SN-L

FixedWingFLightController + Pixel OSD

Ver 2.5
FW 5.8+

LeFeiRC

2019/1/10

WARING：

Please strictly observe the relevant national laws and regulations for safe flight. We do not advocate flying high, flying far, experience the fun of the model airplane in a fully safe environment, and create a good environment for model airplane sports! Before using the flight control, you must fully understand the various safety details and deeply understand that the flight is risky. It is impossible to be completely reliable on the equipment and any electronic products on the aircraft. You should use the Sinan (SN_L) fixed-wing flight control to evaluate the product and use the system according to relevant regulations. The system provider does not use the product for any use. Responsible for direct or indirect losses and consequences.

i. 目录

1. INTERFACE

RSSI	Connect to receiver RSSI channel
PPM	Connect to SBUS/PPM
A1	Extend other functional interfaces
A2	Extend other functional interfaces
AIL	Aileron servo interface
ELE	Elevator servo interface / Airspeed interface
THR	ESC interface
RUD	RUD servo interface
GPS	Connect to GPS
PMU	Power/Camera/VTX/Current, all in one interface

- **CONNECT AIR-SPEED METER**

Step1: set AUX1/AUX2 channel as ELE function

Step2: connect ELE servo to AUX1/AUX2 channel

Step3: connect airspeed meter to ELE channel

Step4: power on again

If you should change ELE servo direction, you should set AUX1/AUX2 channel direction

- **POWER SUPPLY**

All above interfaces are powered by the external 5v BEC module, and the flight controller does not output 5V to supply power to these interfaces.

2. FLIGHT MODE

MANUAL	Remote control directly controls the aircraft
STAB	Auto level
HORIZON	ACRO mode + STAB mode
RTH	Return to home
HOVER	Altitude hold and cycle。
ALTHOLD	Aircraft hold altitude and flight route(with GPS)
GUID	Keep on the route
ACRO	Gyro mode
SUB-MODE	Switch mode to slave mode

- **RTH MODE**

When the return altitude is higher than the set height, for example, returning at a height of 150m. If the set return altitude is 120m, the aircraft will return at a height of 150m, and then decrease the altitude to 120m when approaching the home position. If the return altitude is less than 30m, the aircraft will climb to 30m before turning. The RC cannot control the aircraft during the RTH mode, but the throttle can be raised by the throttle stick.

In auto cruise mode, the throttle is automatically calculated based on the speed (airspeed or ground speed). In the case of a downwind or a large wind, the throttle can be raised by the remote control to prevent the aircraft from stalling. for example if auto throttle is 45%, but the RC throttle is 50%, then FC output 50% throttle.

- **GEO FENCE**

When the fence is turned on, the RTH mode is triggered once the height or distance exceeds the fence radius. The way to

cancel the RTH mode is to switch the mode switch once. If you do not cancel, you can dial the mode switch several times.

3. SWITCH FLGHT MODE

SN_L sets the RC channel 5 as the main mode switch, so the 5th channel of the RC must be set to a three-segment switch; the SUB-MODE switch can be selected or not used when the remote controller is calibrated.

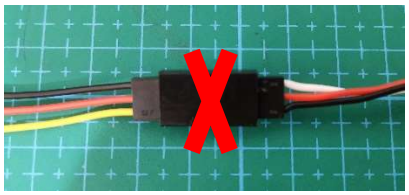
Example:

Position	Mode switch	SUB-Mode Switch
1	STAB	RTH
2	SUB-MODE	HOVER
3	ALTHOLD	MANUAL

4. INSTALLATION

① PMU MODULE

✧ **Before power on FC, please check everything is correct.**



install direction: *<BASE FUNCTION> -<AP DIRECTION>*

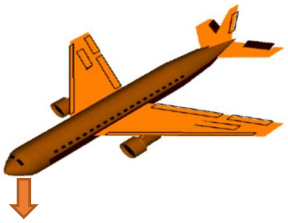
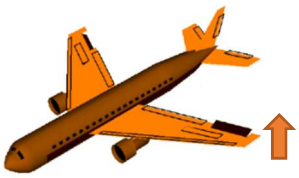
0°	Arrow point to head
180°	Arrow point to rear
90°	Arrow point to Left side of the nose
270°	Arrow point to right side of the nose

The FC installation should try to avoid the vibration source and keep away from the motor; try to install it near the center of gravity. Be sure to recalibrate the level after changing the installation direction

② HOW TO CONNECT SERVO

Interface / Type	AIL	ELE	THR	RUD	AUX1	AUX2
Wing	Servo1	Servo2	ESC		ALL	ALL
T tail	AIL servo	ELE servo	ESC	RUD servo	ALL	ALL
V tail	AIL servo	ELE servo1	ESC	ELE servo1	ALL	ALL

③ **CORRECT CONTROL SURFACES MOVEMENT**

5. OSD

Speed unit' Km/h' or 'Mile/h'; Distance unit 'm' or 'Ft'.

flight summary after landing

6. REMOTE CONTROLLER

➢ **CALIBRATE RC**

Make sure the 5th channel as mode switch is a three-segment switch.

When a new RC is connected to the FC, it will pop up a calibration screen:

Page1: reset all channels, flip mode switch enter next step	Clear all offsets, sticks is homed, and the RC does not set the range limit
Page2: throttle **Up**, flip mode switch enter next step	Get throttle MAX value
Page3: throttle **Down**, flip mode switch enter next step	Get throttle MIN value
Page4: **Keep** the AIL stick to the **Left**, flip mode switch enter next step	Get AIL channel MIN value
Page5: **Keep** the ELE stick to the **Down**, flip mode switch enter next step	Get ELE channel MAX value
Page6: **Keep** the RUD stick to the **Left**, flip mode switch enter next step	Get RUD channel MIN value
Page7: flip subMode switch, flip mode switch enter next step	Detect subMode switch

➢ **ENTER RC CALIBRATE**: *<BASE FUNCTION> - <CALI RC>*

① When you can't enter RC calibrate menu for some reason; follow steps like this:

Power on FC -> make RC sticks move to the side-> wait until RC calibrate menu display

② Before OSD initialization is complete, don't move sticks, otherwise you would enter RC calibrate menu again

③ After calibrate, don't change RC channel offset

➢ **FAIL-SAFE**

PPM receiver FC can't recognize whether the RC is out of control, need to be set in advance.

SBUS receiver can automatically identify if it is out of control, **move stick to cancel failsafe mode.**

ENTER OSD MENU *<BASE FUNCTION> - <FAILSAFE MODE>*

FAILSAFE MODE	GPS connect, satellites>6	GPS disconnect/GPS lose signal
HOLD	Hold current mode	Hold current mode
RTH	Return to home	Switch to stab mode, close throttle, Circling down①
STAB	Switch to stab mode, close throttle, Circling down	Switch to stab mode, close throttle, Circling down

①The AIL is 10 degrees to the left, the ELE is 15 degrees down, and the throttle is closed.

- **RSSI**
  - ① Support independent RSSI and RSSI signal channels in SBUS or PPM signals; can be selected by OSD menu.
  - ② The independent RSSI automatically recognizes the RSSI signal type, PWM or AD type; the RSSI signal of some models of receivers may cause the OSD picture to flicker due to the RSSI modulation into a high frequency pulse signal.
  - ③ FC does not return to home based on the RSSI signal value.
  - ④ If connect a SBUS receiver, you Set RSSI channel to 18, *<OSD SETTINGS MENU>-<SENSOR>-<RSSI CHANNEL>* , FC will auto calculate RSSI according to SBUS signal packet loss rate.
- **CALIBRATE ESC**

  Step1: switch to manual mode.

  Step2: unplug the ESC signal line and wait for ESC to make a di---di---di--- sound.

  Step3: move the throttle stick to the max position, then plug in the ESC signal line.

  Stpe4: hear di—di—, then move the throttle stick to the lowest to complete the calibration.
- **ARM&DISARM**

Satellites	<=6	>6
GPS connect	DISARM	ARM
GPS disconnect	ARM	ARM

*If flight mode is manual mode, you can control the throttle in any situation

7. PRE-FLIGHT CHECK

- **CHECK ACCEL HEALTH** *<OSD>-<SCOPE>-<HEALTH>*
  - ① The vibration is in good condition. When the plane is flying flat, the vibration point is scattered within the two warning lines.

  - ② The vibration is large, and most of the vibration points fall outside the warning line, which easily leads to the FC can't calculate the correct attitude

- **CALIBRATE LEVEL** *<SENSOR> - <CALI LEVEL>*
  - ① Horizontal calibration is required after changing the mounting direction.
  - ② If you have not calibrated for a long time or the temperature difference has changed too much, you need to recalibrate.
  - ③ Ensure that the aircraft is level and static during horizontal calibration.
- **SENSITIVITY ADJUSTMENT**
  - ① *<BASE FUNCTION>-<AIL BASE GAIN> -<ELE BASE GAIN> -<RUD BASE GAIN>*: The larger the value, the faster the reaction speed and the excessive jitter.
  - ② *<ADVANCE FUNCTION>-<STAB GAIN>-<FEED FORWARD GAIN>:* The larger the value, the faster the response joystick will be, and the jitter will be exceeded.
  - ③ Adjustment steps:

    Step1: set *<FEED FORWARD GAIN>*, normally reduce feed forward gain to 40

    Step2: set the *<AIL BASE GAIN> <ELE BASE GAIN> <RUD BASE GAIN>*. You can fly by default, then increase or decrease the sensitivity according to the state of flight.
  - ④ Speed PID Factor *<ADVACE FUNC>-<STAB GAIN>-<SPEED PID FACTOR>*

    PRINCIPLE: the faster the speed, the smaller the rudder surface sensitivity should be. The greater the value, the greater the speed involved in PID control.

    EXAMPLE: when speed of the aircraft is very fast, the aircraft begins to shake; then you can increase *<SPEED PID FACTOR>* value.

8. FLIGHT AND CONTROL

- **AUTO TAKEOFF**
  - ① ALT-Hold mode: Push the throttle to enough power and the aircraft will automatically climb to a height of 20m.
  - ② RTH mode:

    1.1 *<TAKE OFF SPEED >* more than zero, push throttle stick away from the zero position, give plain a speed until motor start.

    1.2 *<TAKE OFF SPEED>* equal zero, push throttle stick away from the zero position, shake the aircraft, until motor start. Aircraft will auto climb at 30m.
- **SPEED CONTROL**
  - ① Disconnect Airspeed

    Speed is controlled by the ground speed, cruising speed set in *<ADVANCE FUNCTION>-<CURISE SPEED>*.
  - ② Connect Airspeed

    Speed is determined by airspeed, Preventing the wind from flying in the head, causing the ground speed to be too small, please set *<MINIMUM GROUND SPEED>.*

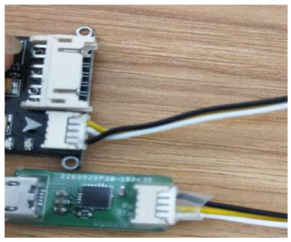
9. OSD ACTION

Enter OSD menu	Flip mode switch twice
AIL move left	Exit the current menu or exit the selected mode
AIL move right	Enter menu or select setting item
ELE move up or down	Change item index or select parameter

* in flight can't enter the setup menu

10. Firmware upgrade

- Download upgrade software and drivers and install：install “CP210x USB to UART Bridge” driver.
  https://github.com/HelloLeFei/SN_L/releases
  www.lefeirc.com
- Connect via USB：Select correct com ID.



- **Upgrade SN_L**
  - **Step1:** power off FC at first
  - **Step2:** Select “SN_L”
  - **Step3:** load firmware and flash,
  - **Step4:** Before the end of the countdown, power on FC