hobbyzone®

Carbon Cub S 2 1.3m

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

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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.

RTF BASIC

BNF® BASIC

HBZ320001   *HBZ32500*

Instruction Manual | Bedienungsanleitung
Manuel d'utilisation | Manuale di Istruzioni

HORIZON® HOBBY

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.

14+ **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.

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 Hobby Zone® news.

Table of Contents

Specifications	
Wingspan	51" (1300mm)
Length	34" (865mm)
Weight	Without Battery: 2.3lbs (1075g) With Recommended 3s 2200mAh Flight Battery 2.8lb (1285g)

Included Equipment	
Transmitter	Spektrum™ DXS 2.4GHz (SPMR1010)
Transmitter Batteries	4 AA Alkaline
Receiver	Spektrum™ DSMX SRXL2 RX with Connector (SPM4650C)
Flight Controller	Spektrum™ Flight Controller (SPMA3230A)
ESC	30-Amp 3S/4S ESC with Telemetry (EFLA1030FB)
Motor	480 Brushless Outrunner, 960Kv 14 Pole (EFLM480BL)
Propeller	9 x 6 (EFLP09060)
Servos	(2) Aileron, A381, 350mm lead (1) Elevator, A381, 70mm lead (1) Rudder, A381, 70mm lead

Needed To Complete	
SPMXPSA200	Smart G2 Powerstage Bundle with 3S 2200mAh Battery and S120 Smart Charger

Required Equipment	
Flight Battery	3S 11.1V 2200mAh LiPo Battery with IC3® Connector
Battery Charger	3S LiPo Battery Compatible

Optional Accessories	
RFL1205	RealFlight Trainer Edition RC Flight Simulator
SPMWS2000	WS2000 Wireless Simulator USB Dongle
DYN1405	LiPo Charge Protection Bag, Large
SPMSA382	Optional Flap Servo, 13g Sub Micro MG Servo
EFLA250	Park Flyer Tool Asst, 5 pc
HBZ7390	Float Set: Super Cub LP
SPM9747	DSMX SRXL2 Remote Receiver
SPMA3052	Standard Servo Extension 9"
SPMA3173	Spektrum GPS Module
SPMA3180	Landing Assist Sensor (LAS)
SPMXBC100	Smart Battery & Servo Tester

Completion Guide

Scan the QR code for your chosen product to go to the product completion guide for information on the recommended Powerstage bundle as well as other compatible batteries and chargers.

HBZ320001   *HBZ32500*

Required Tools
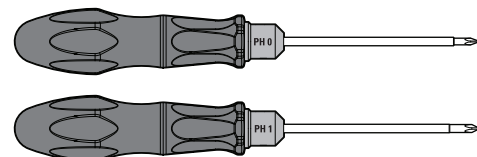
• Phillips Screwdrivers (PH#0, PH#1)

Aircraft Components

Typical Control Components

Control Horn
Retaining Sleeve
Clevis
Pushrod
Servo Arm
Servo

Aileron

Vortex Generator

Aileron Servo

Flap

Electronic Speed Control (ESC)

Elevator

Horizontal Stabilizer

Receiver

Elevator Servo

Flight Battery

Rudder Servo

Spinner

Flight Controller

LED Indicator   Motor   Propeller

Main Landing Gear

Rudder

Vertical Stabilizer

Aileron Servo

Tailwheel
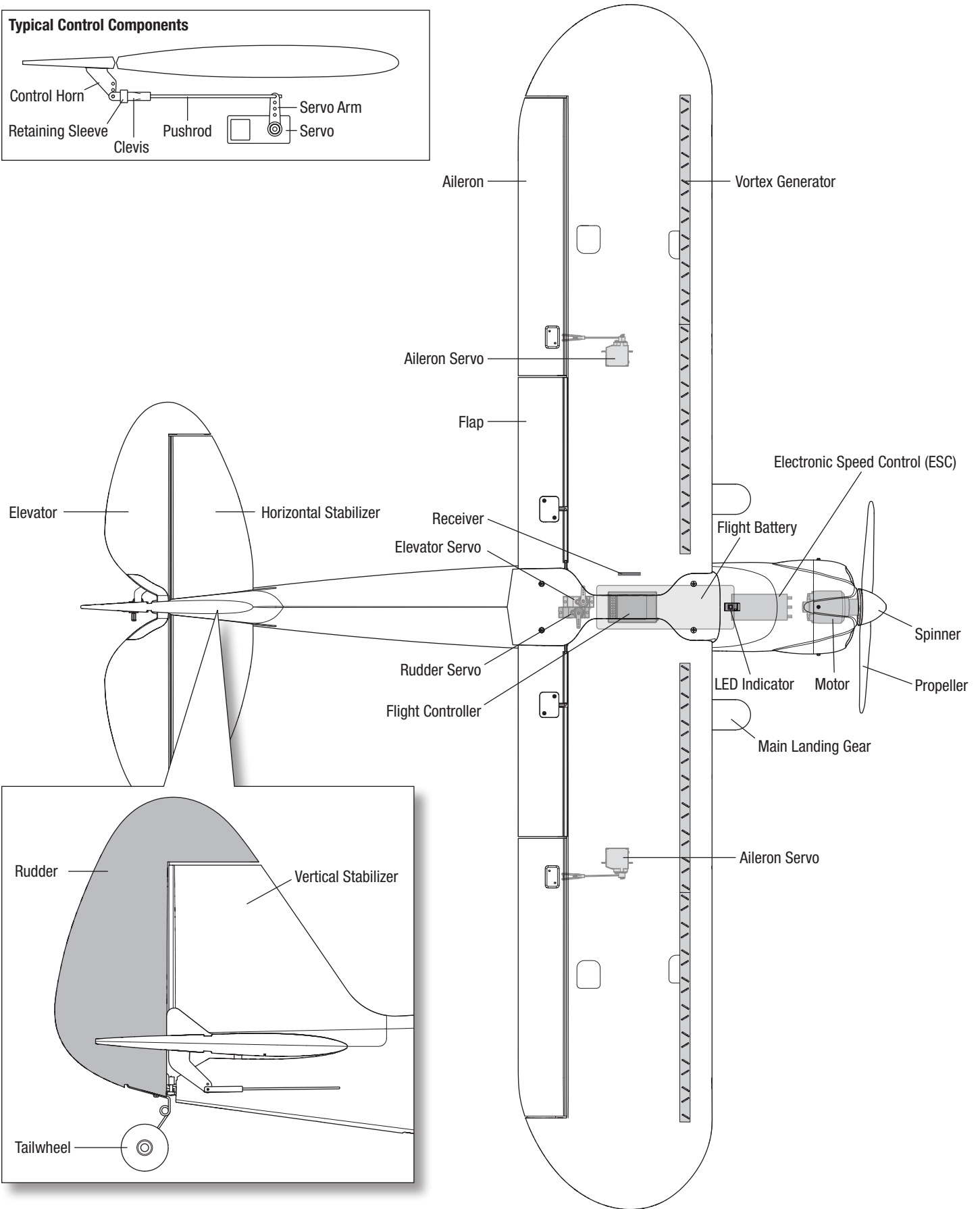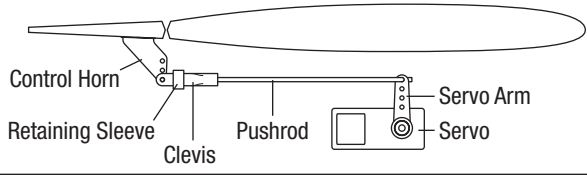
Assembly

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/CarbonCubS2assembly.

Assembly Video

Install the Main Landing Gear

The hardware for the landing gear installation is in bag A. The plastic landing gear fairings are in a separate bag.

1. Install the left and right fairings (marked L and R) on the respective sides of the strut.
2. Install a wheel on each axle using wheel collars and spacers. Using a PH#1 Phillips screwdriver, tighten the set screws on the flat spots of the axle.

TIP: A small amount of threadlock will help secure the setscrew in the collar.

3. Turn the latch to open the battery hatch.
4. Slide the landing gear into the channels in the battery compartment of the fuselage as shown.
5. Install the left and right landing gear retainers (marked L and R) in the respective slots on the bottom of the fuselage using four 2.5 x 10mm screws and PH#1 Phillips screwdriver.
6. Close the battery hatch and secure the latch.

2.5 x 10mm (4)
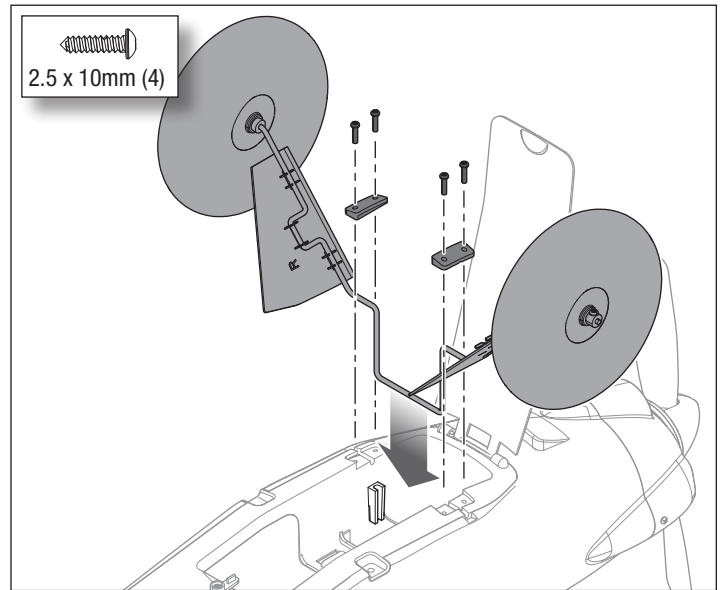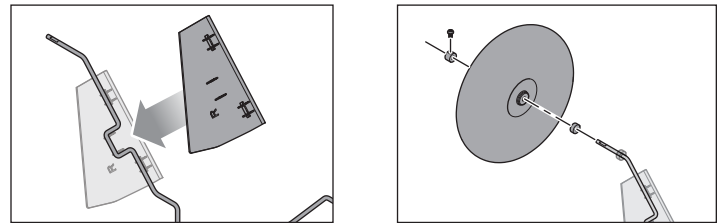
Tail Surfaces Installation

We recommend watching the "Tail Surfaces Installation" chapter/section of the assembly video by scanning this QR code or using this URL: www.horizonhobby.cc/CarbonCubS2assembly.

Assembly Video

The hardware for the tail surface installation is located in bag B.

1. Install the horizontal stabilizer on the fuselage as shown.
2. Carefully insert the two pins of the vertical stabilizer through the horizontal stabilizer holes and the fuselage holes.

   TIP: Turn the rudder so the control horn is under the horizontal stabilizer.

3. Install two 3 x 14mm screws through the bottom of the fuselage and into the vertical stabilizer pins. Do not overtighten the screws.
4. Install the 2 x 8mm rudder hinge screw with a PH#1 Phillips screwdriver, as shown. Tighten completely, then loosen the screw ½ turn so the rudder rotates freely.
5. Connect the rudder and elevator pushrod clevises in the outermost holes of the rudder and elevator control horns. Refer to the clevis adjustment instructions to center the rudder and elevators.

3mm x 14mm (2)

2 x 8mm
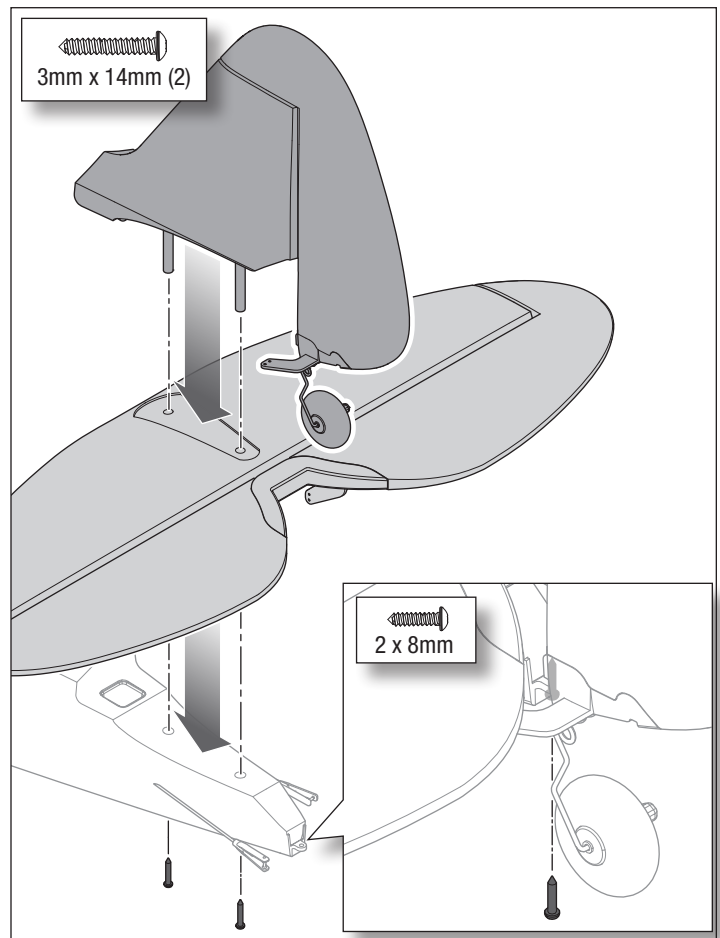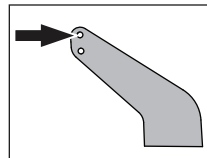
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Wing Installation

We recommend watching the "Wing Installation" chapter/section of the assembly video by scanning this QR code or using this URL: www.horizonhobby.cc/CarbonCubS2assembly.

Assembly Video

Assembly

1. Install the vortex generators in the channels on the top of the wing by installing the double-sided tape into the channels. Install the vortex generators on the tape with the rounded corners of the fins toward the front of the wing, as shown in the illustration.

Fin Side View
Front
Round Corner
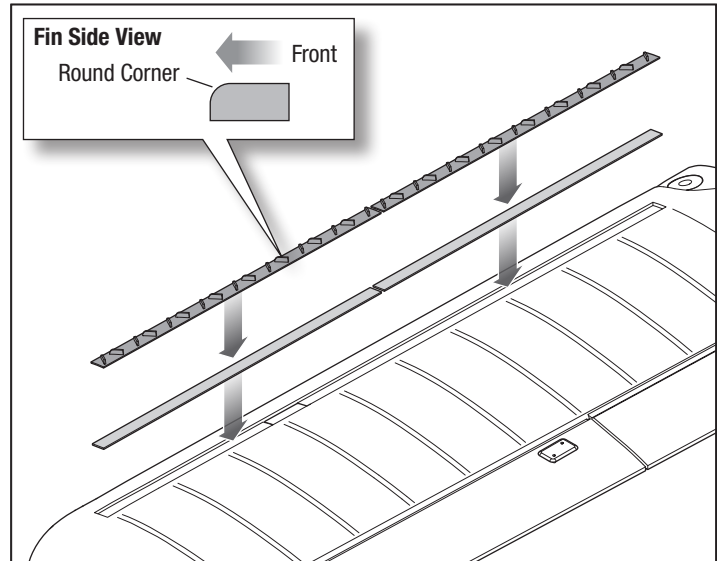
2. Slide the wing tube in the hole in the left wing.
3. Slide the other end of the wing tube into the hole in the right wing until both wings meet.
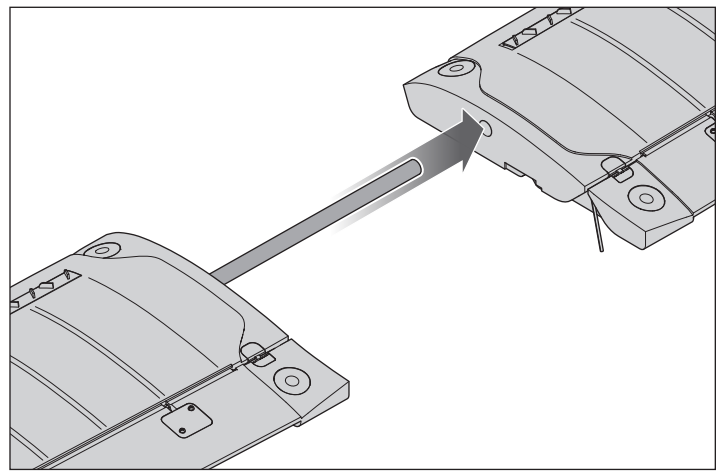
4. Install the wing cover to the top center section of the wing, aligning the posts on the cover with the holes as shown.
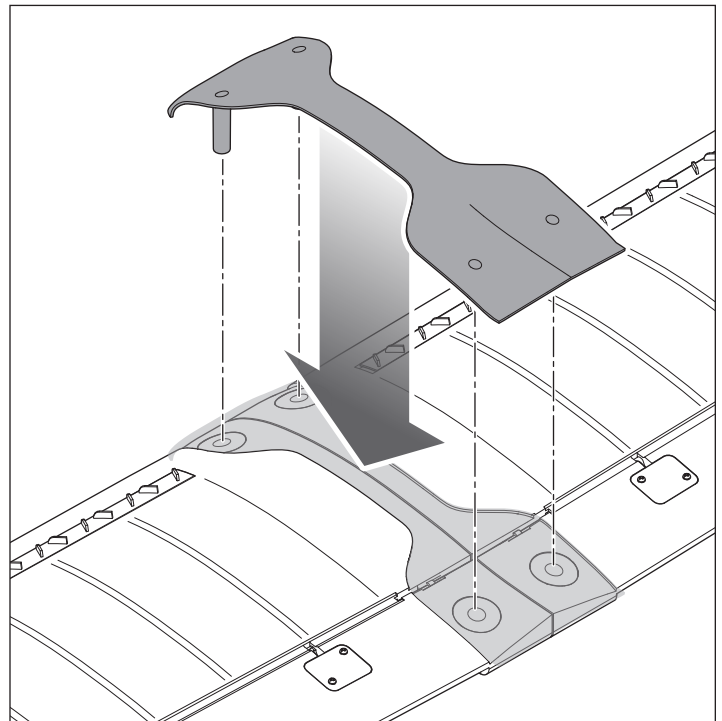
Installation

The hardware for the wing installation is in bag C.

1. Connect the left aileron servo connector to the servo extension labeled "**AIL-L**" and the right aileron servo connector to the servo extension labeled "**AIL-R**".

2. Align the wing in the wing saddle, aligning the holes in the wing cover with the mounting holes in the fuselage. Ensure the flap linkages and servo wires are fully within the fuselage opening.

NOTICE: DO NOT crush or otherwise damage the wiring when attaching the wing to the fuselage. Servo damage and loss of control may result.

3. Secure the assembled wing to the fuselage with four 3 x 12mm Phillips screws using a PH#1 Phillips screwdriver.

3 X 12mm (4)

AIL-R

AIL-L
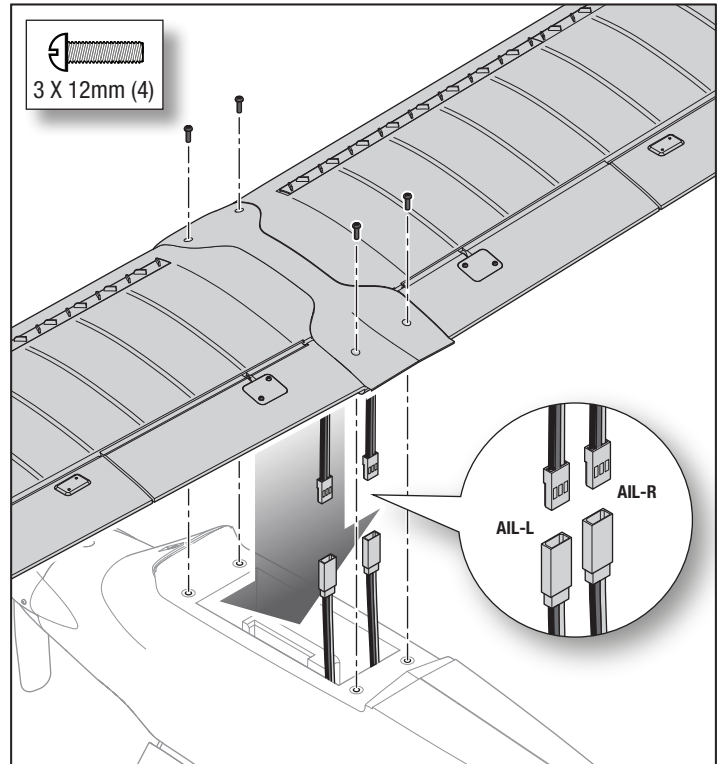
4. Attach the right and left wing struts (marked R and L) under the wing and fuselage using six Phillips screws and a PH#1 Phillips screwdriver.

2.5 X 10mm (6)
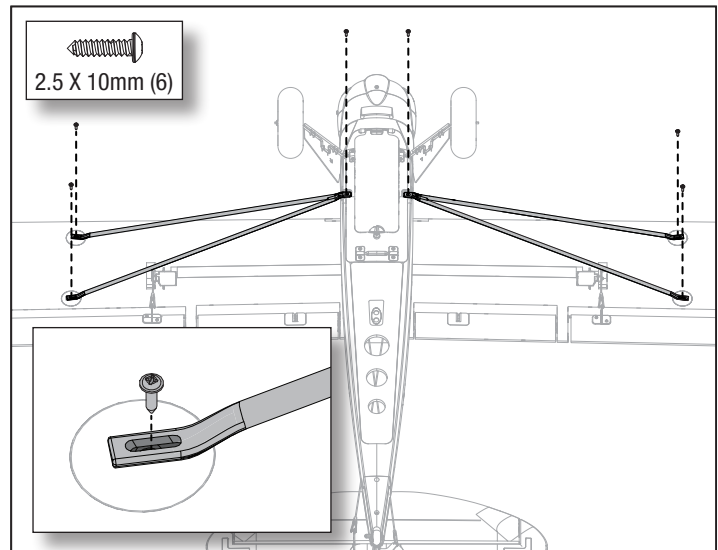
Wing Alignment

Adjust the position of the four screws in the top of the strut slots so the wings are not flexed down or twisted. The wings should be flat or have a slight amount of dihedral from tip to tip, as shown in the illustration.

Carbon Cub S 2 1.3m
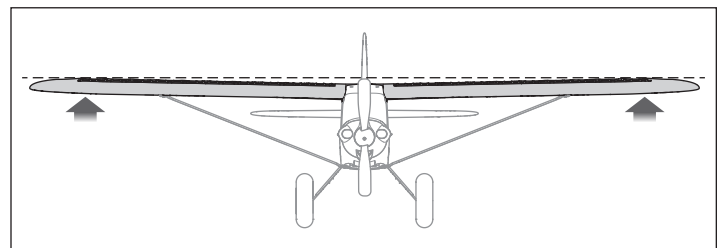
Spektrum DXS Transmitter

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.

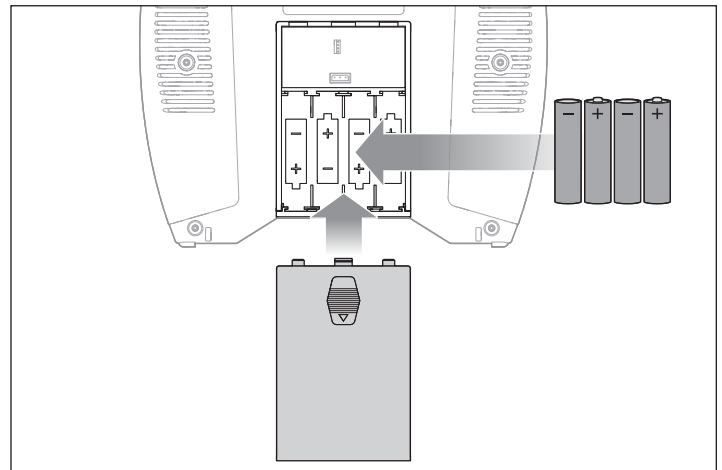See the Binding section for information on re-binding your transmitter and aircraft if necessary. The included transmitter comes bound to the receiver/aircraft from the factory, therefore binding is not typically necessary.

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.

Antenna

Switch D
Switch B
RGB LED
Flight Battery Voltage Indicator
Throttle/ Rudder Stick
Power Button
Throttle Trim
Rudder Trim
Neck Strap Mount

Switch H
Switch F
Elevator/ Aileron Stick
Elevator Trim
Aileron Trim

Handle
Wireless Trainer Port
Programming Port
Battery Holder
Button A
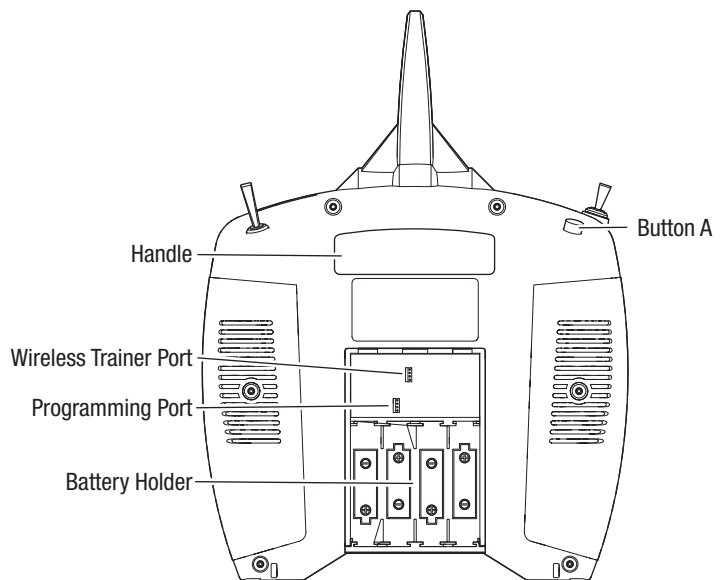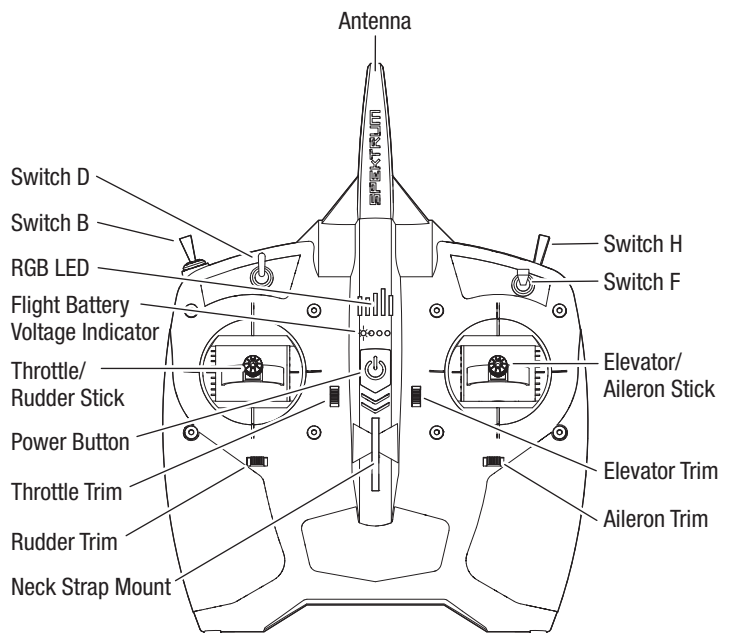
Flight Battery Voltage Indicator

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 useable 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 useable 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 useable 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 Voltage Indicator
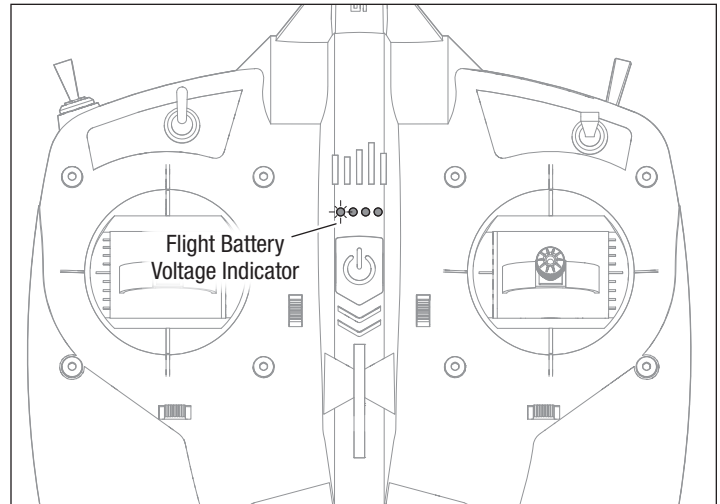
Install the Flight Battery

Battery Selection

- We recommend the Spektrum 2200mAh 11.1v 3s 30C Li-Po (SPMX223S30).
- If using another battery, the battery must be at least 2200mAh capacity.
- The battery should be approximately the same capacity, dimensions and weight as the Spektrum Li-Po battery to fit in the fuselage without changing the center of gravity a large amount.

1. Lower the throttle stick to the lowest setting and center the throttle trim. Power on the transmitter, then wait 5 seconds.
2. Apply a strip of hook tape to the bottom of the battery near the end opposite the battery wires.
3. Turn the latch and open the battery hatch.
4. Install the flight battery as shown. See the Center of Gravity (CG) instructions for more information.
5. Make sure the flight battery is secured using the hook and loop strap.
6. Connect the battery to the ESC. Close the hatch. Turn the aircraft over and place it on its wheels. Keep the aircraft immobile and away from wind for 5 seconds.

⚠ CAUTION: Connecting the battery to the ESC with reversed polarity will cause damage to the ESC, the battery or both. Damage caused by incorrectly connecting the battery is not covered under warranty.

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

⚠ CAUTION: Always keep hands away from the propeller. When armed, the motor will turn the propeller in response to any throttle movement.
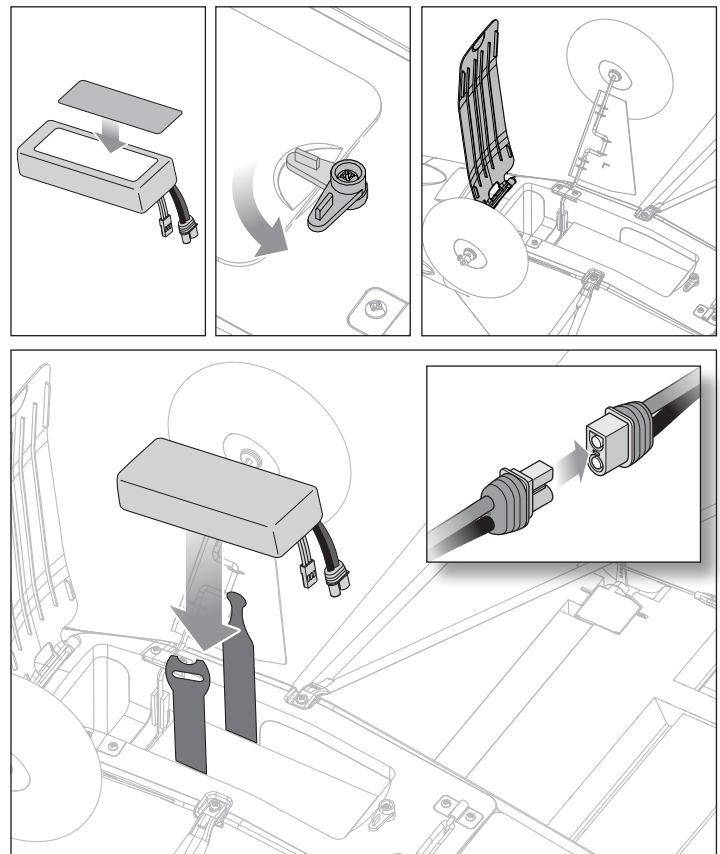
Center of Gravity (CG)

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/CarbonCubS2assembly.

⚠️ **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. The CG should fall within 62–68mm from the leading edge of the wing.

The flight battery must be installed 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 in Intermediate and Experienced modes, 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. In Beginner mode the aircraft is not affected. The SAFE system controls the aircraft attitude.

Adjust the battery position as needed.

62-68 mm back from the leading edge at the wing root
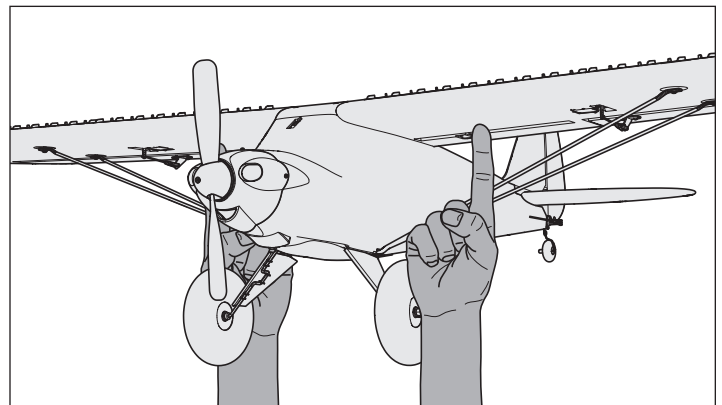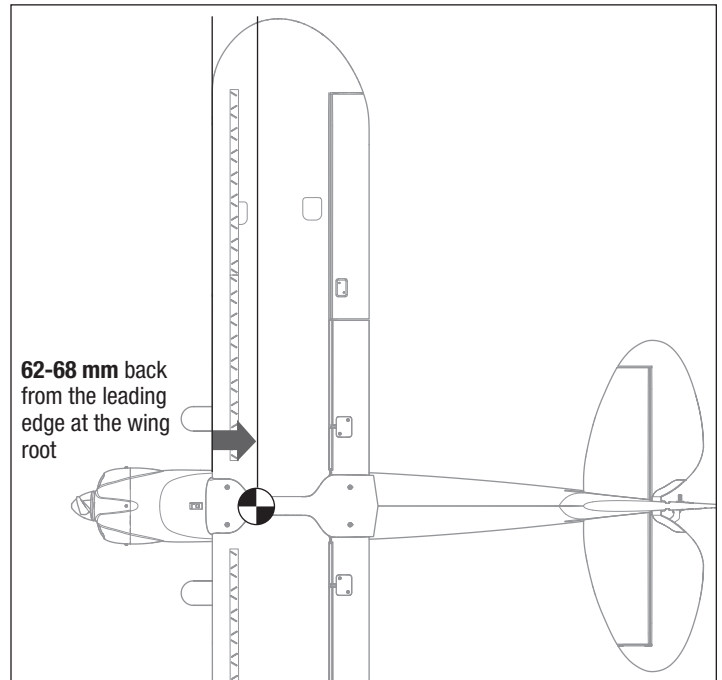
Control Direction Test

⚠️ **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, release the transmitter sticks. Check each of the control surfaces to make sure they are centered. 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.

Throttle/Rudder Stick — Elevator/Aileron Stick
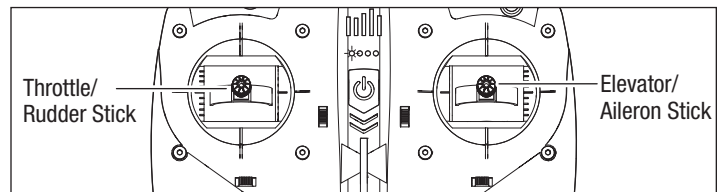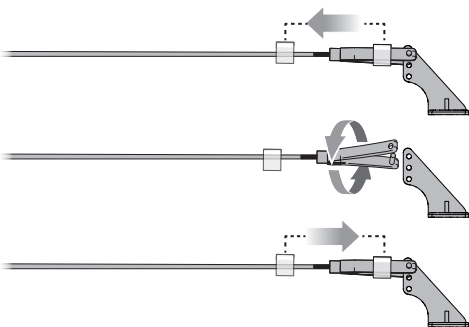
Transmitter command	Control Surface Response (viewed from the rear)
Elevator	
Aileron	
Rudder	

Carbon Cub S 2 1.3m

Before Your First Flight

Before attempting to fly this aircraft for the first time, we strongly 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 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,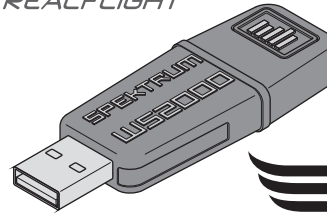 instructors and established flying sites in your area in addition to insurance coverage. Visit www.modelaircraft.org for more information.

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.

Remember, this aircraft can reach significant speeds when flying and will cover ground very quickly. 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 free of trees, buildings, cars, power lines or anything that could entangle your aircraft or interfere with your line of sight.
- Be clear of people and pets.

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. Follow the directions below to enter range check mode for the DXS transmitter:

1. With the throttle stick and trim 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 I) 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 the 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.

Switch F
2X

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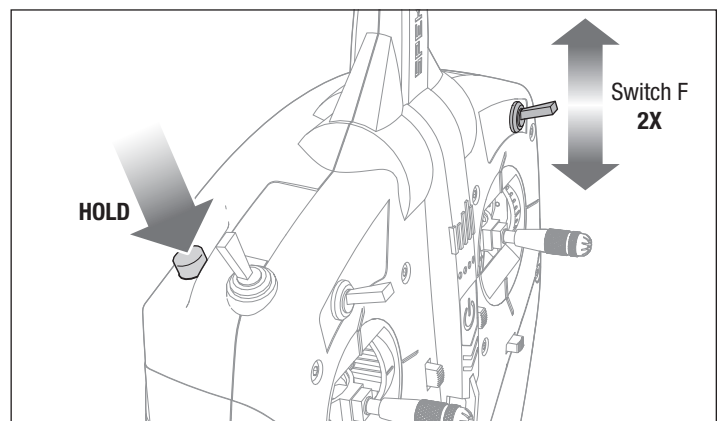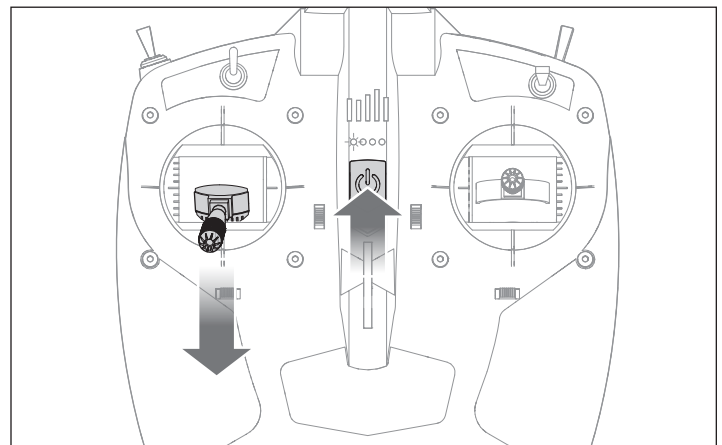
⚠️ **CAUTION:** Due to reduced output power of the transmitter, NEVER attempt to fly while the transmitter is in range check mode. Loss of control will occur.

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

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

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.

Throttle/Rudder Stick

Elevator/Aileron Stick
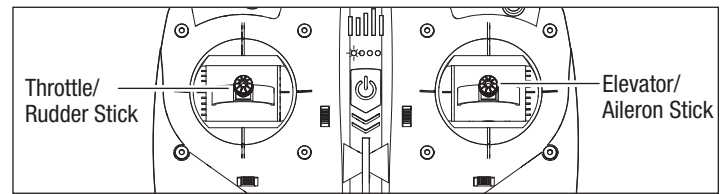
Transmitter command	Aircraft Response
Elevator	
Aileron	
Rudder	

Carbon Cub S 2 1.3m

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; green aircraft LED indicator)

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.

Pitch   **Roll**
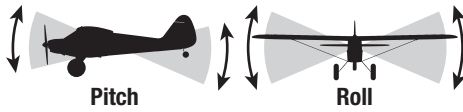
- **Self-leveling:** when the pitch and roll controls are returned to neutral, the aircraft returns to level flight.
- Stability assisted takeoff and landing.
- Throttle based climb and descent.
- Altitude limit of 400 feet.

Intermediate Mode (switch B, position 1; blue aircraft LED indicator)

Less 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.

Pitch   **Roll**

- **NO self-leveling above 50 feet:** self-leveling is only fully active in Beginner Mode.
- Altitude limit of 400 feet.

TIP: When flying in Intermediate Mode, the Carbon Cub S 2 will automatically be in Beginner Mode when below 50 feet.

Experienced Mode (switch B, position 2; red aircraft LED indicator)

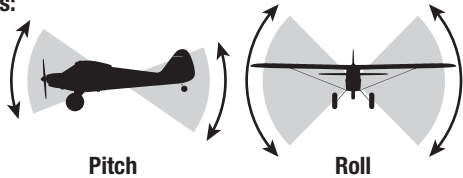**NO flight envelope limits:**
There are no pitch or roll limits, and no self-leveling, so you have complete control! You can even fly inverted (upside down) and perform aerobatic maneuvers including loops, rolls and more.

Pitch   **Roll**
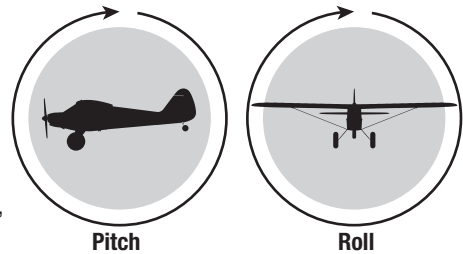
TIP: Switch to beginner mode at any time and release the control sticks for self-leveling.

NOTICE: If the aircraft is upside down when the self leveling is applied, sufficient altitude is required for the aircraft to return to straight and level flight.

Flight Mode Switch
(switch B)

0   1   2
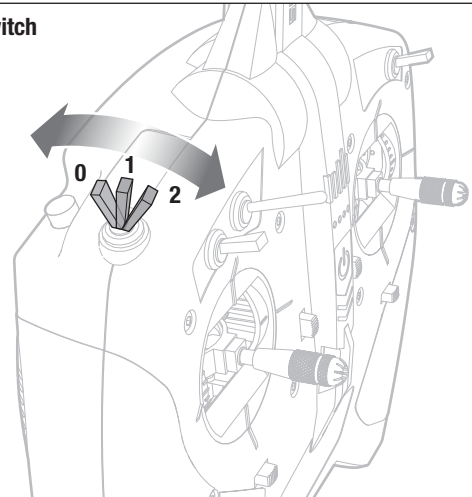
Panic Recovery

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.

Preflight Checklist

Find a safe open area to fly.	Perform the control direction test.
Charge the flight battery.	Perform a radio system range test.
Install a fully charged flight battery in the aircraft.	Plan flight for flying field conditions.
Make sure all linkages move freely.	Set a flight time for 6-8 minutes.
Check the Center of Gravity (CG).	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.

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

Flying Video

Takeoff

Set the flight mode switch to Beginner mode (switch B, position 0) for your first flights. Set a flight timer for 6–8 minutes.

Ground Launch

When the aircraft is ready for flight:

1. Slowly advance the throttle to start the takeoff roll into the wind.
2. Make small rudder inputs as required for heading correction.
3. As the throttle is advanced the aircraft will begin a slow climb out.

Hand Launch

When the aircraft is ready for flight:

1. Grip the aircraft under the fuselage, behind the wing struts.
2. Slowly advance the throttle to 100%.
3. Throw the aircraft slightly nose up and directly into the wind (less than 5–7 mph [8–11km/h]).

Slowly advance the throttle stick.

Wind

Slowly advance the throttle stick.
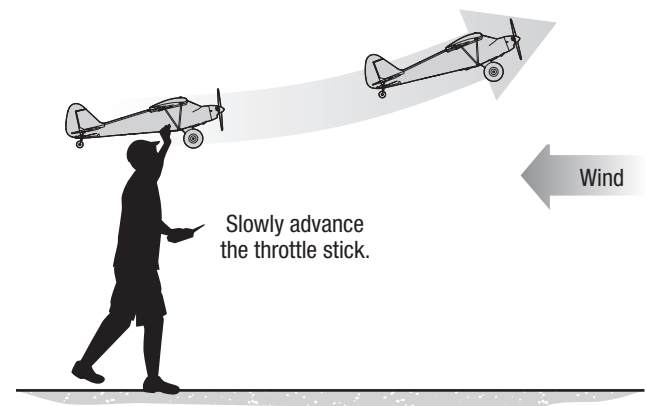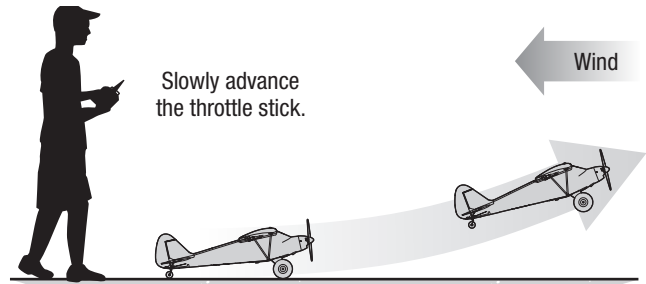
Wind

In Flight

Let the aircraft climb at full throttle, into the wind, until the aircraft gets about 300 feet (91m) above the ground, then decrease the throttle to half (50%). 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 (button A) 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. 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 a climb at full throttle without the use of elevator.

Full throttle   **50% throttle**   **Reduced throttle**
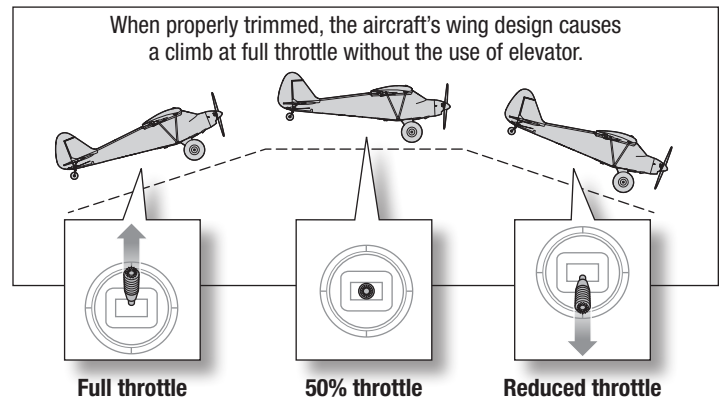
Landing

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 and begin descending towards the runway, keeping the wings level during approach. Try to have the aircraft at 10ft altitude as it passes over the threshold of the runway.

5. As the aircraft passes over the threshold of the runway decrease the throttle fully.

6. Just as the aircraft is about to touch down, gently pull back on the elevator to raise the nose, or flair, 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 flair 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 hold or quickly lower the throttle. Failure to do so could result in extra 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.

65ft (20m)

10ft power is cut

Wind

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.
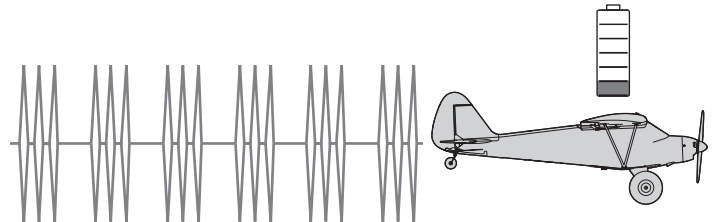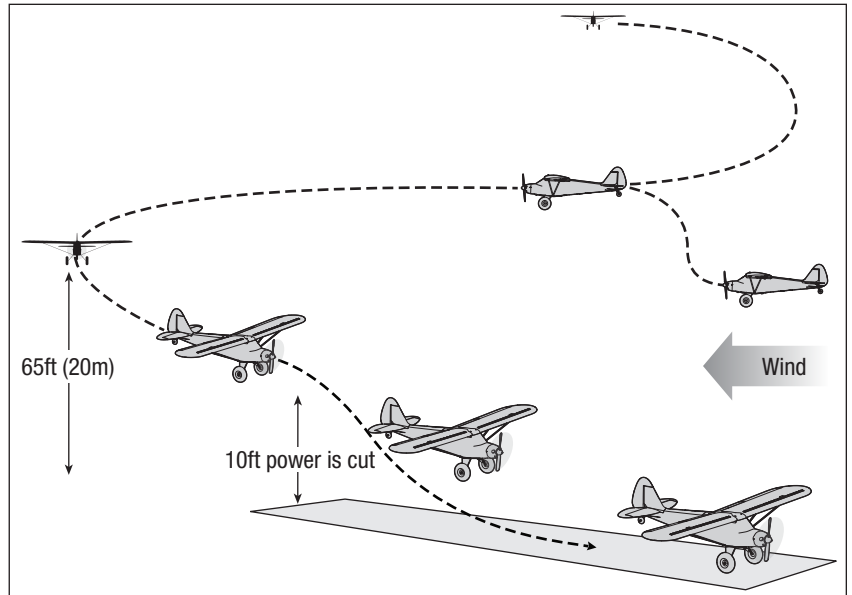
Trimming the Aircraft

Adjusting Trim in Flight

The SAFE flight mode switch should be set to **Experienced mode** (position 2) before adjusting the trims.

Trimming is best done in calm wind conditions.

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.

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

The included 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.

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.

	Aircraft Drift	Trim Required
Elevator		Elevator Trim
Elevator		Elevator Trim
Aileron		Aileron Trim
Aileron		Aileron Trim
Rudder		Rudder Trim
Rudder		Rudder Trim
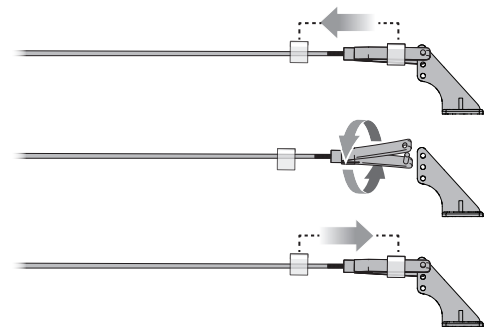
Post Flight

| |
|---|
| 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.

Carbon Cub S 2 1.3m

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.

An extension is installed in the flight controller bind port so binding may be done through the battery door in the bottom of the aircraft without having to remove the wing assembly. Simply insert the bind plug in the open end of the extension marked "BIND" to enter bind mode.
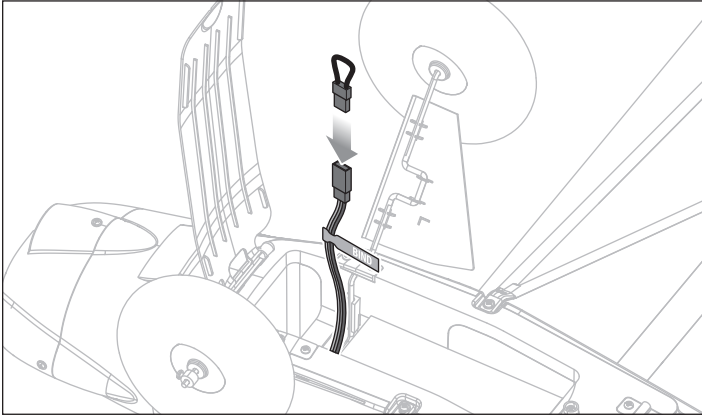
If you have the BNF Basic version aircraft, refer to your transmitter manual for binding instruction for your specific transmitter.

IMPORTANT: The throttle will not arm if the transmitter throttle stick is not put at the lowest position and the throttle trim centered or lower.

If you encounter problems, follow the binding instructions and refer to the transmitter troubleshooting guide for other instructions. If needed, contact the appropriate Horizon Product Support office.

Binding Procedure
1. Power off the transmitter.
2. Make sure the transmitter controls are neutral, the throttle is at the lowest position*, the throttle trim is centered and the aircraft is immobile.[†]
3. Install a bind plug in the bind port extension located in the battery compartment.
4. Connect the flight battery to the ESC. The ESC will produce a long tone followed by a series of additional short tones. The flight controller status LED will begin to flash rapidly.
5. Place your transmitter in bind mode. For the RTF Basic version aircraft transmitter, power on the transmitter while holding the transmitter bind button (button A) to enter bind mode. If you have the BNF Basic version aircraft, refer to your transmitter manual for binding instructions for your specific transmitter.
6. When the bind process is complete, the orange bind light on the receiver will glow solid and the ESC will produce ascending tones, indicating the ESC is armed.
7. Remove the bind plug from the bind port. The receiver will retain the binding settings from the transmitter until another binding is done.
8. Safely store the bind plug (some owners attach the bind plug to their transmitter using two-part loops and clips).

* The throttle will not arm if the transmitter's throttle stick is not put at the lowest position. The aircraft will not arm when it is upside down.

[†] **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.

BNF Basic Transmitter Setup

To use a Spektrum transmitter other than the DXS included with the RTF Basic version aircraft, 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 Spektrtum 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. When prompted to turn off RF, 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. When prompted to turn off RF, 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%**

Carbon Cub S 2 1.3m

Smart Technology Electronic Speed Control (ESC)

The Carbon Cub S 2 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 Carbon Cub S 2 uses a 14-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).
5. Select the **Telemetry** menu option.

```
          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
```

6. Go to the **ESC** menu option.
7. Scroll down to **Poles**.
8. Enter **14** (for iX series transmitters, you must click save to save your changes).
9. Return to the main screen.

Installing Optional Flaps

IMPORTANT: The included DXS RTF Basic version aircraft transmitter is not recommended for the optional flaps as it lacks the necessary mixing functions. The use of flaps typically requires an elevator compensation mix, which the DXS does not currently support.

To install the necessary hardware for the optional flaps:

1. With the wing removed from the aircraft and laying upside down on a flat surface, install the flap servo (SPMSA382, sold separately) in the pocket in the bottom of the wing, in the orientation shown, using hot glue or double-sided servo tape.
2. Connect the flap servo to a servo extension (SPMA3052, sold separately).
3. Connect the servo extension to **Port 8** of the flight controller.
4. Using a sharp hobby knife, carefully remove a small wedge of foam from the outer end and ~1mm strip of foam from the inner end of the flap, as shown in the illustration. Once removed, the flaps should move freely without interference.
5. Turn on throttle cut (switch H, position 1), then power on the transmitter.
6. Power on the aircraft.
7. In the Channel Input Configuration menu of the Channel Assign section of the System Setup list of your computer transmitter, assign AUX2 to an available 3-position switch, usually switch D. Exit back to main menu.
8. Move the assigned flap switch to the up position.
9. Install the servo arm on the servo at the angle shown.
10. On the included flap linkage, slide a silicone tube on each clevis.
11. Install the flap linkage z-bend into the outermost hole of the flap servo arm.

12. Attach both clevises to the flap torque rods as shown.
13. Do a control test of the flaps by moving the previously assigned flap switch on the transmitter. Make sure both flaps are symmetrical when retracted and extended. Adjust the clevises on the flap linkage as necessary.

See the table below for the required flap throws. Measurements are taken at the trailing edge of the flaps.

Flap Travel	
Up (switch position 0)	0mm
1/2 or Takeoff (switch position 1)	12mm
Full or Landing (switch position 2)	25mm

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.

Trainer Button

Instructor*

Student*

SRXL2 DSMX Remote Receiver

Wireless Trainer Port

Back

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 Thro - Aux 1 are set to student.
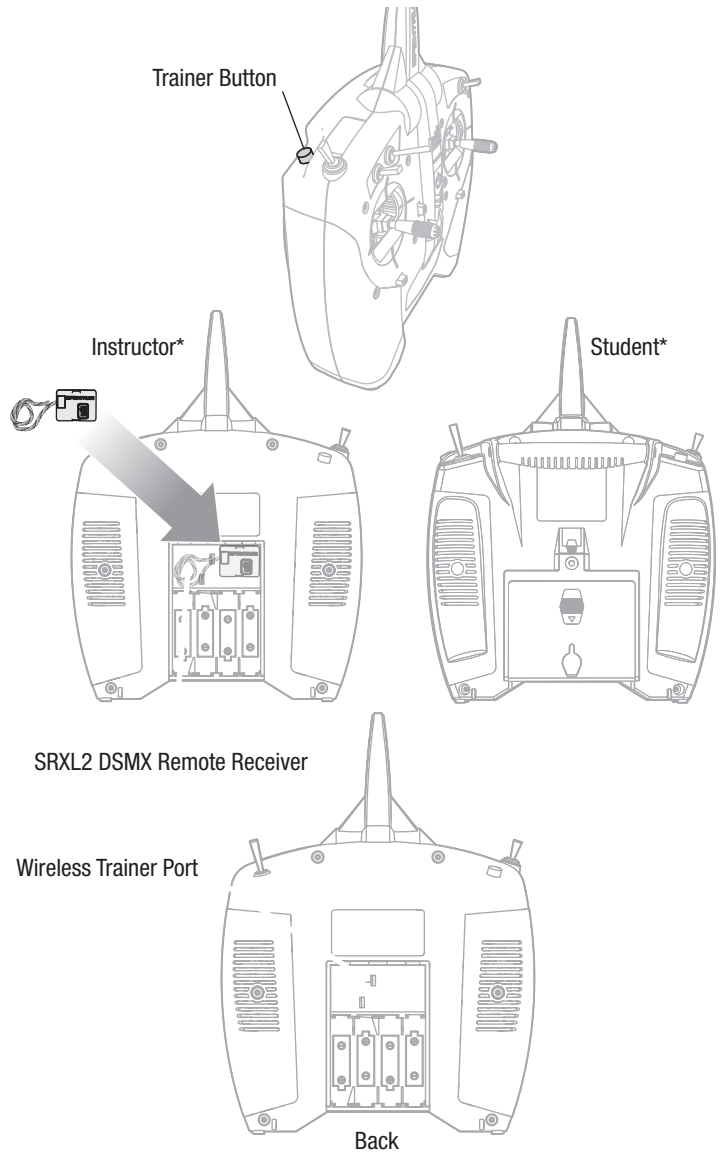
* Some transmitters with older versions of Spektrum Airware software may use different terminology to describe the Student and Instructor functions.

Carbon Cub S 2 1.3m

Flying With the Optional Float Set

Install the optional Float Set (HBZ7390, sold separately) to fly this aircraft from water.

- Float struts, strut brackets and four screws are included with the aircraft.
- Rear bracket screws are included with the floats.

Follow the instructions included with the optional float set for correct installation to the aircraft.

IMPORTANT: Only install 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 aircraft because the electronics can fail if fully immersed in water.

Always ensure the floats are correctly secured to the fuselage prior to taxiing or attempting takeoff.

To taxi on water:

- Use throttle to move the aircraft forward and steer with the rudder stick.
- The aircraft will naturally try to face into the wind when taxiing. Taxi 45 degrees into the direction of the wind, never perpendicular to the wind. The aircraft may flip over if wind gets under the upwind wing.
- Use aileron to hold the upwind wing down.

To take off from water:

- Steer with the rudder to turn into the wind and slowly increase the throttle.
- Keep the wings level on the takeoff run.
- Hold a small amount (1/4–1/3) of up elevator.
- The aircraft will lift off once flying speed is reached.

To land on water:

- Determine where and in which direction you wish to land, preferably into the wind.
- Fly down to a couple of feet off the surface of the water.
- Reduce throttle and add up elevator to flare the aircraft and set down gently on the surface.

⚠ **WARNING:** NEVER attempt to retrieve a downed aicraft from the water alone. Always enlist assistance and use any available safety flotation devices.

Always fully dry the aircraft after flying from water.

IMPORTANT: If water splashes into the fuselage at any time, bring the airplane to shore, open the battery hatch and immediately remove the water. Leave the battery hatch open overnight to let the inside dry and to prevent moisture damage to the electronic components.

⚠ **CAUTION:** Never attempt to fly the aircraft if the electronic components are wet. Failure to fully dry the aircraft can cause the electronic components to fail, which could result in a crash.

Up
Aileron

Down
Aileron

Wind
Direction

45º

Taxi 45 degrees into the direction of the wind.
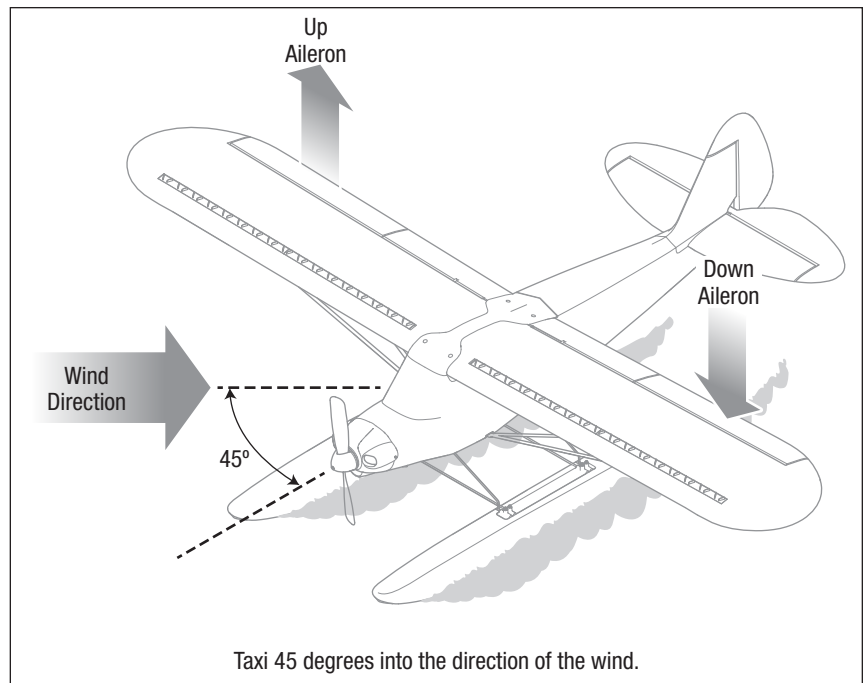
Optional Landing Assist Sensor (LAS) Upgrade

The Carbon Cub S 2 is upgradable with the addition of the optional LAS module (SPMA3180, not included). This allows the advanced SAFE features to be combined with a Landing Assist Sensor (LAS) for smooth, gentle landings.

IMPORTANT: For best results when using the LAS, land on grass or a light colored surface, (e.g., light colored concrete). Black surfaces or water generally 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. Lay the fuselage upside down on a flat surface.
3. Press the factory installed LAS pocket cover to release it. Remove the cover from the LAS pocket. Save the plug for flights without the LAS module.
4. Align the LAS module with the connector wires facing the back of the aircraft. Feed the LAS module connector through the channel in the base of the pocket.
5. Place the LAS module in the pocket and press until it clicks in place.
6. Place the aircraft upright on its landing gear and connect the LAS connector to **Port 7** of the flight controller. For correct polarity of the plug ensure that the orange signal wire **(B)** is facing towards the front of the aircraft when plugged into the flight controller.

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.

Landing with LAS

IMPORTANT: The LAS is functional in all SAFE flight modes except Experienced mode. When the flight mode is switched to Experienced mode the LAS is deactivated and will provide no assistance with landing.

To land the aircraft using the LAS:

1. Set the flight mode to Beginner or Intermediate (switch B, position 0 or 1).
2. Fly a normal approach to the runway, as described in the Flying section.

IMPORTANT: Installation of the LAS module does not provide AutoLand capability. The aircraft must be guided and aligned with the runway manually for landing.

3. When approaching the runway reduce the throttle, keeping the wings level and slowly reducing the altitude of the aircraft.
4. When the aircraft reaches an altitude of roughly 1m, the LAS will level the aircraft, manage the throttle, and then flare the aircraft for touchdown.

LAS with GPS

With GPS installed, LAS will assist the AutoLand mode during landing of the aircraft. When the aircraft's landing approach reaches an altitude of approximately 1m the LAS will level 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.

IMPORTANT: LAS is not active in Experienced mode.
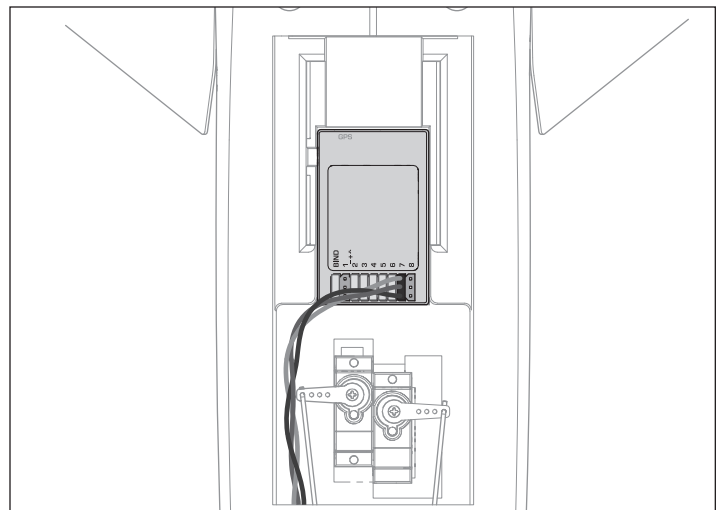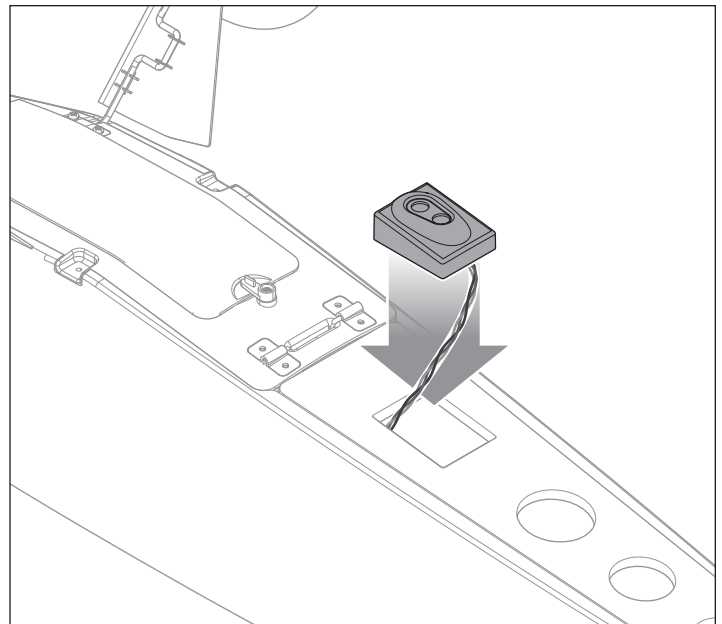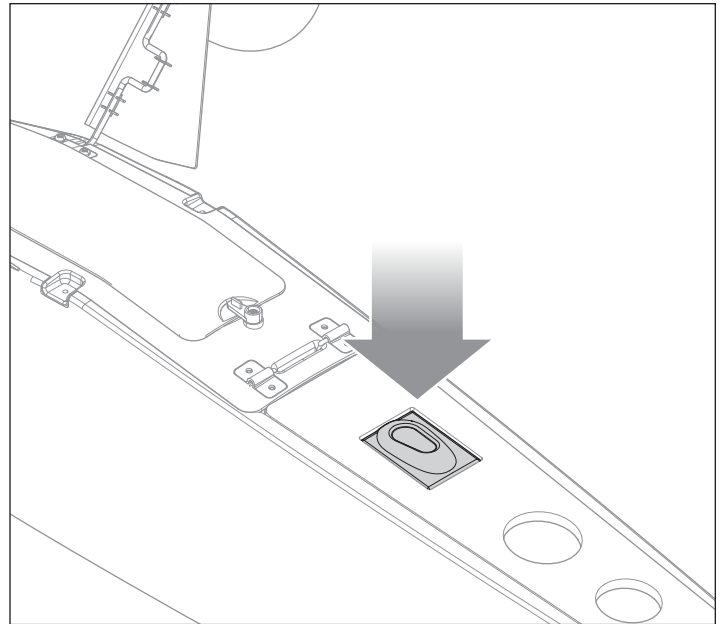
Optional SAFE Plus GPS Module

The included Carbon Cub S 2 flight controller includes SAFE technology out of the box. The flight controller is upgradable with the addition of the optional GPS module (SPMA3173, 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 covering the SAFE Plus GPS module features, and learn the use of Holding Pattern and AutoLand modes before flying with GPS. SAFE Plus features are only available with the SAFE Plus GPS module installed and properly calibrated.

GPS Module Installation

1. Verify the battery is not connected or installed in the aircraft.
2. Insert the module connector in the port labeled GPS on the front side of the flight controller. When installed correctly and viewed from the top, the black wire of the GPS module connector should be toward the left side of the aircraft.
3. Install the GPS module between the foam notches in the fuselage, above the flight controller, with the label facing up and arrow pointing forward.

   TIP: Secure the module in place with foam tape or foam safe adhesive.

IMPORTANT: Do not kink or cut the GPS antenna cable. Kinks or cuts will degrade performance.
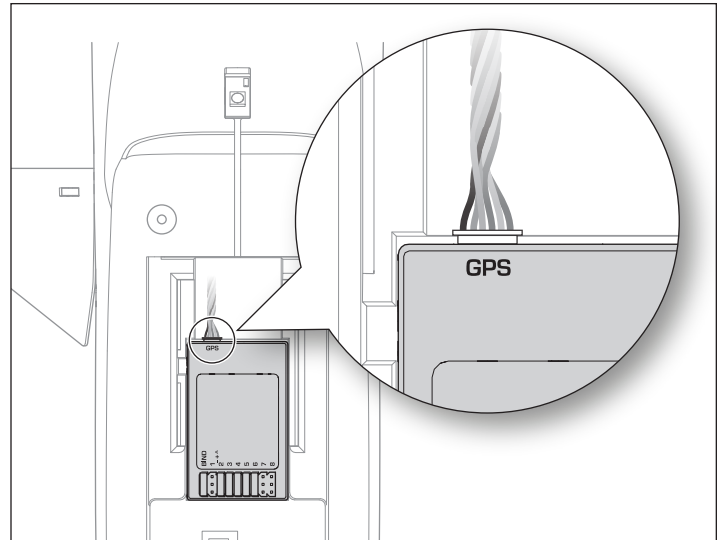
IMPORTANT: IF THE OPTIONAL GPS MODULE IS INSTALLED the aircraft will not respond to transmitter commands after binding if a GPS signal is not acquired.

Binding: After binding with the GPS module installed, the aircraft will search for a GPS lock, indicated by the elevator slowly cycling up and down. After acquiring a GPS lock,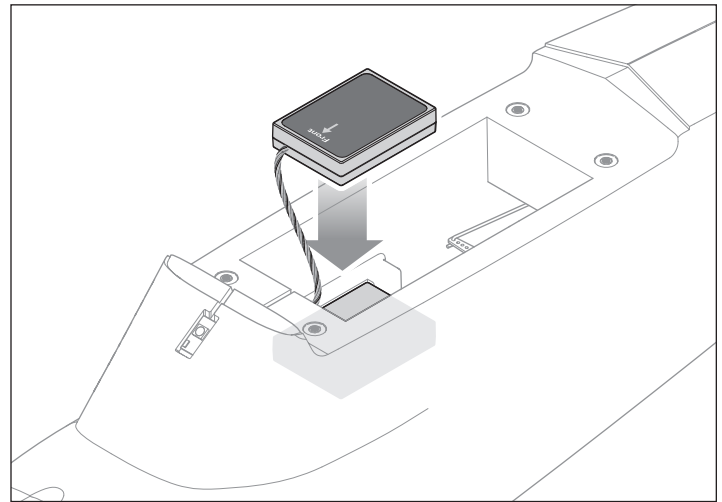 all flight controls except throttle will respond normally. The throttle will be limited, allowing the aircraft to be taxied out to takeoff position on the runway. Set the home position to regain full functioning throttle. See the "Powering ON, GPS Initialization and Establishing Home Location" sub-section of this manual for further details.

Compass calibration: After binding the first time with the GPS module installed in the aircraft, compass calibration is required. The aircraft will automatically enter the compass calibration sequence after installing the GPS for the first time. This is indicated by the ailerons slowly cycling up and down. The aircraft will not respond to transmitter commands with the GPS module installed until calibration has been completed. See the Compass Calibration section of this manual for further details.

Subsequent binding with the GPS module installed will not require compass calibration.

Compass Calibration

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 must 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.

To acquire GPS lock:

1. Activate throttle cut on the transmitter (switch H, position 1).
2. Power on the transmitter.
3. Power on the aircraft. 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.
4. Power off the aircraft, followed by the transmitter.

To calibrate the compass:

1. Center the transmitter trims.
2. Power on the transmitter, then the aircraft while holding the transmitter sticks back and to the inside, 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.
3. After GPS lock has been acquired, the aircraft will signal it has entered compass calibration mode by the following:
    • The ailerons will cycle left and right slowly.
    • The LED indicator on the aircraft will flash red and blue.
4. Once in calibration mode, the throttle is not active and the transmitter sticks can be released.
    IMPORTANT: The transmitter must remain powered ON.
5. Flip the aircraft twice nose over tail, as shown.
6. Turn the aircraft 90 degrees and roll the aircraft twice, as shown.
7. Power off the transmitter.
8. Wait 3 seconds.
9. Power 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.

2 Full Rotations   **2 Full Rotations**
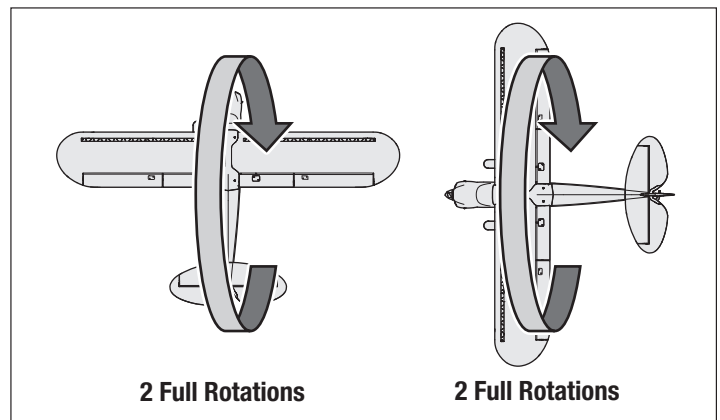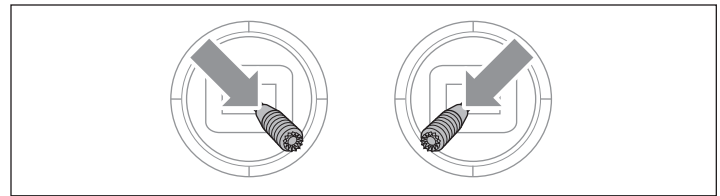
Compass Error (LED Flashing Red and Blue)

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.

Compass Error
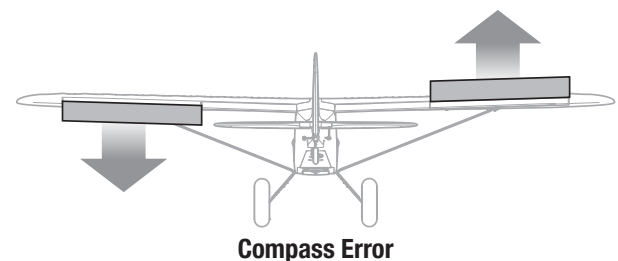
Flying the Carbon Cub S 2 With the SAFE Plus GPS Module Installed

• SAFE Plus technology is designed as flight assistance, not an autopilot. The pilot should fly the aircraft at all times.
• Start in Beginner mode (switch B, position 0). As you learn and become more confident, change modes to advance your flying skills.
• Fly your aircraft outdoors in winds no greater than 12 mph (16 km/h).
• Always launch your aircraft directly into the wind, if possible.

• When flying in AutoLand mode, the aircraft flight path can be adjusted with the transmitter controls. Release the controls to let the GPS system resume command.
• The Carbon Cub S 2 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. (1300' x 1300')

Carbon Cub S 2 1.3m

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. Plug the battery into the aircraft. 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 want 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.
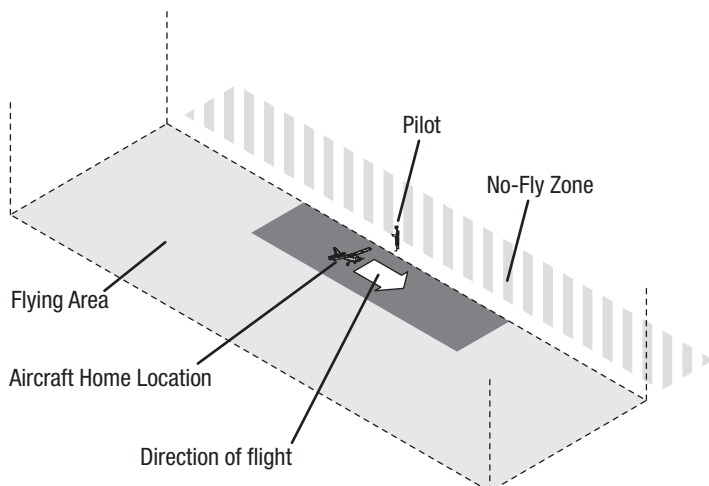
4. Once the aircraft is on the ground at the desired home location, and pointed into the wind, press and hold the HP/AL (Bind) button.
• If either of the circle Virtual Fence modes are active or if Virtual Fence is off, all control surfaces will wag and the throttle will now operate, indicating the aircraft 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 pointed directly down the runway 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.

Deactivating GPS on the Ground

The GPS system is activated when the aircraft is powered on. 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 radio 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 (switch B) 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 Holding Pattern, AutoLand and Virtual Fence modes will not function.

IMPORTANT: When GPS is deactived from the transmitter, the aircraft LED indicator will flash red slowly. No other LED indications will function.

Airfield Virtual Fence
Setting the home location and aircraft heading

Pilot
No-Fly Zone
Flying Area
Aircraft Home Location
Direction of flight

In the example above, *right aileron* is applied to establish the flying side of the airfield as well as the No-Fly Zone.

HOLD   3 X

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 th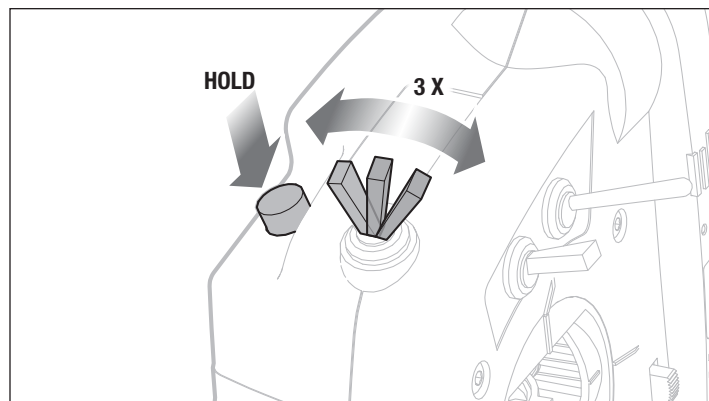e home location if it approaches the edge of the Virtual Fence. Once back inside the fence, the aircraft will "wag" its wings, indicating full control has been given back to the pilot.

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 meters 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.

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.

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.

Virtual Fence Mode	Transmitter Stick Position
Virtual Fence OFF • Low throttle • Full right aileron • Full up elevator • LED Indication: Slow Yellow flash until home point is set.*	
Circle Virtual Fence, Small (Default) • Low throttle • Full left aileron • Full up elevator • LED Indication: Slow yellow flash with 1 Red flash.*	
Circle Virtual Fence, Large • Low throttle • Full left aileron • Full down elevator • LED Indication: Slow yellow flash with 2 Red flash*	
Airfield Virtual Fence • Low throttle • Full right aileron • Full down elevator • LED Indication: Slow Yellow flash with 3 red flash*	

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.

Circle Virtual Fence

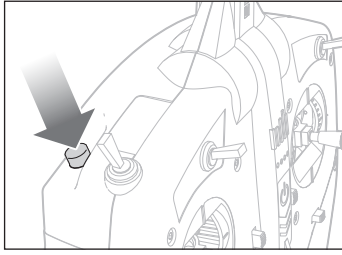Home Location
Small (Default)
Large

Airfield Virtual Fence

No-Fly Zone above ~20ft (6m)
Flying Area
Home Location
Aircraft Heading

Carbon Cub S 2 1.3m
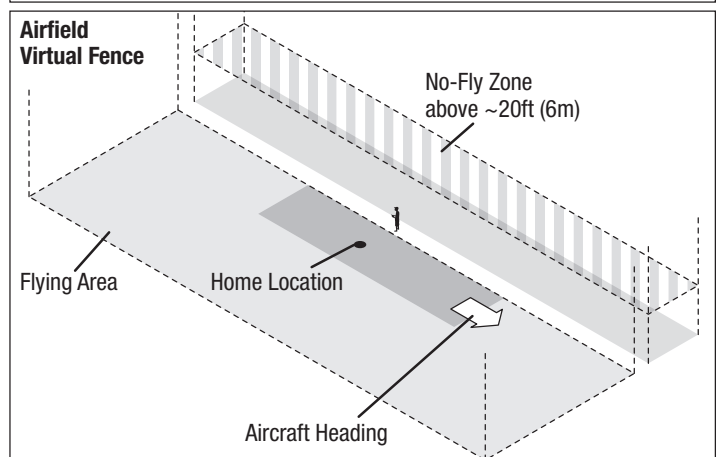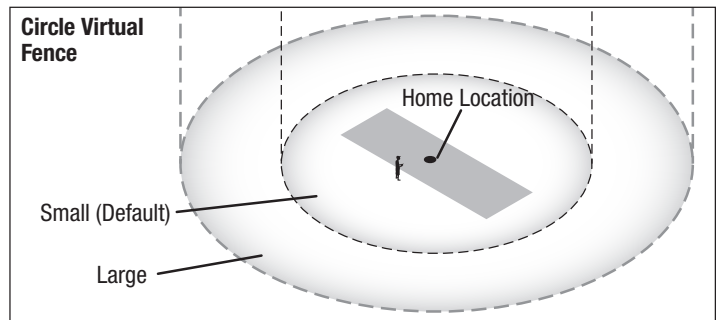
Holding Pattern (HP) Mode

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

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.
- 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.

Holding Pattern Mode
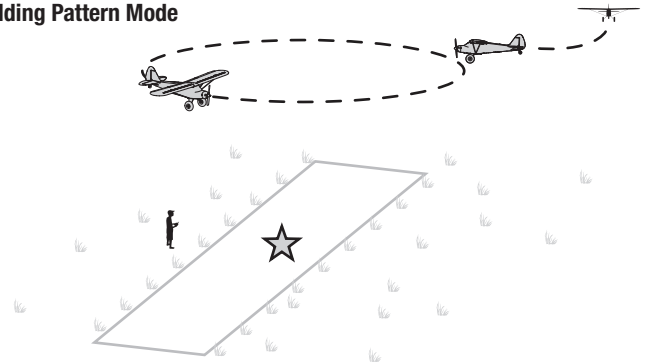
Holding Pattern Mode With Airfield Virtual Fence Active
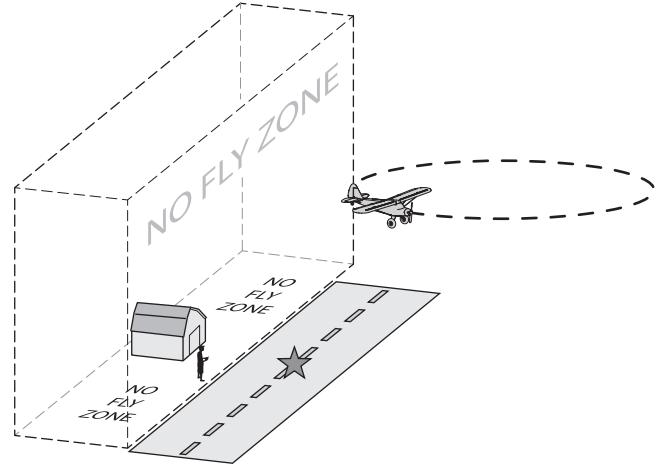
Failsafe and GPS

If the aircraft loses radio connection while the SAFE GPS module is operating, 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.

Deactivating GPS in Flight

IMPORTANT: If GPS is deactivated in flight, the Virtual Fence, Hold Position and AutoLand modes will not function. The pilot will have to manually fly the aircraft back to a safe landing.

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 to regain full manual control.

To deactivate the GPS in flight:

1. Press and hold the HP/AL (bind) button and fully cycle the flight mode switch three times. The rudder will wag to indicate GPS is deactivated.
2. Set the flight mode switch to Beginner mode (switch B, position 0) for SAFE technology benefits.

The GPS system will remain off until the aircraft is landed and power cycled off and back on again.
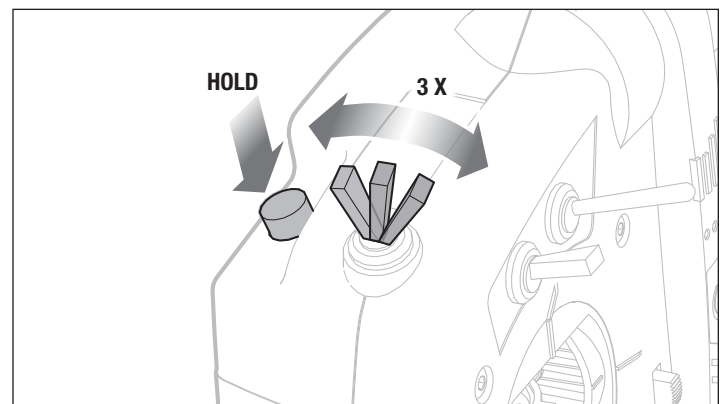
AutoLand Mode

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

To activate AutoLand mode, press and hold the HP/AL button (button A) for three seconds.

Hold for 3 seconds
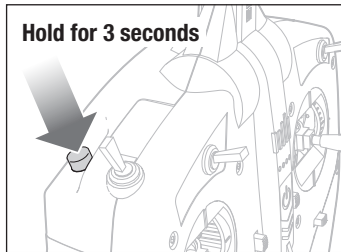
- The aircraft will immediately turn to align itself for an upwind approach and maneuver to an altitude of approximately 65 ft (20m) and 295 ft (90m) downwind from the takeoff point. The aircraft will then turn into the wind and begin the final approach.
- The aircraft will land near the takeoff point and come to a complete stop.
- Press and release the HP/AL button (button A) or change flight modes at anytime to abort the AutoLand approach.

Abort

Wind
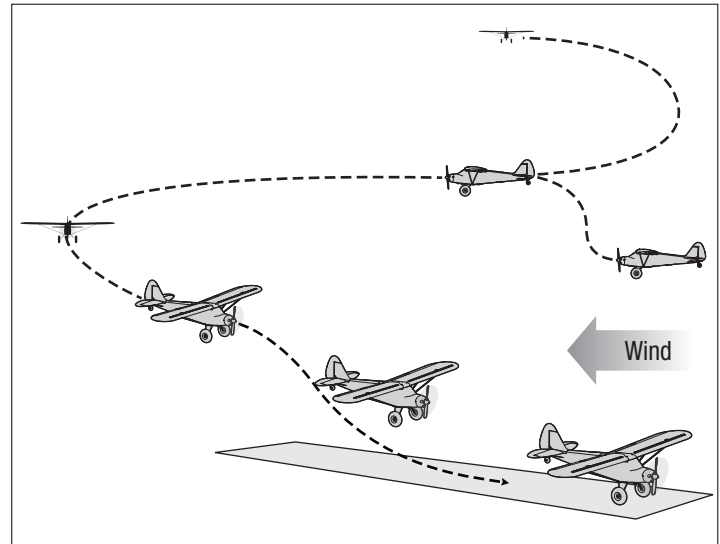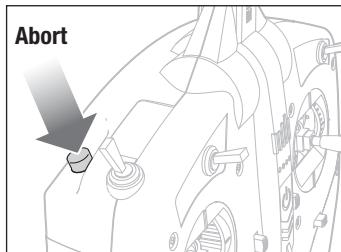
⚠️ **CAUTION:** Never attempt to catch a flying aircraft in your hands. Doing so could cause severe personal injury and damage to the aircraft.

IMPORTANT: When the AutoLand feature is activated, the aircraft will immediately respond to the command. If your aircraft does not respond immediately, GPS signal may have been lost. In this case, the aircraft will have to be flown back and landed manually.

IMPORTANT: AutoLand mode does not have the ability to avoid obstacles. Ensure that your flying location is free of obstacles (trees, buildings, etc) before you start flying. Remain alert during the AutoLand process in the event it becomes necessary to assist or abort the landing approach.

Assisting AutoLand Mode

IMPORTANT: AutoLand mode does not have the ability to avoid obstacles. Ensure that your flying location is free of obstacles (trees, buildings, etc) before you start flying. Remain alert during the AutoLand process in the event it becomes necessary to assist or abort the landing approach.

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 adjsutments 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 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 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.

As an 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 advance to 3/4 power. Set to a higher throttle point in stronger wind or lower throttle point in low wind.

Service and Repairs

NOTICE: After any impact or replacement always ensure the flight controller is secure in the fuselage. If replaced, the flight controller must be installed in the same location and orientation as the original or loss of control and damage may result.

Repairs to the foam can be made using virtually any adhesive (hot glue, regular CA [cyanoacrylate adhesive], epoxy, etc).

Use of CA accelerator on the aircraft can damage paint. DO NOT handle the aircraft until the accelerator fully dries.

When parts are not repairable, see the Replacement Parts list for ordering by item number.

Service of Power Components

⚠️ **WARNING:** Always disconnect the flight battery from the model before removing the propeller.

Disassembly

1. Using a #1 Phillips screwdriver, remove the m2.5 x 7.5 phillips machine screw **(A)** and spinner **(B)**.

2. Use an adjustable wrench to remove the 10mm hex nut **(D)**, propeller **(E)**, spinner backplate **(F)**, thrust plate **(G)** and collet **(C)** from the motor shaft **(H)**.

3. Using a #1 Phillips screwdriver, remove the three m2 x 5.5 self tapping screws **(I)** from the cowl **(J)**. Carefully remove the cowl from the fuselage.

4. Using a #2 Phillips screwdriver, remove the four m3 x 11.5 self tapping screws **(K)** holding the motor mount **(L)** to the fuselage.

5. Disconnect the motor wires from the ESC wires.

6. Using a #2 Phillips screwdriver, remove the four m3 x 9.5 screws **(M)** holding the motor **(N)** to the motor mount.

Assemble in reverse order.

Assembly Tips

- Correctly align and connect the motor wire colors with the ESC wires.
- The propeller size numbers (9 x 6) must face forward for correct propeller operation.
- Ensure the lip of the spinner fits completely into the groove of the spinner backplate for safe operation.

Not all wiring shown

Wing Servo Removal

1. Remove the wing.
2. Unplug the wing servo wires from the marked fuselage servo extensions.
3. Flip the wing over, and set it on a flat surface.
4. Remove the servo tape from the wing bottom of the damaged servo.
5. Remove the pushrod clevis from the aileron control horn.
6. Remove the foam servo wire-retaining strip.
7. Firmly pull on the servo to remove it from the wing.
8. Remove the servo screw and the servo arm.

Wing Servo Installation

1. Plug the servo into the correctly marked aileron extension in the fuselage.
2. Power on the transmitter and activate throttle cut (switch H, position 1).
3. Power on the aircraft. Wait for the aircraft to initialize and for the servos to center.

TIP: If GPS is installed, and you are working indoors, see *Deactivating GPS*.

4. Center the transmitter trims.
5. Align the servo arm by pressing the arm onto the servo. Install the servo arm screw, disconnect the servo from the aileron extension, and begin the servo installation.
6. Secure the servo in the servo pocket with hot glue or servo tape.
7. Press the servo wire into the servo wire channel in the bottom of the wing.
8. Using adhesive, reinstall the foam servo wire retainer.
9. Reinstall the pushrod clevis into the aileron control horn.
10. Connect the aileron servo wires to the proper aileron extension wires in the fuselage.
11. Install the wing.

Fuselage Servo Replacement

The rudder and/or elevator servos are replaced in a similar fashion as the wing servos. The servos connect directly into the flight controller, without extensions.

Factory Settings for the Servo Arms and Control Horns

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

	Elevator	Ailerons	Rudder
Arms			
Horns			

Troubleshooting Guide

Problem	Possible Cause	Solution
Aircraft does not operate	There is no link between the transmitter and receiver	Re-Bind the system following directions in this manual
	No GPS lock (or operating indoor without disabling GPS)	Move to outside and power on aircraft or disable GPS in the aircraft
	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 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 incorrectly	Land immediately, replace or install propeller correctly
Aircraft 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
	Bind plug is not installed correctly	Install bind plug and bind aircraft to transmitter
	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
	Bind plug is left installed	Rebind transmitter to aircraft and remove bind plug before cycling power
	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
Trim changes when flight mode is switched	Trim is not at neutral	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

Carbon Cub S 2 1.3m

Optional SAFE Plus GPS Upgrade Troubleshooting Guide

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
Aircraft does not land on heading set on initial takeoff	Compass is out of calibration	Calibrate the compass using the "Compass Calibration Procedure" located in this manual
GPS Function not operating properly	The compass has been exposed to a magnetic source	Deactivate GPS system while in flight and land the aircraft. Remove any possible magnetic sources such as cameras, camera mounts, speakers ect. Unplug and reconnect flight battery to reactivate GPS system for next flight. Perform compass calibration before flying again.
Virtual Fence modes will not change between modes correctly	Dual rates set incorrectly in transmitter setup	The dual rates should not be set lower than 70% for low rate. Set all low rates to 70% or higher.

Replacement Parts

Part #	Description
EFL310017	LAS Cover: Apprentice STS
EFLA1030FB	30-Amp Telemetry Capable ESC
EFLM480BL	480 BL Outrunner Motor; 960Kv
EFLP09060	Prop P-51 BL 9 x 6; Sportsman S
HBZ3218	Pushrod Set: Sport Cub
HBZ3219	Wing Tube Carbon Cub
HBZ3220	Fuselage: Carbon Cub S+ 1.3m
HBZ3221	Main Wing: Carbon Cub S+ 1.3m
HBZ3222	Tail Set: Carbon Cub S+ 1.3m
HBZ3223	LandingGearSet:CarbonCub S+ 1.3
HBZ3224	Cowl: Carbon Cub S+ 1.3m
HBZ3225	Spinner 40mm: Carbon Cub S+ 1.3
HBZ3226	Wing Struts: Carbon Cub S+ 1.3m
HBZ3227	Mtr Mnt w/Scrws:CarbonCub S+1.3
HBZ3228	Battery Hatch:Carbon Cub S+ 1.3
HBZ3229	Decal Sheet: Carbon Cub S+ 1.3m
HBZ3230	Vrtx Gentrs:CarbonCub S+1.3m
HBZ3233	Prop Adapter: Carbon Cub S
HBZ3234	LG Covers: Carbon Cub S+
SPM4650C	DSMX SRXL2 RX w/Connector
SPMA3230A	Carbon Cub S2 FC
SPMR1010	DXS Transmitter Only
SPMSA381	9g Sub-Micro Servo: 400mm Lead

Recommended Parts

Part #	Description
SPMXPSA200	Smart G2 Air Powerstage 2

Optional Parts

Part #	Description
DYN1405	LiPo Charge Protection Bag, Large
EFL1090	DSV130 3-Wire Digital Srvo MT G
EFLA250	Park Flyer Tool Asst, 5 pc
HBZ7390	Float Set: Super Cub LP
SPM9747	DSMX SRXL2 Remote Receiver
SPMA3052	Standard Servo Extension 9"
SPMA3173	Spektrum GPS Module
SPMA3180	Landing Assist Sensor (LAS)
SPMR6650	DX6e 6CH Transmitter Only
SPMX13003S30M	1300mAh 3S 11.1V Smart 30C LiPo;IC3
SPMX22003S30	2200mAh 3S 11.1V Smart 30C; IC3
SPMXBC100	SMART Battery & Servo Tester
SPMXC1080	Smart S1100 AC Charger, 1x100W

Hardware

Location	Description	Quantity
Spinner	2.5mm x 8mm Machine Screw	1
Cowl	2mm x 5mm Round Head Self-Tapping Screw	3
Motor mount	3mm x 10mm Round Head Screw	4
Firewall	3mm x 12mm BT Self-Tapping Screw	4
Wing mount	3mm x 12mm Round Head Screw	5
Flap plate(left)	2mm x 10mm Pointed Self-Tapping Screw	2
Flap plate(right)	2mm x 10mm Pointed Self-Tapping Screw	2
Control horn (main wings)	3mm x 16mm Round Head Screw	2
Control horn (main wings)	2mm x 18mm Round Head Screw	2
Interplane strut mount	2.5mm x 10mm Pointed Self-Tapping Screw	6
Wire mount(float)	2.5mm x 10mm Flat Head Self-Tapping Screw	4
Nose landing gear plate	2.5mm x 10mm Flat Head Self-Tapping Screw	4
Battery door	2.5mm x 12mm Pointed Self-Tapping Screw	1
Servo arm (main wings)	2mm x 4mm PB Flat Head Machine Screw	2
Servo arm (fuselage)	2mm x 4mm PB Flat Head Machine Screw	2
Rear landing gear mount	3mm x 14mm Pointed Self-Tapping Screw	2
Wire mount(tail wheel)	2mm x 8mm Round Head Self-Tapping Screw	3
Servo arm (flap)	2mm x 4.5mm Pan Head Triangular Self-Tapping Screw	1
Wheel	2.5mm x 4mm Round Head Machine Screw	2

Carbon Cub S 2 1.3m

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.

Dihedral: Positive or up angle of the wing from the wing root to the tip. Adding dihedral to the wing improves stability in the roll axis.

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.

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 aircraftusing 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 flightline, 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, or (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, tplease 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	service@horizonhobby.eu	Hanskampring 9 D 22885 Barsbüttel, Germany
	Sales: Horizon Hobby GmbH	+49 (0) 4121 2655 100	

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

HBZ Carbon Cub S 2 RTF Basic (HBZ320001)
HBZ Carbon Cub S 2 BNF Basic (HBZ32500):
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)/receivers(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:
HBZ Carbon Cub S 2 RTF Basic (HBZ320001): 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.

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.

HBZ Carbon Cub S 2 BNF Basic (HBZ32500): 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.

Wireless frequency and output:
Transmitter:
2402.0 - 2478.0MHz
17.7 dBm
Receiver:
2404–2476MHz
3dBm

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.

E328

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