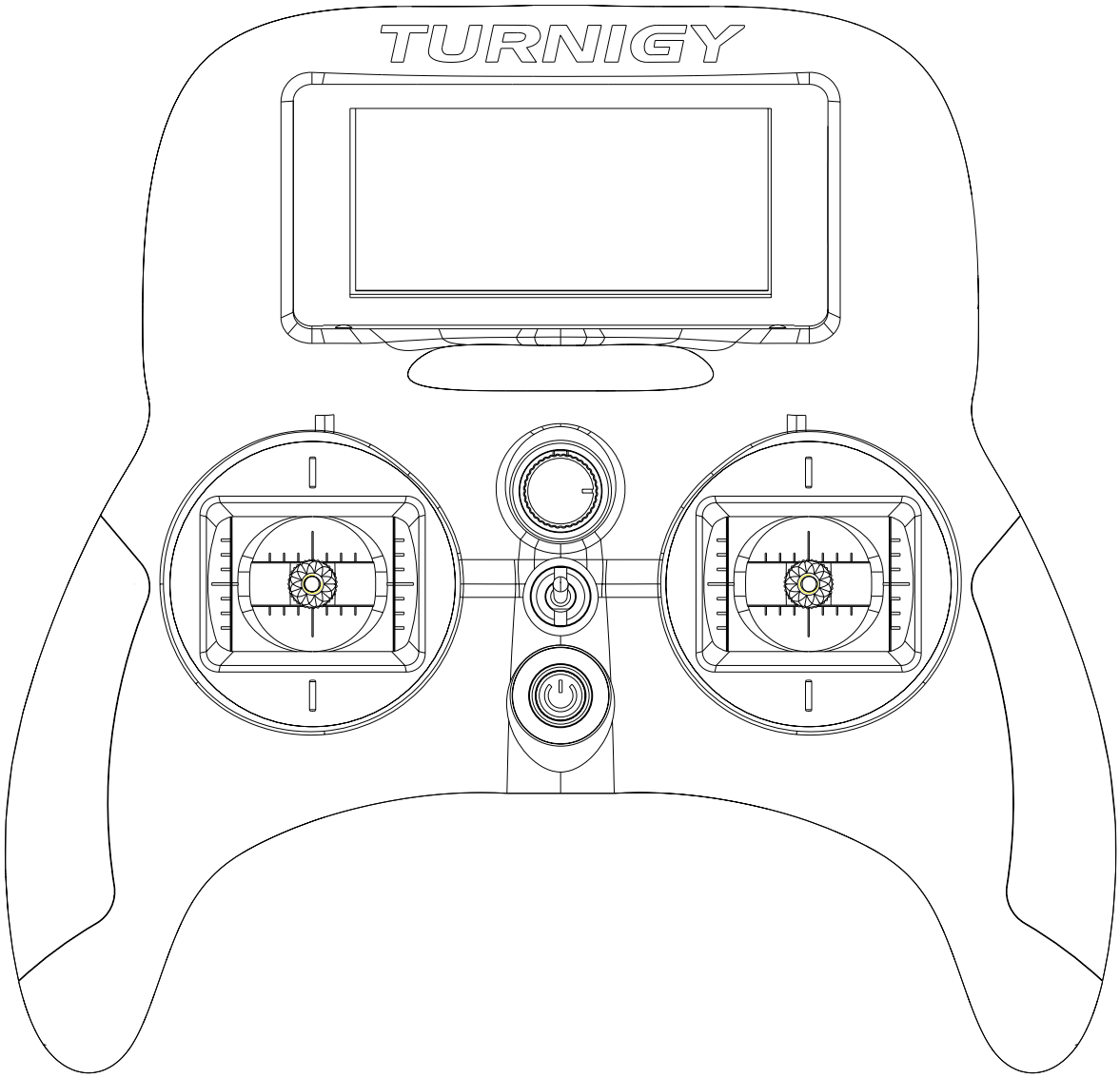
Evolution

DIGITAL PROPORTIONAL RADIO CONTROL SYSTEM

INSTRUCTION MANUAL



TURNIGY®
power systems

Thank you for purchasing our product, an ideal radio system for beginners or experienced users alike.

Read this manual carefully before operation in order to ensure your safety, and the safety of others or the safe operation of your system.

If you encounter any problem during use, refer to this manual first. If the problem persists, contact your local dealer or visit our service and support website for help:

www.Hobbyking.com

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1. Safety

1.1 Safety Symbols

Pay close attention to the following symbols and their meanings. Failure to follow these warnings could cause damage, injury or death.

⚠ **Danger**	•	**Not following these instructions may lead to serious injuries or death.**
⚠ **Warning**	•	**Not following these instructions may lead to major injuries.**
⚠ **Attention**	•	**Not following these instructions may lead to minor injuries.**

1.2 Safety Guide

- **Do not use the product at night or in bad weather like rain or thunderstorm. It can cause erratic operation or loss of control.**
- **Do not use the product when visibility is limited.**
- **Do not use the product on rain or snow days. Any exposure to moisture (water or snow) may cause erratic operation or loss of control.**
- **Interference may cause loss of control. To ensure the safety of you and others, do not operate in the following places:**
  - Near any site where other radio control activity may occur
  - Near power lines or communication broadcasting antennas
  - Near people or roads
  - On any pond when passenger boats are present
- **Do not use this product when you are tired, uncomfortable, or under the influence of alcohol or drugs. Doing so may cause serious injury to yourself or others.**
- **The 2.4GHz radio band is limited to line of sight. Always keep your model in sight as a large object can block the RF signal and lead to loss of control.**
- **Never grip the transmitter antenna during operation. It significantly degrades signal quality and strength and may cause loss of control.**
- **Do not touch any part of the model that may generate heat during operation, or immediately after use. The engine, motor or speed control, may be very hot and can cause serious burns.**

- **Misuse of this product may lead to serious injury or death. To ensure the safety of you and your equipment, read this manual and follow the instructions.**
- **Make sure the product is properly installed in your model. Failure to do so may result in serious injury.**
- **Make sure to disconnect the receiver battery before turning off the transmitter. Failure to do so may lead to unintended operation and cause an accident.**
- **Ensure that all motors operate in the correct direction. If not, adjust the direction first.**
- **Make sure the model flies within a certain distance. Otherwise, it would cause loss of control.**

2. Introduction

The Evolution transmitter and TGY-iA6C receiver constitutes a 2.4GHz AFHDS 2A digital proportional computerized R/C system. This system supports quadcopters.

2.1 System Features

The AFHDS 2A (Automatic Frequency Hopping Digital System Second Generation) is specially developed for all radio control models. Offering superior protection against interference while maintaining lower power consumption and high reliable receiver sensitivity, the AFHDS technology is considered to be one of the leaders in the RC market today.

Bidirectional Communication

Capable of sending and receiving data, each transmitter is capable of receiving data from temperature, altitude and many other types of sensors, servo calibration and i-BUS / S-BUS Support.

Multi-channel Hopping Frequency

This systems bandwidth ranges from 2.408GHz to 2.475GHz. This band is divided in 135 channels. Each transmitter hops between 16 channels (32 for Japanese and Korean versions) in order to reduce interference from other transmitters.

Omni-directional Gain Antenna

The high efficiency Omni-directional high gain antenna cuts down on interference, while using less power and maintaining a strong reliable connection.

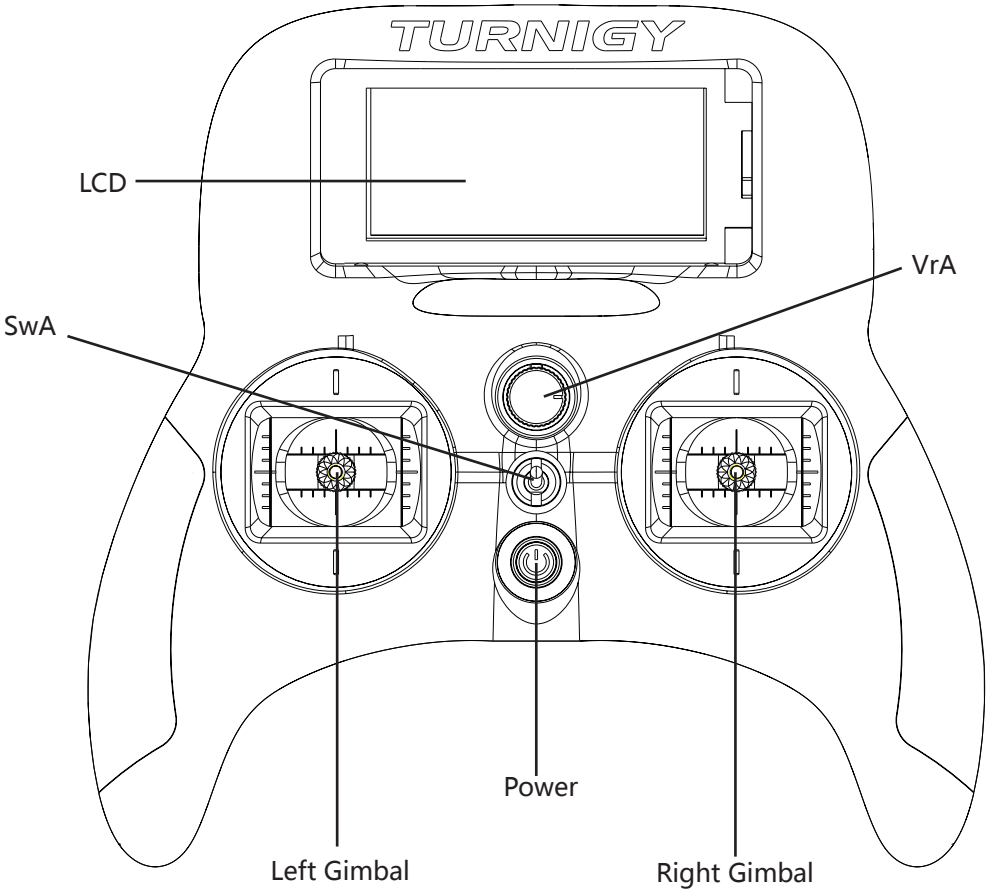
Unique ID Recognition System

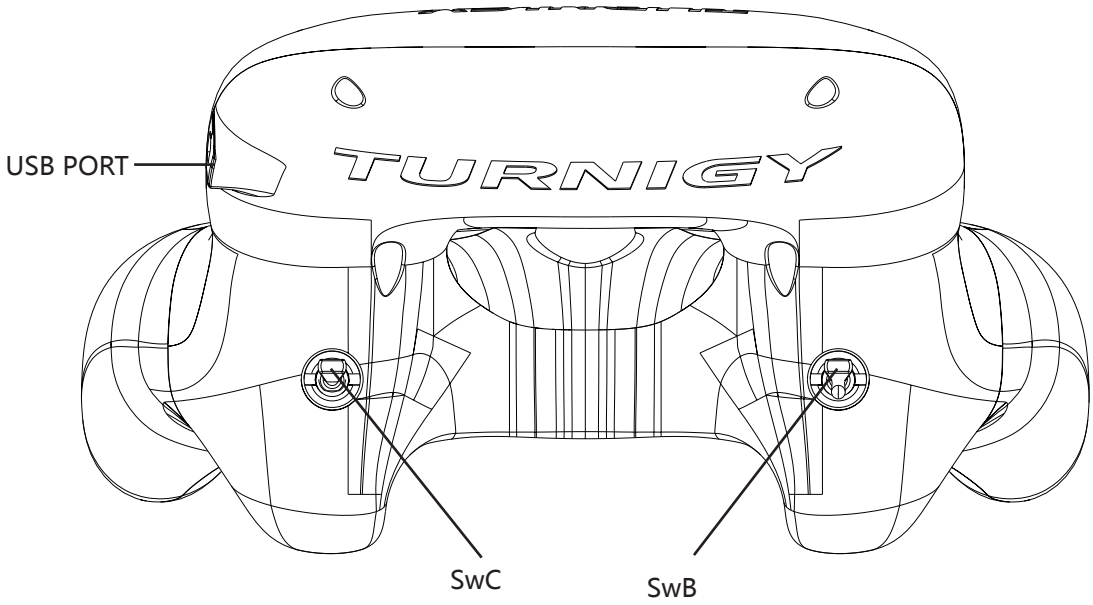
Each transmitter and receiver has it's own unique ID. Once the transmitter and receiver have been paired, they will only communicate with each other, preventing other systems accidentally connecting to or interfering with the systems operation.

Low Power Consumption

The system is built using highly sensitive low power consumption components, maintaining high receiver sensitivity, while consuming as little as one tenth the power of a standard FM system, dramatically extending battery life.

2.2 Transmitter Overview



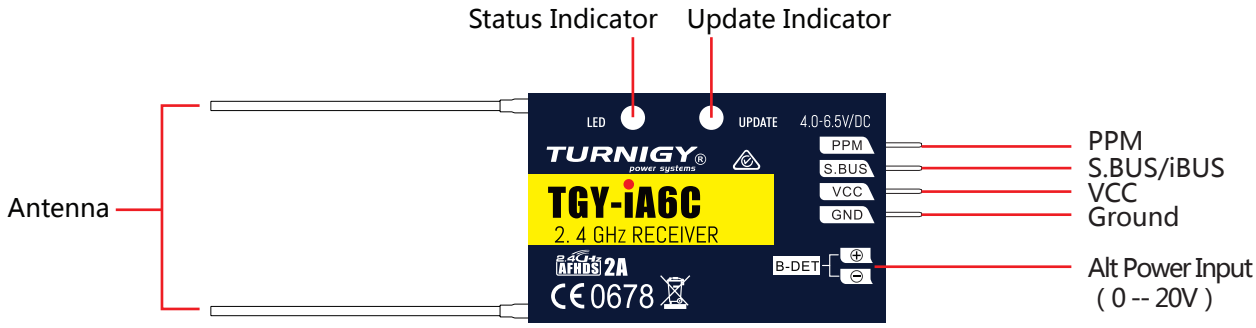


2.2.1 Transmitter Antenna

Precautions:

- For best signal quality, make sure that the antenna is at about a 90 degree angle to the model. Do not point the antenna directly at the receiver.
- Never grip the transmitter antenna during operation. It significantly degrades the RF signal quality and strength and may cause loss of control.

2.3 Receiver Overview



2.3.1 Receiver Antenna

Attention • **For best signal quality, ensure that the receiver is mounted away from motors or metal parts.**

2.3.2 Status Indicator

The status indicator is used to indicate the power and working status of the receiver.

- Off: the power is not connected.
- Lit in red: the receiver is on and working.
- Flashing quickly: the receiver is binding.
- Flashing slowly: the bound transmitter is off or signal is lost.

2.3.3 Connectors

The connectors are used to connect the parts of model and the receiver.

- PPM: Channel output
- GND/VCC: Power Input
- S.BUS: S.BUS and i.Bus Interface
- B-DET: Alternative port for powering receiver.

2.4 USB Simulator Mode

The system may be used as a HID controller when connected to a computer via USB. When connected to a computer the function is activated automatically and will be recognized by windows as a game controller.

To calibrate or test the system in windows:

- 1. Type "RUN" into the search bar and select the program.
- 2. Type "joy.exe" into the "Open:" box and press enter.
- 3. Select the system and open properties within the game controller menu.

Note:

- **any changes made to trims within the system will take effect in the USB mode. If the system is not responding as expected, reset to factory settings in the system menu.**

3. Getting Started

Before operation, install the battery and connect the system as instructed below.

3.1 Transmitter Battery

The transmitter has an internal battery, to charge connect the system to a suitable USB charger or computer.

⚠ **Danger**	•	**Only use specified battery.**
⚠ **Danger**	•	**Do not open, disassemble, or attempt to repair the battery.**
⚠ **Danger**	•	**Do not crush/puncture the battery, or short the external contacts.**
⚠ **Danger**	•	**Do not expose to excessive heat or liquids.**
⚠ **Danger**	•	**Do not drop the battery or expose to strong shocks or vibrations.**
⚠ **Danger**	•	**Always store the battery in a cool, dry place.**
⚠ **Danger**	•	**Do not use the battery if damaged.**

4. Operation Instructions

After setting up, follow the instructions below to operate the system.

4.1 Power On

Follow the steps below to turn on the system:

1. Check the system and make sure that:
   - The batteries are fully charged. (Charge the system via USB cable)
   - The receiver is off and correctly installed.
2. Hold the power buttons until screen lights up.
3. Connect the receiver power supply to the **VCC** and **GND** port on the receiver.

The system is now powerd on. Operate with caution, or serious injury could result.

4.2 Binding

The transmitter and receiver have been pre-bound before delivery. If you are using another transmitter or receiver, the steps below outline the binding process.

1. Hold the power button until screen lights up.
2. Press to open the system menu, scroll down and select "RX Bind", the transmitter will display "Binding to RX.....".
3. Supply power to the receiver. When the receiver is first powered on it will remain in bind mode for 5 seconds.

- After successfully binding the transmitter will display "Bind ok !". The transmitter will then automatically return to the previous menu.

4.3 Pre-use Check

Before operation, perform the following steps to check the system:

1. Check to make sure that all servos and motors are working as expected.
2. Check operating distance: one operator holds the transmitter, and another one moves the model away from the transmitter. Check the model and mark the distance from where the model starts to lose control.

⚠ **Danger**	•	**Stop operation if any abnormal activity is observed.**
⚠ **Danger**	•	**Make sure the model does not go out of range.**
⚠ **Attention**	•	**Sources of interference may affect signal quality.**

4.4 Power Off

Follow the steps below to turn off the system:

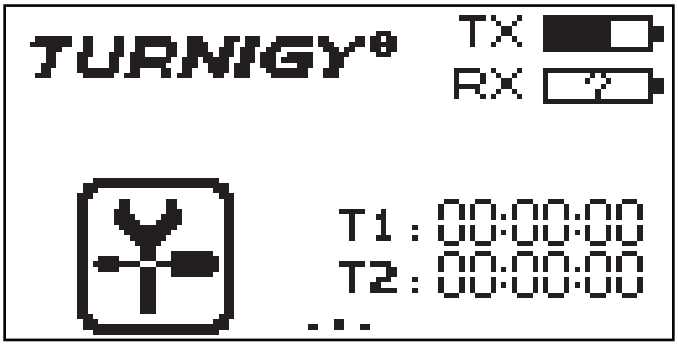
1. Disconnect the receiver power.
2. Hold the transmitter's power buttons to turn off the transmitter.

⚠ **Danger**	•	**Make sure to disconnect the receiver power before turning off the transmitter. Failure to do so may lead to damage or serious injury.**

5. Home Screen

The home screen diplays useful information about your model, including timers and TX/RX status.

Start Page



TX/RX Battery Status + Battery Setup Menu

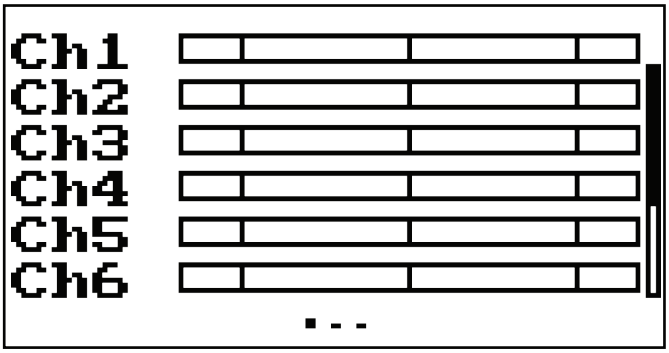
Main Menu

Timers + Timer Menu

Display Servos

Press and hold the screen to preform a servo test.

Note: Make sure that the the engines are turned off/disconected during this test. Failure to do so could lead to harm to yourself or others.



The system's navigation is designed to be easy and quick.

- To change home screen page, use your finger to swipe from left to right to view the the channels screen.
- To enter the main menu, press the icon. Then use your finger to swipe up or down on the screen to scroll.
- To enter a function, touch its name.
- To navigate function menu, swipe up or down to scroll and press an item on the list to enter it.
- To go back to a previous menu, press the icon.

5.1 Timers

To enter the timer function touch T1/T2 on the main screen. The system has 2 timers available, both can be assigned to a switch and have 3 different settings.

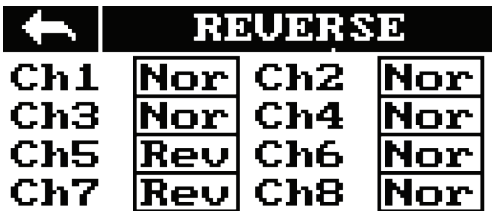
Setup:

1. Select a mode.
   Modes:
   - Up: The up timer starts from zero and counts up.
   - Down: The down timer starts from a pre selected time and counts down.
   - D/U(Down then up): The D/U timer starts from the set time, and counts down to 0, then counts back up.
2. If nessesary set up the pre defined time by selecting the "Setup" option. Select the correct decimal and use the onscreen arrow keys to change the value.

6. Function Settings

6.1 Reverse

The reverse function changes a channels direction of movement in relation to its input. For example, if the blades are spinning in the wrong direction, pushing the model into the ground instead of taking off, this function can be used to correct this.



Setup:

To change between normal and reverse touch the box to the right side of the desired channel.

Nor = Normal, Rev = Reverse.

Select the icon to save and return to the previous menu.

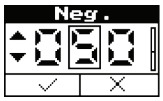
6.2 End Points

The end point function changes the range of movement available to a channel. This can be used to limit the tilt of the model, so that it is easier to control.

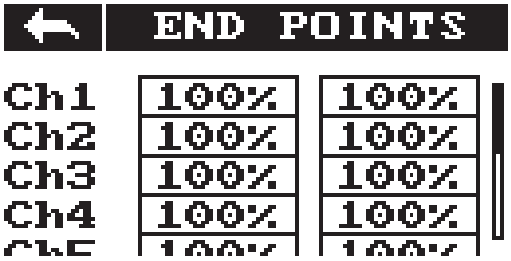
The left box is the low end point, the right box is the high end point, marked below as low being blue and red being high.

To change an end point:

1. Touch the low or high end point box.
2. Touch the desired decimal to change then use the onscreen up and down arrows to change the value.



3. Press the ✓ or ✗ to confirm or cancel changes.
4. Select the icon to save and return to the previous menu.

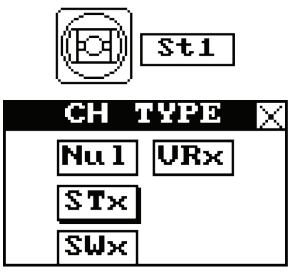


6.3 Aux. Channels

The auxiliary channels can be used to control additional part of a model such as landing gear or lights.

1. Select channels using the left or right arrow keys on the screen on either side of the channel name.

2. The left box below the channel name allows the user to pick the type of control for that channel, Nul, VRx, Stx and SWx.



3. Select the icon to save and return to the previous menu.

6.4 Subtrim

Subtrim changes the center point of the channel. For example, if a model is always drifting to one side, the sub trim can be used to fix this.

To set the subtrim function:

To change the subtrim:

1. Touch the box to the right of the desired channel.

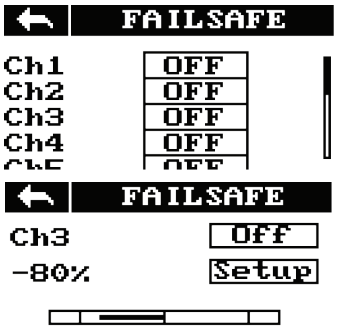
2. Select the correct decimal and use the up and down arrow keys.

3. Press the ✓ or ✗ to confirm or cancel changes.
4. Select the ↩ icon to save and return to the previous menu.

6.5 Failsafe

The failsafe function enables you to pre-set channel positions for the receiver in case of signal loss.

Setup:



1. To setup a failsafe position on a channel, select the channel from the list, to select the channel touch the box to the right of the channel name.

2. The box next to the channel name should display "On", to activate the failsafe touch the box. The box should now display "Off".

3. Move and hold the channel at the desired position, then while keeping the channel at the desired value touch the setup box.

Set all:

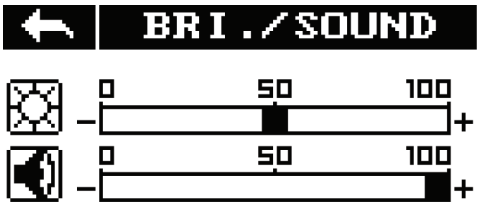
It is possible to set all the channels at the same time, to do so first turn all the channels on as stated above, hold all the channels in the desired position and select "Set all" at the bottom of the list. The system will prompt for a comfirmation, select "Y" for yes.

To Reset all channels, select the "Reset all" option.

Select the ↩ icon to save and return to the previous menu.

6.6 Bri./Sound

This function controlls screen brightness and volume for the system.



To make changes to brightness or volume touch and drag the black box located within the relavent slider. Then select the ↩ icon to save and return to the previous menu.

6.7 LED Setup

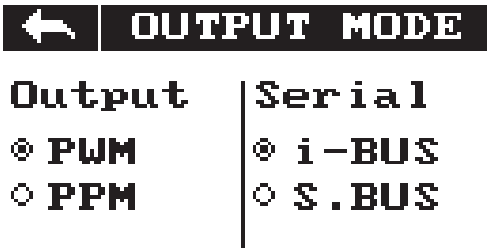
This function controls the LED's located inside the gimbal. When Idle color mode is off, the system will change colour depending on vertical stick position. When Idle color mode is active the system will maintain a single colour, touch the RGB sliders to change the color.

Then select the icon to save and return to the previous menu, select 'Y' when prompted.

6.8 Output Mode

The system has four output modes, PWM 、 PPM、i-BUS and S-BUS compatible.

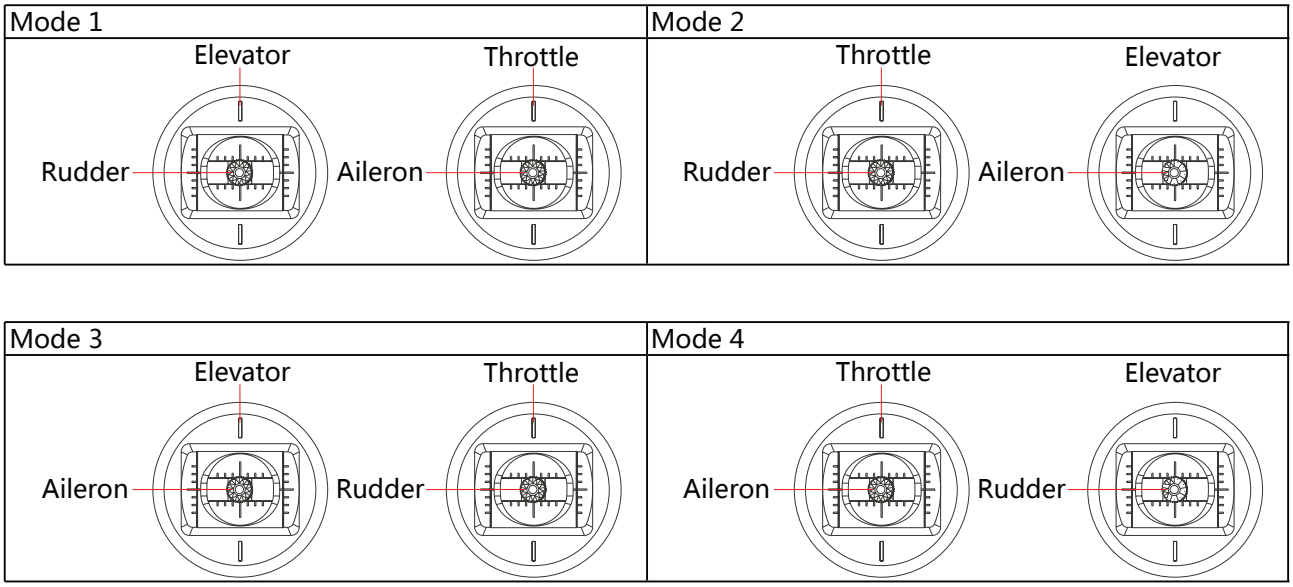
To change between the modes touch the desired mode, the currently selected mode will have a black dot within the circle beside it.



Select the icon to save and return to the previous menu.

6.9 Stick Mode

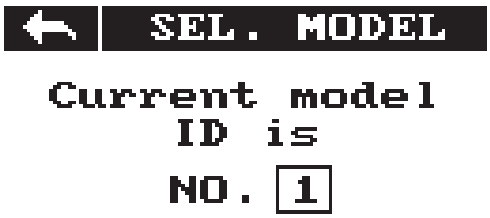
The system has 4 stick modes to change from, to change the mode touch M1, 2, 3 or 4 on the right hand side of the screen. The currently selected mode is highlighted in black.



6.10 Select Model

The system stores up to 5 different model presets which can be recalled, quickly and easily.
To select a model:

1. Touch the model number displayed in a black box.
2. The system will now display the ID menu, use the on-screen up and down arrow keys to navigate to the desired model.
3. Press the ✓ to confirm or ✕ to cancel.



6.11 Model Reset

To reset the current model select model reset from the settings menu and select “Y” for yes. To cancel press “N”.

6.12 Factory Reset

This function resets all settings back to default. To reset the system touch "Factory Reset" in the main menu then when prompted touch "Y" for yes.

Note: Once reset all user settings will be lost.

6.13 Firmware Update

To update the systems firmware:

1. Download the latest firmware from www.Hobbyking.com.
2. Open the firmware update on a computer and connect the system via usb cable.
3. Select "Firmware Update" from the systems function menu. The system will show a prompt, "This will enter firmware update mode and halt other functions" with an option to continue, select "Y". When in update mode the screen will turn off.
4. Once the system has been recognised by the computer select the update button at the bottom of the firmware update software.

Once the system has been updated it will restart. Once the system has restarted it is safe to remove the USB cable.

6.14 About Evolution

This menu shows the product name, firmware version, firmware release date.

7. Product Specification

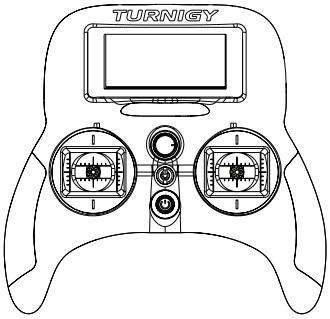
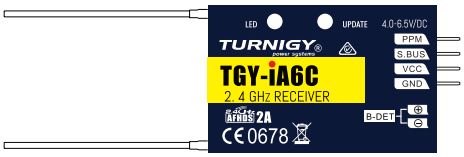
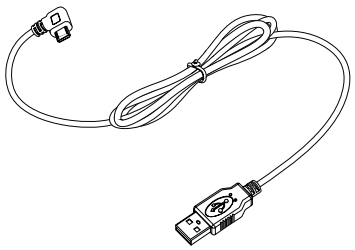
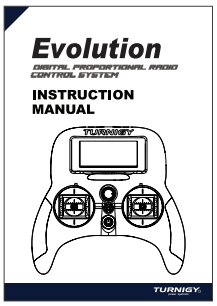
7.1 Transmitter Specification (Evolution)

Channels	8
Model type	Quadcopter
RF range	2.408 ~ 2.475 GHz
Bandwidth	500 KHz
RF channel	135
RF power	Less than 20 dBm
2.4GHz system	AFHDS 2A
Modulation type	GFSK
Stick resolution	4096
Low voltage alarm	Yes (lower than 3.7V)
USB Port	Yes
Power input	3.7V
Antenna length	26 mm*2
Size (Length x Width x Height)	179mm x 81mm x 161mm
Color	White/Black
Certificate	CE0678, FCC ID：N4ZMT600，RCM

7.2 Receiver Specification (TGY-iA6C)

Channels	8
Model type	Quadcopter/Fixed-wing/Helicopter
RF range	2.408 ~ 2.475 GHz
RF channel	135
RX sensitivity	-105dBm
2.4GHz system	AFHDS 2A
Modulation type	GFSK
Power input	4.0V - 6.5 V DC
Weight	7.9 g
Antenna length	26 mm*2
Size (Length x Width x Height)	37.5mm x 24.2mm x 9.0 mm
Color	Black
Certificate	CE0678, FCC ID：N4ZIA6C00，RCM
i-Bus port	Yes
Data acquisition port	Yes

8. Package Contents

Product	Quantity	
Evolution	1	
TGY-iA6C	1	
Micro USB Cable	1	
User Manual	1	

9. Appendix 1 FCC Statement

This equipment has been tested and found to comply with the limits for a Class B digital device pursuant to part 15 of theFCC 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 televison 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.

To assure continued compliance, any changes or modifications not expressly approved by the party responsible for compliance could void the user’ s authority to operate this equipment. (Example use only shielded interface cables when connecting to computer or peripheral devices).

This equipment 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!

The manufacturer is not responsible for any radio or TV interference caused by unauthorized modifications to this equipment. Such modifications could void the user authority to operate the equipment.

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CE 0678 FCC ID: N4ZMT600