Product introduction:

ARKBIRD-AAT (Auto Antenna Tracker) is an antenna tracking system designed for long distance transmission. The airborne module superimposes the GPS coordinate information on the video. After transmitting the video to the ground, the ground receiver module will calculate the pointing angle, so that your ground panel antenna is always aligned with your aircraft to maintain the best video effect and greatly improve the distance of transmission range.

<p style="color:red; text-align:center">PIXHAWK or APM autopilot data transmission: (MAVLINK interface is supported)</p>

1. **Two sets of sensors for dual-coupling correction** equipped with magnetic compass and inertial navigation compass (gyroscopes), ultra high-precision pointing;

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

3. **Video transmission,** 50hz ;

4. **Integrated suction cup mounts and tripod mounting hole** , Super tiny (PTZ body 11cm * 8.8cm * 3.9cm), high-quality powerful steering engine (max load 2kg), 360-degree slip ring without winding;

5. **Take-off point coordinates can be automatically saved after powering-on**; dynamic positioning can be realized by using the GPS interface in the ground module, **which supports movement tracking** (e.g. It can be used when driving or emergency-landed plane searching);

6. 9600-115200 **Self-adaptive GPS Baud rate** without any setting, which is compatible with all kinds of FPV equipment;

7. Reserving an interface for upgrade, and more functions for continuous upgrades.

Airborne module:	Voltage: 2S-4S（7～16.8V）	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!

MAVLINK support (Radio RX): (baud rate 57600) :
PIXHAWK or APM autopilot data transmission connection: (MAVLINK interface)
Connect the Mavlink's digital transmission (5V , ground , RX , TX) to the white port of the rotating part, and then connect it to the serial port from below to the USB device.

The yellow light flashes when the MAVLINK protocol is recognized, and the red light flashes when the position has been positioned, and the tracking can start.

As shown in the figure on the right, the output TX of the data transmission module is connected to the white terminal RX above, and the RX below is connected to the input RX of the serial port to USB device. This output data can be used for both AAT and ground stations simultaneously.
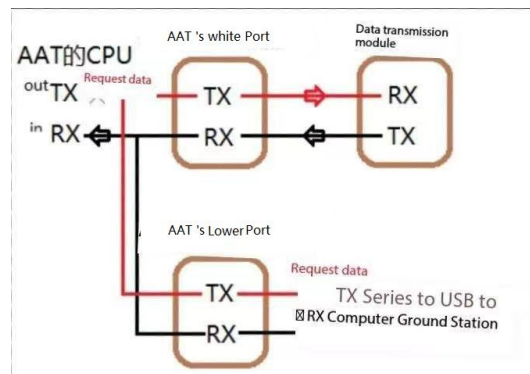
However, it should be noted that since two TX transmissions are not possible, both AAT and the TX of the serial port to USB device below will send request data signals. If interference occurs, it is necessary to unplug the TX cable below or disconnect the out circuit line on the PCB of AAT. If encountering incompatibility, please contact Arkbird@foxmail.com ）
(If using Siyi HM30, connect GND and TX to AAT's RX. It is recommended to use WiFi to connect to the computer for HM30)
Extracting longitude, latitude, and altitude information from the Mavlink protocol requires the ID 33 field, while extracting altitude requires the ID 24 field. At least these two protocol fields are required. For specific settings of open-source flight control, please refer to the document "MAVLINK-MESSAGE SET. pdf"

With AAT, the data transmission distance can be increased by 5-10 times

   Notes: Airborne module superimposes GPS information on video channel. The Ground module calculates out the pointing angle after Demodulation.

   Wiring should be done according to the instructions. If the LED lights flash normally on the airborne and ground module (indicates that communication is normal) and valid GPS signal is identified, the ground module will automatically save the coordinates as launch point and shift into tracking mode.

I.   Airborne Module Wiring

Airborne module can obtain aircraft coordinates in three ways: It can share the GPS serial port in parallel with one line, or connect a TX line directly from Arkbird flight controller, or connect to a separate GPS module(For example, using it on the quad which GPS protocol is closed); In the third way, you need to purchase another GPS module.

Since the transmission speed and reliability of the video module is much higher than that of the audio module, the new version of Arkbird AAT cancelled the audio module and all audio lines are left floating.

Definition of Interface:
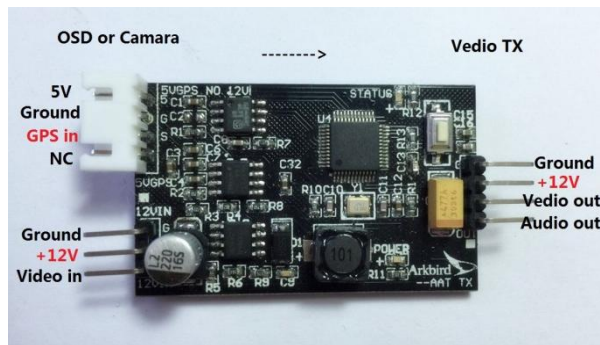
1. **Universal way of connection: welding a parallel line from GPS serial port:**

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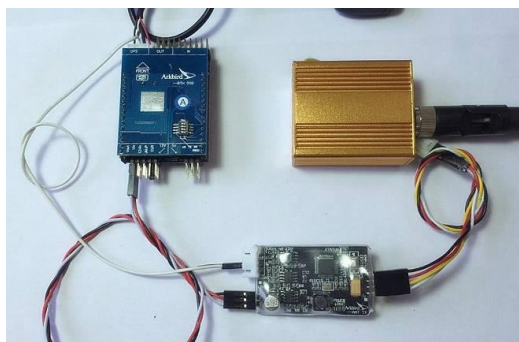

2. **TX port wiring with Arkbird OSD:**

   Connect the video to Arkbird 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
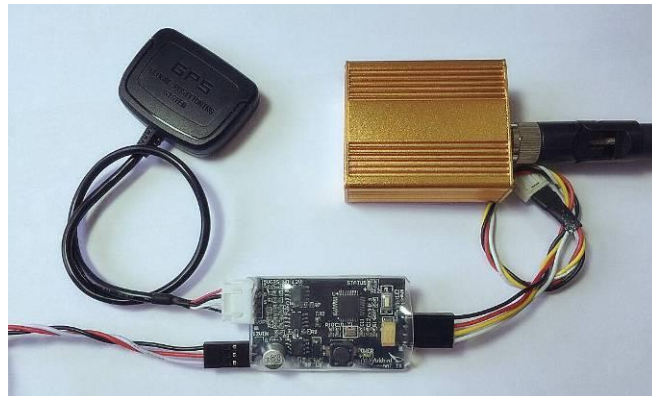
instructions).
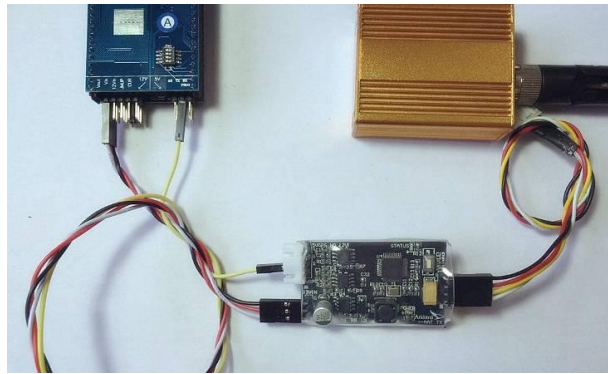
3. Independent GPS module connection:

If no serial GPS or Arkbird TX port is available, one independent GPS can be added.

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

4. Power on after wiring check. Observe STATUS LED on the upper right corner

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

II.   Ground Demodulation Module Connection:

1.   Connect VEDIO RX port to the video receiver (5.5mm Power12V, RCA video, RCA audio don't need to be connected) and be careful not to affect the rotation.

Install it on a smooth surface or on a tripod using the hole at the bottom. Avoid magnetic or metal objects (such as screwdrivers, nails, etc.) to prevent interference to the compass.

2. 12V power supply is on the base frame. Connect RCA to the display or DVR;

3. Power on after correct wiring;

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;

(When you have just powered on the device without positioning and the communication is normal, "HOME LED1" will flash slowly and "VEDIO LED2" double flashes;)

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.

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 you lost your signal. Remember to keep the ground module powered-on, or the information of the last coordinates will be lost.

III.   Key function and Calibration (important!)

Press "HOME Button 1" for five seconds to save airborne module coordinates as take-off point

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

Press "OFFLINE Button 3" to switch between "off-line mode" and "tracking mode". In "off-line" mode you can switch the antenna to any position manually.

Calibration at the take-off point is a must for the first installation. Hold "Cal. Button 2" for five seconds and PTZ will tilt 45 degrees. It moves slowly for 3 seconds and a clockwise six-round rotation ensues. All the data will be collected automatically in this process in order to achieve hard magnetic calibration, gyroscope and magnetic compass coupling calibration, servo's calibration and etc.;

A four-point direction mode follows the completion of calibration. The device automatically lifts 0 degree and points to due north. Press "Cal. button 2" and the PTZ automatically lifts 30 degrees and points to due east; press "Cal. button 2" to point to due south with a 60-degree lift; press "Cal. button 2" for a 90-degree lift and a due west direction. Press "Cal. button 2"again to exit pointing mode. After the calibration, it will automatically turn into offline mode. Please press "OFFLINE button 3" if you need to use the tracking mode.

You can tell the accuracy of direction with the use of Four-point directing. Press "HOME button 1" and "OFFLINE button 3" to trim (once for 0.5 degree) to ensure that the four positions are pointing to the right direction. Notice that the four-point direction calibration must be corrected before taking off!

IV.   FAQ

Q: Video communication is abnormal and the yellow LED2 on the ground doesn't flash

A: Check the wiring and see if the airborne module lights are flashing fast. Connect the display directly to the video receivers to check if you can see images on the display.

Some video receivers with DVR will suppress the data superimposed on the video! Please contact video transmitter merchants for data transmission in video field blanking (some video receivers cannot be used when connected to AVout1 interface. It must be connected to AVout2).

Q: Communication is normal but it doesn't shift into tracking mode automatically, and the red LED1 on the ground doesn't flash fast

A: Check the GPS wiring of airborne module and see if the airborne module LED lights are flashing fast. Press KEY3 to "tracking mode" or try to re-power;

Q: The horizontal pointing is inaccurate;

A: Check the communication link. Check if there is metal or magnetic interference near PTZ then calibrate the device again.

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

Q: When the aircraft is still grounded and PTZ is rotating or pointing inaccurately;

When PTZ on the ground is very close to the airborne module, it may point to the wrong direction because of GPS's drifting error, which is a normal circumstance 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 equipments 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.

Please send an email to Arkbird@foxmail.com if there is any comment or suggestion. We are looking forward to hearing your comments in order to improve our products constantly!