Arkbird

Product introduction:

ARKBIRD-AAT (Auto Antenna Tracker) is an antenna tracking system designed for long range video transmission, which allows the high-gain panel antenna on the ground to be always pointing to your plane, greatly improving the transmission range.

ARKBIRD-mini AAT is integrated with a 5.8G 40chanel video receiver and a 12DB double biquad antenna. It can save time of choosing the said equipment and its optimizing design increases the effective transmission range 3 to 6 times.

Eight innovative designs with best experience:

1. Frequency channel of 5.8G 40channel video receiver integrated, which can receive frequency between 5725 and 5875 MHz;

2. The double biquad antenna gain reaches 12DB, and its standing-wave ratio is lower than 1.1. Every set of antenna is designed by software simulation and passes test of professional network analyzer;

3. Kinds of sensor for dual-coupling correction, equipped with magnetic compass and inertial navigation (gyroscopes, accelerometer), ultra high-precision pointing;

4. Plug and play; work with Arkbird OSD to make a weld-free plug assembler; advanced full-automatic calibration algorithm for one step calibration;

5. Standard video transmission channel, perfectly workable with any video transmission equipment with AV signals and 5.8GHz.

6. Extra-small and super-portable (pan-tilt weighs 120g only, size 5cm*5cm*3cm only.); 360-degree no winding design.

7.Automatically saving take-off point coordinates after power on; add one GPS to ground module will enable dynamic tracking, which allows the ground module change the position while tracking (for example, can be used when driving a car, or finding the plane unexpectedly landed);

8. 9600-115200 **Self-adaptive Baud rate NMEA GPS** without any setting;

9. Adapt with Arkbird 2.0 Autopilot, no additional airborne module needed.

Airborne module: Voltage: 2S-4S（ 7～16.8V, 12V suggested）　　　Peak current: 200mA@12V

Ground module:　Voltage: 3S（ 12V）　　　　　　　　　　　　　Peak current: 800mA@12V

Attention:

Please read the instructions and "Frequently Asked Questions" at the end of our instructions，carefully before using it. Pay attention and be sure to check the details and wiring before powering on. Incorrect wiring may cause permanent damage to the device!

Mini-AAT airborne applies GPS port sized 4P 2.54mm. Ground receiver applies GPS port sized 6P 1.25mm. Size of the two ports might be different.

ARKBIRD-5.8GHz double biquad antenna remains minimum SWR of 1.03. Frequency 5.8G is for recommendation.

Wiring according to the instructions (the audio channel allows no connection). Observe that LED lights are flashing correctly on the airborne and ground module (indicating normal communication). After identifying a valid GPS signal, the ground will automatically save the coordinates as launch point, automatically on tracking mode.
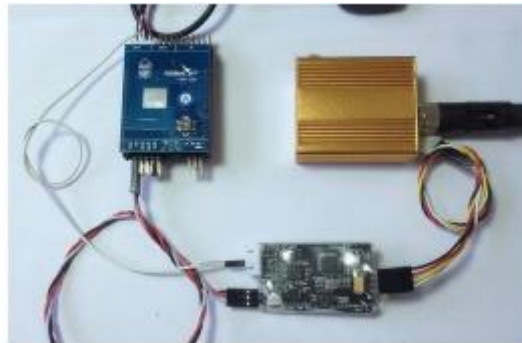
I. Airborne Module Wiring

Airborne module can procure coordination of aircraft in three connection methods: sharing same one GPS module in parallel connection, wiring to Arkbird Autopilot's TX port or install another independent GPS module (such as installed on a four-axis airplane whose GPS protocol is closed). The practice of last method needs an additional GPS module.

Definition of Interface:

1. Universal connection method, welding a parallel line from GPS serial port:

Connect the "signal wire" of a NMEA GPS module to the "GPS IN" port of airborne module (Arkbird GPS signal line is the second white wire, as shown below). Update rates are decided by the GPS module.
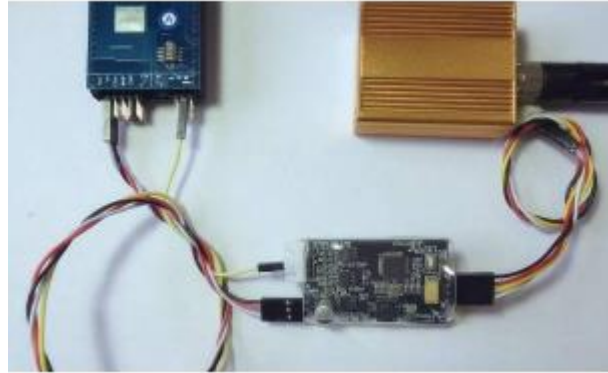

2. TX port wiring with Arkbird OSD:

Connect the video to Arkbird 1.0 OSD's Vout port; one wire from TX port; will be able to identify the position signal (as shown below).

Notes: As for Arkbird OSD 3.1021 or older firmware, the update frequency of TX port is 1hz.You can upgrade it to the latest firmware for 10hz upgrading rate and faster tracking speed (please refer to Arkbird upgrade instructions)

3. **Independent GPS module connection:**

When no serial GPS port available, you can add one independent GPS.

Airborne module has a 5V power supply (100mA) for a GPS module, connect the "5V, GND, serial ports signal" into airborne module.
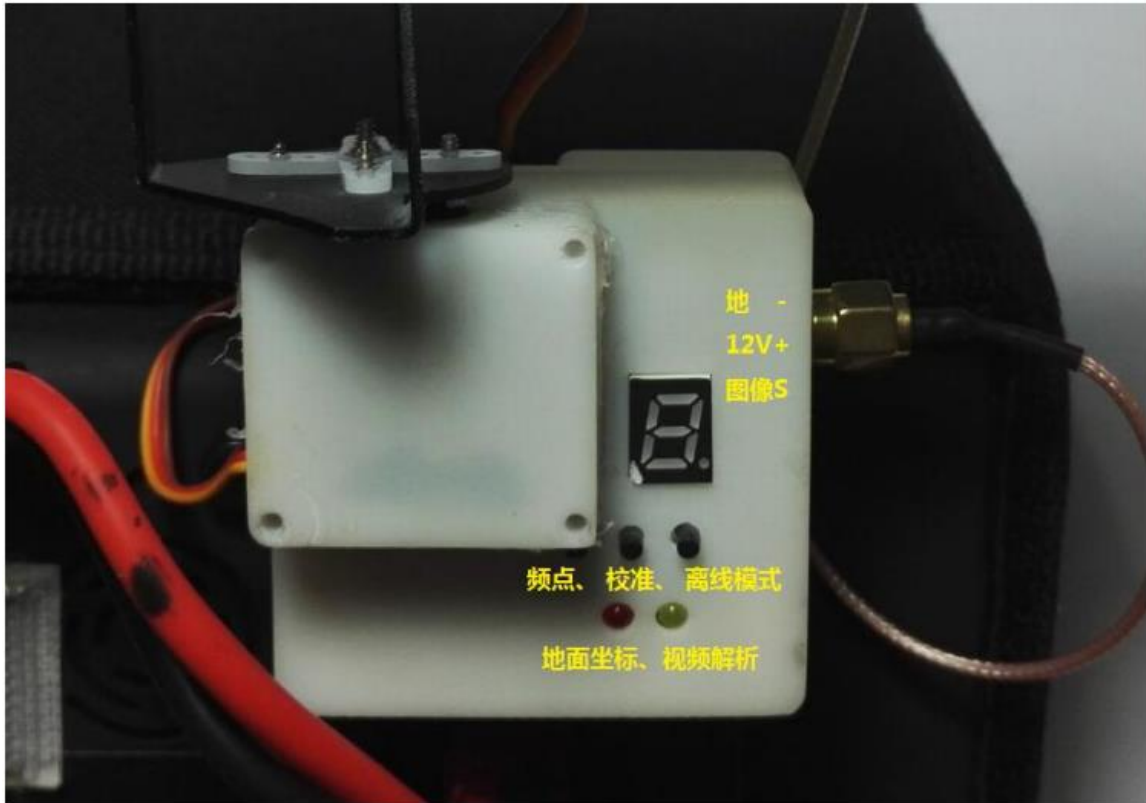

4. **Power on after correct wiring, and observe LED on the upper right corner**

Power LED is consistently on. If only the **video signal** is identified, Status LED on the upper right will double flash (twice per second); and if the video signal and the **GPS signal** are both correctly identified, LED will flash fast (10hz). Please check the video input and GPS wiring to ensure LED lights **flash fast**.

II. Ground Demodulation Module Connection:

1. The ground module integrates 5.8G video receiver and an antenna. Only need to connect the 3P wire from the output terminal to your display. The order respectively is ground, 12V input port and video out port.

2. The ground module of AAT can be stuck on the back of display. Things those might affect the direction of compass such as magnetic objects and metals (screw, nail etc.) should not be installed on ground equipment.

3. Ground Module of mini AAT can get power from monitor or individually powered by a 12V battery.

4. Powering on after wire checking: **Switching 5.8G video channel through pressing Button 1 and Button 3**

If the Nixie tube displays 1-9ACEFHJ and the decimal points go out, the frequency is first 16 channels;

If the Nixie tube displays 1-9ACEFHJ and the decimal points flash slowly, the frequency is in secondary 16 channels;

If the Nixie tube displays 1-9ACEFHJ and the decimal points flicker fast, the frequency is in last 8 channels;

5. After getting a clear video image, checking the data communication:

If ground GPS module is plugged in, the red "HOME LED1" will double flash. If the ground module locates the correct coordinates of **take-off point**, the red LED1 will flash fast.

If the video communication works normal, the yellow "VEDIO LED2" will double flash. If airborne module locates the correct coordinates of **the plane**, the yellow LED2 will flash fast;

After airborne module positioning is completed, the ground module will save HOME coordinates once and shift into tracking mode automatically. Make sure that LED on the airborne module and two LED lights on the ground module are flashing fast before launching the plane is very important.

Notes: If GPS module is connected to the ground module (optional; as shown above), it will use the ground GPS automatically to real-time update HOME coordinates and give directions for dynamic positioning. (The change in position of ground module is allowed while tracking)

When there is no video signal, AAT will point to the latest identified coordinates before signal lost.
Remember to keep the ground module powered-on; otherwise information of the last coordinates will be lost.

III. Key function and Calibration (important!)

Press transmitter's "Channel button 1" to set video transmission frequency, then pressing "button 1" and "button 3" to switch 40 frequency channels.

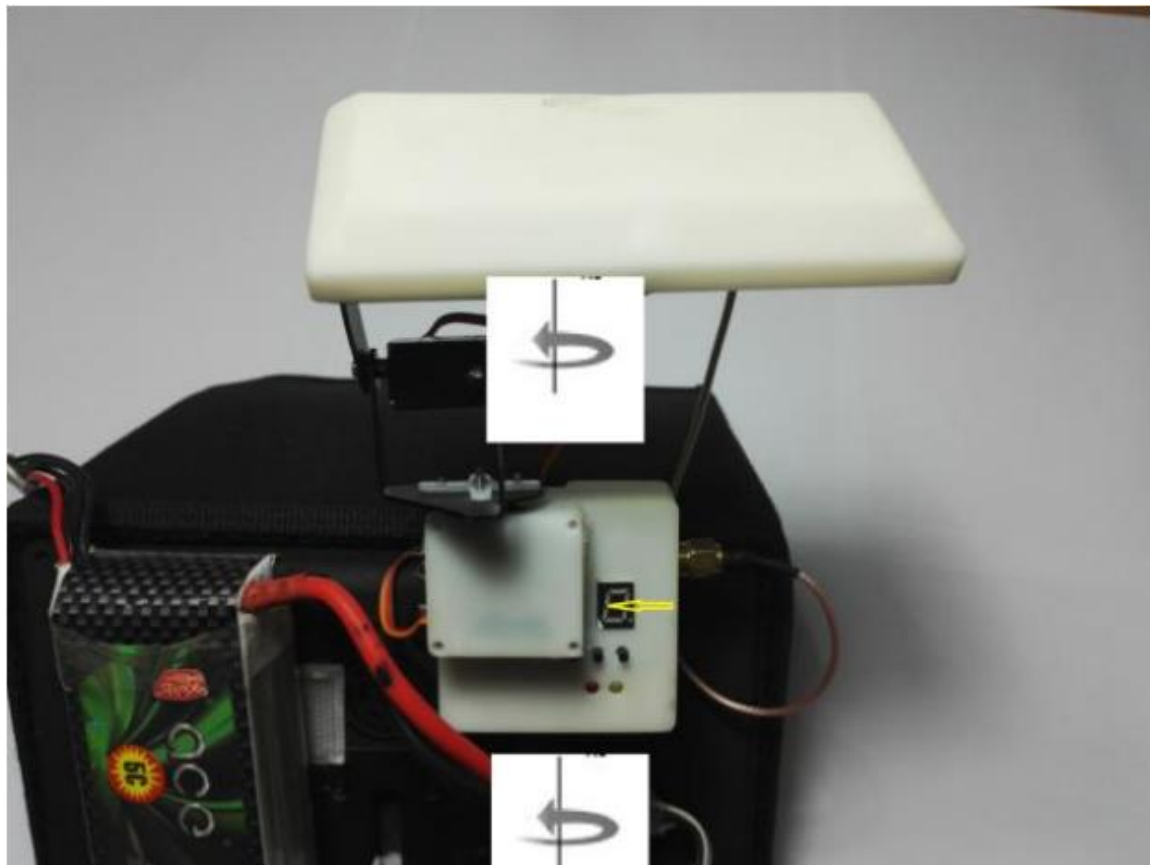Press "Cal. Button 2" for five seconds for automatic calibration mode

Press "OFFLINE Button 3" to switch between "off-line mode" and "tracking mode". (Servo points at the right above during off-line mode)

Calibration at the take-off point is necessary for the first installation or move to another flight field. .

Calibration should be made in 3 steps: Laying it horizontal, horizontally rotate and vertically rotate for 3 circles.
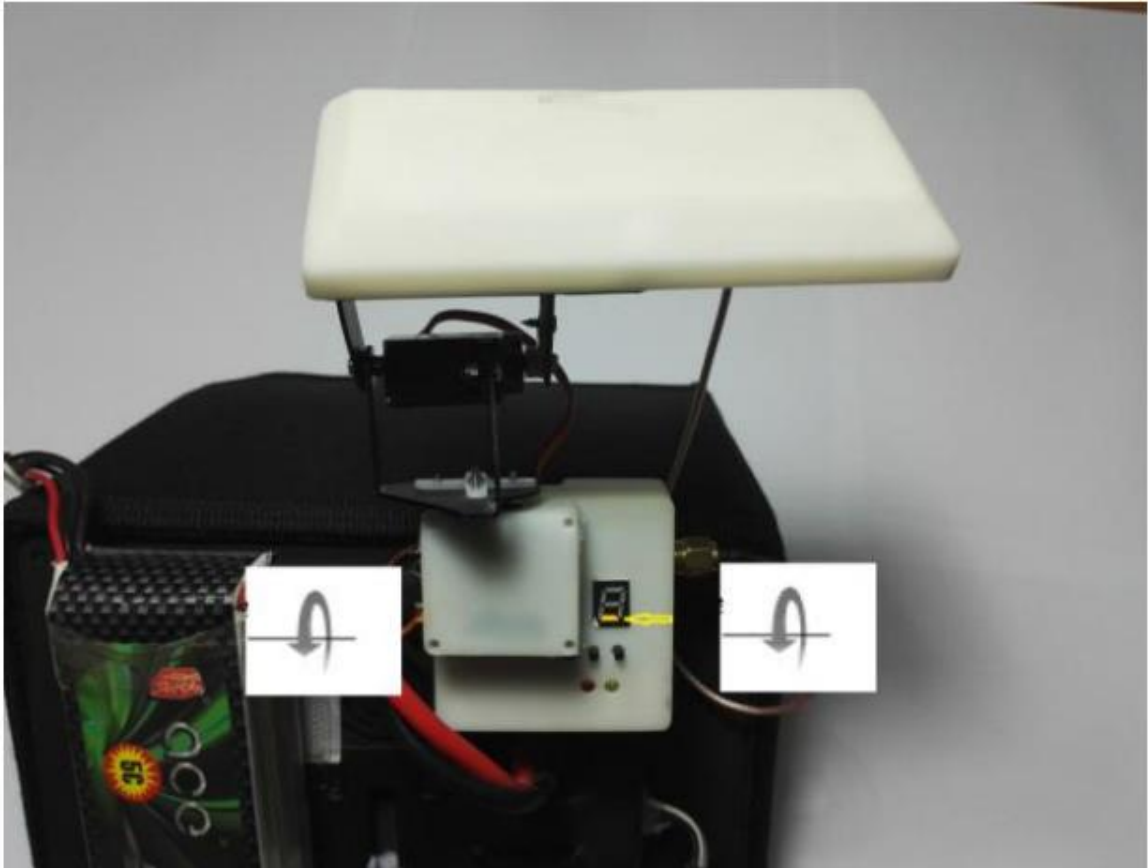
1) Long-press Button 2 to enter "Calibration Mode". The pan-tilt goes up 90 degrees and the top red lights on Nixie tube will be on. Then you need to lay the mini AAT stable for 3 seconds to make the module automatically collect data of horizontal position ;

2) Then the second row of Nixie tube indicates horizontal calibration. Please horizontally rotate mini AAT for 3 circles to calibrate horizontal compass.

3) Then the third row of Nixie tube indicates vertical calibration. Please vertically rotate mini AAT for 3 circles to calibrate vertical compass.

After the calibration is completed, it comes to the four-point direction mode. The device automatically lifts 0 degree and points to due north. Pressing "Cal. button 2" and the PTZ automatically lifts 30 degrees and points to due east; Pressing "Cal. button 2" to point to due south with a 60-degree lift; Pressing "Cal. button 2" for a 90-degree lift and a due west direction. Pressing "Cal. button 2"again to exit pointing mode. After the calibration, Mini AAT will automatically turn into off-line mode. Please press "OFFLINE button 3" if you need to use the tracking mode.

Four-point directing can be judged whether the direction is accurate. Press "HOME button 1" and "OFFLINE button 3" to trim, once for 0.5 degree to ensure that the four are pointed to the right direction. Note that the four-point direction calibration must be correct before taking off!

If angle of each contiguous point is not exactly 90 degree, which may be caused by magnetic field interference or other metal objects in the vicinity. **Checking around and do calibration again after make sure no interference.**

IV. FAQ

Q: Video communication is abnormal and yellow LED 2 on the ground module doesn't flash;
A: Check the wiring and see if the airborne module lights are flashing fast. Check if there is video image on your display. Try to change the PAL/NTSC mode of camera. For different international camera design and craftsmanship, which may leads to unsatisfactory data identification.

Q: Yellow LED on airborne module doesn't flash quickly;
A: The airborne module cannot work only if it is accessed to AV signals. If the yellow LED flashes slowly (video

signals cannot be identified), checking video connection. Or change the PAL/NTSC mode of camera.

If the airborne LED in double flash (GPS signals cannot be identified), please check GPS wire and signal input port. Check if the GPS module and video access port are common-grounded. (If ground wires of some equipment are not connected, connecting black GND signal wire to AAT airborne module in parallel).

Q: Communication is normal but it doesn't shift into tracking mode automatically, and red LED 1 on the ground doesn't flash quickly;

A: Checking the GPS wiring of airborne module and see if the airborne module LED light is flashing fast. Pressing KEY3 switch to "tracking mode" or try to re-power;

Q: The horizontal pointing is inaccurate;

A: Checking the communication link. Checking if there exist metal or magnetic interference near PTZ then do calibration again. Changing Mini AAT ground module's equipment or going to a new fly field, do calibration again is needed.

If there is a constant angle error, please press "button 1" or "button 3" for adjustment under four-point calibration mode.(Ignore the four-point direction positions)

Q: Pitch angle is inaccurate

A: Reinstalling tilt servo's rocker arm to keep Pitch angle in horizontal when tilt servo point at due north in horizontal during calibration.

Q: When the aircraft does not take off, PTZ is rotating or the pointing is inaccurate;

A: When the airborne modules very close to PTZ on the ground, since the GPS positioning is always drifting, PTZ on the ground may point to the wrong direction. It is normal and the error will disappear after takeoff.

Attention:
Please read through carefully:

1. The autopilot can only be used for small-scale RC model. Please do not install it in a camera plane which might fly over crowded areas for safety concern.

2. Please install and manipulate the autopilot according to instructions and check the condition before every flight.

3. Not all equipment and electric products of the plane are completely reliable. Please follow the instructions and regulations. The provider of the system is not responsible for any direct or indirect loss and consequences caused by the product.

Any comment, suggestion and enquiry contact us via Jungle@arkbirdfpv.com&Arkbird@foxmail.com. Thanks for your time!

Arkbird

LIST: 40 Video Channels Frequency:

频道(CHANNEL)/本振(LO)	P7(CS1)	P8(CS2)	P9(CS3)	P2(S1)	P10(S2)	P13(S3)
A1：5.740GHz/5.260GHz	0	0	0	1	1	0
A2：5.760GHz/5280GHz	0	0	1	1	1	0
A3：5.780GHz/5.300GHz	0	1	0	1	1	0
A4：5.800GHz/5.320GHz	0	1	1	1	1	0
A5：5.820GHz/5.340GHz	1	0	0	1	1	0
A6：5.840GHz/5.360GHz	1	0	1	1	1	0
A7：5.860GHz/5.380GHz	1	1	0	1	1	0
A8：5.880GHz/5.400GHz	1	1	1	1	1	0
B1：5.725GHz/5.245GHz	0	0	0	0	0	0
B2：5.745GHz/5.265GHz	0	0	1	0	0	0
B3：5.765GHz/5.285GHz	0	1	0	0	0	0
B4：5.785GHz/5.305GHz	0	1	1	0	0	0
B5：5.805GHz/5.325GHz	1	0	0	0	0	0
B6：5.825GHz/5.345GHz	1	0	1	0	0	0
B7：5.845GHz/5.365GHz	1	1	0	0	0	0
B8：5.865GHz/5.385GHz	1	1	1	0	0	0
C1：5.733GHz/5.253GHz	0	0	0	1	0	0
C2：5.752GHz/5.272GHz	0	0	1	1	0	0
C3：5.771GHz/5.291GHz	0	1	0	1	0	0
C4：5.790GHz/5.310GHz	0	1	1	1	0	0
C5：5.809GHz/5.329GHz	1	0	0	1	0	0
C6：5.828GHz/5.348GHz	1	0	1	1	0	0
C7：5.847GHz/5.367GHz	1	1	0	1	0	0
C8：5.866GHz/5.386GHz	1	1	1	1	0	0
D1：5.705GHz/5.225GHz	0	0	0	0	1	0
D2：5.685GHz/5.205GHz	0	0	1	0	1	0
D3：5.665GHz/5.185GHz	0	1	0	0	1	0
D4：5.645GHz/5.165GHz	0	1	1	0	1	0
D5：5.885GHz/5.405GHz	1	0	0	0	1	0
D6：5.905GHz/5.425GHz	1	0	1	0	1	0
D7：5.925GHz/5.445GHz	1	1	0	0	1	0
D8：5.945GHz/5.465GHz	1	1	1	0	1	0
E1：5.658GHz/5.178GHz	0	0	0	X	X	1
E2：5.695GHz/5.215GHz	0	0	1	X	X	1
E3：5.732GHz/5.252GHz	0	1	0	X	X	1
E4：5.769GHz/5.289GHz	0	1	1	X	X	1
E5：5.806GHz/5.326GHz	1	0	0	X	X	1
E6：5.843GHz/5.363GHz	1	0	1	X	X	1
E7：5.880GHz/5.400GHz	1	1	0	X	X	1
E8：5.917GHz/5.437GHz	1	1	1	X	X	1