

**FULL OPERATION WITH MODE CONTROL REQUIRES ARDUOPTER 3.4.**

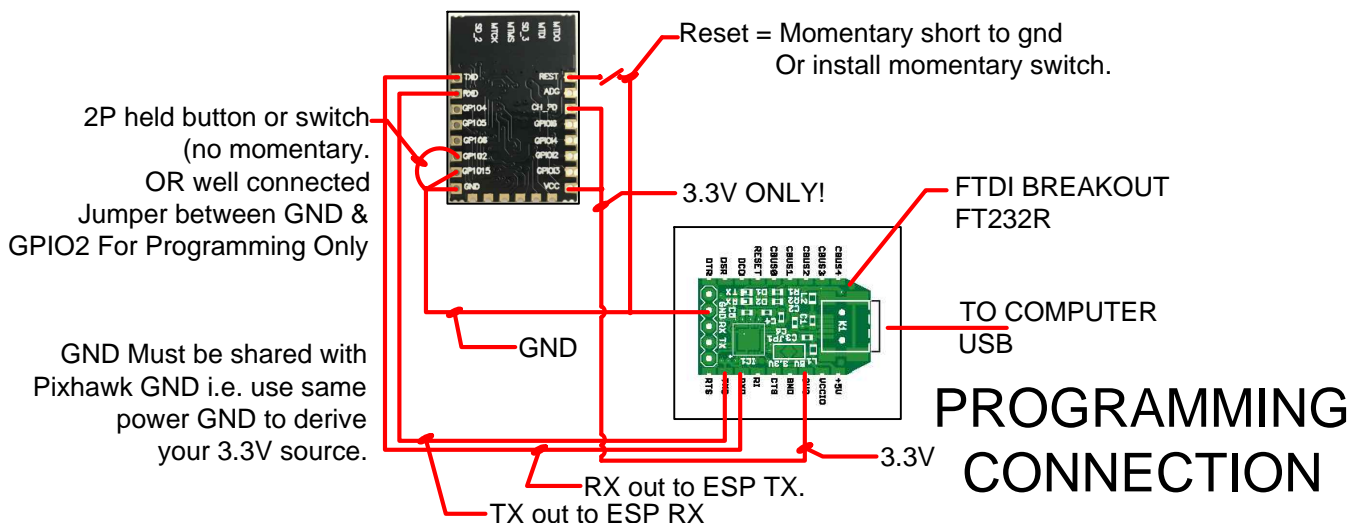
- \* Gopro Silver or Black 4
- \* Soldering Rig
- \* Wire (servo wire works well)
- \* A 3.3V Power Source. I use the inexpensive little imports found on Amazon. Though I'd suggest you use something in the \$15 or better range. Just my opinion.  
DO NOT CONNECT MORE 3.3V TO THIS BOARD
- \* An FTDI or similar USB to Serial breakout board. I use a BOB FT232R.  
<https://www.elektor.com/ft232r-usb-serial-bridge-bob-110553-91>
- \* ESP8266-12E - if you aren't a really good solderer, I'd suggest buying a board with breakout & pins, and making servo connections to the unit.

I'll also include a basic pcb layout I'm using, if you would like to etch one yourself. Credit to anyone that deserves credit is given in the .ino file. Many thanks!

1. Download and install Arduino IDE - 1.6.8 or better <https://www.arduino.cc/en/Main/Software>

2. Add the ESP8266 Arduino Boards Manager to IDE.  
File - Preferences - Settings  
Add the following to the "Additional Boards Manager Urls" Box:  
[http://arduino.esp8266.com/stable/package\\_esp8266com\\_index.json](http://arduino.esp8266.com/stable/package_esp8266com_index.json)
3. Download and install the WOL Library:  
<https://github.com/koen-github/WakeOnLan-ESP8266>
4. Download the GP control Arduino Sketch. Unzip to your chosen location.  
[https://github.com/lucidwan/Ardu\\_gp\\_control/](https://github.com/lucidwan/Ardu_gp_control/)

CONNECT your ESP8266-12E to your USB to serial device:



Program:

1. Install your FTDI drivers (or USB serial device drivers)
2. Open Arduino IDE.
3. Open the sketch.

The sketch assumes you haven't changed from the default GP IP address of 10.5.5.9. If you've changed it, I'd suggest resetting.

Edit the sketch, filling in your GP ssid & password & mac address. You must obtain the unique MAC address for the ON function to work.

I'm sure there is a simple app out there to do this. You could also connect a computer to the gopro access point, and dig it out that way.

I login to my router, and look at "wireless survey".

Whichever way you find to get yours, find your gopro ssid and inspect it. The mac address should be listed in this format XX:XX:XX:XX:XX:XX.

Transfer each 2 digit group i.e. XX: this to the sketch, making sure to keep the 0x that is prefixing each group like this 0xA2<-- where "A2" is the first 2 digits of your mac. Then continue with each of the rest in the address, making sure to use commas instead of colons.

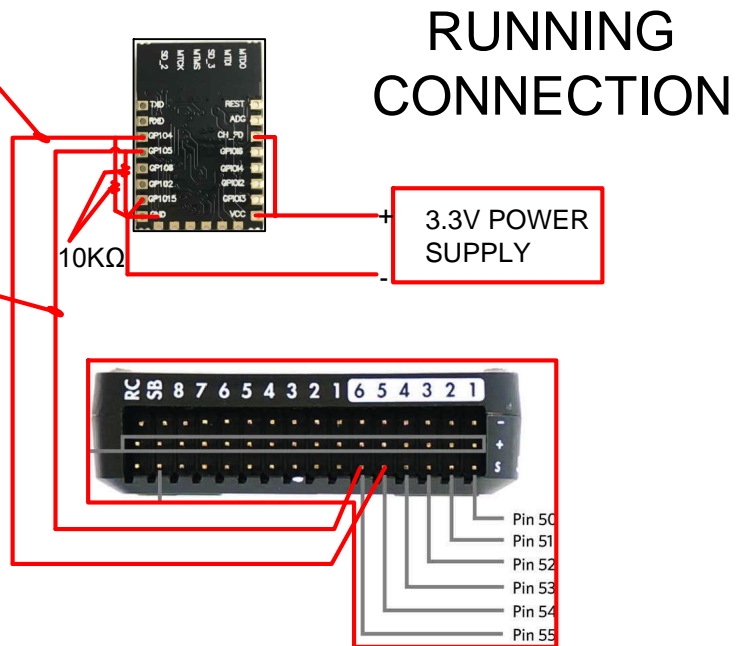
The mac in the sketch is an example only.

4. Save the sketch.
5. Connect your FTDI or USB Serial choice to your computer, verifying you've wired the ESP8266-12E to it per the above diagram.  
Select Generic ESP8266 as your board in boards mgr.  
Flash Mode - Dio. Flash Mem - or whatever yours is.  
Flash Freq - 40mhz. Cpu Freq - 80mhz.  
\* If your chip is new & never powered - start with baud at 9600. They seem to all have different rates but I've found either 9600 or 115200 new out of the box.
6. Perform the following, as described in image above  
Install a button, switch, or RELIABLY CONNECTED jumper between GND & GPIO2 on the ESP8266. This is to be held low the entire time so don't use a momentary. When ready to flash, be sure I02 is shorted to Gnd, and held low throughout the whole flash procedure.  
Apply power; pull RST LOW/short to grd - momentarily. You'll see a quick flash of blue the onboard LED.  
This resets the chip into flash mode.
7. Check/Verfiy the sketch in IDE.
8. If it checks out, Upload!
9. At 100% and IDE says upload complete - remove power (unplug your FTDI), remove whatever method you used to jumper GPIO2.

10. Connect per the image below - for operation.

MODE CHANGE IN THIS  
EXAMPLE - PIN 55 IS RC14. SET RC  
14\_FUNCTION TO (0).  
SET CH\_(YOUR INPUT  
CHANNEL)\_OPT = (34)  
{RELAY 2 ON/OFF}.

CAMERA TRIGGER  
RC7 UNDER MISSION PLANNER  
CAMERA GIMBAL SETUP.  
SET SHUTTER TO (RELAY)



#### Pixhawk Setup:

1. Verify you are running Arducopter 3.4 or better.
2. Open mission planner and connect to Pixhawk.
3. Go to Initial Setup - optional hardware - camera gimbal.
4. Set Shutter to be "relay". Set Duration to 1 (1/10 sec). Set PWM to correspond with your switch. PWM must be set high i.e. 1800 for signal out.
5. Go to Config/Tuning.
6. Find BRD - expand - find BRD\_PWM\_COUNT - set to (4) - assuming you need not more than 2 relays.
7. Find CH7\_OPT - set to (9) or camera trigger function. Map to switch on your radio output (input to Pixhawk). This sets up the shutter function. You must connect pin GPIO5 to Aux 5 bottom/signal pin. DO NOT CONNECT TO ANYTHING OTHER THAN SIGNAL PIN.
8. Pick an available input channel CHX\_OPT in which you can map to a switch on your radio for output (input to Pixhawk). Set this to be (34) [Arducopter 3.4+ only] {relay 2 on/off function}. This will control the mode switch. PWM must be set high i.e. 1800 for signal out. This sets up the mode switch function. You must connect pin ESP8266 GPIO4 to Aux 6 bottom/signal pin. DO NOT CONNECT TO ANYTHING OTHER THAN SIGNAL PIN.

9. Scroll down to RC13\_FUNCTION. Set to (0).
  10. Scroll down to RC14\_FUNCTION. Set to (0).
  11. Scroll down to RELAY. Expand. Verify Relay 1 pin is 54, and Relay 2 pin is 55. Set RELAY\_DEFAULT = 0 (off).
  12. Verify and Write all changes.
  13. Reboot Pixhawk.
  14. Turn on Gopro Wireless. Keep powered off.
  15. Apply Power to correctly connected ESP8266 Module.
- The following should occur in about 5 seconds:  
Gopro powers on and enters video mode.  
Upon depressing momentary shutter switch, video starts. Depressed again, video stops.  
Upon depressing momentary mode switch, mode will change to photo mode. Depress shutter, picture is taken.  
The mode switch will always go to the mode it isn't currently in.  
I've used this successfully for hours and have noticed zero interference with my rig.

I'll assume no liability for any issues.

Happy Gopro-ing on your vehicle!

PC Board layout:

This is a to scale layout on which you can solder a module only ESP8266.

Install header pins for use with jumper caps  
for power & rx/tx, flash and reset (on bottom).

The faint grey rectangle will measure 1.5 inches horizontally.

Again - I'll assume no liability for any issues.

PCB Image is available at

[https://github.com/lucidwan/Ardu\\_gp\\_control/blob/master/esp8266gpcontrol.pdf](https://github.com/lucidwan/Ardu_gp_control/blob/master/esp8266gpcontrol.pdf)

