VS2 GROUND CONTROL SYSTEM

INSTRUCTION MANUAL
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1. Introduction

Thank you for purchasing a VS2 GCS series digital proportional R/C system. This system is extremely versatile and may be used by beginners and pros alike. In order for you to make the best use of your system and to fly safely, please read this manual carefully. Due to unforeseen changes in production procedures, the information contained in this manual is subject to change without notice.

This RC Control system bridges the gap from conventional real aircraft and RC aircraft allowing for RC pilots to experience a realistic experience and real aircraft pilots a familiar control interface when transitioning to hobby models. The Ground control system is also perfect for robotics and other RC hobby uses.
2. Overall Layout of Ground Station

2.1 Exterior & Interface

1. GCS power switch
2. Ground control system power switch
3. CH5 / Twist switch
4. CH6 / Twist switch
5. CH3 / Throttle
6. CH8 / 3 Grades switch
7. CH7 / 3 Grades switch
8. Multi-rotor unlock key
9. Roll / Pitch mintrim switch
10. Yaw mintrim switch
11. System menu key
12. Training / Simulation / UHF port
13. USB extension port
14. firmware upgrade port
15. Battery compartments
16. Power display
17. 12V DC Electrical outlet
18. 2.4GHz transmission module
19. 360° non-direction
20. screen stand

2.2 Training, Simulation, UHF port

This ground station has two CPPM ports that can be used for trainer, head tracker inputs or simulator output or even a standalone LRS transmitter system.

Port definition listed as below:
2.3 Battery and Charger

1. The ground station has an audible low battery warning system.

2. This Product uses a standard 3s lipo battery for power.

3. To charge the battery, simply open the magnetic hatch, disconnect the balance port connector and charge the battery using appropriate conventional charging methods. Once complete reinstall the battery and connect the balance port connector.
4. This product has a 12V DC electrical outlet on the back. Can be used to supply power to the screen. If you insert an external power supply from here, please remove the internal battery.

2.4 Installation and transportation

Remove the ground station from the transport case and use the 4 quick release thumb screws to attach the console to the tripod or other mounting system.
2.5 Packing list

1. Ground control system VS2 control panel
2. Screen stand
3. Tripod, fast release & clip-on screws for tripod
4. Hexagon wrench, spare screw
5. Firmware upgrade USB cable
6. Aluminium case
3. Basic Operation

3.1 Insert New Joystick

When the system detected new USB joystick, it will ask whether to activate the new joystick. If the answer is yes, the system will clear current configuration and accept the newly inserted joystick as primary device.

3.2 Throttle Alarm

Throttle warning! pls put the throttle to the lowest

Close RF
During the initiation of the system, if the throttle is not at the lowest position, the system will alarm, and suspend until the user adjust the throttle to the lowest position. If the user clicked “Close RF”, the RF system will be shut down to protect the user when the system is initiated.

3.3 Default setting of Joystick

1. CH6 / Twist switch
2. CH5 / Twist switch
3. Throttle
4. Aileron
5. Rudder
6. Elevator
7. CH8 / 3 Grades switch
8. Roll / Pitch mintrim switch
9. Multi-rotor unlock key
10. Yaw mintrim switch
11. CH7 / 3 Grades switch
12. System menu key

4. Instruction of Menu Operation

4.1 WINDBOX Buttons for Menu Operation

Press "Menu Right Button" to enter main menu when under the system home screen.
4.2 System Home Screen

A. A timer is on the left of the information bar
B. Inserted USB joystick status is in the middle of the information bar
C. The battery voltage is on the right of the information bar
D. 4-channels data is in the middle of the screen
4.3 Sub-menu Operations

For entering sub-menu, press “Menu Right Button” when under main menu.

Sub-menu Operation

A. Back: press “Menu Left Button” to return to upper level menu. Press “Menu Up” and “Menu Down” buttons to select sub-menu.

B. Menu without options: press “Menu Left Button” to return to upper level menu. Press “Menu Right Button” to enter sub-menu.

C. Menu with options: press “Menu Left” and “Menu Right” button to set the parameters.
D. The up arrow at the upright corner of the menu screen indicates previous page available.

E. The down arrow at the downright corner of the menu screen indicates next page available.

5. Functions

5.1 Servo Monitor

This function can be used to monitor the values of all channels. The first page shows the values of the first eight channels; press “Menu Down Button” to move to next page for the values of other eight channels. Press “Menu Left Button” to return to upper level menu.
5.2 Trim Setting

- Option one: select targeted channel
- Option two: the value of trim
- Option three: Reset trim. sub-trim is reset to the initial value.

5.3 D/R Setting

This function can be used to adjust the output range of the channel.

- Option one: disable or enable all channels dual rate functions.
- Option two: choose targeted channel.
• Option three: change the rate value of the targeted channel. The default value is 100%; adjustable range from 50% to 150%.

5.4 CH Reverse Setting

This function reverses the operation direction of the sticks, switches, trimmer levers, and knobs

• Option one: choose targeted channel
• Option two: "NORM": Normal operation direction "Reverse": Operation direction is reversed.
5.5 Linear Curve Setting

This function can be used to adjust the linear curve of specific channels.

- Option one: enable or disable the curve functions of all channels
- Option two: choose the targeted channel
- Option three: select the point for forming the curve (A total of 5 points)
- Option four: the value of selected point in x-coordinate
- Option five: the value of selected point in y-coordinate

The revised curve can be previewed.

Note:

1. The x-value of the 1\textsuperscript{st} and 5\textsuperscript{th} point cannot be modified
2. The x-value of current point should be larger than the x-value of previous point, and smaller than the x-value of next point.

5.6 Mixing Setting

- Option one: enable or disable the mixing functions
- Option two: set the main mixing channel
- Option three: set the secondary mixing channel
- Option four: set mixing rate
- Option five: set mixing mode: Delta wing, car controller, and wing flap

For example: For Delta wing, choose: mixing channels: 1 and 2; ratio: 50%; mixing mode: Delta wing.
For mixing of a car controller or a USB steering wheel, throttle and brake pedal should be mixed to a main channel.

5.7 Receiver Link Procedure

Please refer to the external transmitter and receiver instructions you purchased.

5.8 Fail Safe Setting

Please refer to the external transmitter and receiver instructions you purchased.

5.9 Button Monitor

On the button monitor screen, when press any button, corresponding number on the screen will flash. Thus the number related to that
button can be confirmed. Such number will be used in button mapping which we will explain in next chapter.

5.10 Button Mapping

WINDBOX can map any button of the joystick to a specific action. For instance, a 3-segment switch, shortcut for unlock multi-rotorscraft, trim button, and so on.

- Option 1: select targeted button
- Option 2: select targeted channel (if the following action is selected for all channels, ignore this)
- Option 3: select action

Optional actions for option 3:
• Close: do not map the current button
• High: Set channel as a three-stage switch and set it to high
• Middle: Set channel as a three-stage switch and set it to middle
• Low: Set channel as a three-stage switch and set it to Low
• Three-stage Switch: Set channel as a three-stage switch, switch the three stage by order.
• Two-stage Switch: Set channel as a two-stage switch, switch the two stage by order.
• The channel value+: Press the button, the channel value is increased.
• The channel value-: Press the button, the channel value is decreased.
• Trim+: Press the button, the Trim value is increased.
• Trim-: Press the button, the Trim value is decreased.
• switch D/R: Open or close the Proportion(D/R) function
• switch Curve: Open or close the linear curve function
• Map buttons to the menu control: down, up, left, right.
• Clear timer
• Trainer switch on: enable the trainer function
• Trainer switch off: disable the trainer function
• Switch the trainer ON/OFF
• Throt Cut ON: Enable thro cut function
• Thro Cut OFF: Disable thro cut function
• Switch the Thro Cut ON/OFF
- Unlock Shortcut: trigger unlock action of multi-rotorcraft
- APM 1-6: trigger segment of six-segment APM switch

**Note:** If the channel was already mapped to joystick linear axis, it’s a must to cancel mapping first, otherwise, there will be conflict. The way of canceling mapping is referred to the chapter “Cancel Mapping to Joystick linear axis”.

Example 1: If we want to map the button of Saitek X52 Pro Joystick to the 3-segment switch of CH8,

1. Open “Button Monitor” menu, press the first button, then we will observe button number 30 flash on the screen;
2. Back to “Button Mapping” menu, select button 30 for option 1;
3. Select CH8 for option 2;
4. Select “High” for option 3. Then the button mapping for first button is finished.
5. Refer to step 1 to find the button number for the second button of the joystick, i.e., 29. Select CH8 for option 2; select “Middle” for option 3;
6. Refer to step 1 to find the button number for the third button of the joystick, i.e., 28. Select CH8 for option 2; select “Low” for option 3. Then the three buttons are mapped to the 3-segment switch in CH8.

Example 2: the way to map the POV hat button of the joystick to the menu button of the WINDBOX is as follows (based on Saitek X52)
1. Firstly open “Button Monitor”, find the number of the PoV hat;
2. Press the up, down, left and right button of PoV hat of the joystick, then number 42, 43, 40 and 41 flash on the screen respectively;
3. Return to “Button Mapping” menu. Option 1 Select button No. 40. Ignore options 2;
4. Select “Menu Left Button” for option 3. Then the left button of PoV hat is mapped to “Menu Left Button”;
5. Refer to above steps to map the rest buttons of PoV hat to “Menu Right Button”, “Menu Up Button” “Menu Down Button”.

Note: For common joystick such as X52, X52pro and X55, there are default mapping button and channels when inserted into the system. User can revise based on default settings.
5.11 Cancel Button Mapping

Sometimes, we need to release one channel for linear axis of the joystick. Then, we have to check whether the channel is mapped to certain button.

For example: for canceling the mapping between the button of Saitek X52 and CH8,

1. Open “Button Mapping” menu. Select button 30 for option 1, and CH8 for option 2;
2. Select “Close” for option 3;
3. Refer to step 1, set the action of Button 28 and 29 as “Close”;
4. Then the mapping between buttons and CH8 is canceled. For mapping this channel to joystick linear axis again, please operate according to chapter “Joystick Linear axis Mapping Setting”.

5.12 Shortcut Setting for Unlocking Action of multi-rotorcraft

This function can be used to record the specific unlocking action of the fly controller, and assign a specific button to trigger such action, thus to simplify the unlocking process for multi-rotorcraft for users.
• Option 1: record the specific actions of unlocking;

• Option 2: set hold time of unlocking action.

The way to record specific unlocking action:

1. Select option 1 and then press right button to record the unlocking action;

2. Keep the joystick at unlocking position specified by fly controller, and keep such position;

3. Select option 1 and then press left button to stop recording.

Note: Please keep the unlocking position until the end of the recording.

The way to set unlocking button shortcut:

1. Open “Button Monitor” menu, press the button of joystick which is selected as the unlocking shortcut, then confirm the number of that button (assumed as 2);

2. Open “Button Mapping” menu;

4. Select “Unlock” for option 3. Then the setting for unlocking shortcut is completed. Press button 2 can directly unlock the multi-rotorcraft.

Attentions: pressing unlocking shortcut is equal to conduct unlocking action, the motor will run with idling speed. Please be careful. It’s better to select a button with cover as shortcut, for example, the fire button of X52.

### 5.13 Set Six-segment Switch of APM/PIX Fly Controller

For six segment switch of APM/PIX4 fly controller, the six segment can be mapped to six buttons, thus to switch at any time. This menu can be used to revise the value of a specific gear.

- Option 1: 1st- 6st gear, press Left and Right button to select.
- Option 2: Value of APM gear. Press Left and Right button to select.
The way to map buttons to each segment of a six-segment switch:

1. Open “Button Monitor”, press specific button of the joystick, and confirmed the number of that button (assumed as button 2);

2. Open “Button Mapping” menu;

3. Select “Button 2” for option 1, and select the planned mapping channel for option 2;

4. Select “APM1” for option 3;

5. Refer to above steps to set other five segments of the switch.

5.14 Mapping Linear axis of the Joystick to the Channel

WINDBOX can map all linear axis of the joystick to specific channel.
- Option 1: joystick display menu. Click it to enter sub-menu to view the axis names of the joystick;
- Option 2: select the name of targeted axis of the USB joystick;
- Option 3: select the channel number to be mapped to the targeted axis.

For example: for mapping the left and right direction axis of joystick to channel 1,

1. Click option 1 to enter joystick display sub-menu. Pull the joystick leftwards and rightwards, then we can find the indicating rod for RX axis is also moving leftward and rightwards. Then the name of the axis of the joystick is RX.
2. Select “RX” for option 2;
3. Select “CH1” for option 3;
4. Then the RX axis of the joystick is successfully mapped to CH1.

5.15 Cancel the Mapping of the axis of Joystick

The system already mapped all the linear axis of the joystick to channels. But sometimes, we want to use button to control these channels, for example, mapping a three-segment switch with a channel. Then, we have to cancel previous mapping for axis.
The way to cancel the mapping for axis of the joystick is as follows:

(assumption: cancel the mapping between RX axis and CH6)

- Select “RX” for option 2
- Select “CH13” for option 3 (i.e., the maximum channel number +1).

### 5.16 Trainer Setting

The Trainer function makes it possible for the instructor to choose which channels are to be used for instruction, making it possible to match the training ability to the student’s skill level. Two transmitters (eg: another WINDBOX, or Futab, JR, Frysky, WFLY transmitters) must be connected by an optional trainer cord, and the instructor’s transmitter should be programmed for trainer operation, as described below.

You can also use the button mapping function, for assigning a button of the joystick as a switch to determine the control right.
● Option 1: Trainer switch ON/OFF. A button of the joystick can also be mapped to a switch to enable and disable such function.

● Option 2: select the targeted channel for the Trainer.

● Option 3: select source channel.

● Option 4: select the data source: Joystick, PPM IN.

For example, for using a WINDBOX as Trainer, the setting is as following:

1. Set the output of trainee’s remote controller to PPM signal, then use trainer cable to connect trainee’s Transmitter with the WINDBOX;

2. Select “ON” for option 1;

3. Select “PPM IN” for option 4;
4. Turn on Trainer function, shake the joystick of the trainee. In the channel display menu, you can trace the action of the trainee.

For example, how to mapping the channel of the trainee controller to the specific channel of coach controller?

In default situation, the CH1 of the trainee controller will be mapped to the CH1 of the coach Transmitter, and the CH2 of the trainee Transmitter will be mapped to the CH2 of the coach Transmitter, and the other channels follow the same rule. If we want to change the corresponding relationships, for example, set the CH1 of coach Transmitter to correspond to the CH3 of the trainee Transmitter, we can select “CH1” for option 2, and select “PPM CH3” for option 3.

For example, if WINDBOX to be set as trainee controller, the training function should be disabled. While the output mode should be changed to PPM signal output.

1. In “Trainer Setting” menu, select “OFF” for option 1;

2. Open “Output Mode” menu;

Set the value of option 1 from “Built-in 2.4G” to “futaba PPM”, then connect WINDBOX with coach Transmitter via trainer cable.
5.17 Connect with 433/915M Range Extender

WINDBOX can work with 433/915M range extender to increase remote control distance. The WINDBOX will output PPM signals to a 433M transmitter module, and there will be a 433Mbps receiver on the aircraft.

Setting with cable:
1. Connecting: One side of the simulator cable should be connected to the PPM input port of the 433M range extender;
2. The other side of the simulator cable should be connected to the PPM output port of WINDBOX;
3. Open “Output Mode” menu of the WINDBOX;
4. Select “futaba PPM” for option 2.

5.18 Connect WINDBOX with PC Flight Simulator

1. Install simulator in the PC;
2. Wiring. Insert the audio plug into the softdog of the simulator;
3. The other side of the simulator cable should connect with the PPM output port of WINDBOX;
4. Open the “Output Mode” menu of the WINDBOX;
5. Select “futaba PPM” for option 2.

If the simulator cable was made by users themselves, connect the two wires of the audio plug with the PPM connector of WINDBOX.

The signal wire in the middle of the audio plug of the simulator cable $\longleftrightarrow$ PPM pin of the PPM connector of WINDBOX

The grounding wire at the edge of the audio plug of the simulator cable $\longleftrightarrow$ GND pin of the PPM connector of WINDBOX

5.19 Low Battery Alarm Setting

- Option 1: select alarm voltage. If the voltage is lower than this value, the buzzer will alarm. If 2S lithium battery is used, please set this value to 7v. If 3S lithium battery is used, please set the value to 10.8v;

- Option 2: select the type of battery;
- Option 3: enable or disable low battery alarm function.

### 5.20 Configuration Setting

![Configuration Setting Diagram]

WINDBOX can save five configuration for model aircraft at most.

- Option 1: to switch the configurations. (if apply the new configuration, please save the configuration, re power on the windbox)

- Option 2: save current configuration.

- Option 3: reset current configuration, all the configurations will be cleared. Inserted joystick will be regarded as new device.

- Option 4: display the system version.
In general, if a configuration is revised, the system will automatically save the configuration when the throttle is at the lowest position. Sometimes, there is a “beep” tone when the throttle is at the lowest position, that means the system saved the revised configuration automatically.

5.21 Throttle Setting

When the Throttle Off function is enabled, the throttle output will always at the lowest, no matter what’s the position of the throttle axis of the joystick. This function could protect users when using a gasoline-powered engine. You can also map a button to enable or disable this function.

- Option 1: Enable or Disable this Function.
- Option 2 and Option 3 are for specifying the type of channel: non-throttle or throttle. According to usual practice, CH3 is throttle channel, and other channels are all non-throttle channels.