



**FPV Add-on
Quadcopter Frame**

**GPS Kit with NAZA-M V2 Flight Controller
and Turnigy 9X Transmitter/Receiver**



READ THIS FIRST – IMPORTANT SAFETY INFORMATION!

- **READ ALL WARNINGS AND PRECAUTIONS ON THIS PAGE BEFORE ASSEMBLY OR OPERATION!**
- Serious injury can be caused by rotating propellers. Always remove the propellers when working on the quadcopter.
- Secure long hair and loose clothing/jewelry when building, testing, and operating your quadcopter to avoid entanglement with motors.
- Always wear eye protection when assembling, soldering, operating, or repairing your quadcopter.
- When soldering, realize that the soldering iron is very hot and could cause serious burns. Be mindful of the tip at all times. Unplug it when not in use.
- Remove and return the soldering iron safely to its stand, being mindful of the power cord's potential to be accidentally pulled or tripped on.
- Realize that when the drone's battery is connected, there is a possibility of injury from the motors and propellers even when not in flight.
- Perform initial electronic speed controller (**ESC**) programming before installing the propeller blades. Remove propeller blades before reprogramming the **ESCs**.
- Bind the **Transmitter** and **Receiver** before installing the propeller blades.
- Follow the instructions carefully; incorrect assembly of your quadcopter could cause risk of catastrophic equipment failure, personal injury to you or others, and property damage.
- This quadcopter assembled and used as directed in this manual is an RC hobby aircraft. If you choose to modify your quadcopter to function as anything other than intended in this manual, you do so entirely at your own responsibility and risk.
- Make sure all parts of the quadcopter are in good condition. Replace any broken parts before attempting a flight.
- Only use the recommended battery pack, and always disconnect the battery when not in use.
- Before flight, check that the propellers are installed correctly and firmly tightened.
- **ALWAYS FLY WITH A FOCUSED CONCENTRATION.**
- Do not fly near people, buildings, trees, power lines, or other objects and only operate your quadcopter in an area with no children, unsecured pets, or livestock, which can be harmed by contact with rotating blades.
- Only operate your quadcopter outdoors and away from crowded areas. All observers should stand a safe distance behind the operator.
- Only operate your quadcopter in an environment where you can maintain unobstructed visual contact with it. Do not operate at night, or where there is fog, smoke, or dust that could limit visibility.
- Do not fly in high winds as even a light breeze can make flying difficult for beginners.
- Do not submerge your quadcopter or operate it in rainy or damp conditions. Beware of sprinklers and of landing in wet vegetation.
- Do not over load the quadcopter with payloads for which it wasn't designed.
- Inform yourself of and follow all current federal, state, and local laws regarding the use of RC hobby aircraft in the area where you plan to operate your quadcopter.
- Please respect the FAA's "Know Before You Fly" recommendations <http://knowbeforeyoufly.org/> and the AMA's National Model Aircraft Safety Code <http://www.modelaircraft.org/files/105.pdf>.
- Store your quadcopter and its radio controller out of reach of children, pets, and those who do not know how to use them safely.







FPV Add-on Option to Quadcopter Frame

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By purchasing any DRONE KIT (third party product), you agree to the above terms.



Packing List

<p>FPV Goggles/5" Monitor (1 qty)</p>	
<p>LiPo Battery (for goggles) (1 qty – Brand & size may vary)</p>	
<p>Long Servo Cables (2 qty – Brand may vary)</p>	
<p>Micro-SD Card w/Adapter (1 qty – Brand may vary)</p>	

These instructions are a continuation of the DroneCurriculum.net Quadcopter Kit build series.

Assembly – Step 1

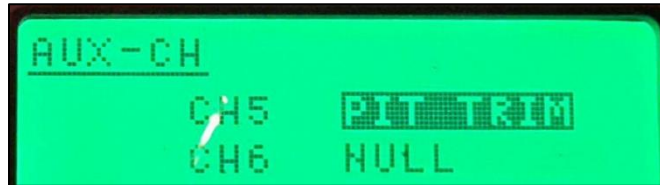
Configuring the Transmitter for Gimbal Movement Options

Because you will be able to see what the camera sees while in flight, it's necessary to set up the transmitter for camera **pitch control**. You can also set it up for **roll control** if desired.

1. Go to your **Turnigy 9X transmitter** and navigate to the **AUX-CH** screen.



2. Change **Channel 5** to **PIT TRIM**. Hit **MENU** to save the change.



Channel 5 will be used to adjust the gimbal's **PITCH CONTROL** during flight using the **PIT. TRIM** knob on the controller:



3. Using one of the **long servo cables**, plug it into **Channel 5 on the receiver** (attached to the drone). Plug the other end into the **PIT** port under the gimbal. **BE AWARE** that the **brown or black wire needs to be towards the outer edge** (see illustration).



- Next, you can choose whether you want to also control the **ROLL of the gimbal** while in flight (this is optional). If you choose this option however, you will lose the remote control of the **ATTITUDE GAIN** because we will need to re-purpose the **HOV. PIT** knob.



(You will still be able to remotely adjust the **BASIC GAIN** with the **HOV. THR** knob).

Here's a review of what the **GAINS** do:

BASIC GAIN: This adjusts the **SMOOTHNESS** of the general flight and hovering. You will be able to “settle down” the aircraft so that it doesn't oscillate while in the air.
ATTITUDE GAIN: This adjusts how the aircraft responds to movement of the joysticks. You will be able to adjust its quickness to your liking.

NOTE: If you chose to re-purpose the **HOV. PIT** for gimbal **ROLL** control, you can adjust and save the **ATTITUDE GAIN** in the *Assistant* software.

- If you want to control the gimbal's **ROLL** during flight, then unplug the servo cable from the *NAZA-M V2's* **X1** port and **Channel 7** on the receiver. Using a **long servo cable**, connect the plugs to **Channel 7 on the receiver** and the **ROLL port** on the gimbal. Again, **BE AWARE** that the **brown or black wire needs to be towards the outer edge** (see illustration).
- You can test your changes by first turning the transmitter on, then plugging the drone's main battery in. If everything is correct, you will be able to control the gimbal's **PITCH** with the **PIT. TRIM** knob and the gimbal's **ROLL** with the **HOV. PIT** knob (if chosen).



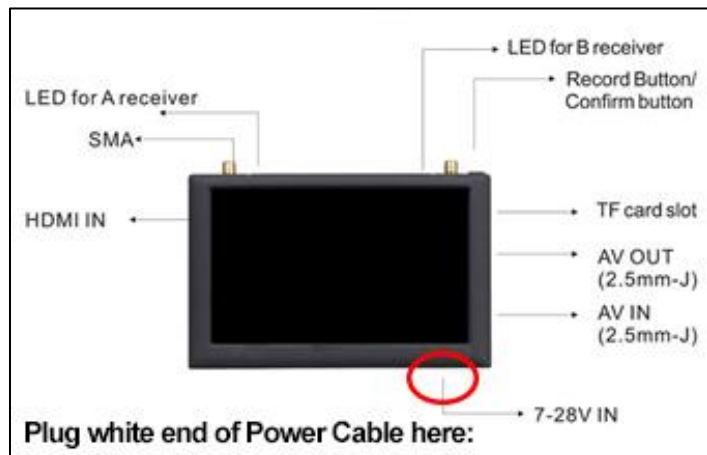
Assembly – Step 2 Setting Up the FPV Monitor

It's best to set up the FPV monitor before installing it into the goggles.

1. Unload the FPV box:



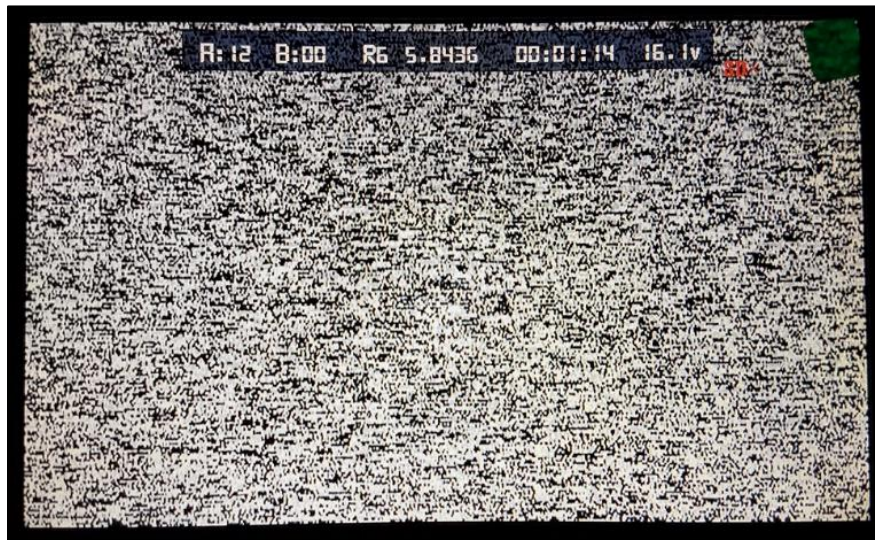
1. Attach both **ANTENNA** to the top of the monitor. They can eventually be angled in any direction to assist in grabbing the signal.
2. Plug the **Power Cable** into the bottom of the monitor. Then plug the monitor's battery into the **XT60** port.



3. Locate the **5-way toggle switch** on the back of the monitor. It will be used for the main function control of the monitor.

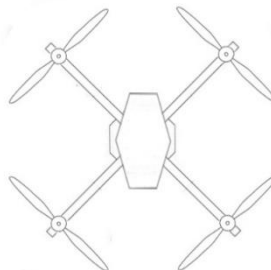


Click-in on the toggle switch to turn the monitor on. After a few seconds, you will see a startup screen. (NOTE: There is a green tab on the top right of the screen. It can be grabbed to remove a thin protective film covering).

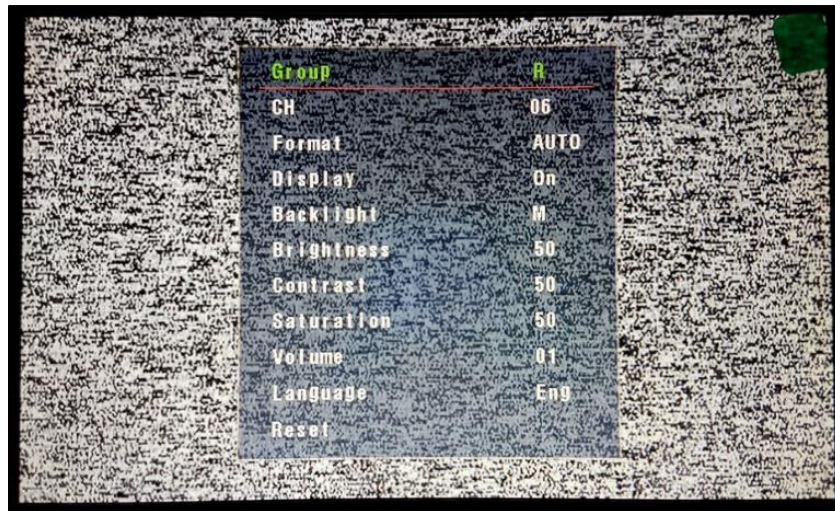


For your information, the top row indicates the following (your information will be different from that shown):

- **A:12 B:00** = The signal strength reception of diversity signals **A & B**.
- **R6 5.8436** = The last reception channel used.
- **00:01:14** = The length of time screen has been on.
- **16.1v** = The remaining voltage strength of the monitor's battery.
- **SDX** (in red) = Means there is no Micro-SD card inserted into the monitor.



4. **Click-in** the **toggle switch** again to get the following screen:



This screen provides numerous choices for control of the monitor. **Click-up** or **-down** on the toggle switch to select an option, and toggle left or right to change a value. **Click-in** on the toggle switch to leave the setup screen.

5. You can also **Click-up** on the toggle switch to run through several more options. The first option is the **DVR function** (more about this below). Another **Click-up** on the toggle switch will take you to the **HD IN** function (you can plug a cable into the mini-HDMI port on the side to view HD on your monitor). One more **Click-up** on the toggle switch takes you back to the **MAIN SCREEN**.
6. Power up your transmitter and then your drone. If everything is connected, the gimbal will activate and the camera will turn on. Check your gimbal's **PITCH** and **ROLL** control again from the transmitter.
7. **Click-down** on the toggle switch for a few seconds to activate the **Auto Search ...** function. Your monitor will locate the best signal reception. You will then see what the camera is seeing on your monitor.

Assembly – Step 3

Recording Options

NOTE: You have two options to record a video of your flight – either on the **camera itself** or using the **DVR function** on the FPV monitor. In my experience, you will get a higher-quality, less “noisy” video when recording on the camera. The advantage of recording using the DVR function is that you can have immediate play-back on the monitor. A disadvantage is that the DVR recording is limited to 3-minute clips at a time.

If Recording on the Camera:

The camera needs a **Micro-SD card** inserted to properly record video (max 32GB). Push it all the way in so it “locks.” Also, make sure the video choice is selected.



You will need to **manually start** your camera’s recording function prior to flight.

1. With the main drone battery plugged in, your camera should also be on. It will have a **solid red light** in front. Hold the top camera button down for several seconds and release. When the red light begins **flashing**, it indicates it is recording video.
2. **IMPORTANT:** Upon landing, be sure to hold the power button in again to **stop the recording**. Your recording **will not be saved** if you simply power off the drone.
3. To view your video, **remove** the Micro-SD card from the camera (**push it in gently** to allow it to be “unlocked”). Place the Micro-SD card into the **Adapter** and then watch it on your computer using a **Card Reader**.

If Recording using the DVR function on the Monitor:

1. You need to insert a **Micro-SD card** in the side slot of the monitor before you will be able to record using the built-in **DVR function** (max 32GB). Push it all the way in so it “locks.”
2. You can access the **DVR function** by a single **Click-up** of the toggle switch or by holding the top right **Record Button/Confirm Button** in for a few seconds.



If the DVR page displays “**NO IMAGE**”, **Click-down** on the toggle switch once to get an FPV image.



3. A single click of the top **Record Button/Confirm Button** will start the recording. You will see the elapsed time in red (in the lower left). Click it again to stop the recording.
4. While in the DVR screen, **Click-down** on the toggle switch to access any recordings you have made (this is the playback screen). Scroll through the video choices using **Click-left & -right** on the toggle switch.
5. To play a video, use the top **Record Button/Confirm Button**.
6. While in the playback screen, **Click-in** on the toggle switch to get to the **Delete** and **Format** screen (**NOTE:** If you have been playing a video, you may have to backout to the DVR screen and then go to the playback screen again to use the **Delete/Format** function). Use **Click-left** or **-right** on the toggle switch to make a choice. Once your choice is made, hit the **Record Button/Confirm Button** to choose between:
 - **Delete: Single / All**
 - **Format: Cancel / Execute**

Click-left or **-right** on the toggle switch to make a choice. Hit the **Record Button/Confirm Button** to execute. **Click-in** on the toggle switch to finish, and **Click-in** on the toggle switch again to leave.

7. **Click-down** on the toggle switch to leave the playback screen and go back to the DVR screen. **Click-up** on the toggle switch to leave the DVR screen and go through the **HD IN** screen and then back to the **MAIN SCREEN**.

NOTE: You can also record directly from the **MAIN SCREEN** while in flight by hitting the **Record Button/Confirm Button**. You will see a small red flashing “*Rec” indication. Click the **Record Button/Confirm Button** to stop recording. You will need to go to the DVR page to see the video.

Assembly – Step 4

Inserting the Monitor into the Goggles

1. Open the front of the goggles by pulling on the top of the red latch. It is held in place by a magnet.
2. Insert the monitor into the goggles and secure the latch.



3. Thread the battery cable through the loops on the side of the head-strap and into the elastic battery holder in the back of the goggle head-strap.



Assembly – Step 5

Other Options

The FPV kit came with a 2.5mm A/V cable, and there are ports on the side for **A/V-OUT** and **A/V-IN**. There is also a **tinted plastic sheet** to be used optionally on the inside Fresnel lens in case the lighting doesn't suit you.

CAUTION!

Flying First-Person-View (FPV) using goggles can be a real challenge. We recommend (as does the FAA) that a second crew member be involved whenever flying this way. This "spotter" visually watches the aircraft in flight and gives updates and advice to the FPV pilot.

Congratulations!! Always fly SAFELY!!!