| TMF Pro Flight Controller | INTRODUCTION & USING MANUAL |

| ENG & 中文 | Ver. 1.0 |

TMF
TOP MICRO FLIGHT

A Note on Safety 安全注意事項

If you've never flown a radio-control helicopter before in your life, you should practice on a RC-simulator first. Even if the copter is auto-stable, there are always situations that require quick and efficient responses.

　如果你從未飛過任何遙控直升機，你應該先從模擬飛行器開始玩起! 即使直昇機有自動穩定功能，但仍然有一些特定狀況需要快速反應的經驗。

!! This is not a toy, but you can have a lot of fun. !!

!! 這不是玩具，但是他可以給你帶來許多樂趣。 !!

Introduction 簡介

A multi-rotor copter is a remote controlled vehicle that utilizes several motors to provide lift and control flight. The flight controller board has gyroscopes (measuring angular velocity) and accelerometers (measuring accelerations, or gravity), these sensors can help the pilot to stabilize inherently an unstable vehicle such as a multi-rotor copter. The pilot can control the multi-rotor copter with a remote control. The Roll, Pitch, Throttle and Yaw can be controlled with two sticks on the remote control – which requires a four-channel transmitter and receiver radio system.

多旋翼機是一個遙控操縱的載具且利用多顆馬達提供其升力與控制飛行。飛行控制板上有陀螺儀(感測轉動速度)和加速度計(感測加速度或重力)，這些感測器可以幫助飛行員穩定一些先天不穩定的系統，如多旋翼機。飛行員可以利用遙控器來控制多旋翼機，滾轉、俯仰、油門和航向可以透過在遙控器上的兩隻搖桿來操控，因此至少需要四通道的遙控器與接收機。

Installation and Building 安裝與建置

● Vibration 震動

The TMF Pro flight controller utilizes extremely sensitive gyroscopes and accelerometers to measure the motion of the multi-rotor copter. In order to make the flight performance better, some anti-vibration mounts is needed

   TMF Pro 飛行控制板使用極為敏感的陀螺儀與加速度計來量測多旋翼機的運動。為了讓飛行性能更好，因此使用一些避震裝置是必要的。

● Transmitter 遙控器

A four-channel transmitter is used to control the vehicle's motion. It is needed to control the roll, pitch, throttle and yaw.TMF Pro support 2 axis gyro-stabilized camera mount servo output, you can trim this two servos via 5 and 6 channel.

   遙控器可用來操控多旋翼機的動作,有四個主要操作位於遙控器上的搖桿用以控制滾轉，俯仰，油門和航向，因此四通道的遙控器是必要的。TMF Pro 支援 2 軸陀螺穩定雲台伺服機輸出，您可透過第五第六動來微調伺服機。

Transmitter Parameter settings 遙控器參數設定

	Ch1 Aileron 副翼	Ch2 Elevator 升降舵	Ch3 Throttle 油門	Ch4 Rudder 方向舵
JR/Spektrum	Normal	Normal	Normal	Normal
Futaba	Reverse	Reverse	Reverse	Reverse
Trims Sub Trims	Centered 中立點			

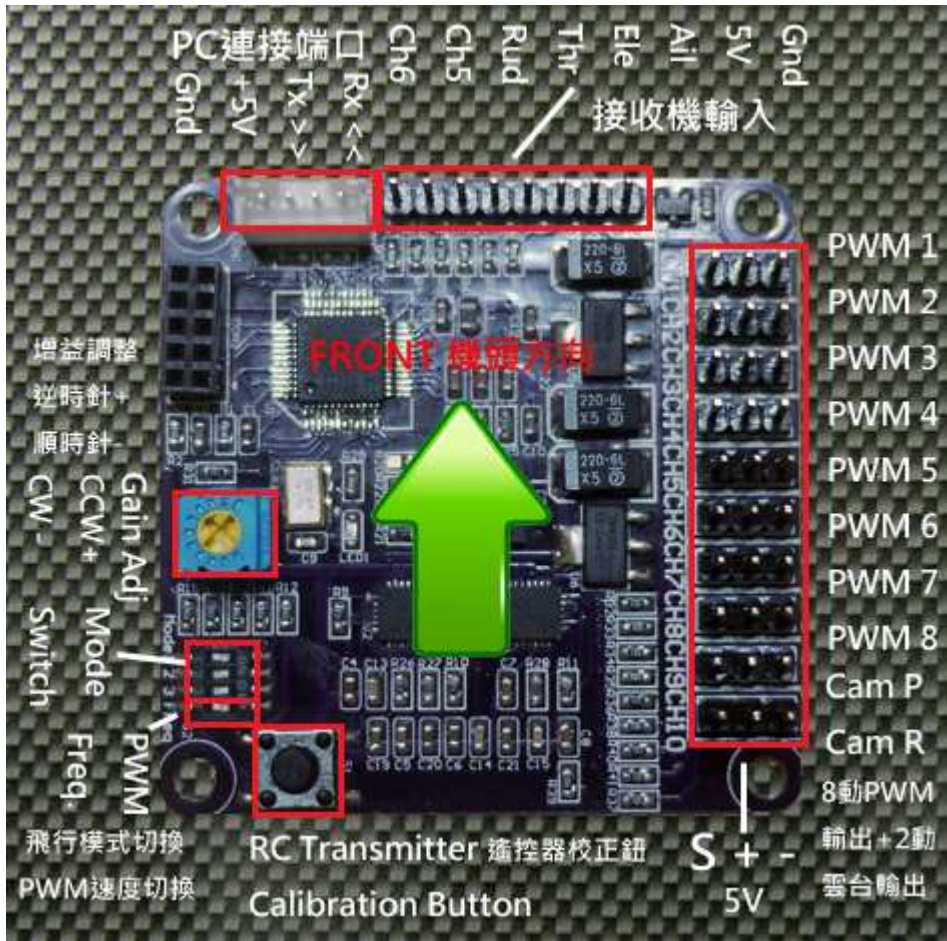## ● **Electronic Speed Controllers(ESCs) 電子變速器**

There are many different commercial ESCs can be use with multi-rotor copter. As a result, it is impossible to provide a specific description of the set-up and calibration procedure, but the basic **throttle calibration is necessary**.

　有許多不同種類的商用電子變速器可以用於多旋翼機。基於這個理由，不太可能提供一個具體的設定與校正步驟，但是最基本的**油門校正是必須的**。
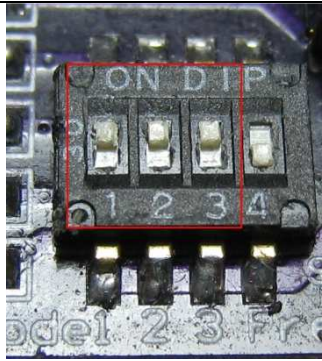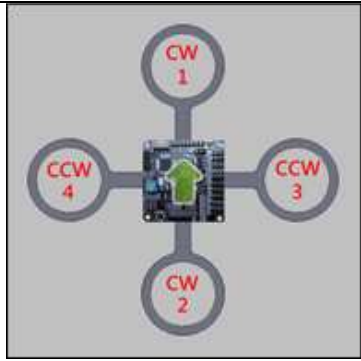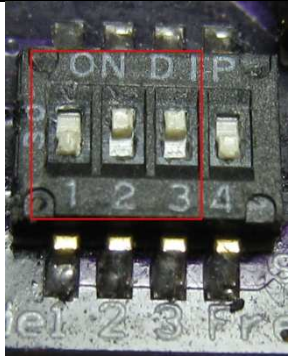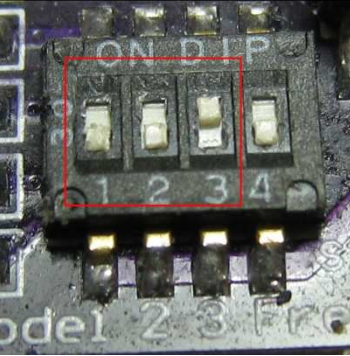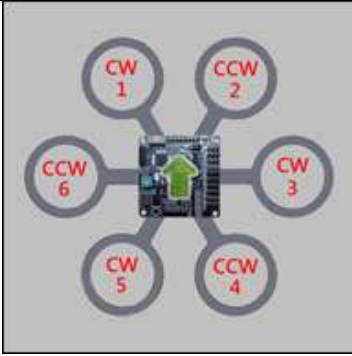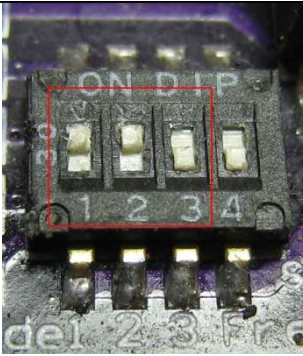
● **System Layout 系統布線**
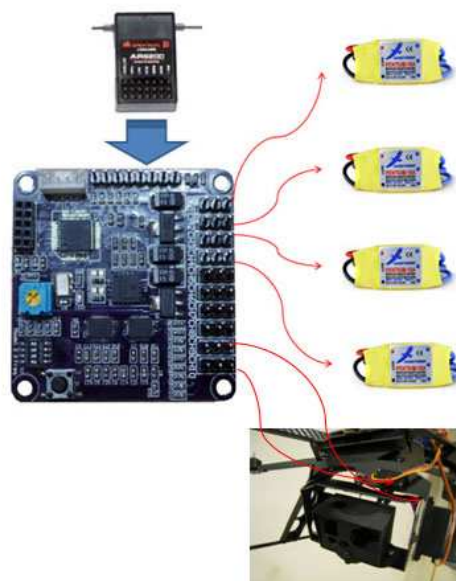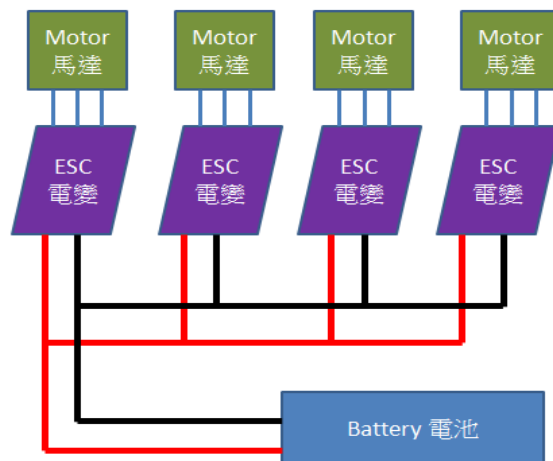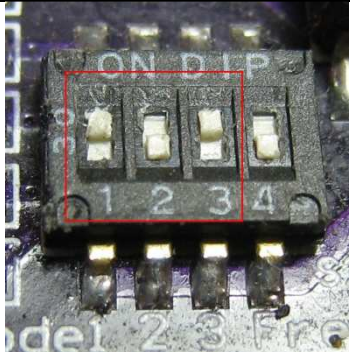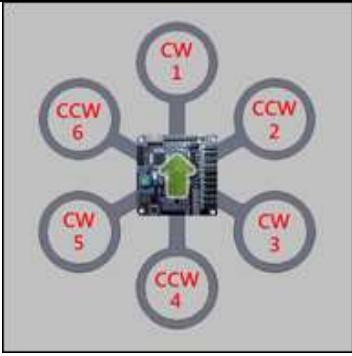
- **Flight controller board 飛行控制板**
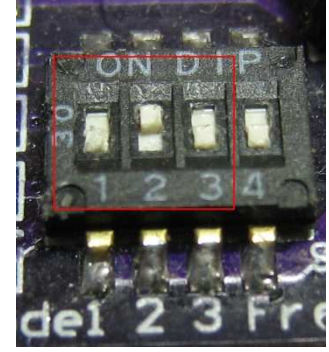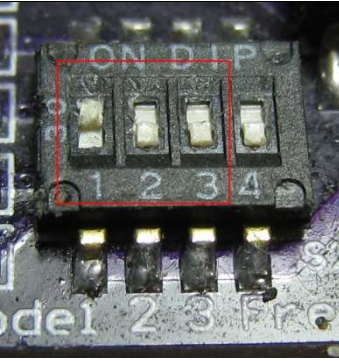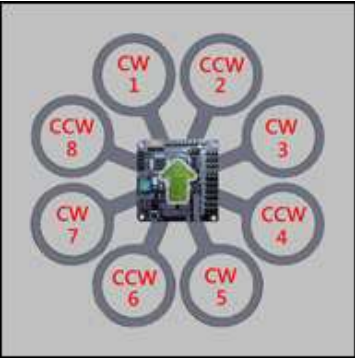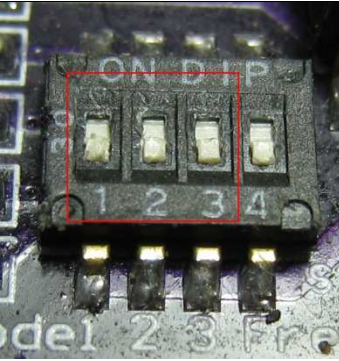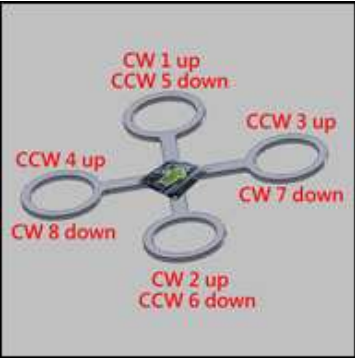
- **Flight Mode Switch 飛行模式切換開關**
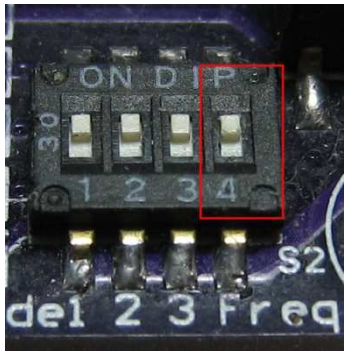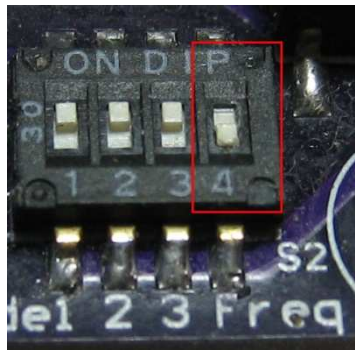
  (CW 順時針 CCW 逆時針)

Flight Mode	Switch	Layout
Quad +4 四旋翼 +4		

Quad X4 四旋翼 X4		
Hexa +6 六旋翼 +6		
Hexa X6 六旋翼 X6		
Quad Y4 四旋翼 Y 型四		

Hexa Y6 六旋翼 Y 型六		
Octo FH8 八旋翼 平面式		
Octo CX8 八旋翼 共軸式		

● **PWM Frequency Switch PWM 頻率切換開關**

PWM Frequency	300Hz	400Hz
switch		

● **Receiver 接收機**
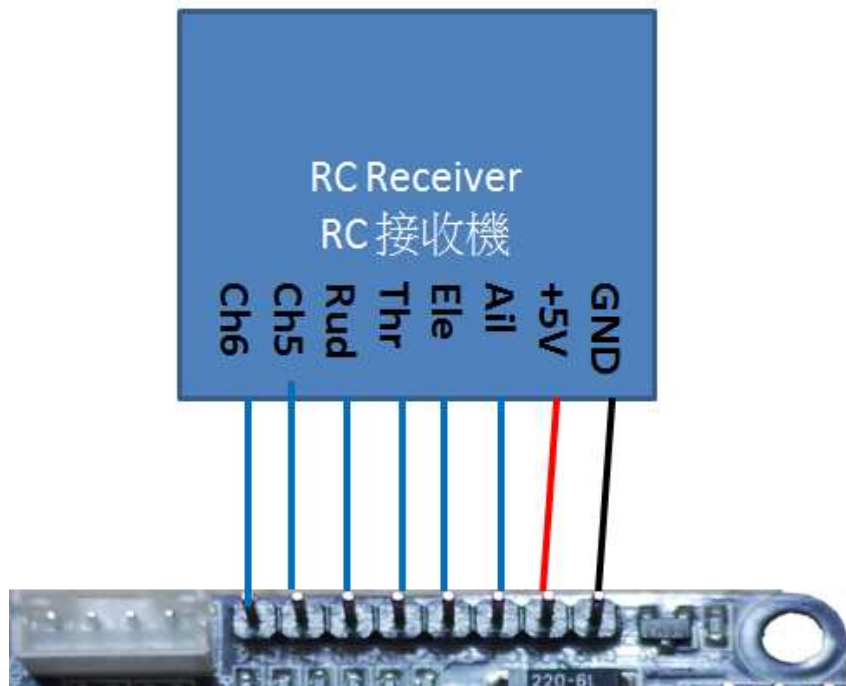
Operation 操作

● **Quick Start Guide and Flight Preparation 快速開始飛行步驟**

Power-on the device. You will know the device is on when you see the blue LED light.

上電，然後藍色 LED 燈會亮起。

Calibrate your transmitter if you are using the flight controller board for the first time. To do this, you need to maintain the stick in the center. Then, you move the throttle down; and press and hold the calibration button until the LED light blinks. You will have to do this step again if you change your receiver.

如果你是第一次使用，你必須校正你的遙控器。保持你的搖桿於中立點，油門移到最下，按住並保持校正鈕，等待 LED 燈再次變亮。(如有更換接收機，你必須再次執行此步驟)

Calibrate the flight controller board sensor. Place the vehicle on the ground. Then move the throttle up and the rudder to the left. Wait until the LED blinks. Then, bring it back to original position.

校正飛行控制板感測器。把你的載具置於水平地面，油門移到最上且方向舵移到最左，等待 LED 燈再次亮起，然後搖桿回到原來位置。

Adjusting the gain, clockwise decreas gain value, counterclockwise increas gain value.(Motor Stop Mode require to for gain adjustment) Stop Mode allow to change gain value, Gian value locked in place while in motor idel mode.)

調整增益值，順時針轉增益值變小，逆時針轉增益值變大。(只有在馬達停轉模式時才能改變增益值，在馬達怠速模式下將會鎖定增益值)

Start your motor and leave it in an idle mode. Move the throttle down. Then, move the rudder to the right and enjoy the flight.

啟動你的馬達進入怠速模式。油門移到最下且方向舵移到最右，然後你將可以開始享受飛行。

Stop your motor; move the throttle down and the rudder to the left.

停轉你的馬達。油門移向最下且方向舵移到最左。

● **Computer Program Setup 電腦軟體設定**

Hardware connect 硬體連接
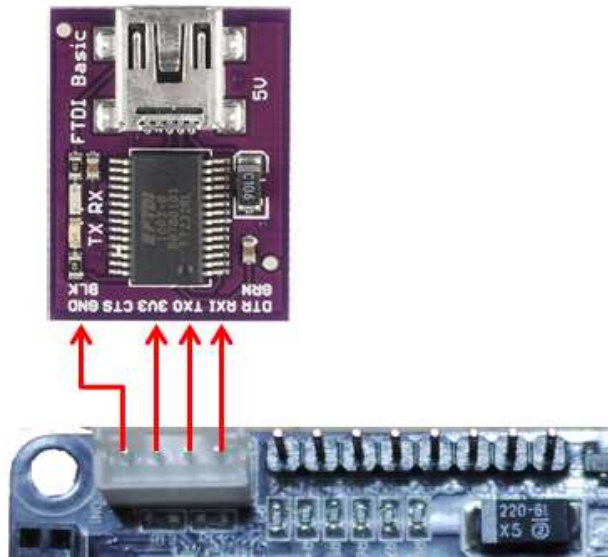
Open program (make sure TMF Pro power on) and click "connect" button, if connection succeed, data will be shown in other box.

　開啟程式(確保 TMF Pro 有上電)並單擊 connect 按鈕,如果連線成功資料將會顯示於其他框框。

This below group will show 3-axis attitude, 3-axis gyro rate, flight gain, flight mode, and PWM ESC frequency data.

　下方這個區塊將顯示 3 軸姿態、3 軸陀螺角速度、飛行增益值、飛行模式與 PWM 電變輸出速度。

Data From Flight Controller Board

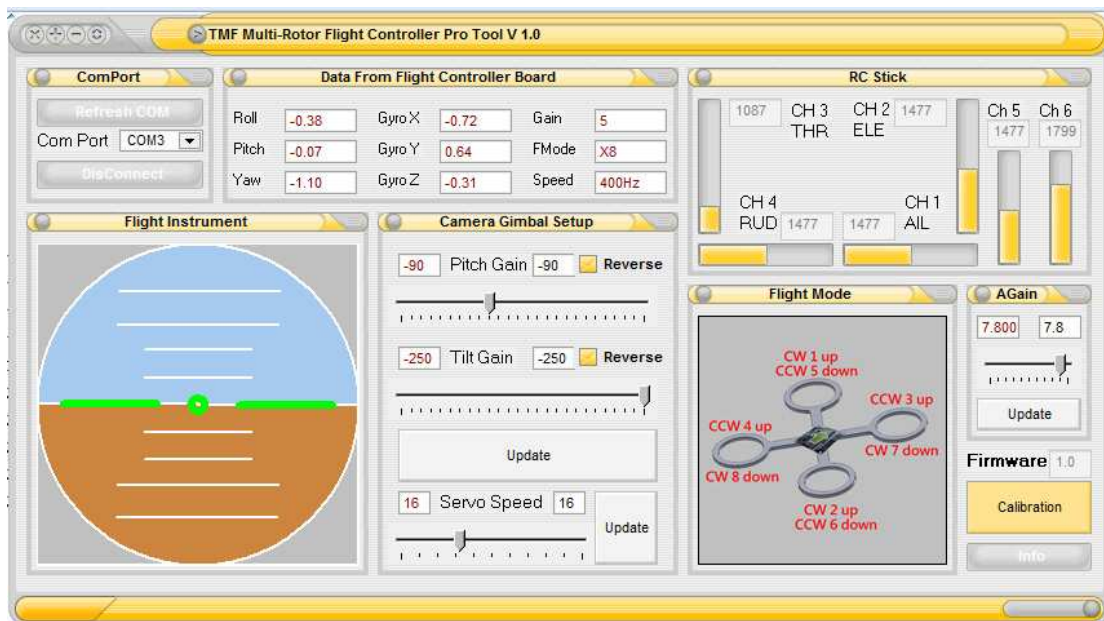| Roll | -0.38 | Gyro X | -0.72 | Gain | 5 |
| Pitch | -0.07 | Gyro Y | 0.64 | FMode | X8 |
| Yaw | -1.10 | Gyro Z | -0.31 | Speed | 400Hz |

This below group will show 2-axis camera gimbal setup state. Scrollbar can be set the rotate gain(right black number means your gain value, left red number means controller eeprom gain value), when move stop on your gain value, click the "Update" button.

The camera servo setup is the same with gain value setup.

下方這個區塊將顯示 2 軸穩定雲台設定狀態，拉桿可以移動設定轉動增益(右邊黑色數字代表你要設定的值，左邊紅色數字代表目前飛控內部的設定值)，當移動到你要的設定值時點擊下方"Update"按鈕即可更新。

下方的伺服機轉動速度設定同上
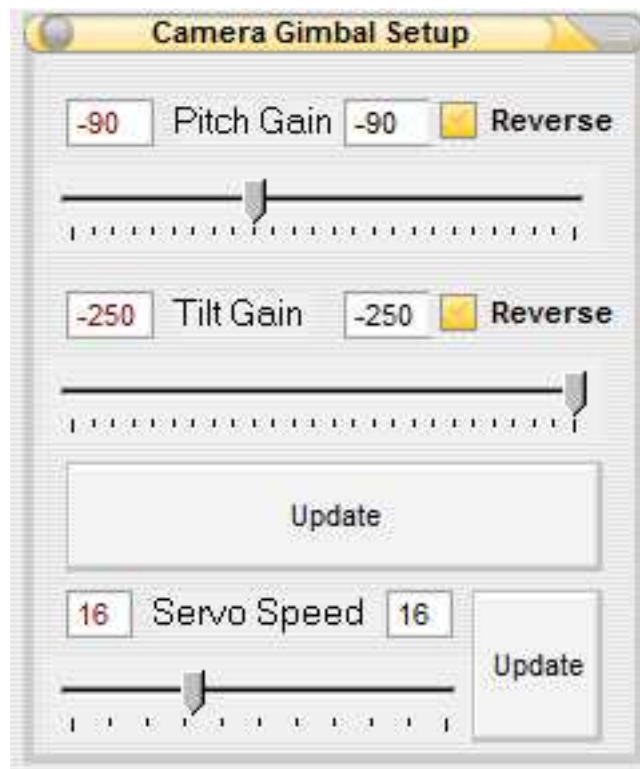
This below group will show six RC transmitter stick state, the yellow bar move direction must the same with your RC transmitter stick, box value means PWM time (unit us).

下方這個區塊將顯示 RC 遙控器 6 通道狀態，黃色條柱移動時必須與您手上的搖控器移動方向相同，格子內數字代表各通道 PWM 值(單位 us)。

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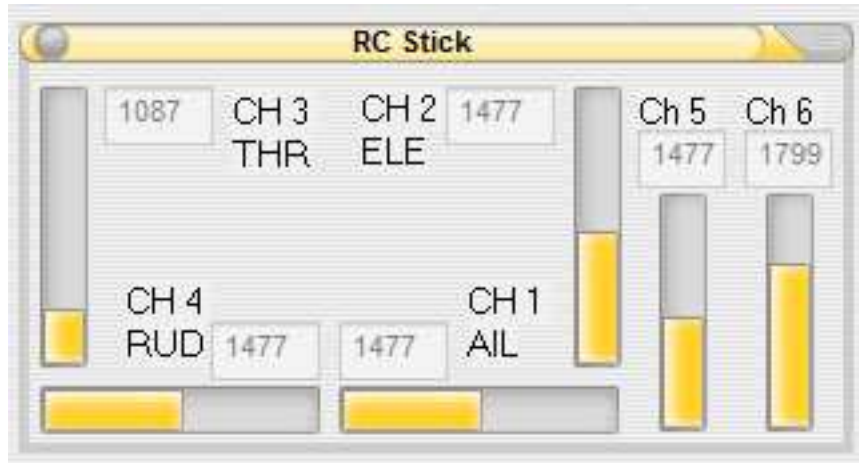
This below group will show the auxiliary gain, if move the RC stick, copter attitude overshoot(usually in big frame over 50cm motor to motor), it means RC stick and attitude coupling control gain is too big, you can reduce this gain value(6.4~8.0).

下方區塊將顯示輔助增益，如果移動搖桿，載具姿態有衝過頭現象(通常發生在大型大於 50cm 之機架)，這表示搖桿與姿態的耦合增益太大，可減小此值來解決此現象。

This below group will show firmware number, "Calibration" button can calibration auto-level sensor, "Info" button will show the TMP Pro board each port description.

下方區塊將顯示韌體版本，"Calibration"按鈕可以校正水平姿態保持感測器，"Info"按鈕將顯示 TMF Pro 板之各接點說明。

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● **Firmware Update 韌體更新**

Open program and select correct Com port, scan button can refresh computer com

port (must be close windows UAC setting)

開啟程式並選擇 Com 連接埠，scan 鍵可以更新電腦的 com 連接埠(必須把

windows 的使用者帳戶控制 UAC 設定成不要通知)

Click "Open Firmware File" button, and select firmware (*.tmf)

點擊" Open Firmware File" 按鈕並選擇韌體更新檔(*.tmf)

Put down flight controller calibration button and hold, re-power flight controller
(LED will flash), then release button. Wait for firmware automatic updates (LED will
flash).

按下飛控上的校正按鈕並按住不放，飛控重新上電然後放開按鈕 (LED 燈會閃)。

等待韌體自動上傳 (LED 燈會閃)。

Finish updates.

完成上傳

Appendix 附錄