



# Hornet-OSD Manual

## Dear customers:

Hello! Thank you for purchasing the OSD of Guilin Feiyu Electronic Technology Co., Ltd. In order to achieve full potential and safe operation of this product, please carefully read this manual prior to installation.

## Preface

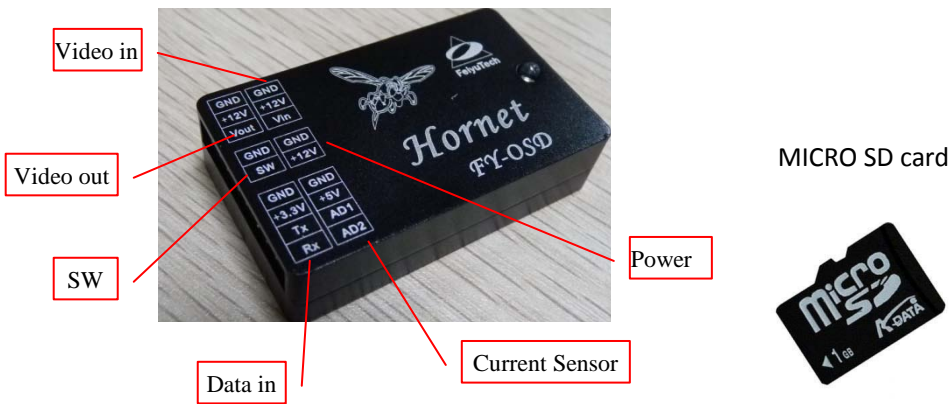
The Hornet-OSD overlays flight telemetry information onto your video image. The telemetry information displayed includes flight altitude, flight speed, flight direction, and home direction and so on. You also can save the telemetry information to a MICRO SD card (you should buy the card by yourself, for we don't offer it, picture is shown as below), then realizing trace playback via FYGCS. The Hornet-OSD can be connected to the FY-21AP, FY-31AP and FY-3ZT systems to display autopilot telemetric data, or to a GPS receiver to display positioning data.

Hornet-OSD automatically adapts to either PAL or NTSC video input and confirms if there is a MICRO SD card or not. The adaptive processes are within about 20 seconds.

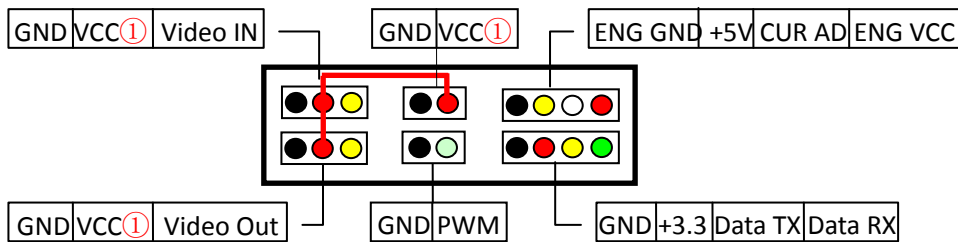
## Working status explanation:

After connecting the power supply, the indicator LED light will be activated. The Hornet- OSD will automatically detect the incoming video (NTSC or PAL).The "NTSC" or "PAL" will overlaid on the screen when the video signal is detected. If Data is received from the autopilot (FY-21AP, FY31AP, FY-3ZT or GPS module) the LED indicator of Hornet- OSD will begin to flash. If not, the Hornet-OSD will automatically restart after waiting for 20 seconds.

Once the input video is detected even if there is interruption to the video signal, the telemetry data of the Hornet- OSD will continue to be transmitted via the video stream.



## Interface Schematic Diagram:



- ① 1. DANGER: The three "VCC" ports (positive) for Video In, Video Out and Power In are all inter-connected. Therefore you are allowed to connect ONE input voltage only. DO NOT input more than one power supply or damage to the OSD will occur.
2. It is recommended to power the OSD independently to ensure a clean video display.
3. Note that power to the OSD is not supplied by the Autopilot module. Power is via the 12 volt input.

## List of Interfaces

PORT	Connection Description
Video in	Camera or video input port
Video out	OSD Overlaid video output, connect to video transmitter or video screen
SW	RC receiver switch input to control OSD display
Power	OSD video overlay board and camera and video transmitter power supply.
Data in	FY-21AP/FY-31AP/FY-3ZT/GPS data interface
Current Sensor	Current sensor input for measuring the battery voltage and current.

## Detailed description of the "Video in" port

GND	Connect to the camera GND
VCC	Connect to camera's power supply "VCC". (Note: Power is supplied from the OSD to the Camera. Do not input any other power supply through this port or damage will occur).
Video IN	Video input (Connect to the camera video signal output).

## Detailed description of the "Video out" port

GND	Connect to video transmitter GND
VCC	Connect to video transmitter power supply input "VCC". (Note: Power is supplied from the OSD to the video transmitter. Do not input any other power supply through this port or damage will occur).
Video Out	Video output (connect to video transmitter video input).

## Detailed description of the "SW" port

GND	Connect to the power "GND" port of the RC receiver.
PWM IN	Connect to the signal port of your RC receiver (you need to designate to a free channel).

## Detailed description of the "Power" port

GND	Connected to the power "GND" that supply to the OSD control board.
VCC	Connect to the power "VCC" that supply to the OSD control board(Safe input range: DC6V to 12V) Note: this power supply is sent directly to your Video Camera and Video Transmitter. E.g. if you are using a 12 volt Video Camera and Transmitter, the input voltage should also be 12 volt.

## Detailed description of the "Data in" port

GND	FY-21AP /FY-31AP GND ,or the GND of the GPS
+3.3V	Use only to supply power to the FY-GPS module. (DO NOT connect this port to the FY-21AP / FY-31AP or the FY-3ZT).
Data TX	Connect to the "RX1" data output port of the FY-21AP/ FY-31AP /FY-3ZT, or the "RX" port of the GPS module.
Data RX	Connect to the "TX1" data output port of the FY-21AP/ FY-31AP /FY-3ZT, or the "TX" port of the GPS module.

## Detailed description of the "Current Sensor" port

ENG VCC	Connect to battery positive (Red)
CUR AD	Connect to the current sensor output signal (White)
+5V	+5V power supplied to the current sensor from OSD (Yellow)
ENG GND	Connect to battery negative (Black)

## Current Sensor:

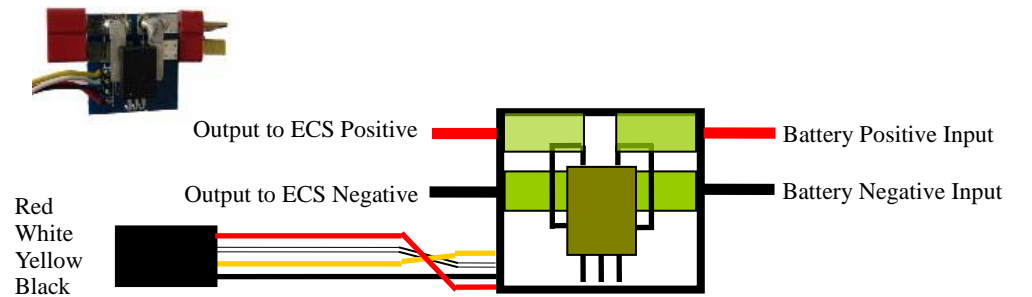


Figure3. Current Sensor

## Application diagram

The Hornet-OSD can directly connect to the data output port of FY-21AP, FY-31AP or FY-3ZT, or separately connect to the output port of GPS module, and then overlay the flight data information to the video signal. The application diagram is shown as bellow.

Note: The modules in the imaginary line frame means that you can choose any one of these modules to connect.

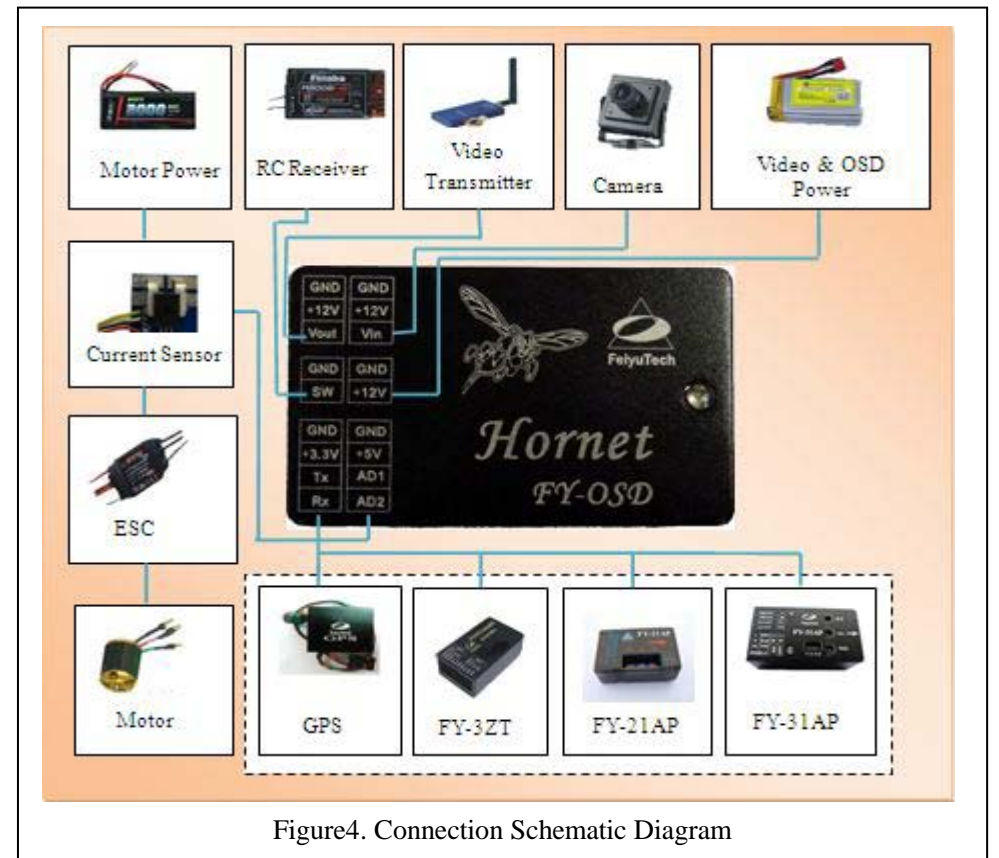


Figure4. Connection Schematic Diagram

## Introduction for the flight State of FY-21AP /FY-31AP or FY-3ZT

Name	Introduction
RC	Manual Flight. Autopilot deactivated.
ABM	Auto balance mode
FAF	For FY-21AP:Fixed Altitude flying mode; for FY-3ZT/FY-31AP:Air route fly mode
RTL	Auto Return Mode
ACM	Auto Circle Mode

**Interface introduction**

The telemetry data display is as follows:

1	Attitude measurement error coefficient (refer to the prompt)	11	Relative altitude (Unit : m)
2	GPS speed (Unit: km/h)	12	Horizon position display
3	Current latitude and longitude of the plane (Format: "dddmm.mmm")	13	The angle of turning to the return point (Unit: deg)
4	Total flight time (Format: "mm.ss")	14	Course angle of flight (Unit: deg)
5	Flight mode	15	Operating temperature(Unit: °C)
6	Distance to take-off Point (Unit : m)	16	The battery voltage of the video transmitter (Unit: V)
7	Power battery voltage (Unit: V)	17	The battery power consumed (Unit: mA / h)
8	Climb rate (Unit: m/s)	18	'Radar' aircraft Position relative to 'Radar' Home position
9	The quantity of satellite used for positioning	19	'Radar' Home position
10	Power battery current (Unit: A)		

**Error Coefficient Assessment (Attitude measurement error coefficient assessment)**

- Attitude measurement error coefficient is an assessment (ECA) of the aircraft attitude as measured by FY-21AP, FY-31AP or FY-3ZT.
- "0" value is normal, maximum value is "1000".
- The higher the ECA is, the more error in autopilot attitude control will be.
- If this coefficient continues to increase to 1,000 in the flight, this indicates the FY-21AP ,FY-31AP or FY-3ZT do not meet the requirements of automated flight, so flight control will be transferred back to you (manual flight or RC mode).
- This is usually caused by installations that result in high vibrations or shock to the FY-21AP , FY-31AP or FY-3ZT. You will need to check or adjust the autopilot installation to reduce vibration.

**Display Modes selection**

The OSD can be controlled to show different display information via one spare channel of your radio Rx. There are 5 optional display modes controlled by the different PWM signals. You can use default mode if you do not want to change the display modes.

**How to change the display modes:**

You can use a 2-way switch to change the display modes, the PWM signal of the 2-way switch is 900µs ~1200µs and 1800µs ~ 2100µs (in order to describe the frequency range conveniently , the PWM signal "900µs ~1200µs" might be called "L" for short , and "1800µs ~ 2100µs" might be called "H" for short. ).

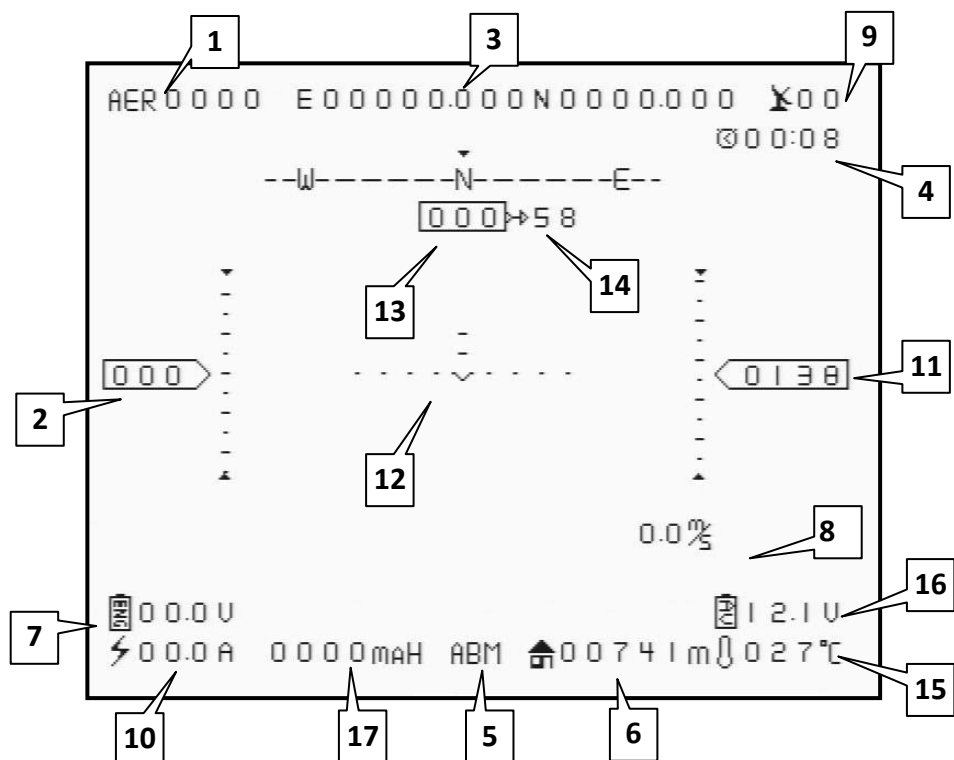
The default mode is "A. All information displayed", if you want to change to "B. Default Mode With artificial horizon", just operate as following: first the switch is required to be played to "L", then to "H", you have changed the display mode for one time by this. Save the information after changing. When the OSD powers down and restarts, it will continue to keep in the display Mode B.

That is to say, you can change the display mode for one time by switching the "L" to "H", the five display modes can be selected by circling in turn like this. (Note: the fifth display mode is "E. Remove All Information")

Mode B is default when a jumper is used in the SW connector and power for the Hornet-OSD.

**The modes are shown as below:**

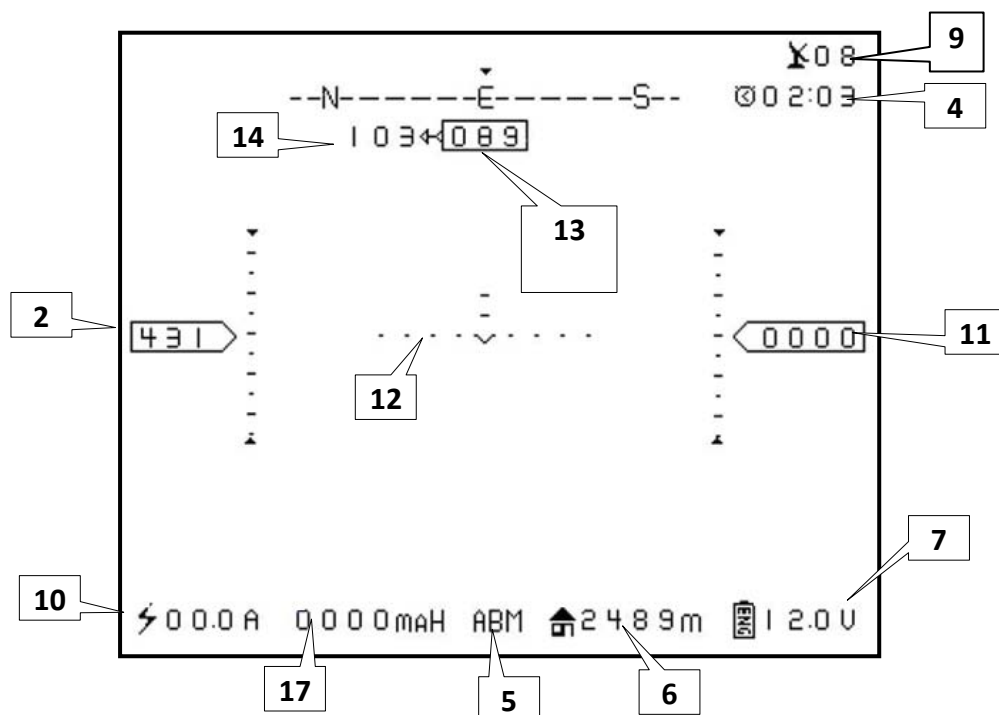
**Mode A: All Information Displayed**



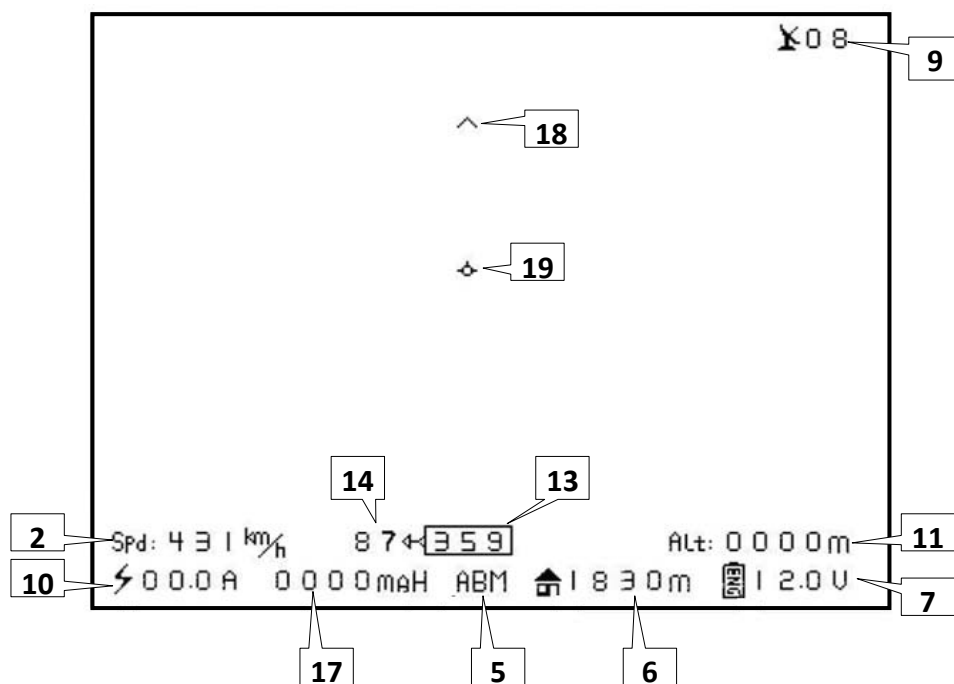
**Mode B: Partial Display With Artificial Horizon**

**Note:** 9:Relative altitude (Unit : meter)

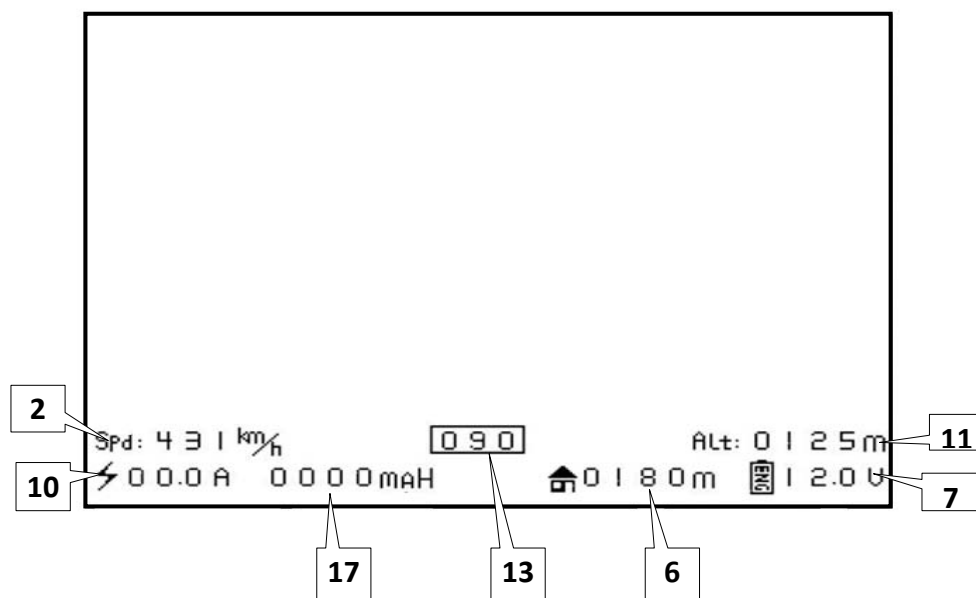
- A. When connect with the autopilot or FY-31AP will display the barometer altitude.
- B. When only GPS Receiver is connected to the Hornet, GPS Altitude will be displayed.



**Mode C: Radar Positioning Function**



**Mode D: Brief Mode**



**Data record of FY-21AP, FY-31AP, FY-3ZT and GPS module**

Hornet-OSD can automatically record the information of FY-21AP, FY-31AP, FY-3ZT or GPS Receiver connected to it via an inserted MICRO SD card.

**Data naming:**

If no data is received by Hornet OSD, the recorded data is noted at "FEIYU\*\*\*.txt". ("\*\*\*" is a running number from 000 to 999), for example, "FEIYU001.txt". If 4 GPS satellites or more are detected, the file will automatically be renamed after the date and time of flight (month, day, hour and minute). For example, if the date is Nov 14, eight minutes pass eight, the name will be "11140808.txt".

**Flight mode**

When in the NAV mode (for FY-21AP: Fixed Altitude flying mode; for FY-3ZT/FY-31AP: Air route fly mode), it will display not only the letter "NAV" on the overlay interface, but also the current waypoint every two seconds, so circulates.

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**Note:** We reserve the right to change this manual at any time! And the newest edition will be shown on our website.