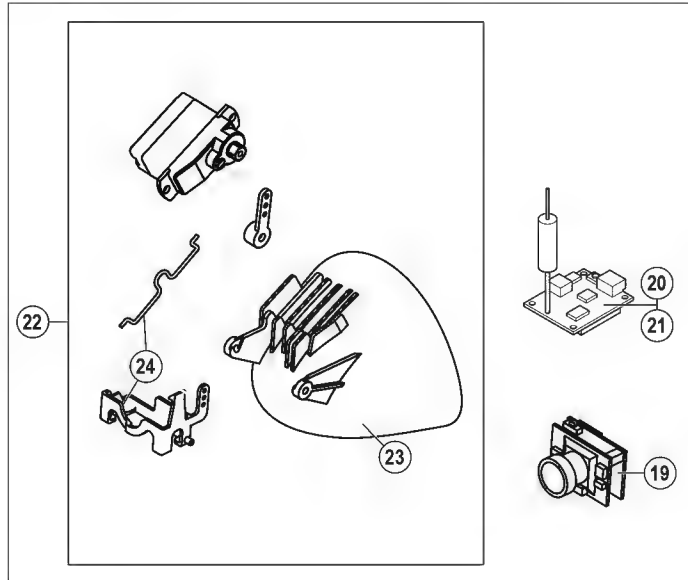


Optional FPV Equipment



M600 VTOL



Wuxi Mirarobot Science&Technology Co.,Ltd.

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Development Zone, Wuxi, Jiangsu, China

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RTF/BNF

Mirarobot

WARNING

Please 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. It is essential to read and follow all the instructions and warnings in the manual, prior to assembly, setup or use, in order to operate correctly and avoid damage or serious injury.

Age Recommendation: Not for children under 14 years. This is not a toy.

MEANING OF SAFETY SIGNAL WORDS

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

- **NOTICE:** Procedures, which if not properly followed, create a possibility of physical property damage AND a little or no possibility of injury.
- **CAUTION:** Procedures, which if not properly followed, create the probability of physical property damage AND a possibility of serious injury.
- **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.

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 move the throttle fully down at rotor strike.
- 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.
- **Never** operate aircraft with damaged wiring.
- **Never** touch moving parts.

CONTENTS

- Airplane
- Battery-800mAH 7.4V Li-Po
- Charger-2S USB Li-Po Charger
- Adapter
- Remote controller (RTF)

SPECIFICATIONS

- Length: 10.24in (260mm)
- Wingspan: 23.62in (600mm)
- Takeoff Weight: Appr. 5.64oz (173g)
- Motor: Brushless 2206*2 2680KV
- Servo: 4.3g*2/2g*1
- Propeller: 125*75
- Controller: 2.4G 6CH+

FREFLIGHT

- Remove and inspect contents
- Read this instruction manual thoroughly
- Charge the flight battery
- Setup transmitter
- Fully assemble the airplane
- Install the flight battery in the aircraft (once it has been fully charged)
- Check the Center of Gravity(CG)
- Bind the aircraft to your transmitter
- Make sure linkages move freely
- Perform the Control Direction Test with the transmitter
- Perform the stability system control direction test with the aircraft
- Adjust flight controls and transmitter
- Perform a radio system range test

- Find a safe open area to fly
- Plan flight for flying field conditions

CHARGING WARNINGS

CAUTION: All instructions and warnings must be followed exactly. Mishandling of Li-Po batteries can result in a fire, personal injury, and/or property damage.

- **NEVER LEAVE CHARGING BATTERIES UNATTENDED**
- **NEVER CHARGE BATTERIES OVERNIGHT**
- By handling, charging or using the included Li-Po battery, you assume all risks associated with lithium batteries
- If at any time the battery begins to balloon or swell, discontinue use immediately. If charging or discharging, discontinue and disconnect. Continuing to use, charge or discharge a battery that is ballooning or swelling can result in fire
- Always store the battery at room temperature in a dry area for best results
- Always transport or temporarily store the battery in a temperature range of 40–120° F (5–49° C)
- Do not store battery or model in a car or direct sunlight. If stored in a hot car, the battery can be damaged or even catch fire
- Always charge batteries away from flammable materials
- Always inspect the battery before charging
- Always disconnect the battery after charging, and let the charger cool between charges
- Always constantly monitor the temperature of the battery pack while charging
- **ONLY USE A CHARGER SPECIFICALLY DESIGNED TO CHARGE LI-PO BATTERIES**

Failure to charge the battery with a compatible charger may cause a fire resulting in personal injury and/or property damage.

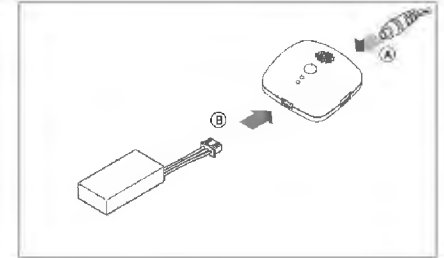
- Never discharge Li-Po batteries to below 3V per cell under load
- Never cover warning labels with hook and loop strips
- Never charge batteries outside recommended levels
- Never charge damaged batteries
- Never attempt to dismantle or alter the charger
- Never allow minors to charge battery packs
- Never charge batteries in extremely hot or cold places (recommended between 40–120° F or (5–49° C) or place in direct sunlight

Note: Battery performance can suffer greatly in cooler temperatures. It is recommended the batteries be warm before flight.

BATTERY CHARGING

NOTICE: Charge only batteries that are cool to the touch and are not damaged. Look at the battery to make sure it is not damaged e.g., swollen, bent, broken or punctured.

1. Connect the AC power supply (A) to the charger.
2. Connect the other end of the power supply to an appropriate AC power source.
3. Connect the battery balance lead to the charger adapter (B).



WARNING: Only connect the battery balance lead to the charger adapter. Never attempt to connect any other type of lead to the charging adapter or charger port.

4. Connect the charger adapter to the charger (C).
5. Press the Button to begin charging.
6. Battery charging is complete when the charger LED is solid green.
7. Always disconnect the flight battery from the charger immediately upon completion of charging.

CAUTION: Only use chargers specifically designed to charge the included Li-Po battery. Failure to do so could result in fire, causing injury or property damage.

CAUTION: Never exceed the recommended charge rate.

LED Indications

Flashing Green LED with power connected but without battery: Standby

Flashing Green LED: Battery connected

Flashing Red LED at varying speeds: Charging

Simultaneously Flashing Red and Green LEDs: Balancing

Solid Green LED: Full Charge

Rapidly Flashing Red and Green LEDs: Error

CAUTION: Once charging is complete, immediately remove the battery. Never leave a battery connected to the charger.

INSTALL THE TRANSMITTER BATTERIES (RTF)

The LED indicator flashes and the transmitter beeps progressively faster as the battery voltage drops.

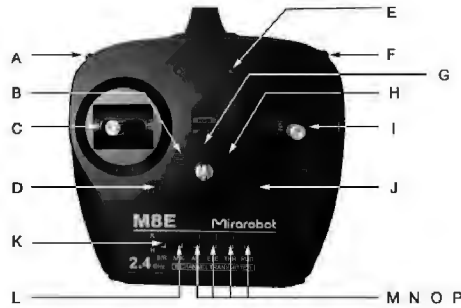
Replace the transmitter batteries when the transmitter begins to beep.

TRANSMITTER CONTROL (RTF)

- A — Motor Arm/Disarm Switch
- B — Throttle Trim (Left Hand Throttle) / Elevator trim (Right Hand Throttle)
- C — Control Stick
- D — Rudder Trim
- K — Rudder SMALL/BIG Switch (up-SMALL)/Rudder SMALL/BIG Switch (down-BIG)
- L — Mix Control ON/OFF Switch (up-OFF)/Mix Control ON/OFF Switch (down-ON)



- F — Mode Switch:
0: Multirotor Mode
1: Fixed Wing-Stability Mode
2: Fixed Wing-ACRO Mode
- G — Throttle Trim (Right Hand Throttle)
/ Elevator Trim (Left Hand Throttle)
- I — Control stick
- J — Aileron Trim
- Servo Settings of channel 1~4:
M — Aileron Channel (CH.1)
N — Elevator Channel (CH.2)
O — Throttle Channel (CH.3)
P — Rudder Channel (CH.4)



TRANSMITTER CONTROL (BNF) FLYSKY

Channel	Mode
CH1	Roll left/right
CH2	Pitch front/back
CH3	Throttle
CH4	Yaw levorotation/dextrorotation
CH5 (three-way switch)	Flight Mode: air pressure/6-axis/3-axis
CH6 (switch)	Startup/Stop/Revert

FLYSKY protocol and channel setting

The receiver only support devices using AFHDS 2A protocol.

Available models:

FS-I6, FS-I6X, FS-I6S, FS-TM8, FS-TM10, FS-I10

PPM — Set "SYSTEM→RX, setup→PPM, output→on" in the transmitter and save.

FRSKY DSM2

Channel	Mode
CH1	Throttle
CH2	Roll left/right
CH3	Pitch front/back
CH4	Yaw levorotation/dextrorotation

CH5 (three-way switch)	Flight Mode
CH6 (switch)	Startup/Stop ~ Revert

Frsky DSM2 protocol and channel setting

The Frsky BNF receiver only support devices using Frsky D8 protocol.
The DSM2 BNF receiver only support devices using DSM2 protocol.

MODEL ASSEMBLY

Install the Wingtip Plates/Landing Gear

The wingtips and tip plates are marked with an "R" and "L". Match the tip plate to the corresponding wingtip.

Slide the tip plates forward over the wingtips until the lock clicks in place.

To remove the plates, press the locking tab in and slide the plate to the rear.

Install the Propeller Guards

Install the propeller guards by sliding them around the propellers and over the motor pods as shown, until they snap into place.

Install 2 screws into each guard to secure in place. Do not overtighten the screws as damage to the mounts or guards may result.

TRANSMITTER AND RECEIVER BINDING

Binding Procedure (RTF)

Power off the transmitter. Press button J and power on the transmitter at the same time. Then release button J, the transmitter beeps and the LED flashes for 25 seconds. Power on the drone in 5 seconds.

The LED turns solid, indicating the bind is successful.

The LED flashes if bind is failed.

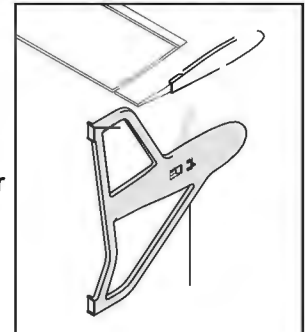
Note: You do not need to do it again once the binding is successful.

Power on the remote controller first and then plug in the battery to the drone.

Binding Procedure (BNF)

FLYSKY Frsky DSM2 Binding Procedure 1

1. Plug binding wire into the aircraft (default port: at the bottom of the aircraft. Without binding wire, please refer to the procedure 2), install the flight battery. The LED at the right of the aircraft will flash red rapidly, indicating the aircraft has entered code-matching mode.
2. Set the transmitter into code-matching mode. The LED indicator will flash slowly, indicating the code-matching has been successful.
3. The aircraft is bound when the LED indicator turns solid. Repeat procedures as mentioned above if you encounter problems during binding.



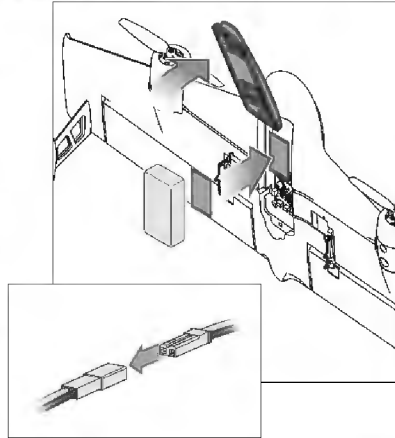
FLYSKY Frsky DSM2 Binding Procedure 2

1. Install the flight battery, keep the aircraft camera opposite to the ground for 2 seconds. The LED at the right of the aircraft will flash red rapidly, indicating the aircraft has entered code-matching mode.
 2. Set the transmitter into code-matching mode. The LED indicator will flash slowly, indicating the code-matching has been successful.
 3. The aircraft is bound when the LED indicator turns solid.
- Repeat procedures as mentioned above if you encounter problems during binding.

BATTERY INSTALLATION AND ESC ARMING

Installation

1. Lower the throttle and throttle trim to the lowest settings. Power on the transmitter and wait approximately 5 seconds.
2. Open the battery hatch.
3. Apply the loop side (soft side) of the hook and loop tape to the bottom of your battery and the hook side to the battery tray. Use enough hook and loop material to ensure the battery is held securely in place through even the most violent aerobatic maneuvers.



NOTICE: Failure to use adequate hook and loop material may allow the battery to become dislodged or ejected in flight. Movement of the battery in flight may cause a change of the center of gravity and loss of control.

1. Install the fully charged battery centered in the battery compartment.
2. Connect the battery lead to the aircraft power lead, noting correct polarity.

CAUTION: Connecting the battery to the aircraft power lead with reversed polarity will cause damage to the flight controller and the battery. Damage caused by incorrectly connecting the battery is not covered under warranty.

3. The aircraft must be either vertical on the landing gear or horizontal on its back to initialize. Keep the aircraft immobile and away from wind or the flight control system may not initialize.

CAUTION: Always keep hands away from the propeller. When armed, the motor will turn the propeller in response to any throttle movement.

4. Close the battery hatch.
5. Refer to the Center of Gravity section to ensure the model balances at the recommended CG.

CENTER OF GRAVITY(CG)

The CG location is within 126-136mm (measured forward from the trailing edge of the wing).

CAUTION: Failure to confirm the correct center of gravity may cause a loss of control and a crash. Crash damage is not covered under warranty.

CONTROL HORN AND SERVO ARM SETTINGS

The table shows the factory settings for the elevon control horns and servo arms. Do not make changes to the elevon linkages.

	Control Horns	Servo Arms
Elevons		

CONTROL CENTERING

Before the first flight, or in the event of an accident, make sure control surfaces are centered when the transmitter controls and trims are neutral. The transmitter sub-trim must be set to zero. Adjust the linkages mechanically if the control surfaces are not centered.

Make the U-shape narrower to make the connector shorter. Make the U-shape wider to make the linkage longer.

FLIGHT CONTROL DIRECTION TESTS

Transmitter Input Test

This test ensures that the flight control system is reacting properly to your transmitter inputs. Assemble the aircraft and bind your transmitter to the receiver before performing this test.

CAUTION: Keep all body parts, hair and loose clothing away from the propellers at all times, as these items could become entangled.

Set the transmitter flight mode switch to stability mode (position 1).

Holding the aircraft horizontal at the tail, arm the flight control system by pressing and releasing the arming button on the transmitter. The aircraft surfaces will deflect quickly in either direction and then to center to indicate the control system is now armed. Once the flight control system is active, the control surfaces may move rapidly. This is normal.

Move the transmitter controls as shown in the "Transmitter Input" column of the table. The control surfaces should react to your inputs by moving in the directions shown in the "Control Surface Reaction" column. If any of the control surfaces do not respond in the proper direction, ensure the corresponding transmitter channel is NOT reversed.

Transmitter Input	Control Surface Reaction (viewed from the rear)

Stability System Reaction Test

This test ensures that the flight control system is reacting properly to external forces, such as wind. Assemble the aircraft and bind your transmitter to the receiver before performing this test.

CAUTION: Keep all body parts, hair and loose clothing away from the propellers at all times, as these items could become entangled.

Set the transmitter flight mode switch to stability mode (position 1).

Holding the aircraft horizontal at the tail, arm the flight control system by pressing and releasing the arming button on the transmitter. The aircraft surfaces will deflect quickly in either direction and then to center to indicate the control system is now armed. Once the flight control system is active, the control surfaces may move rapidly. This is normal.

Pivot the entire aircraft as shown in the "Aircraft Movement" column of the table. The control surfaces should react to your movements by moving in the directions shown in the "Control Surface Reaction" column. If the control surfaces do not respond as shown, do not fly the aircraft.

Aircraft Movement	Control Surface Reaction (viewed from the rear)

FLIGHT MODES

Multicopter Mode (switch position 0)

Vertical mode allows the aircraft to take off and land vertically. The flight controls work similar to a quadcopter.

- Limited bank and pitch angle
- Self levelling when the controls are centered

Stability Mode (switch position 1*)

Stability mode allows the novice pilot to get comfortable flying a fixed wing aircraft in forward flight.

Pivot the entire aircraft as shown in the "Aircraft Movement" column of the table. The control surfaces should react to your movements by moving in the directions shown in the "Control Surface Reaction" column. If the control surfaces do not respond as shown, do not fly the aircraft.

Aircraft Movement	Control Surface Reaction (viewed from the rear)

FLIGHT MODES

Multicopter Mode (switch position 0)

Vertical mode allows the aircraft to take off and land vertically. The flight controls work similar to a quadcopter.

- Limited bank and pitch angle
- Self levelling when the controls are centered

Stability Mode (switch position 1*)

Stability mode allows the novice pilot to get comfortable flying a fixed wing aircraft in forward flight.

- Limited bank and pitch angle
- Self levelling when the controls are centered

Acro Mode (switch position 2*)

Acro mode is intended for experienced pilots who are comfortable flying the aircraft in any orientation.

- No bank angle limits
- No self levelling when the controls are centered
- Fully aerobatic capable

⚠ CAUTION: Acro mode is intended only for experienced pilots who have mastered fixed wing aerobatic flight. Attempting to use acro mode without the necessary flight experience may cause loss of control, property damage or a crash.

Crash damage is not covered under warranty.

To access acro mode:

1. Power on the transmitter
2. Power on the aircraft, allowing it to initialize fully
3. Hold the transmitter sticks to the bottom, inside corners and quickly cycle the flight mode switch from position 0 to position 2 and back 3 times.

The control surfaces will cycle multiple times. If successful, the LED on the flight control board will show both green and red LEDs when the flight mode switch is set to acro mode (position 2).

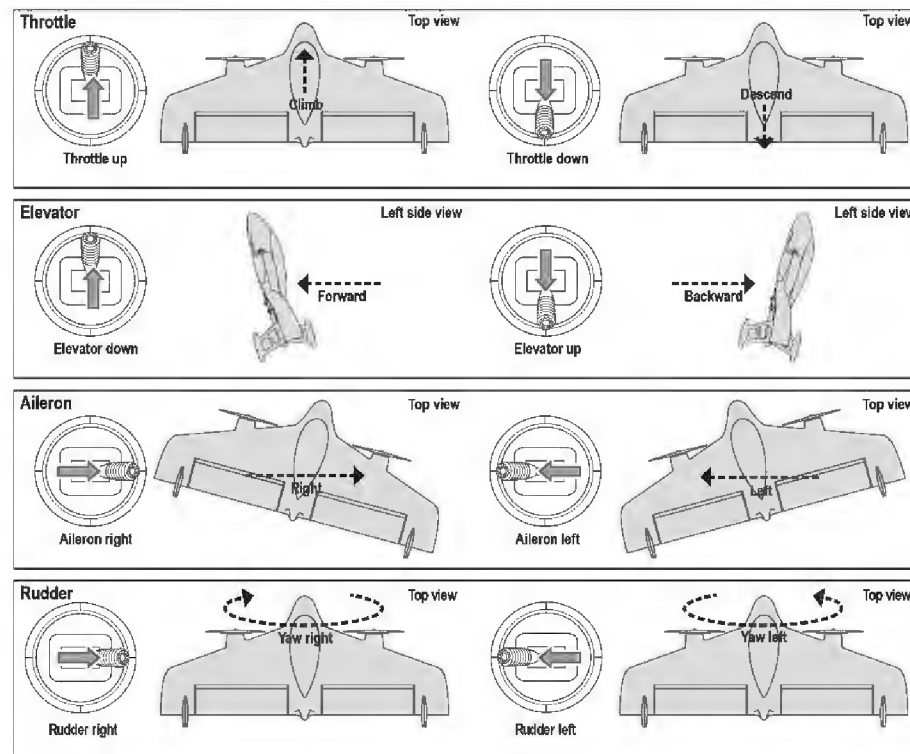
Once accessed, acro mode will be available whenever the aircraft is powered on. It is not necessary to unlock the mode every time the aircraft is powered on.

If you wish to lock acro mode again, repeat the directions above until the receiver LED shows stability mode (red LED) in both flight mode switch position 1 and 2.

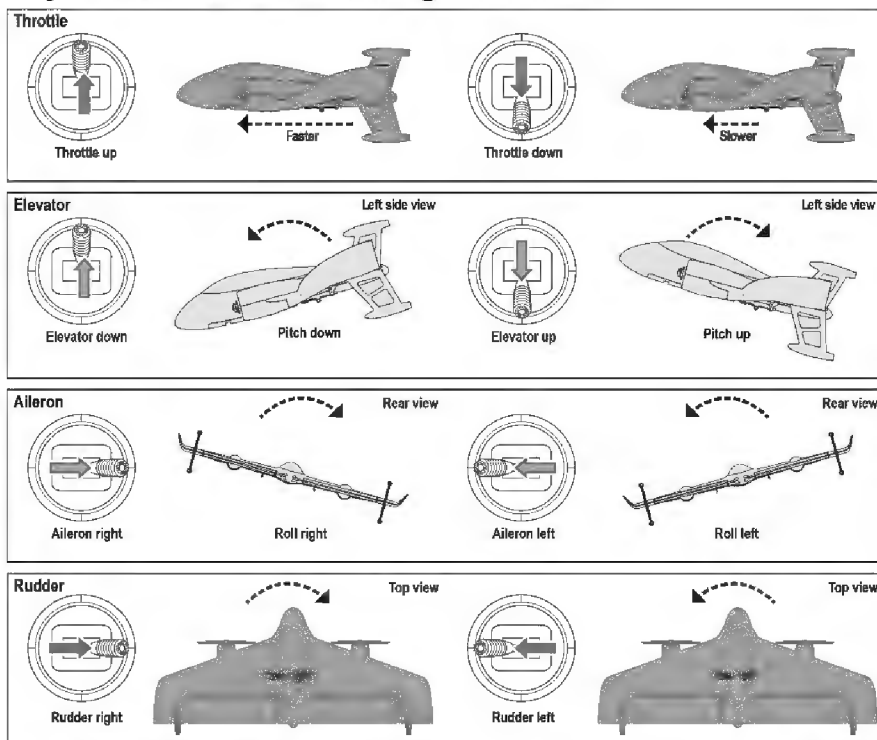
UNDERSTANDING THE PRIMARY FLIGHT CONTROLS

The aircraft is capable of both vertical, multirotor-style flight and forward, airplane-style flight. It is important to understand how the primary flight controls function and how the aircraft reacts in both flight modes. Take a few minutes to familiarize yourself with the controls prior to attempting your first flight.

Multicopter Flight Mode



Stability and Acro Forward Flight Modes



FLYING YOUR AIRCRAFT

Consult local laws and ordinances before choosing a flying location.

NOTICE: While the aircraft is capable of forward flight in light to moderate winds, we recommend using multirotor mode only in very light wind or calm conditions. Using multirotor mode or transitioning from forward flight to multirotor mode in windy conditions will cause the aircraft to be blown downwind and could cause a loss of control or a crash. Use only the forward flight modes for flying in windy conditions.

Range Check your Radio System

Before you fly, range check the radio system. Refer to your specific transmitter instruction manual for range test information.

Just before Flight

For best results, always use a fresh battery. Due to the increased battery draw of this or any vertical lift aircraft, using an old or worn battery will give far shorter flight times.

For your first flights with the recommended 900mAh battery pack, set your transmitter timer or a stopwatch to 8 minutes.

NOTICE: Never fly the aircraft without first setting and activating a timer.

After 8 minutes, land the aircraft. Adjust your timer for longer or shorter flights depending on your preference and battery usage.

Arming

The aircraft can be armed in any of the three flight modes. The active flight mode

during arming determines how the aircraft will indicate it is armed and ready for flight. Prior to arming, lower the throttle to the lowest setting. The aircraft will not arm unless the throttle is fully lowered.

When the aircraft is armed in multirotor mode, the motors will spin up to idle speed. When the aircraft is armed in either stability or acro mode, the elevons will cycle and then return to center. The motors will not run until throttle is applied.

IMPORTANT: As a safety feature, arming in one flight mode and changing to another flight mode prior to adding throttle will cause the aircraft to disarm.

Vertical Takeoff

1. Place the aircraft vertically on the landing gear on a flat, level surface with the top facing you. The aircraft must be sitting vertically to arm in multirotor mode.
2. Set the flight mode to multirotor flight.
3. Lower the throttle to the lowest setting. The aircraft will not arm unless the throttle is fully lowered.
4. Arm the aircraft by pressing and holding the motor arm/disarm switch. When the aircraft is armed in multirotor mode the motors will spin up to idle speed.
5. Gradually increase the throttle until the model lifts off and is approximately 2 ft. (600mm) off the ground. Avoid forcing the aircraft into the air.

Hovering and Vertical Flight

Making small corrections on the transmitter, try to hold the aircraft in one spot. If flying in calm winds, the model should require almost no corrective inputs. After moving the aileron/elevator stick and returning it to center the model should level itself. The model may continue to move due to inertia. Move the stick in the opposite direction to stop the movement.

After you become comfortable hovering, you can progress into flying the model to different locations, keeping the top pointed towards you at all times to aid with orientation. You can also ascend and descend using the throttle stick.

When comfortable with these maneuvers, attempt flying with the aircraft in different orientations. It is important to keep in mind that the flight control inputs will rotate with the aircraft, so always try to picture the control inputs relative to the nose of the aircraft. For example, pushing the elevator stick forward will always pitch the nose toward the bottom of the fuselage, causing the aircraft to move forward and vice versa.

Hovering and multirotor flight is best attempted in low wind conditions. Attempting to fly in higher winds will cause the aircraft to drift downwind dramatically if the top or bottom are turned into the wind. It is possible to hold position somewhat if the aircraft is turned sideways into the wind, but this is recommended only for more experienced pilots.

Lowering the throttle to descend while flying in multirotor mode in choppy or windy conditions may cause the aircraft to appear "bouncy" or erratic. This is normal as the flight controller reacts to compensate for the moving air.

Transitioning In Flight

To transition to stability, forward flight from multirotor flight, change the flight mode switch on your transmitter to the stability flight mode position. The throttle will

increase slightly and the aircraft will pitch forward until forward flight attitude has been achieved. It is normal to have some slight oscillations in pitch as the aircraft transitions into forward flight. While in stability flight mode the motors use differential thrust to provide yaw control.

NOTICE: Always fly in a clear and open area. While the transition from multirotor to forward flight does not require much space, you will not be able to change the direction of flight until the transition is complete. NEVER attempt to transition to forward flight indoors in anything but a large open space such as a large gymnasium.

To transition to multirotor flight from forward flight, reduce the airspeed and change the flight mode switch on your transmitter to the multirotor flight position. The throttle will increase slightly and the aircraft will pitch up until it reaches a multirotor attitude.

NOTICE: If you are flying in wind, the aircraft will be blown downwind after it transitions to vertical mode.

Transition to vertical flight at low throttle will cause the aircraft to descend until more throttle is applied.

Stability and Acro Forward Flight

Fly the aircraft and trim it for level flight per the In Flight Trimming section. The aircraft flies in a very similar manner in forward flight to any other fixed-wing aircraft. It is capable of a wide range of aerobatic maneuvers, including loops and rolls. Additionally, the differential thrust of the motors allows for unique spinning and tumbling maneuvers.

Hand Launching

Hand launching is preferred when flying in higher winds or when vertical takeoff may not be possible.

1. Lower the throttle to the lowest setting. The aircraft will not arm unless the throttle is fully lowered.
2. Power on the model normally, allowing it to initialize completely.
3. Set the flight mode switch to stability mode.
4. Hold the aircraft horizontal, with a firm grip at the rear-center of the airframe, being careful not to interfere with the control surfaces.
5. Arm the aircraft by pressing and holding the motor arm/disarm switch. When the aircraft is armed in either stability or acro mode, the control surfaces will cycle left and right and then return to center. The aircraft is now armed in stability mode. The motors are armed and will run with any throttle input.
6. Increase the throttle to approximately 50–75%.
7. Give the aircraft a light, underhand toss into the wind.

Landing

The preferred method of landing is to transition the aircraft into multirotor flight mode and bring it into a low hover. Slowly lower the throttle to descend to a soft landing. Immediately activate throttle cut or press and hold the motor arm/disarm switch to stop the motors when the aircraft touches down. Failure to stop the motors may cause the aircraft to skip or hop across the ground if the flight controller does not recognize the aircraft has landed.

It is possible to land the aircraft in forward flight as well when conditions dictate it, such as in high wind. To land while in a forward flight mode, turn the aircraft into the wind and lower the throttle to decrease the forward speed. Fly the aircraft to approximately 6 inches (15cm) or less above the runway, using a small amount of throttle for the entire descent. Keep the throttle on until the aircraft is ready to touch down.

Just before touch down, keep the wings level and the airplane pointed into the wind. Gently lower the throttle while easing back on the elevator to bring the aircraft to touch down on the runway as slowly and gently as possible. Using stability mode for landings will help stabilize the aircraft.

IMPORTANT: The aircraft will automatically disarm after sitting for approximately 3 seconds with no throttle, no control inputs or aircraft movement.

The average flight time with a mixture of multirotor and forward flight using the recommended **900mAh** flight battery is approximately 8 minutes.

After landing disconnect and remove the Li-Po battery from the aircraft to prevent trickle discharge. Charge your Li-Po battery to about half capacity before storage. During storage, make sure the battery charge does not fall below 3V per cell.

NOTICE: If a crash is imminent, activate the throttle cut to immediately stop the motors to reduce the possibility of damage to the airframe and electronic components.

NOTICE: Crash damage is not covered under warranty.

NOTICE: If a crash is imminent, activate the throttle cut to immediately stop the motors to reduce the possibility of damage to the airframe and electronic components.

NOTICE: Crash damage is not covered under warranty.

Propeller Inspection

Inspect the propellers after every flight. Check for breaks, cracks or bends of the propeller tips. Even minor damage may affect the flight performance of the aircraft and may cause unwanted yaw under throttle in forward flight. If any damage is found, replace the propeller before attempting additional flights.

Low Voltage Cutoff (LVC)

When a Li-Po battery is discharged below 3V per cell, it will not hold a charge. The aircraft's ESC protects the flight battery from over-discharge using Low Voltage Cutoff (LVC). Once the battery discharges to approximately 3.45V per cell, the LVC will reduce the power to the motor in order to leave adequate power to the receiver and servos to land the aircraft.

How the LVC function is indicated is dependent on which flight mode is active. While in vertical mode, the motor power will decrease. The aircraft will respond sluggishly to throttle and will gradually not be able to gain or hold altitude.

When the motor power decreases, land the aircraft immediately and replace or recharge the flight battery.

While in either of the forward flight modes, the motors will cut off briefly and power back on. If the motors cut off or surge in power, land immediately and replace or recharge the flight battery. Transition back to vertical mode is possible if done early in

the LVC

NOTICE: Repeated flying to LVC may damage the flight battery.

LVC does not prevent the battery from over-discharge during storage.

Tip: Monitor your aircraft battery's voltage before and after flying by using a Li-Po Cell Voltage Checker.

Repairs

Most repairs to the foam can be made using virtually any adhesive (hot glue, regular CA, epoxy, etc). When parts are not repairable, you can order all replacement and optional parts from our website.

IN FLIGHT TRIMMING

Familiarize yourself with the Flying Your Aircraft section prior to trimming your aircraft. Trimming should be done in calm wind conditions and with a fully charged transmitter and flight battery. Trimming should only be necessary in acro mode, as the flight controller will compensate for minor trim issues in multirotor and stability modes. It is important to make any trim adjustments mechanically in the control linkages and re-set the transmitter trims to center to keep any changes made from affecting multirotor and stability modes.

1. Power on and takeoff normally.
2. Change the flight mode to acro and fly straight and level at approximately 3/4 throttle.
3. Trim the aircraft for level flight using the trim buttons on the transmitter.
4. When the aircraft maintains reasonable straight and level flight, land the aircraft.
5. Set the flight mode back to acro mode if it was changed for landing. Power cycle the aircraft. Do not activate the throttle. Take note of the neutral position of the control surfaces.
6. Adjust the control linkages mechanically, as shown in the "Control Centering" section, to compensate for the amount of trim entered.
7. Re-center the trims on the transmitter. **The transmitter trims should always be centered for best flight performance.**
8. Fly the aircraft again to check the changes made.
9. Repeat the trimming process until the aircraft will maintain reasonable straight and level forward flight without excessive control corrections.

When the initial trimming process is done, the aircraft should not require large amounts of trimming on subsequent flights. If large amounts of trim are needed to hold straight and level on later flights, land the aircraft and check the control surfaces for damage or binding.

POST FLIGHT

1. Disconnect the flight battery from the flight controller
2. Power OFF the transmitter.
3. Remove the flight battery from the aircraft.
4. Recharge the flight battery.
5. Repair or replace all damaged parts.

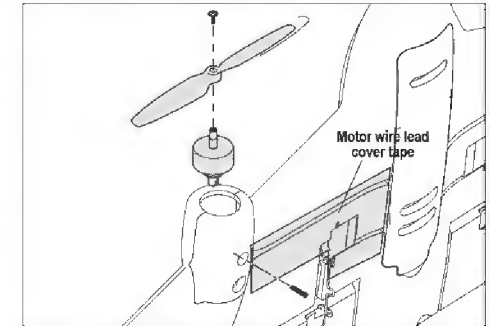
6. Store the flight battery apart from the aircraft and monitor the battery charge.
7. Make note of the flight conditions and flight plan results, planning for future flights.

MOTOR SERVICE

CAUTION: Always disconnect the flight battery before performing motor service.

Motor Removal

1. Disconnect the motor lead from the flight control board.
2. Remove the propeller retention screw and propeller from the motor shaft.
3. Looking through the hole in the bottom of the motor nacelle, remove the setscrew from the motor mount.
4. Very carefully remove the tape covering the motor wire lead.



5. Pull the motor from the motor mount, feeding the motor wire lead through the nacelle.

Assemble in reverse order.

Note: The illustration shows the propeller guard removed for clarity.

It is not necessary to remove the guards to replace the motors.

Consult local laws and ordinances before operating FPV equipment.

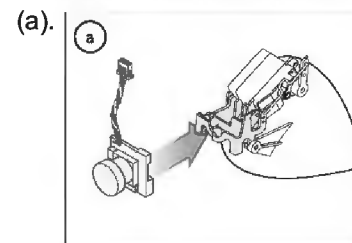
In some areas, FPV operation may be limited or prohibited. You are responsible for operating this product in a legal and responsible manner.

Items required for FPV installation and operation:

- FPV Camera Mount with Servo
- FPV Camera
- 150mW Video Transmitter North America only
- 25mW Video Transmitter European Union only
- Video Monitor with suitable headset or ground station

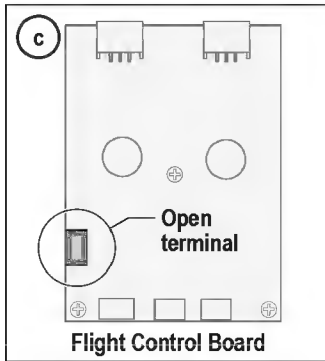
Installing the Optional FPV System

1. Remove the flight battery from the aircraft.
2. Install the camera to the camera mount with double sided tape. The camera should be installed so the wiring harness is at the top left side of the mount as shown



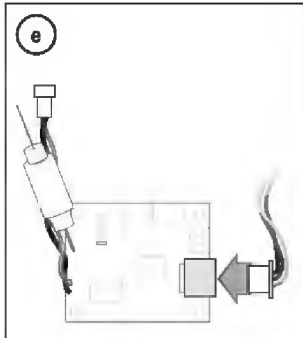
3. Peel the backing from the double stick tape of the FPV mount.
4. Attach the mount to the nose of the aircraft as shown (b), making sure the mount is centered and level to the aircraft.

- Connect the 4 pin/ 3-wire connector of the y-harness to the open terminal (c) on the flight control board.



- Connect the 2-wire power connector of the y-harness to the video transmitter power lead (d).
- Connect the 3-wire extension to the terminal on the video transmitter (e).

- Apply double-sided tape to the bottom of the video transmitter and slide it under the flight control board as shown (f). It should slide

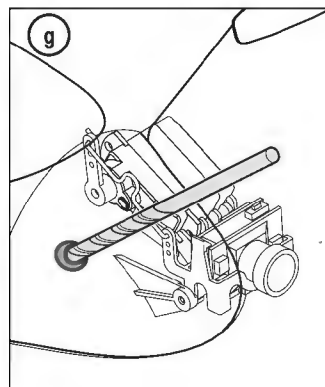
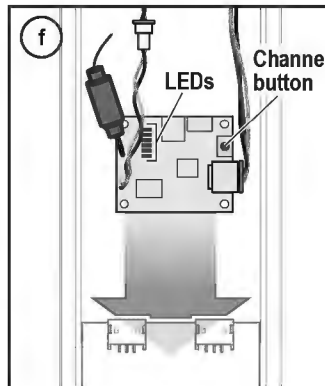
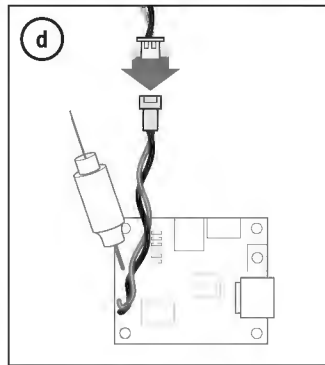
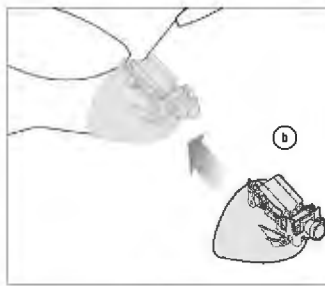


in far enough that about half of the transmitter is under the flight control board and the channel button and LEDs are still visible. Do not force the transmitter any farther.

- Determine whether you wish to route the wire leads internally or externally around the fuselage and into the battery hatch.

If routing the wires internally, carefully drill a hole through the fuselage as shown (g), large enough to accommodate the servo and camera connectors, from the nose of the aircraft into the battery compartment.

- Route the servo end of the y-harness and the camera extension from the battery compartment to the FPV mount.
- Connect the servo lead to the y-harness connector.



- Connect the camera lead to the 3-wire extension. Leave enough slack in the wire extension at the nose so the camera mount can pivot through its full range of travel without binding.

Operating the FPV Mount

The FPV camera mount does not require any programming or additional channels in the transmitter. All functions are controlled by the flight control board on the aircraft. Changing between the flight modes with the flight mode switch moves the camera to one of two preset positions.

- While in multirotor mode the camera faces toward the bottom of the aircraft. This allows for a forward view while flying in multirotor mode.
- While in either of the forward flight modes, stability or acro, the camera faces toward the front of the aircraft.

The angle of the camera can be adjusted slightly for your preferred optimal viewing angle by adjusting the length of the control rod on the camera mount. Refer to the Control Centering section for a description of how to adjust the length of the control rod. Ensure any adjustments made to the camera control rod do not cause binding in either the multirotor or forward flight mode camera positions.

NOTICE: Never try to move the mount up or down by hand. Damage to the mount servo may result.

Operating the Video Transmitter

Consult local laws and ordinances before operating FPV equipment.

In some areas, FPV operation may be limited or prohibited. You are responsible for operating this product in a legal and responsible manner.

See the Available Frequency table to find the desired video channel and band. The video transmitter channel and band are changed using the button on the video transmitter, as shown. There are 6 LEDs on the video transmitter board. The red LED is the channel indicator. The next 5 blue LEDs are the band indicators.

Channel Selection

- Channel 1 is indicated by the red LED glowing solid.
- Press the button to cycle through the channels (1-8). The red LED will flash once as you cycle through each channel. Press the button once for each channel until the desired channel is reached. If unsure of the current transmitter channel, press the button to cycle the channels until you reach channel 1, indicated by a solid red LED, then cycle to the channel desired.

Band Selections

- Press and hold the button to change the video transmitter band.
- Each time the button is pressed and held, the blue band LED will indicate a change to the next available band. The blue LEDs indicate FS/IRC band, band E (North America only), band A, race band and band B, as shown in the illustration.

NOTICE: Due to the additional current draw of the camera, servo and video transmitter on the aircraft electrical system, using the optional FPV system will shorten

the expected flight times.

Available Frequencies, North America(mHz)

Available Frequencies, European Union(mHz)

TROUBLESHOOTING GUIDE

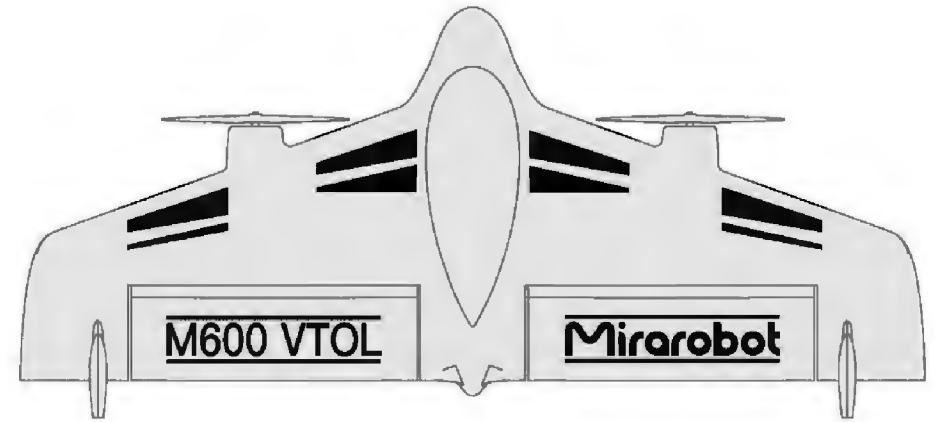
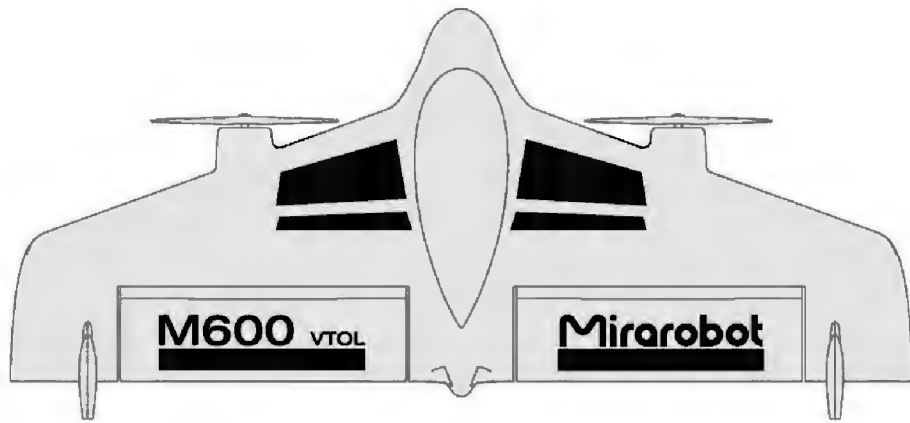
Problem	Possible Cause	Solution
Aircraft will not arm	Throttle cut switch in the disarm position (position 1)	Set the throttle cut switch to the arm position (position 0)
Aircraft will not respond to throttle but responds to other controls	Throttle not at idle and/or throttle trim too high	Reset controls with throttle stick and throttle trim at lowest setting
	Throttle servo travel is lower than 100%	Make sure throttle servo travel is 100% or greater
	Throttle channel is reversed	Reverse throttle channel on transmitter
	Motors disconnected from ESCs	Make sure motors are connected to the ESCs
Extra propeller noise or extra vibration	Damaged propeller and spinner, collet or motor	Replace damaged parts
	Propeller is out of balance	Balance or replace propeller
	Prop bolt is loose	Tighten the prop bolt
	Flight battery charge is low	Completely recharge flight battery
	Flight battery damaged or old	Replace flight battery with a fresh battery and follow flight battery instructions
	Flight conditions too cold	Make sure battery is warm before use

	Battery capacity too low for flight conditions	Replace battery or use a larger capacity battery
Aircraft will not Bind (during binding) to transmitter	Transmitter too near aircraft during binding process	Move powered transmitter a few feet from aircraft, disconnect and reconnect flight battery to aircraft
	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
	Flight battery/transmitter battery charge is too low	Replace/recharge batteries
	Bind switch or button not held long enough during bind process	Power off transmitter and repeat bind process. Hold transmitter bind button or switch until receiver is bound
Aircraft will not connect (after binding) to transmitter	Transmitter too near aircraft during connecting process	Move powered transmitter a few feet from aircraft, disconnect and reconnect flight battery to aircraft 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 connecting again
	Aircraft bound to different model memory (ModelMatch™ radios only)	Select correct model memory on transmitter

	Flight	Replace/recharge batteries
	battery/Transmitter battery charge is too low	
	Transmitter may have been bound to a different aircraft using different DSM protocol	Bind aircraft to transmitter
	Control surface, control horn, linkage or servo damage	Replace or repair damaged parts and adjust controls
	Servo wire damaged or connections loose	Do a check of wires and connections, connect or replace as needed
	Transmitter is not bound correctly or the incorrect aircraft was selected	Re-bind or select correct airplanes in transmitter
	Flight battery charge is low	Fully recharge flight battery
	Flight controller is damaged	Replace the flight controller
Controls reversed	Transmitter settings are reversed	Perform the Control Direction Test and adjust the controls on transmitter appropriately
Oscillation	Damaged propeller	Replace propeller
	Imbalanced	Balance the propeller

	propeller	
	Motor vibration	Replace parts or correctly align all parts and tighten fasteners as needed
	Loose battery	Use more hook and loop material to secure the battery
	Loose flight controller	Align and secure the flight controller in fuselage
	Loose aircraft controls	Tighten or otherwise secure parts (servo, arm, linkage, horn and control surface)
	Worn parts	Replace worn parts (especially propeller or servo)
	Irregular servo movement	Replace servo
Inconsistent flight performance	Trim is not at neutral	If you adjust trim more than 8 clicks, adjust the clevis to remove trim
	Sub-Trim is not at neutral	Remove all sub-trim. Adjust the servo linkage for proper alignment of surfaces
	Aircraft was not kept upright and immobile for 5 seconds after battery connection	With the throttle stick in lowest position, disconnect battery, then reconnect battery and keep the aircraft still for 5 seconds
Aircraft motor surges while in forward flight modes	Low battery. Low Voltage Cutoff is being triggered.	Recharge flight battery or replace battery that is no longer performing
Aircraft does	Low battery. Low	Recharge flight battery or replace

not maintain or gain altitude in vertical flight mode	Voltage Cutoff is being triggered.	battery that is no longer performing
Aircraft immediately flips or crashes on throttle up	Propellers installed incorrectly	Install the propellers with the "R" propeller on the right side motor and the "L" propeller on the left side motor
Aircraft is unstable in yaw or yaws to one side under throttle in forward flight	Damaged propeller	Inspect the propellers and replace any damaged parts



EXPLODED VIEW

