If GPS is deactivated, none of the Virtual Fence modes, Hold Position mode or Auto Land mode will function. The pilot will have to manually fly the aircraft back to a safe landing.

Holding Pattern Mode



Holding Pattern Mode, Airfield Virtual Fence Active



AutoLand Mode

When you are ready to land or your flight timer has signaled, press and hold the HP/AL button on the transmitter for 3 seconds.

The aircraft will instantly respond and begin a landing approach in the direction set during initialization. The aircraft will land near your initialization point/location and come to a complete stop.

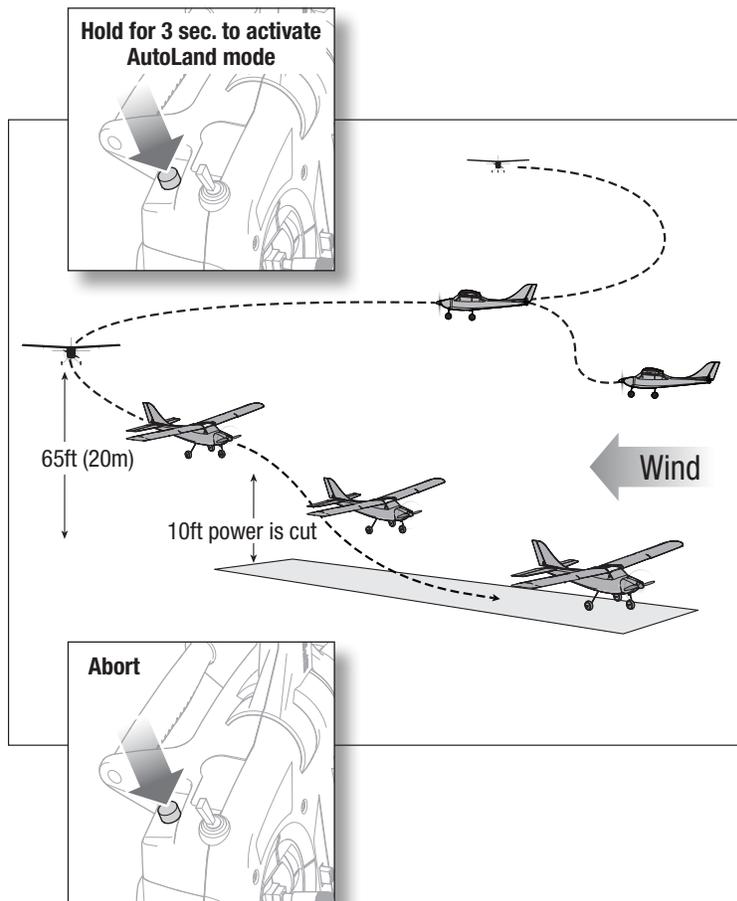
When AutoLand is activated, you can still control the aircraft to avoid obstacles like trees or poles. The aircraft will allow you to make corrections if you apply aileron or elevator commands, and will momentarily return throttle control to the throttle stick while the elevator or aileron commands are being used. Once clear of the obstacles just let go of the control sticks and the AutoLand feature will take over and resume the landing.

At any time you can abort a landing by pressing and releasing the HP/AL button or by changing the flight mode.

If you want to takeoff again after landing pull the throttle to low position and then press the red HP/AL button again to deactivate AutoLand, or change flight modes.

IMPORTANT: The AutoLand feature can not be initiated when your aircraft is below an altitude of approximately 20ft (6m).

NOTICE: The AutoLand feature does not possess the ability to avoid obstacles. Ensure that your flying location is free of obstacles (trees, buildings, etc) before you start flying.



Manually Assisting AutoLand Mode

No stick inputs are required when AutoLand is activated. However, stick inputs can be used at anytime during AutoLand to avoid an obstacle, lengthen the landing or smooth the final flare on landing.

Aileron stick:

Use the aileron stick to steer left or right to avoid an obstacle or make slight heading adjustments when on final approach. When aileron is given, the throttle will automatically advance slightly. Release the aileron stick and the system will take over full control.

Throttle stick:

Use the throttle stick to set a throttle max point. When elevator stick input is given, the throttle will go to the max point.

Elevator stick:

Up elevator: Allows the aircraft to stretch its approach by gaining altitude. When up elevator is applied the throttle increases to the throttle max point that you have established with the throttle stick.

As the aircraft passes over the runway threshold, pull the throttle stick fully back and use up elevator to flare the aircraft to a soft touch down on the runway. This is the best practice for landings and will help prevent accidental propeller strikes.

Down elevator: Allows the aircraft to stretch its approach without gaining or losing altitude. When down elevator is applied, the throttle increases to the throttle max point that you have established with the throttle stick without gaining or losing altitude. As soon as the right stick is centered, the system will take over full control again.

Example: When landing into a headwind, set the throttle stick to approximately 3/4 power. When the elevator stick is moved to extend the landing approach, the power will only progress to 3/4 power. Set to a higher throttle point in stronger wind or lower throttle point in low wind.

Deactivating GPS

Deactivating GPS in the Air

If for any reason you wish to deactivate the GPS system while the aircraft is airborne, such as if the GPS system is not calibrated correctly or is not responding as expected, follow the directions below:

1. Press and hold the HP/AL (bind) button and cycle the flight mode switch fully 3 times. The rudder will wag, indicating the GPS system is deactivated.
2. Maintain control of the aircraft and return to the runway to land manually.

To reactivate the GPS system, power cycle the aircraft.

IMPORTANT: When the GPS system is deactivated, the aircraft's Holding Pattern, AutoLand and Virtual Fence modes will not function.

Deactivating GPS on the Ground



WARNING: Do not perform this or any other equipment test with the propeller installed on the aircraft. Serious injury or property damage could result from the motor starting inadvertently.

The GPS system is activated from the factory. If for any reason you wish to deactivate the GPS system, such as to perform a control direction test indoors or to simply enjoy the aircraft without GPS features, follow the directions below:

1. Ensure that your transmitter is bound to the aircraft. If necessary, refer to the *Transmitter and Receiver Binding* section.
2. Power on the transmitter.
3. Power on the aircraft. After the aircraft finds the RF signal, the elevator will start to move up and down slowly, indicating the GPS system is searching for satellites.
4. Press and hold the HP/AL (bind) button and cycle the flight mode switch fully 3 times. The elevator will stop moving and the rudder will wag, indicating the GPS system is deactivated.

To reactivate the GPS system, power cycle the aircraft.

IMPORTANT: When the GPS system is deactivated, the aircraft's Holding Pattern, AutoLand and Virtual Fence modes will not function.

IMPORTANT: When GPS is deactivated from transmitter, LED will flash red slowly. No other LED indicators will function.

To have LED indicators, unplug GPS from flight controller.

Troubleshooting Guide (SAFE Plus GPS Upgrade)

Problem	Possible Cause	Solution
Aircraft will not respond to throttle but responds to other controls	AutoLand was not deactivated after landing	Deactivate AutoLand by pressing the AL/HP button or changing flight modes and lower throttle
	Home location has not been set	Set the home location
	Direction of Airfield fence has not been set.	Use aileron command to set the fence location.
Ailerons go up aircraft will not bind to transmitter (during binding)	Transmitter too near aircraft during binding process	Power off transmitter, move transmitter a larger distance from aircraft, disconnect and reconnect flight battery to aircraft and follow binding instructions
	Bind switch or button not held long enough during bind process	Power off transmitter and repeat bind process
	Aircraft or transmitter is too close to large metal object, wireless source or another transmitter	Move aircraft and transmitter to another location and attempt binding again
	Aircraft was not placed upright	Place aircraft upright after powering up
Ailerons go up and aircraft will not respond to transmitter (after binding)	Less than a 90-second wait between first powering on transmitter and connecting flight battery to aircraft	Leaving transmitter on, disconnect and reconnect flight battery to aircraft
	Aircraft was not upright, level or motionless	Leaving transmitter on, disconnect and reconnect flight battery to aircraft assuring that the aircraft is upright, level and motionless
	Aircraft cannot acquire a GPS signal	Turn off GPS Move to an outdoor location away from metal or concrete and try again
	Aux1 (CH 6) reversed	Reverse Aux1
Aircraft will not enter compass calibration	Aircraft cannot acquire a GPS signal	Move to an outdoor location away from metal or concrete and try again
Motor does not respond after landing	Over Current Protection (OCP) stops the motor when the transmitter throttle is set high and the propeller cannot turn	Fully lower throttle and throttle trim to arm ESC
	AutoLand has not been deactivated	Press and release HP/AL button to deactivate AutoLand feature
Motor pulses but battery is fully charged, not an LVC motor pulse	Lost GPS Signal	Turn off the GPS functions
		Try flying at a different location

LED Indications

Plane Status	LED on the windshield status	On-board LED Indication and required action	Surface Movement
Tx and Rx are not bound	Flash red and blue in sequence rapidly	Flash red and blue in sequence rapidly	All surfaces centered
Plane enters bind mode	Flash yellow rapidly	Flash red and blue in sequence rapidly	All surfaces centered
Bind button AUX1 on Tx is reversed	Flash blue rapidly	Flash blue rapidly	Elevators move up
Search for GPS lock	Flash purple slowly	Flash purple slowly	Wags elevator slowly
Virtual Fence indicator; GPS signal if found and locked, Home location is not set.	Yellow LED flashes slowly. Red LED flashes 0-3 times: 0 time-Virtual Fence Off 1 time-Circle Virtual Fence, small 2 times-Circle Virtual Fence, large 3 times-Airfield Virtual Fence	Blue LED flashes slowly. Red LED flashes 0-3 times: 0 time-Virtual Fence Off 1 time-Circle Virtual Fence, small 2 times-Circle Virtual Fence, large 3 times-Airfield Virtual Fence	"Wags elevator 4 times rapidly, and then center the elevator. Throttle ONLY pulses the motor to taxi to reach location to set home point. After set home point, throttle is full range power. "
Compass calibration: if calibration is never done, plane will enter compass calibration mode after GPS is locked.	Flash red and blue in sequence slowly	Flash red and blue in sequence slowly Enter calibration.	Wags ailerons continuously
Home location is set virtual fence modes are off: Press and hold the bind button for 3 seconds	Green: Beginner mode Blue: Intermediate mode Red: Expert mode		Wags all surfaces three times
Beginner Flight Mode: switch position: 0	w/o LAS: solid green w/ LAS working: solid Green with purple flash every 5 seconds	w/o LAS: solid blue w/ LAS working: solid blue	
Intermediate Flight Mode: switch position: 1	w/o LAS: solid blue w/LAS working: solid blue with purple flash every 5 seconds	w/o LAS: solid purple w/LAS working: solid purple	
Experienced Flight Mode: switch position: 2	w/o LAS: solid red w/LAS working: solid red	w/o LAS: solid red w/LAS working: solid red	
Panic mode	Solid green	Solid blue	
Plane automatically turns around and flies back to the home location after it approaches the edge of the virtual fence.	Flashes blue slowly	Flashes blue slowly	After the plane flies back inside the fence, wags the plane twice to indicate the control is given back to the pilot.
Holding Pattern Mode: Enter: click bind button Abort: click bind button	Flashes blue slowly	Flashes blue slowly	
AutoLand Mode: Enter: Press and hold bind button for 3 seconds Abort/Exit: click bind button or change flight modes	Flashes blue slowly	Flashes blue slowly	
Manually turn off GPS after initialization is done: Press and hold the bind button and toggle the flight mode switch 3 times.	Flashes red slowly	Flashes red slowly	Wags the plane twice
Loss of signal	Flashes red rapidly	Flashes red rapidly	
GPS is installed backwards/Heading abnormal/Flight control turns off GPS	Flashes red slowly	Flashes red slowly	Throttle taxi pulse.

Optional Transmitter Setup

To use a Spektrum transmitter other than the included DXS, use the setup table which corresponds to your transmitter series, DX, NX or iX series, to program the transmitter.

When using the recommended setup, the transmitter switch layout is as follows:

- Switch B Selects the Flight mode; Beginner (position 0), Intermediate (position 1), Experienced (position 2)
- Button I controls the Panic mode (depressed activates Panic mode)
- Switch F controls the aileron dual rates
- Switch C controls the elevator dual rates
- Switch G controls the rudder dual rates.
- Switch H controls the throttle cut.

IMPORTANT: After completing the transmitter setup or making any changes to the transmitter setup, the transmitter and receiver must be re-bound to save the desired failsafe positions.

Dual Rates

Make the initial flights in low rate, changing to high rate elevator for landing.

NOTICE: To ensure AS3X technology functions properly, do not lower rate values below 50%. If less control deflection is desired, manually adjust the position of the pushrods on the servo arm

NOTICE: If oscillation occurs at high speed, refer to the Troubleshooting Guide for more information.

Exponential

After first flights, adjust the exponential settings in the transmitter to fine tune the responsiveness of the aircraft around neutral to your preference.

iX Series Transmitter Setup

1. Power ON your transmitter and begin once the Spektrum Airware app is open. Select the orange pen icon in the upper left corner of the screen, the system asks for permission to **Turn Off RF**, select **PROCEED**
2. Select the three dots in the upper right corner of the screen, select **Add a New Model**
3. Select Model Option, choose **DEFAULT**, select **Airplane**. The system asks if you want to create a new acro model, select **Create**
4. Select the last model on the list, named **Acro**. Tap on the word Acro and rename the file to a name of your choice
5. Tap and hold the back arrow icon in the upper left corner of the screen to return to the main screen
6. Go to **Model Setup**;
Select **Channel Assign**, select **PROCEED**
5 Gear: Switch B
6 Aux1: Switch I
Press and hold the back arrow icon in the upper left corner of the screen to return to the main screen
7. Go to the **Model Adjust** menu
8. Select **Dual Rates and Expo**;
Channel: Aileron
Switch: Switch F
Set Switch Positions **0** and **1: Rate 100%, Expo 10%**
Set Switch Position **2: Rate 70%, Expo 5%**
9. **Channel: Elevator**
Switch: Switch C
Set Switch Positions **0** and **1: Rate 100%, Expo 10%**
Set Switch Position **2: Rate 70%, Expo 5%**
10. **Channel: Aileron**
Switch: Switch G
Set Switch Positions **0** and **1: Rate 100%, Expo 10%**
Set Switch Position **2: Rate 70%, Expo 5%**
11. Tap the back arrow to return to the **Model Adjust** menu
12. Select **Throttle Cut**;
Switch: Switch H
Position: -100%

NX Series Transmitter Setup

1. Power ON your transmitter, click on scroll wheel, roll to **System Setup** and click the scroll wheel. Choose yes.
2. Go to **Model Select** and choose **<Add New Model>** near the bottom of the list. Select **Airplane Model Type** by choosing the airplane, select **Create**
3. Set **Model Name**: Input a name for your model file
4. Go to **Channel Assign**
5 Gear: Change A to Switch B
6 Aux1: Change D to Button I
Click **List** to exit
5. Select **<Main Screen>**, Click the scroll wheel to enter the **Function List**
6. Go to **D/R (Dual Rate) and Expo**;
Channel: Aileron
Set **Switch: Switch F**
Set Switch Positions **0** and **1: Rate 100%, Expo 10%**
Set Switch Position **2: Rate 70%, Expo 5%**
7. Go to **D/R (Dual Rate) and Expo**;
Channel: Elevator
Set **Switch: Switch C**
Set Switch Positions **0** and **1: Rate 100%, Expo 10%**
Set Switch Position **2: Rate 70%, Expo 5%**
8. Go to **D/R (Dual Rate) and Expo**;
Channel: Rudder
Set **Switch: Switch G**
Set Switch Positions **0** and **1: Rate 100%, Expo 10%**
Set Switch Position **2: Rate 70%, Expo 5%**
9. Select **List** to go back to the **Function List**
10. Select **Throttle Cut**;
Switch: Switch H
Position: -100%

DX Series Transmitter Setup

1. Power ON your transmitter, click on scroll wheel, roll to **System Setup** and click the scroll wheel. Choose yes.
2. Go to **Model Select** and choose **<Add New Model>** at the bottom of the list. The system asks if you want to create a new model, select **Create**
3. Set **Model Type**: Select **Airplane Model Type** by choosing the airplane. The system asks you to confirm model type, data will be reset. Select **YES**
4. Set **Model Name**: Input a name for your model file
5. Select **<Main Screen>**, Click the scroll wheel to enter the **Function List**
6. Go to **D/R (Dual Rate) and Expo**;
Channel: Aileron
Set **Switch: Switch F**
Set Switch Positions **0** and **1: Rate 100%, Expo 10%**
Set Switch Position **2: Rate 70%, Expo 5%**
7. Go to **D/R (Dual Rate) and Expo**;
Channel: Elevator
Set **Switch: Switch C**
Set Switch Positions **0** and **1: Rate 100%, Expo 10%**
Set Switch Position **2: Rate 70%, Expo 5%**
8. Go to **D/R (Dual Rate) and Expo**;
Channel: Rudder
Set **Switch: Switch G**
Set Switch Positions **0** and **1: Rate 100%, Expo 10%**
Set Switch Position **2: Rate 70%, Expo 5%**
9. Select **List** to go back to the **Function List**
10. Select **Throttle Cut**;
Switch: Switch H
Position: -100%

Smart Technology Electronic Speed Control (ESC)

The Apprentice STS is equipped with an exclusive Smart technology electronic speed control that can provide a variety of real-time power system related telemetry data while you fly, including motor RPM, current, battery voltage and more to compatible Spektrum AirWare™ equipped transmitters.

When powered on, the ESC will send the below information to the flight control and the information will be displayed on the transmitter telemetry screen.

- RPM*
- Voltage
- Current
- Throttle
- FET Temperature
- BEC Temperature

* For the RPM telemetry information to display correctly, you must program the motor pole count into the Telemetry settings of your transmitter.

The Apprentice STS uses a 12-pole motor.

To program the motor pole count information:

1. Power on your transmitter.
2. Set the throttle cut to on.
3. Power on the aircraft and allow it to initialize.
4. In your transmitter, go to the **Function List** (**Model Setup** in iX series transmitters).

ESC Status			
RPM:	0		
Volts:	0.0V		
Motor:	0.0A	0% Output	
Throttle:	0%		
Fet Temp:	0.0C		
BEC:	0.0C	0.0A	0.0V

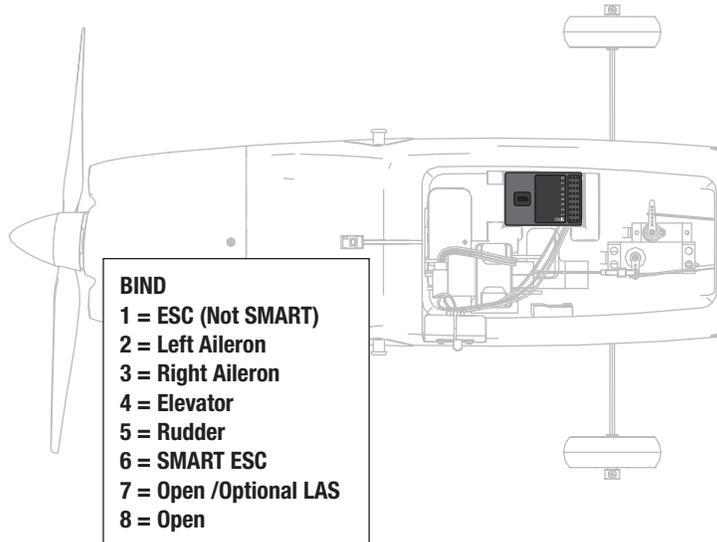
5. Select the **Telemetry** menu option.
6. Go to the **ESC** menu option.
7. Scroll down to **Poles**.
8. Enter **12** (for iX series transmitters, you must select save to save your changes).
9. Return to the main screen.

Service and Repairs

NOTICE: After any impact or replacement, always ensure the receiver is secure in the fuselage. If you replace the receiver, install the new receiver in the same orientation and manner as the original receiver or damage may result.

Repairs to the wings and fuselage of this aircraft can be made easily using virtually any adhesive (hot glue, regular CA [cyanoacrylate adhesive], epoxy, etc).

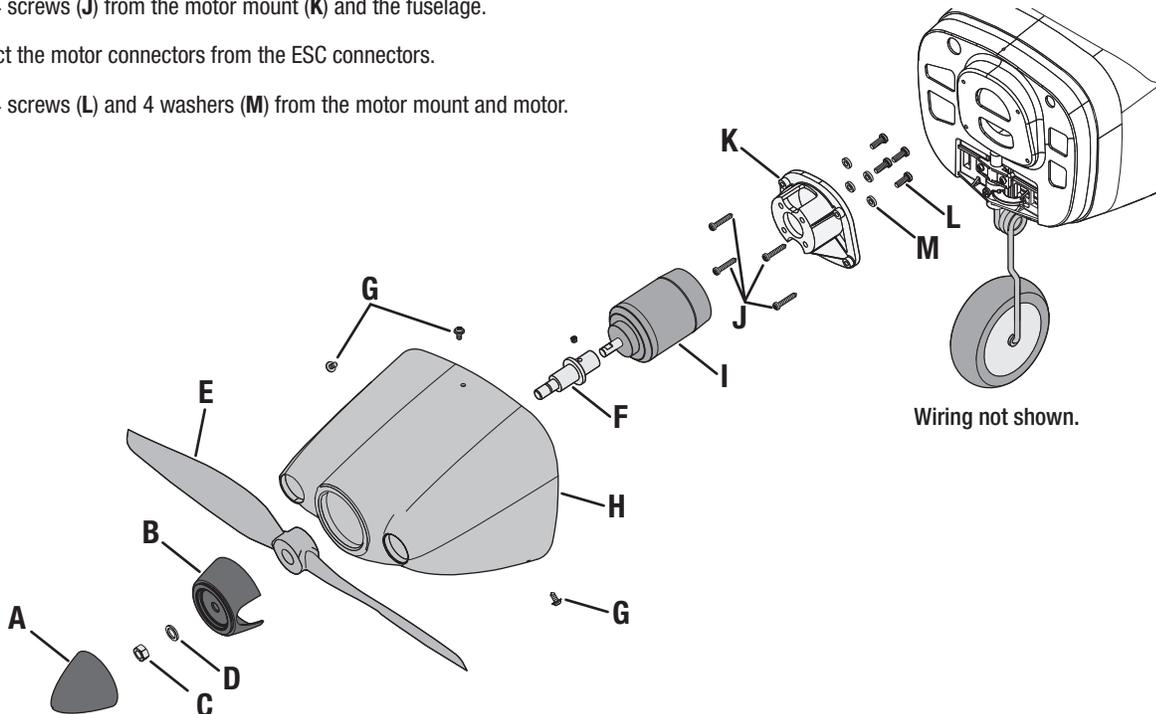
When parts are not repairable, see the Replacement Parts List for ordering by item number. For a listing of all replacement and optional parts, refer to the list at the back of this manual.



Propeller and Motor Service

Disassembly

1. Remove the spinner (A) from the backplate (B), by pinching the backplate and pulling the spinner away.
2. Remove the hex nut (C), washer (D) and propeller (E) from the collet (F).
A tool may be required to remove the hex nut.
3. Carefully remove 3 screws (G) and the cowling (H) from the fuselage.
4. Remove the collet from the motor (I).
5. Remove 4 screws (J) from the motor mount (K) and the fuselage.
6. Disconnect the motor connectors from the ESC connectors.
7. Remove 4 screws (L) and 4 washers (M) from the motor mount and motor.



Assembly

Assemble in reverse order.

- Correctly align and connect the motor wire colors with the ESC wires.
- The propeller size numbers (11 x 8) must face forward for correct propeller operation.
- A tool is required to tighten the hex nut on the collet.
- Ensure the spinner is fully connected to the spinner backplate for safe operation.

Wiring not shown.

Factory Settings for the Control Horns and Servo Arms

The illustration shows recommended hole settings in the servo arms and control horns.

	Elevator	Ailerons	Rudder / Nose Gear
Arms			
Horns			

AS3X® System Trouble Shooting Guide

Problem	Possible Cause	Solution
Trim change when flight mode is switched	Trim is not at neutral	If you need to adjust the trim more than 8 clicks, return the trim to neutral and manually adjust the clevis to center the trim
	Sub Trim is not at neutral	Do not use Sub Trim. Adjust the servo arm or the clevis

Troubleshooting Guide

Problem	Possible Cause	Solution
Aircraft does not operate	No link between the transmitter and receiver	Re-Bind the system following directions in this manual
	Transmitter AA batteries are depleted or installed incorrectly as indicated by a dim or unlit LED on the transmitter or the low battery alarm	Check polarity installation or replace with fresh AA batteries
	No electrical connection	Push connectors together until they are secure
	Flight battery is not charged	Fully charge the battery
	Crash has damaged the radio inside the fuselage	Replace the fuselage or receiver
Aircraft keeps turning in one direction	Rudder or rudder trim is not adjusted correctly	Adjust stick trims, then land and manually adjust aileron and/or rudder linkages so no transmitter trim is required
	Aileron or aileron trim is not adjusted correctly	Adjust stick trims or manually adjust aileron positions
Aircraft is difficult to control	Wing or tail is damaged	Replace damaged part
	Damaged Propeller	Land immediately and replace damaged Propeller
	Center of gravity is behind the recommended location	Shift battery forward, do not fly until correct Center of Gravity location is achieved
Aircraft nose rises steeply at half throttle	Wind is too gusty or strong	Postpone flying until the wind calms down
	Elevator is trimmed 'up' too much	If trim must be adjusted more than 4 clicks when pushing the trim button, adjust push rod length
	Battery is not installed in the correct position.	Move forward approximately 1/2"
Aircraft will not climb	Battery is not fully charged	Fully charge battery before flying
	Elevator may be trimmed 'down'	Adjust elevator trim 'up'
	Propeller damaged or installed backwards	Land immediately, replace propeller
Aircraft is difficult to launch in the wind	Launching the aircraft down wind or into a cross wind	Always launch the aircraft directly into the wind
Flight time is too short	Battery is not fully charged	Recharge battery
	Flying at full throttle for the entire flight	Fly at just above half throttle to increase flying time
	Wind speed too fast for safe flight	Fly on a calmer day
	Propeller damaged	Replace propeller
Aircraft vibrates	Propeller, spinner or motor damaged	Tighten or replace parts
Rudder, ailerons or elevator do not move freely	Damaged or blocked push rods or hinges	Repair damage or blockage
Aircraft will not Bind (during binding) to transmitter	Transmitter is too near aircraft during binding process	Move powered transmitter a few feet from aircraft, disconnect and reconnect battery to aircraft
	Aircraft or transmitter is too near a large metal object, wireless source or another transmitter	Move the aircraft and transmitter to another location and attempt binding again
	Flight battery/transmitter battery charge is too low	Replace/recharge batteries
Aircraft will not connect (after binding) to transmitter	Transmitter is too near aircraft during connecting process	Move powered transmitter a few feet from aircraft, disconnect and reconnect battery to aircraft
	Aircraft or transmitter is too near a large metal object, wireless source or another transmitter	Move the aircraft and transmitter to another location and attempt connecting again
	Aircraft battery/Transmitter battery charge is too low	Replace/recharge batteries
	Transmitter may have been bound to a different model (using different DSM Protocol)	Bind aircraft to transmitter
After being properly adjusted, aileron and/or rudder are not in neutral position when battery is plugged in	Model was moved during initial power on	Unplug flight battery and reconnect, keeping model immobile for at least 5 seconds

Replacement Parts

Part #	Description
EFL2733	Spinner: Apprentice
EFL2734	Motor Mount: Apprentice
EFL2735	5mm Prop Adapter: Apprentice
EFL2737	Wing Hold Down Rods with Caps: Apprentice
EFL2738	Rubber Bands (8): Apprentice
EFL310005	Pushrod Set: Apprentice S
EFL310006	Nose Gear: Apprentice S
EFL310007	Main Landing Gear: Apprentice S
EFL310008	Firewall: Apprentice S
EFL310009	Nose Gear Arm & Mounting Strap: Apprentice S
EFL310010	Battery Door: Apprentice S
EFL310011	Wheels 65mm (3): Apprentice S
EFL310013	Wing Set: Apprentice STS
EFL310014	Fuselage: Apprentice STS
EFL310015	Tail Set: Apprentice STS
EFL310016	Decal Set: Apprentice STS
EFL310017	LAS Cover: Apprentice STS
EFL310018	Cowl: Apprentice STS
EFL310020	GPS Cover: Apprentice STS
EFL310021	Screw Set; Apprentice STS
EFLA1030FB	30-Amp Telemetry Capable ESC
EFLM7215	BL15 Outrunner Motor, 840Kv
EFLP11080E	11 x 8 Electric Prop
EFLR7150	37g Standard Servo
EFLR7155	13g Digital Micro Servo
SPM4650C	DSMX SRXL2 Rx w/Connector
SPMA3230	Flight Controller: Apprentice STS
SPMR1010	DXS Transmitter

Recommended Parts

Part #	Description
SPMXPSA300	Smart G2 Powerstage Bundle: 3S 4000mAh; S120

Glossary of Important Terms

Aileron: Control surface found on the trailing edge of each wing. Giving right aileron control causes the right aileron to deflect up and the left aileron to deflect down, making the aircraft roll to the right. Giving left aileron control causes the left aileron to deflect up and the right aileron to deflect down, making the aircraft roll left.

AS3X: Active Stabilization, 3-Axis. An electronic stability system that counters outside forces such as wind, turbulence, torque, tip-stall, control sensitivity issues due to CG position, to make the aircraft fly more smoothly, and provide a better flying experience.

Binding: The process of electronically linking the transmitter to the receiver. The aircraft will then recognize only a particular transmitter.

Center of Gravity (CG): Point at which the aircraft balances, most notably from front to back.

Clevis: The U-shaped connector at the end of the aircraft pushrod which allows adjustment of the pushrod length.

Control Throw: The distance a control surface deflects, normally measured from the widest point of the control surface.

Dual Rate: Setting found in the transmitter which allows two different control throw distances when the control stick is deflected fully. Using a low rate gives less control throw at full deflection and thus a less sensitive feel to the aircraft. Using high rate gives greater control throw at full deflection and thus a more sensitive feel to the aircraft.

Optional Parts

Part #	Description
SPMA3180	Landing Assist Sensor (LAS)
SPMR6775	NX6 6 Ch Transmitter Only
SPMX3200S30	3200mAh 3S 11.1V Smart 30C; IC3
SPMXPSA300	Smart G2 Powerstage: 3S 4000mAh; S120
SPMR8200	SPMR8200 NX8 8-Channel DSMX Transmitter Only
RFL1200S	RealFlight 9.5S RC Flight Sim with InterLink Controller
SPMXC2050	S155 G2 1 x 55W AC Smart Charger
SPMX323S30	11.1V 3200mAh 3S 30C Smart G2 LiPo Battery: IC3

Hardware

Location	Description	Quantity
2 x 5mm self-tapping screw	One on top of the cowl and two on the bottom	3
M6 x 3mm machine screw w/ Washers	To secure the motor on the motor mount	4
3 x 10mm self-tapping screw	Motor mount to the firewall	4
2.5 x 15mm self-tapping screw	Secure nose gear bracket to firewall.	2
3 x 6mm self-tapping screw	To mount the servo arm to nose landing gear wire	1
2 x 4.5mm self-tapping screw	Servo arm screws	3
2.5 x 6mm self-tapping screw	Rudder/nose gear servo arm screw	1
M2 x 21mm machine screw	To secure the control horns on main wing	4
M2 x 10mm machine screw	To secure the control horn on vertical fin	2
M2 x 10mm machine screw	To secure the control horn on horizontal tail	2
2.5 x 15mm self-tapping screw	To mount the tail to fuselage	3
2.5 x 12mm self-tapping screw	To secure the battery door latch	1
2.5 x 8mm self-tapping screw with washer	To secure the ESC switch	2

EDF: Electric Ducted Fan

Elevator: Control surface found on the trailing edge of the horizontal stabilizer. Up elevator causes the aircraft to pitch up. Down elevator causes the aircraft to pitch down.

Electronic Speed Control (ESC): an electronic device that controls and regulates the speed of the motor. It has connections from the battery, to the motor, and to the Receiver.

Exponential: A setting programmed in the transmitter which allows the pilot to tailor the sensitivity of the controls around neutral. Increasing the exponential value creates a softer control feel around neutral, thus making the aircraft less sensitive to control inputs. Exponential only affects the controls around neutral.

Low Voltage Cutoff (LVC): A safety feature built into the electronic speed control which activates when the battery voltage drops below a determined level, cutting power to the motor, but still providing power to the receiver and servos, allowing the aircraft to be landed safely.

Pitch: The rotation of the aircraft nose up or down, controlled by the elevator.

Range Test: Test to check the transmitter and receiver are functioning properly. The test is done by setting the transmitter to a low-power mode and testing the control function from a set distance.

Receiver: an electronic device installed in the aircraft which decodes the control inputs sent from the transmitter and sends the inputs to the servos.

Roll: Left and right rotation of the aircraft around the longitudinal axis.

Rudder: Control surface found on the trailing edge of the vertical stabilizer. Right rudder control causes the nose of the aircraft to turn to the right. Left rudder causes the nose of the aircraft to turn left.

Sensor-Assisted Flight Envelope (SAFE) Technology: Offers smoother flight capability that battles windy conditions for you and multiple modes so you can fly with the level of protection and assistance that suits any given moment of the flight.

Servo: Electronic component which translates the control signals from the receiver into movement of a control surface. The servo is connected to the control surface with a pushrod.

Throttle: Control input which regulates the speed of the motor. A higher throttle setting makes the motor rotate faster, thus increasing forward thrust. A lower throttle setting makes the motor rotate slower, thus decreasing forward thrust.

Transmitter: Control unit held by the pilot which sends signals to the aircraft.

Yaw: Left or right rotation of the aircraft nose, controlled by the rudder.

Important Federal Aviation Administration (FAA) Information

Use the QR code below to learn more about the Recreational UAS Safety Test (TRUST), as was introduced by the 2018 FAA Reauthorization Bill. This free test is required by the FAA for all recreational flyers in the United States. The completed certificate must be presented upon request by any FAA or law enforcement official.



**Recreational
UAS Safety Test**

If your model aircraft weighs more than .55lbs or 250 grams, you are required by the FAA to register as a recreational flyer and apply your registration number to the outside of your aircraft. To learn more about registering with the FAA, use the QR code below.



FAA DroneZone

AMA National Model Aircraft Safety Code

Effective January 1, 2018

A model aircraft is a non-human-carrying device capable of sustained flight within visual line of sight of the pilot or spotter(s). It may not exceed limitations of this code and is intended exclusively for sport, recreation, education and/or competition. All model flights must be conducted in accordance with this safety code and related AMA guidelines, any additional rules specific to the flying site, as well as all applicable laws and regulations.

As an AMA member I agree:

- I will not fly a model aircraft in a careless or reckless manner.
- I will not interfere with and will yield the right of way to all human-carrying aircraft using AMA's See and Avoid Guidance and a spotter when appropriate.
- I will not operate any model aircraft while I am under the influence of alcohol or any drug that could adversely affect my ability to safely control the model.
- I will avoid flying directly over unprotected people, moving vehicles, and occupied structures.
- I will fly Free Flight (FF) and Control Line (CL) models in compliance with AMA's safety programming.
- I will maintain visual contact of an RC model aircraft without enhancement other than corrective lenses prescribed to me. When using an advanced flight system, such as an autopilot, or flying First-Person View (FPV), I will comply with AMA's Advanced Flight System programming.
- I will only fly models weighing more than 55 pounds, including fuel, if certified through AMA's Large Model Airplane Program.
- I will only fly a turbine-powered model aircraft in compliance with AMA's Gas Turbine Program.
- I will not fly a powered model outdoors closer than 25 feet to any individual, except for myself or my helper(s) located at the flight line, unless I am taking off and landing, or as otherwise provided in AMA's Competition Regulation.
- I will use an established safety line to separate all model aircraft operations from spectators and bystanders.

Limited Warranty

What this Warranty Covers—Horizon Hobby, LLC, (Horizon) warrants to the original purchaser that the product purchased (the “Product”) will be free from defects in materials and workmanship at the date of purchase.

What is Not Covered—This warranty is not transferable and does not cover (i) cosmetic damage, (ii) damage due to acts of God, accident, misuse, abuse, negligence, commercial use, or due to improper use, installation, operation or maintenance, (iii) modification of or to any part of the Product, (iv) attempted service by anyone other than a Horizon Hobby authorized service center, (v) Product not purchased from an authorized Horizon dealer, (vi) Product not compliant with applicable technical regulations, or (vii) use that violates any applicable laws, rules, or regulations.

OTHER THAN THE EXPRESS WARRANTY ABOVE, HORIZON MAKES NO OTHER WARRANTY OR REPRESENTATION, AND HEREBY DISCLAIMS ANY AND ALL IMPLIED WARRANTIES, INCLUDING, WITHOUT LIMITATION, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE PURCHASER ACKNOWLEDGES THAT THEY ALONE HAVE DETERMINED THAT THE PRODUCT WILL SUITABLY MEET THE REQUIREMENTS OF THE PURCHASER'S INTENDED USE.

Purchaser's Remedy—Horizon's sole obligation and purchaser's sole and exclusive remedy shall be that Horizon will, at its option, either (i) service, or (ii) replace, any Product determined by Horizon to be defective. Horizon reserves the right to inspect any and all Product(s) involved in a warranty claim. Service or replacement decisions are at the sole discretion of Horizon. Proof of purchase is required for all warranty claims. SERVICE OR REPLACEMENT AS PROVIDED UNDER THIS WARRANTY IS THE PURCHASER'S SOLE AND EXCLUSIVE REMEDY.

Limitation of Liability—HORIZON SHALL NOT BE LIABLE FOR SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR PRODUCTION OR COMMERCIAL LOSS IN ANY WAY, REGARDLESS OF WHETHER SUCH CLAIM IS BASED IN CONTRACT, WARRANTY, TORT, NEGLIGENCE, STRICT LIABILITY OR ANY OTHER THEORY OF LIABILITY, EVEN IF HORIZON HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. Further, in no event shall the liability of Horizon exceed the individual price of the Product on which liability is asserted. As Horizon has no control over use, setup, final assembly, modification or misuse, no liability shall be assumed nor accepted for any resulting damage or injury. By the act of use, setup or assembly, the user accepts all resulting liability. If you as the purchaser or user are not prepared to accept the liability associated with the use of the Product, purchaser is advised to return the Product immediately in new and unused condition to the place of purchase.

Law—These terms are governed by Illinois law (without regard to conflict of law principals). This warranty gives you specific legal rights, and you may also have other rights which vary from state to state. Horizon reserves the right to change or modify this warranty at any time without notice.

WARRANTY SERVICES

Questions, Assistance, and Services—Your local hobby store and/or place of purchase cannot provide warranty support or service. Once assembly, setup or use of the Product has been started, you must contact your local distributor or Horizon directly. This will enable Horizon to better answer your questions and service you in the event

that you may need any assistance. For questions or assistance, please visit our website at www.horizonhobby.com, submit a Product Support Inquiry, or call the toll free telephone number referenced in the Warranty and Service Contact Information section to speak with a Product Support representative.

Inspection or Services—If this Product needs to be inspected or serviced and is compliant in the country you live and use the Product in, please use the Horizon Online Service Request submission process found on our website or call Horizon to obtain a Return Merchandise Authorization (RMA) number. Pack the Product securely using a shipping carton. Please note that original boxes may be included, but are not designed to withstand the rigors of shipping without additional protection. Ship via a carrier that provides tracking and insurance for lost or damaged parcels, as Horizon is not responsible for merchandise until it arrives and is accepted at our facility. An Online Service Request is available at http://www.horizonhobby.com/content/service-center_render-service-center. If you do not have internet access, please contact Horizon Product Support to obtain a RMA number along with instructions for submitting your product for service. When calling Horizon, you will be asked to provide your complete name, street address, email address and phone number where you can be reached during business hours. When sending product into Horizon, please include your RMA number, a list of the included items, and a brief summary of the problem. A copy of your original sales receipt must be included for warranty consideration. Be sure your name, address, and RMA number are clearly written on the outside of the shipping carton.

NOTICE: Do not ship LiPo batteries to Horizon. If you have any issue with a LiPo battery, please contact the appropriate Horizon Product Support office.

Warranty Requirements—For Warranty consideration, you must include your original sales receipt verifying the proof-of-purchase date. Provided warranty conditions have been met, your Product will be serviced or replaced free of charge. Service or replacement decisions are at the sole discretion of Horizon.

Non-Warranty Service—Should your service not be covered by warranty, service will be completed and payment will be required without notification or estimate of the expense unless the expense exceeds 50% of the retail purchase cost. By submitting the item for service you are agreeing to payment of the service without notification. Service estimates are available upon request. You must include this request with your item submitted for service. Non-warranty service estimates will be billed a minimum of ½ hour of labor. In addition you will be billed for return freight. Horizon accepts money orders and cashier's checks, as well as Visa, MasterCard, American Express, and Discover cards. By submitting any item to Horizon for service, you are agreeing to Horizon's Terms and Conditions found on our website http://www.horizonhobby.com/content/service-center_render-service-center.

ATTENTION: Horizon service is limited to Product compliant in the country of use and ownership. If received, a non-compliant Product will not be serviced. Further, the sender will be responsible for arranging return shipment of the un-serviced Product, through a carrier of the sender's choice and at the sender's expense. Horizon will hold non-compliant Product for a period of 60 days from notification, after which it will be discarded.

10/15

Contact Information

Country of Purchase	Horizon Hobby	Contact Information	Address
United States of America	Horizon Service Center (Repairs and Repair Requests)	servicecenter.horizonhobby.com/RequestForm/	2904 Research Rd Champaign, Illinois, 61822 USA
	Horizon Product Support (Product Technical Assistance)	productsupport@horizonhobby.com 877-504-0233	
	Sales	websales@horizonhobby.com 800-338-4639	
European Union	Horizon Technischer Service Sales: Horizon Hobby GmbH	service@horizonhobby.eu +49 (0) 4121 2655 100	Hanskampring 9 D 22885 Barsbüttel, Germany

FCC Information

Contains FCC ID: BRWKATY1T

FCC ID: BRWSRLRR2

This equipment complies with FCC and IC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator and/or antenna and your body (excluding fingers, hands, wrists, ankles and feet). This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Supplier's Declaration of Conformity

FC EFL Apprentice 1.5m STS RTF Basic and BNF Basic (EFL370001/ EFL3750):

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.



CAUTION: Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a

residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Horizon Hobby, LLC
2904 Research Rd.,
Champaign, IL 61822
Email: compliance@horizonhobby.com
Web: HorizonHobby.com

IC Information

CAN ICES-3 (B)/NMB-3(B)

Contains IC: 6157A-KATY1T

IC: 6157A-SRLRR2

This device contains license-exempt transmitter(s)/receiver(s) that comply with Innovation, Science, and Economic Development Canada's license-exempt RSS(s). Operation is subject to the following 2 conditions:

1. This device may not cause interference.
2. This device must accept any interference, including interference that may cause undesired operation of the device.

Compliance Information for the European Union



EU Compliance Statement:

EFL Apprentice 1.5m STS RTF Basic (EFL370001): Hereby, Horizon Hobby, LLC declares that the device is in compliance with the following: EU EMC Directive 2014/30/EU; EU Radio Equipment Directive 2014/53/EU; RoHS 2 Directive 2011/65/EU, RoHS 3 Directive - Amending 2011/65/EU Annex II 2015/863.

EFL Apprentice 1.5m STS BNF Basic (EFL3750): Hereby, Horizon Hobby, LLC declares that the device is in compliance with the following: EU Radio Equipment Directive 2014/53/EU, RoHS 2 Directive 2011/65/EU, RoHS 3 Directive - Amending 2011/65/EU Annex II 2015/863

The full text of the EU declaration of conformity is available at the following internet address: <https://www.horizonhobby.com/content/support-render-compliance>.

NOTE: This product contains batteries that are covered under the 2006/66/EC European Directive, which cannot be disposed of with normal household waste. Please follow local regulations.

Wireless frequency and output:

Transmitter:

2402.0 - 2478.0MHz
17.7 dBm

Receiver:

2404-2476MHz
3dBm



E328

EU Manufacturer of Record:

Horizon Hobby, LLC
2904 Research Road
Champaign, IL 61822 USA

EU Importer of Record:

Horizon Hobby, GmbH
Hanskampring 9
22885 Barsbüttel Germany

WEEE NOTICE:



This appliance is labeled in accordance with European Directive 2012/19/EU concerning waste of electrical and electronic equipment (WEEE). This label indicates that this product should not be disposed of with household waste. It should be deposited at an appropriate facility to enable recovery and recycling.



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E-flite, Plug-N-Play, Bind-N-Fly, BNF, the BNF logo, DSM, DSM2, DSMX, Spektrum AirWare, EC3, IC3, AS3X, SAFE, the SAFE logo, ModelMatch, and the Horizon Hobby logo are trademarks or registered trademarks of Horizon Hobby, LLC.

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US 8,672,726 US 9,056,667 US 9,753,457. US 10,078,329. US 9,930,567. US 10,419,970. Other patents pending.

<http://www.horizonhobby.com/>