

This guide is intended to help you modify a remote shutter release cable for use with APM/Pixhawk Flight Controllers and setup the flight controller for triggering the camera. This method eliminates the need (and costs) for 3rd party triggering devices. In this specific example, we will use a Sony Alpha 6000 (A6000) camera. This procedure may work with other cameras however for this specific example, we will use a Sony Alpha A6000 (A6000).

Items Required:

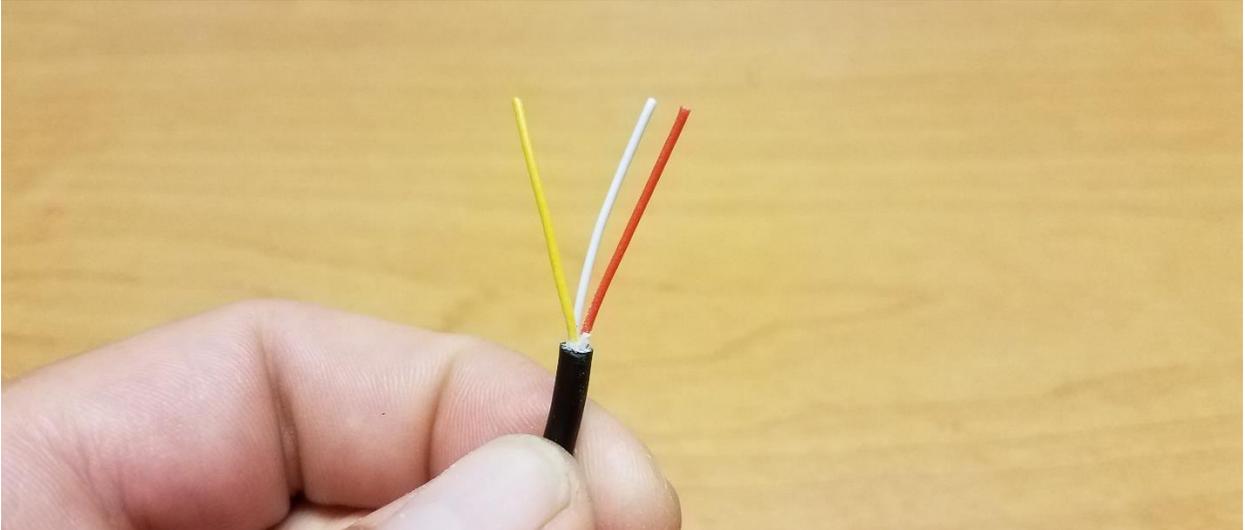
- Sony A6000
- Pixhawk or APM Flight Controller
- Remote Shutter Release Cable (Click [HERE](#) for a link to an affordable solution)
- Servo Pins ([LINK](#))
- Servo Pin Crimper ([LINK](#))
- Wire Stripper or Razor Blade
- Laptop with Mission Planner Installed

Step 1: Preparing the Remote Shutter Release Cable

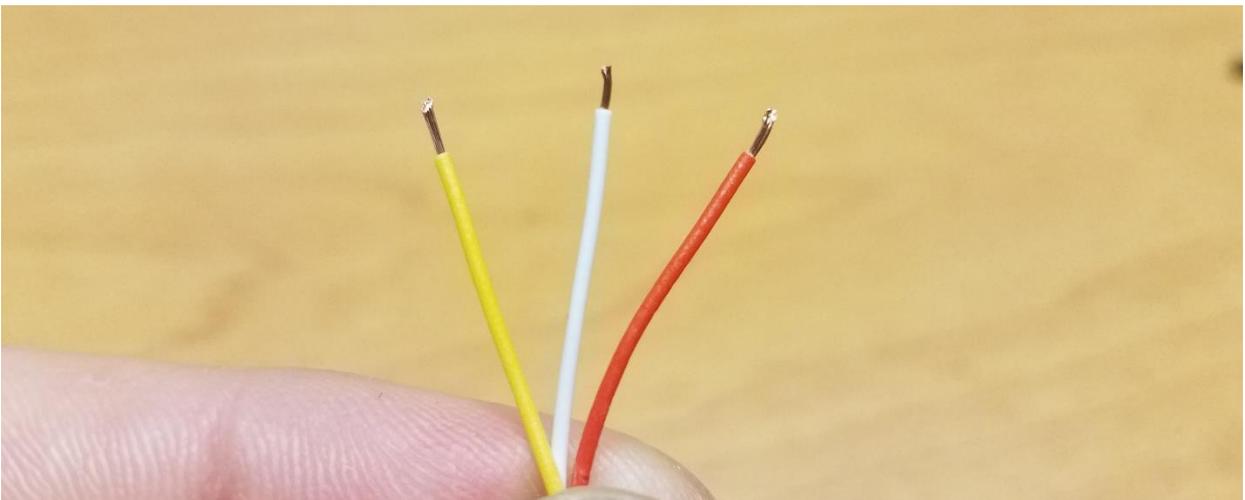
- a) Trim the Remote Shutter Release Cable to the desired cable length



- b) Strip off approximately 2-3cm of the black sleeve making sure not to damage the 3 wires contained within the sleeve.



- c) Remove approximately 3mm of the sleeves off of each of the three wires. You will need to make sure that there is enough of the sleeve removed that when the servo pin is crimped to the wire that there is contact between the pin and the exposed wire.

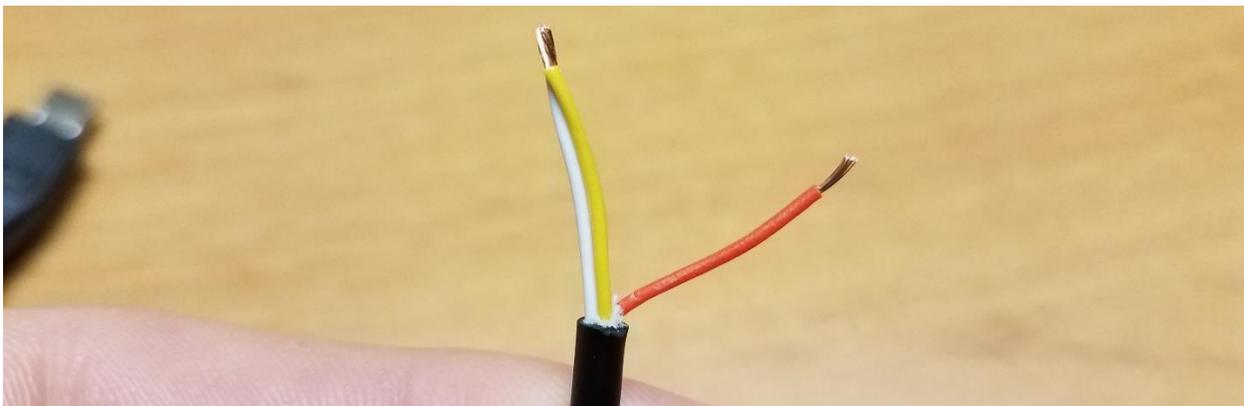


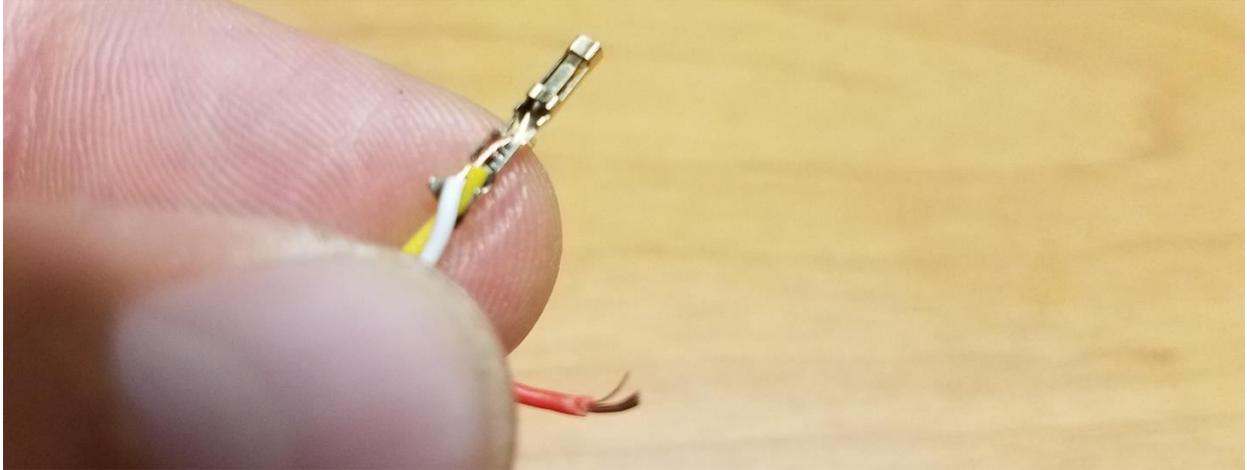
The three wires have the following functions:

- i. RED: SHUTTER
- ii. YELLOW: GROUND
- iii. WHITE: FOCUS

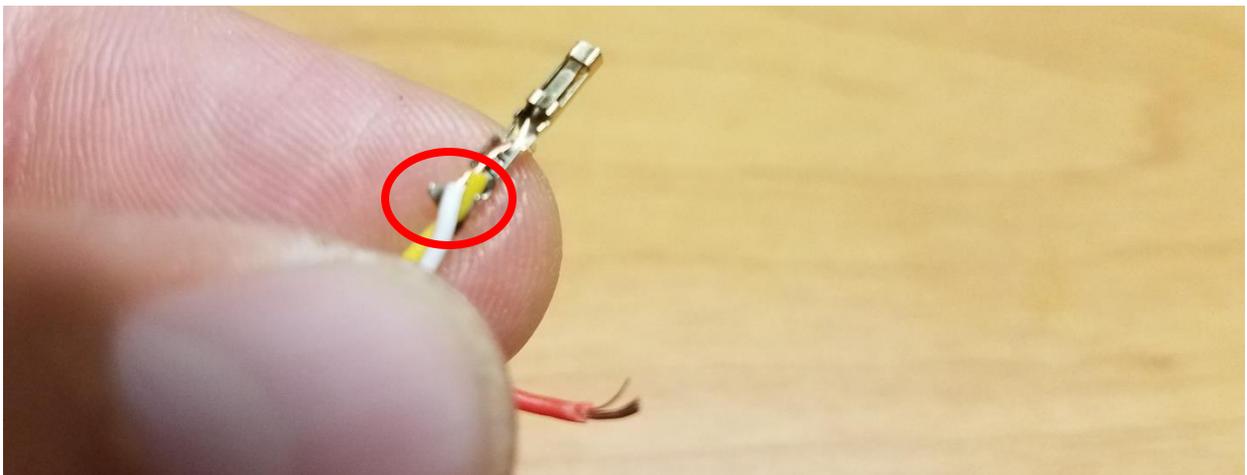
NOTE: Your wire coloring may differ from this example. You can identify which functions are controlled by each cable by connecting the cable to your camera, powering it on and then shorting the cables in pairs to identify which pair does what. For example, if you have a GREEN, BLUE and BLACK set of wires and shorting BLUE and BLACK results in the camera focusing, and then you short the GREEN AND BLUE wires and nothing happens but shorting the GREEN AND BLACK results in the camera exposing, then you know that the BLACK wire is ground, GREEN is shutter and BLUE is focus.

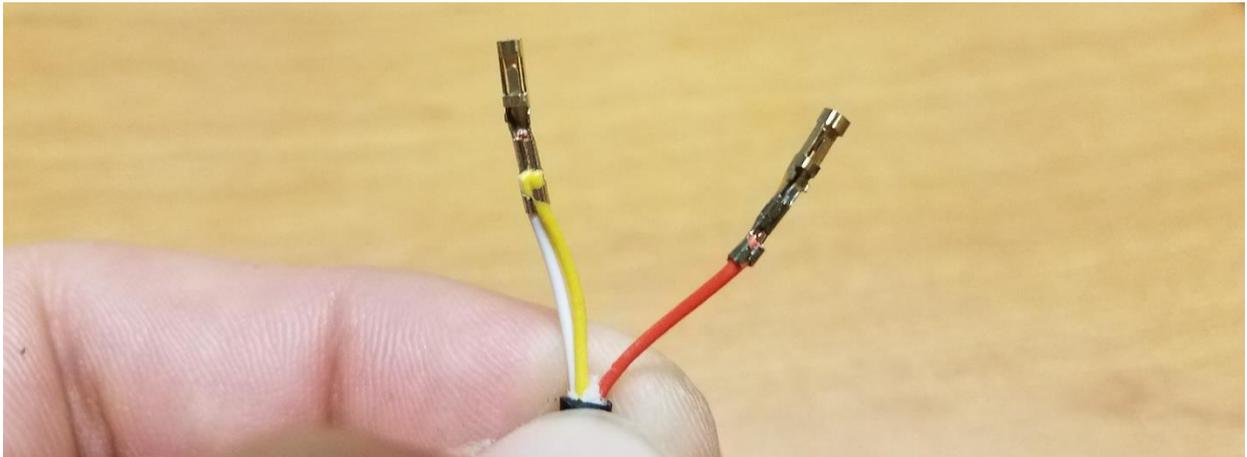
- d) Twist the exposed ends of the FOCUS and GROUND wires together then crimp a servo connector to the pair as well as to the exposed end of the SHUTTER wire.



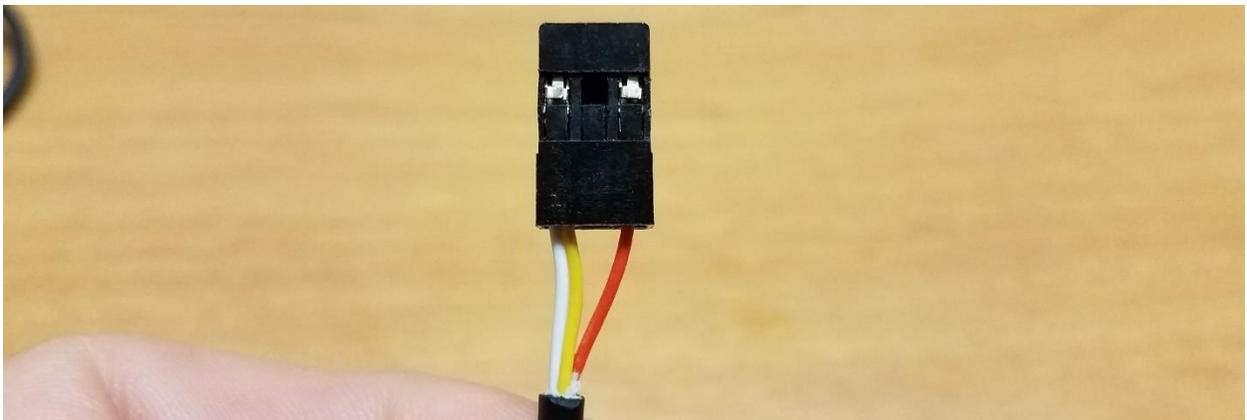


TIP: The Servo Pin has two sets of tabs which after crimping will fold on each other and secure the wire. To make life a little easier, use a small pair of needle nose pliers to press the pair of tabs on the end of the servo pin tightly against the wires. This will prevent the wires from coming out of the servo pin while trying to crimp them.

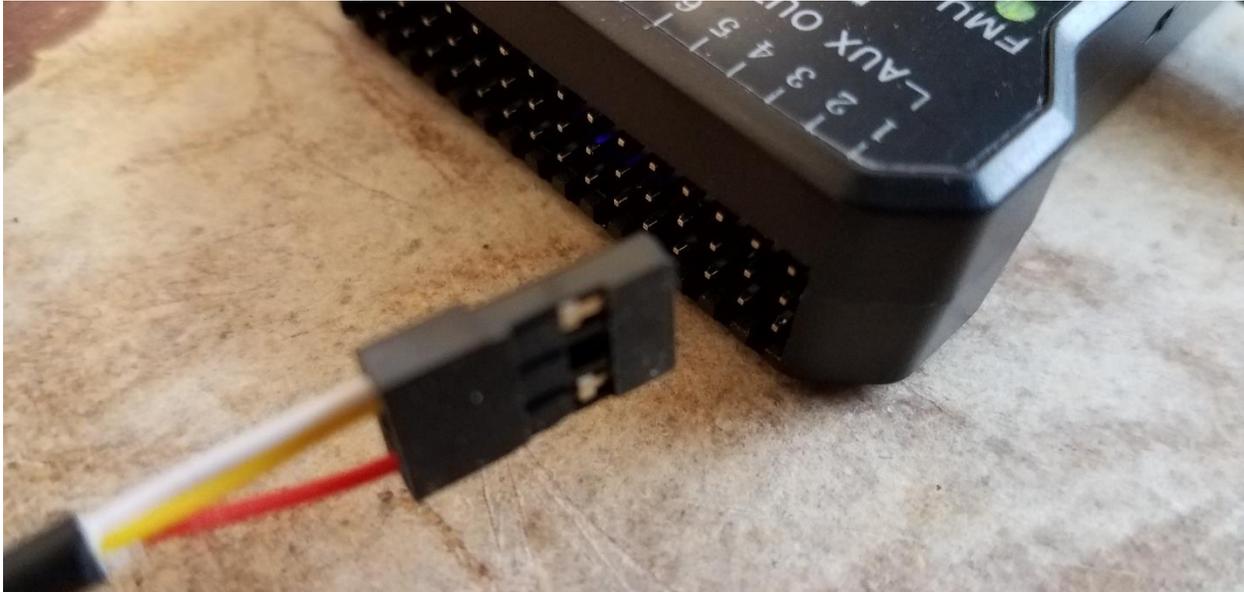




e) Insert the Servo Pins into a Servo connector, one pin on each side of the middle slot of the servo connector.



The cable is now ready for connection to your Pixhawk or APM Flight Controller. Note that the Shutter Pin (in this case the RED wire) will be on the SIGNAL side of the Auxiliary port while the WHITE/YELLOW wire will be on the GROUND side of the Auxiliary port.



Step 2: Setting up your Pixhawk/APM flight controller to trigger your camera via the Shutter Release Cable

- a) Connect to your Pixhawk/APM Flight Controller via Mission Planner either through direct USB connection or wireless telemetry link.
- b) Connect your modified shutter release cable to AUX 1 on the Pixhawk (CH9 on APM) making sure to maintain the correct orientation for polarity.



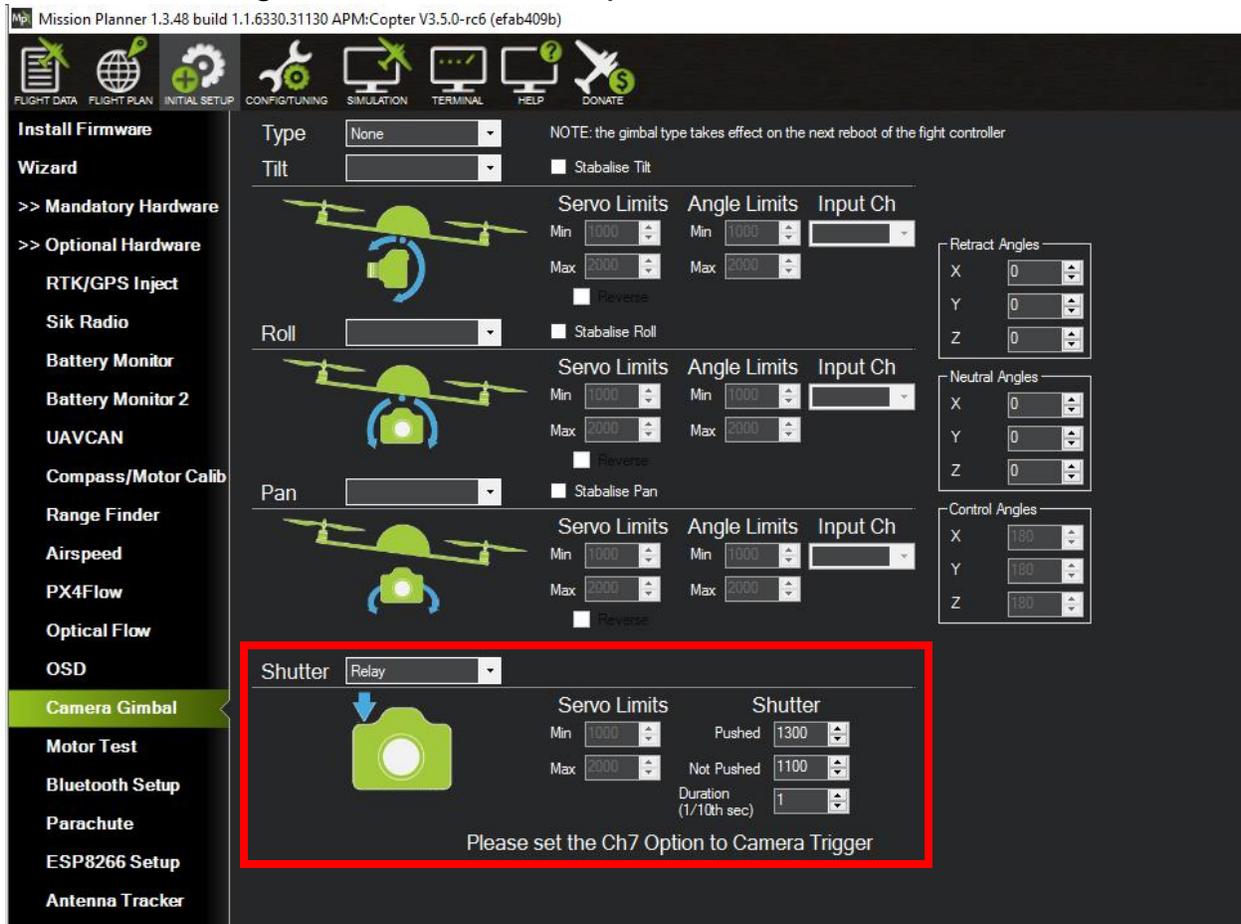
c) Connect the shutter release cable to your camera and power the camera on.



Since we have shorted the FOCUS and GROUND wires, the camera should automatically pull focus. As of now, I have not found a way to connect the SHUTTER, FOCUS and GROUND wires individually to the Pixhawk/APM and have the flight controller pull the camera focus and trigger the camera in sequence. To get around this, the camera settings are set so that the camera has the following features activated:

- i. Pre-Shutter Focus
- ii. Continuous Auto-Focus

d) In Mission Planner, navigate to INITIAL SETUP -> CAMERA GIMBAL and change the SHUTTER drop-down menu to “RELAY”



NOTE: You can play around with the “Duration” values to increase or decrease the responsiveness of the shutter command. With the Sony A6000, a duration of 1/10th of a Second functions perfectly.

- e) Proceed to the CONFIG/TUNING -> EXTENDED TUNING screen in Mission Planner and change the CH7 OPT to “Camera Trigger”. This will be necessary if you intend to use your remote controls CH7 to trigger the camera in addition to having the flight controller trigger the camera.



- f) Navigate to the FULL PARAMETER LIST under the main CONFIG/TUNING tab and locate the “CAM_TRIG_TYPE” parameter. This parameter must show as 1 for “RELAY”. If it is not set to 1, change this parameter to 1 before proceeding to the next step.

Mission Planner 1.3.48 build 1.1.6330.31130 APM:Copter V3.5.0-rc6 (efab409b)

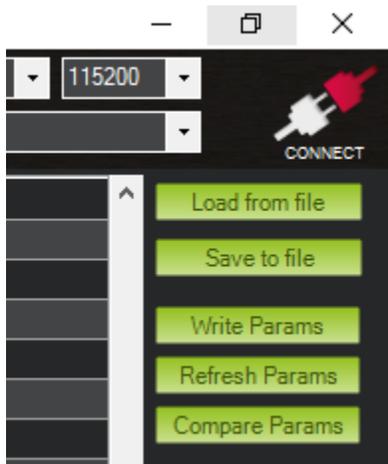
Command	Value	Units	Options	Desc
BRD_SAFETYENABLE	1		0:Disabled 1:Enabled	This controls the default state of the safety switch at startup. When set to 1 that if a safety switch is fitted the user can still control the safety state after st
BRD_SBUS_OUT	0		0:Disabled 1:50Hz 2:75Hz 3:100Hz 4:150Hz 5:200Hz 6:250Hz 7:300Hz	This sets the SBUS output frame rate in Hz
BRD_SER1_RTSCSTS	2		0:Disabled 1:Enabled 2:Auto	Enable flow control on serial 1 (telemetry 1) on Pixhawk. You must have the F then flow control will be auto-detected by checking for the output buffer filling
BRD_SER2_RTSCSTS	2		0:Disabled 1:Enabled 2:Auto	Enable flow control on serial 2 (telemetry 2) on Pixhawk and PX4. You must h is set to 2 then flow control will be auto-detected by checking for the output b
BRD_SERIAL_NUM	0		-32767 32768	User-defined serial number of this vehicle, it can be any arbitrary number you
BRD_TYPE	2		0:AUTO 1:PX4V1 2:Pixhawk 3:Pixhawk2 4:Prancer 5:PixhawkMini 6:Pixhawk2Slim 7:VRBrain 5.1 8:VRBrain 5.2 9:VR Micro Brain 5.1 10:VR Micro Brain 5.2 11:VRBrain Core 1.0 12:VRBrain 5.4	This allows selection of a PX4 or VRBRAIN board type. If set to zero then the
BTN_ENABLE	0		0:Disabled 1:Enabled	This enables the button checking module. When this is disabled the paramet
CAM_DURATION	10	seconds	0 50	How long the shutter will be held open in 10ths of a second (i.e. enter 10 for
CAM_FEEDBACK_PIN	-1		-1:Disabled 50:PX4 AUX1 51:PX4 AUX2 52:PX4 AUX3 53:PX4 AUX4(fast capture) 54:PX4 AUX5 55:PX4 AUX6	pin number to use for save accurate camera feedback messages. If set to -1 camera really takes a picture. A universal camera hot shoe is needed. The pi Pixhawk then a fast capture method is used that allows for the trigger time to
CAM_FEEDBACK_POL	1		0:TriggerLow 1:TriggerHigh	Polarity for feedback pin. If this is 1 then the feedback pin should go high on
CAM_MAX_ROLL	0	Degrees	0 180	Postpone shooting if roll is greater than limit. (0=Disable, will shoot regardless
CAM_RELAY_ON	1		0:Low 1:High	This sets whether the relay goes high or low when it triggers. Note that you sh
CAM_SERVO_OFF	1100	pwm	1000 2000	PWM value to move servo to when shutter is deactivated
CAM_SERVO_ON	1300	pwm	1000 2000	PWM value to move servo to when shutter is activated
CAM_TRIGG_DIST	0	meters	0 1000	Distance in meters between camera triggers. If this value is non-zero then ne can also be set in an auto mission using the DO_SET_CAM_TRIGG_DIST
CAM_TRIGG_TYPE	1		0:Servo 1:Relay	how to trigger the camera to take a picture

g) Scroll down through the parameters until you get to “RELAY_PIN”. Here you will want to set the “RELAY_PIN” parameter to match the AUX Port you have connected the shutter release cable to. Since we have connected the cable to AUX1 on a Pixhawk, we need to change the “RELAY_PIN” parameter to “50” (50:Pixhawk AUXOUT1). If you are connecting to an APM, then you will need to change this parameter to “13”.

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Command	Value	Units	Options	Desc
RC9_DZ	0	pwm	0 200	dead zone around trim or bottom
RC9_MAX	1900	pwm	800 2200	RC maximum PWM pulse width. Typically 1000 is lower limit, 1500 is neutral and 20
RC9_MIN	1100	pwm	800 2200	RC minimum PWM pulse width. Typically 1000 is lower limit, 1500 is neutral and 20
RC9_REVERSED	0			
RC9_TRIM	1500	pwm	800 2200	RC trim (neutral) PWM pulse width. Typically 1000 is lower limit, 1500 is neutral and
RCMAP_PITCH	2		1 8	Pitch channel number. This is useful when you have a RC transmitter that can't cha changes to take effect.
RCMAP_ROLL	1		1 8	Roll channel number. This is useful when you have a RC transmitter that can't char changes to take effect.
RCMAP_THROTTLE	3		1 8	Throttle channel number. This is useful when you have a RC transmitter that can't c 2.X: Changing the throttle channel could produce unexpected fail-safe results if cor changes to take effect.
RCMAP_YAW	4		1 8	Yaw channel number. This is useful when you have a RC transmitter that can't cha Reboot is required for changes to take effect.
RELAY_DEFAULT	0		0:ON 1:OFF 2:RelayCharge	The state of the relay on boot.
RELAY_PIN	50		-1:Disabled 13:APM2 A9 pin 47:APM1 relay 50:Pixhawk AUXOUT1 51:Pixhawk AUXOUT2 52:Pixhawk AUXOUT3 53:Pixhawk AUXOUT4 54:Pixhawk AUXOUT5 55:Pixhawk AUXOUT6 111:PX4 FMU Relay 112:PX4 FMU Relay2 113:PX4IO Relay1 114:PX4IO Relay2 115:PX4IO ACC1 116:PX4IO ACC2	Digital pin number for first relay control. This is the pin used for camera control.
			-1:Disabled 13:APM2 A9 pin	

h) Now that the required parameters have been changed, click on "WRITE PARAMS"



Step 3: Testing the Remote Shutter Cable and Flight Controller

Now that the cable has been modified and connected to the Pixhawk/APM which has been setup to trigger the camera via relay, let's test it.

a) Navigate back to the FLIGHT DATA Screen and right click on the map to select "TRIGGER CAMERA NOW"



Once clicked, you should hear or see the camera expose. If the camera does not expose, check the following:

- Correct Orientation of cables (ie, Shutter Wire is connected to the SIGNAL pin on the correct port of the flight controller and Ground is connected to Ground)
- Camera is On and not in an Error State
- Camera lens is not too close to an object which may cause it to be unable to autofocus and expose

If you still are not getting the camera to expose and all of the above-mentioned check points are not a problem, then you may want to adjust the Shutter Duration mentioned in Step 2 Part D.

If your camera took a picture, congratulations! You are all set to take pictures using the Pixhawk/APM flight controller without needing third party hardware!

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OR

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