



ENGR 7A

Electrical Fabrication and Calibration

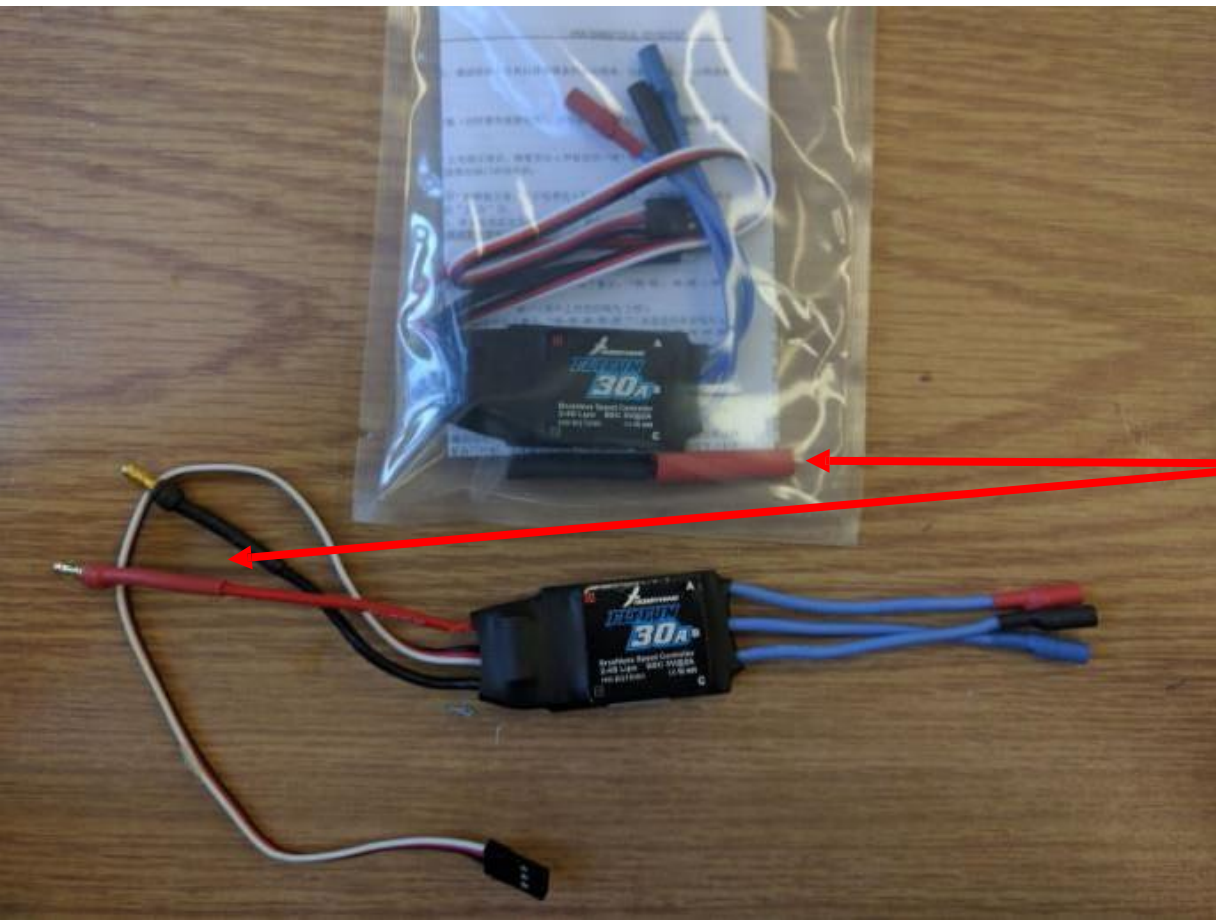
Fall 2018

Outline

- Electrical Fabrication
 - Electronic Speed Controllers
 - NAZA Voltage Regulator
 - 1400 KV and 2450 KV Motors
- Electrical Calibration
 - Electronic Speed Controllers: Throttle Range Setting
 - NAZA Flight Controller Software

Electronic Speed Controllers

1. Solder male bullet connectors to power wires
2. Cover bullet connectors with heat shrink (included in package)



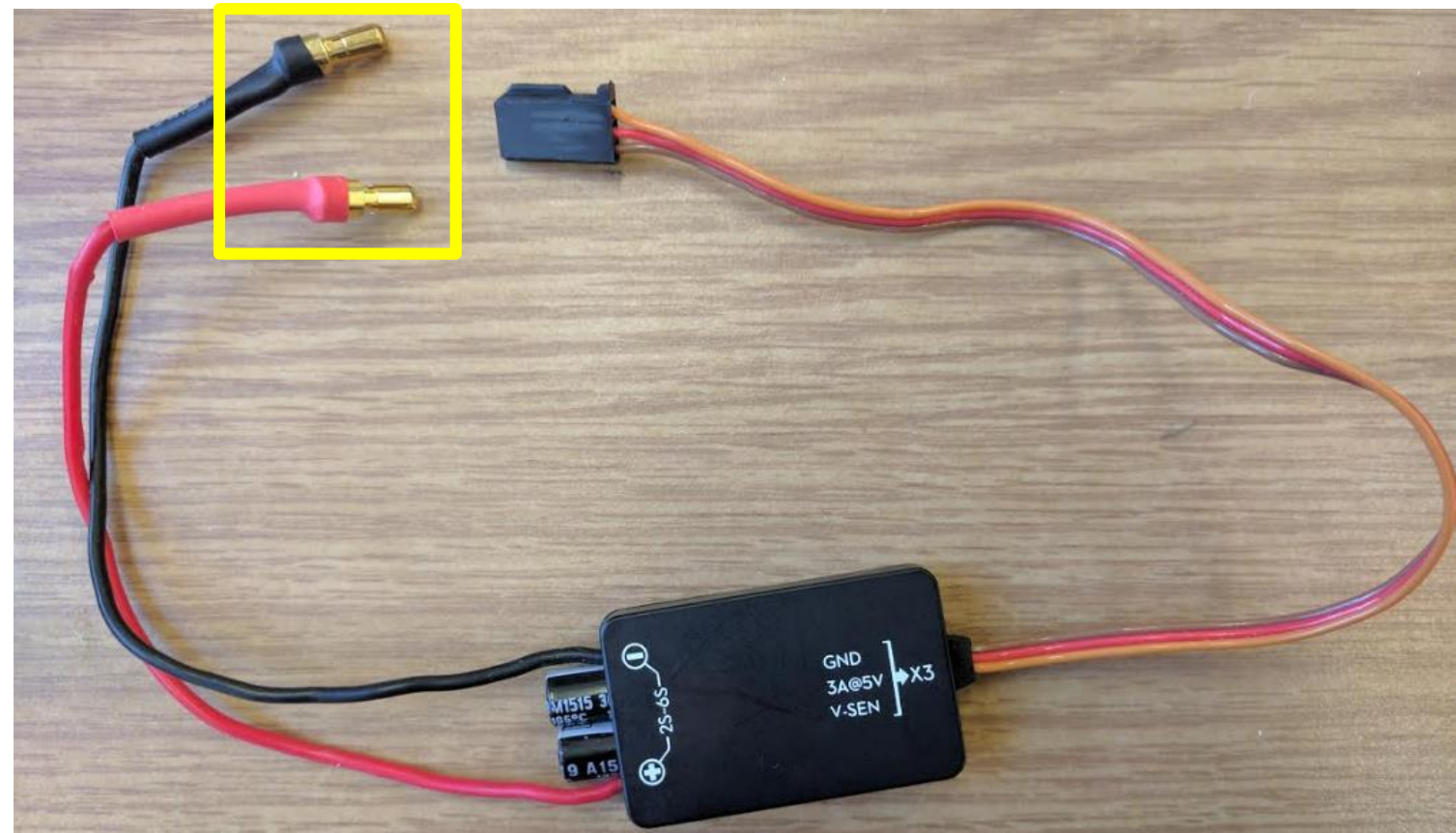
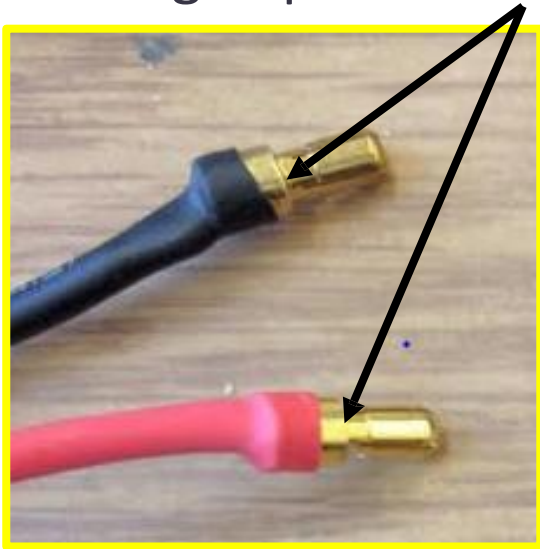
Red Heat Shrink Added to **Red** Wire

Black Heat Shrink Added to **Black** Wire

NAZA Voltage Regulator

1. Solder male bullet connectors to power wires
2. Cover bullet connectors with heat shrink (not included)

NOTICE: The heat shrink did not cover the full bullet connector. It should go up to the line!



Motors

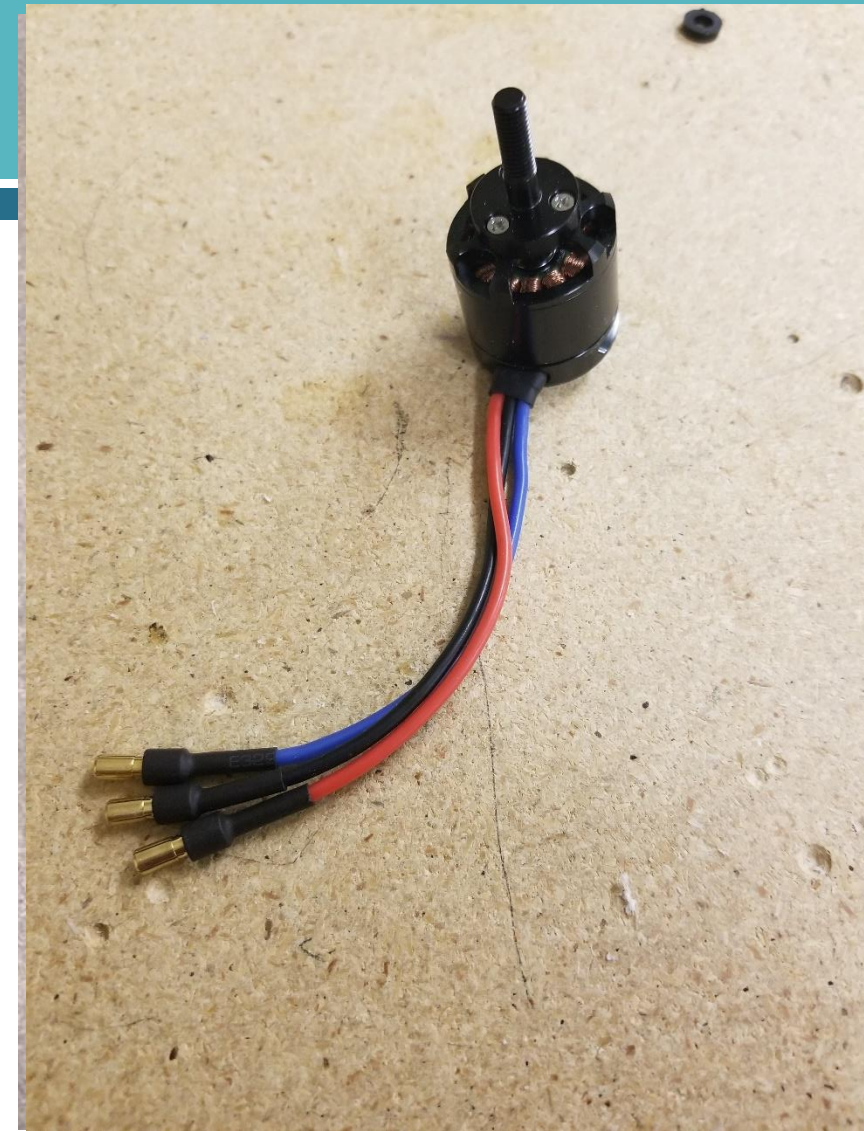
Sunny Sky 1400 KV & Sunny Sky 2450 KV

1. Male bullet connectors are already soldered
2. Heat shrinks are already placed

NOTICE: Coverage of bullet connectors.

BAD...

GOOD!



Electronic Speed Controllers: Calibration

BEFORE PUTTING ESCs ON THE QUADCOPTER!

Throttle Range Setting: Instruction sheet included with packaging

Purpose: Set minimum and maximum throttle for your set of 4 ESCs

Required Materials: 4 ESCs, 1 motor, transmitter & receiver, battery

Setup for each individual ESC:

1. Plug 3 motor wires into the ESC
2. Plug Black/Red/White connector into throttle channel of receiver**

** Throttle Channel: See next 2 slides

Transmitter & Receiver Channels

Commercial transmitters come in right & left handed configurations.

Left-handed transmitters have been modified so all transmitters are right-handed, as seen below.

- The modified transmitters are labeled **OLH** (Originally Left Handed)
- This changes the wiring connections from the receiver to the NAZA Flight Controller (see next slide)



Receiver to NAZA Flight Controller



Regular (Originally **Right** Handed) Transmitters

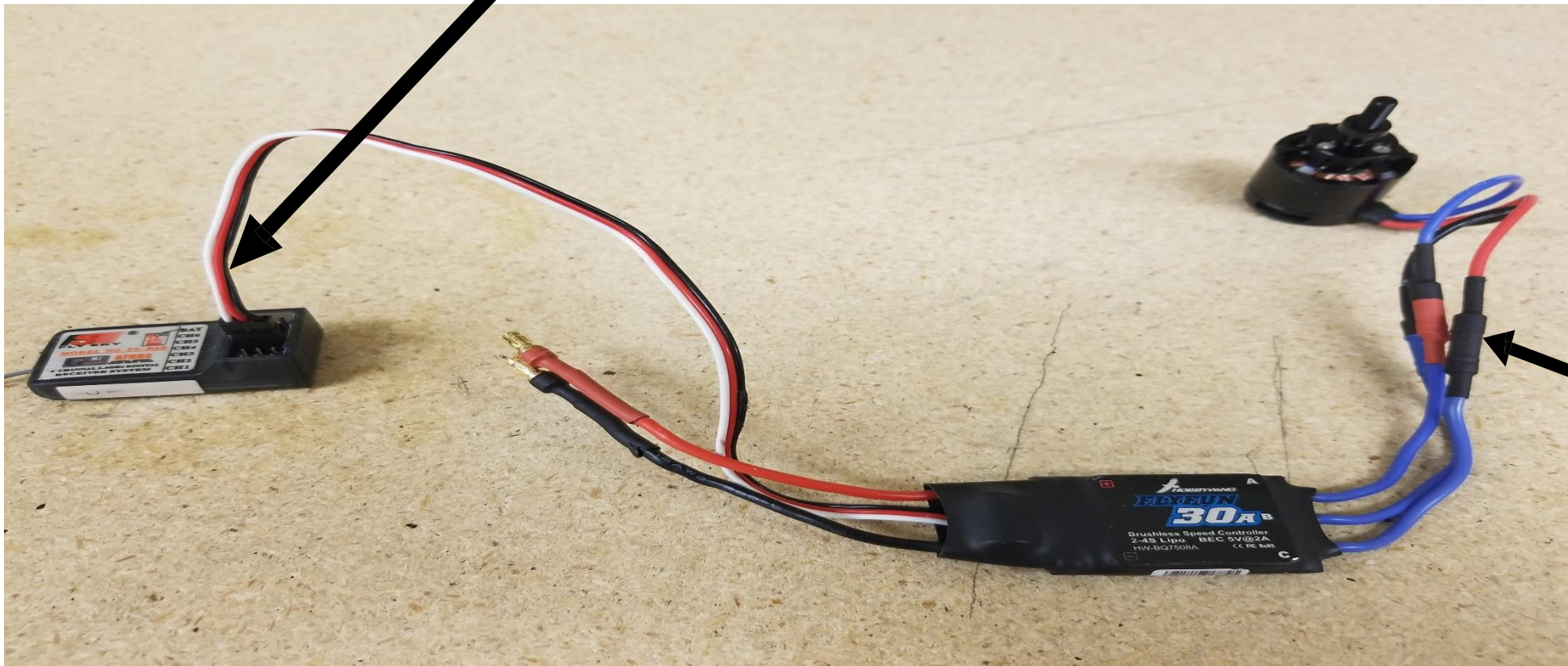
- 1 → A
- 2 → E
- 3 → T ** Use channel 3 for ESC calibration
- 4 → R
- 5 → U

Modified (Originally **Left** Handed) Transmitters

- 1 → A
- 2 → T ** Use channel 2 for ESC calibration
- 3 → E
- 4 → R
- 5 → U

Setup

Throttle Channel Ground Wire
TO THE RIGHT



**Good Bullet
Connector
Coverage**

ESC Calibration Steps

“Throttle Range Setting”

Follow the calibration steps for the ESC that your team has

TWO types of ESC:

HOBBYWING FLYFUN 30A ESC ([Refer to the next slide](#))

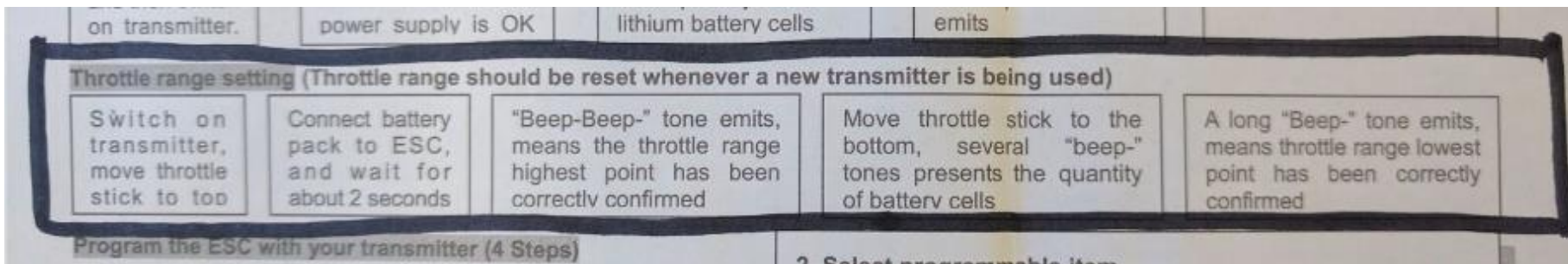
RCMALL 30A ESC ([Refer to the “Calibrating ESC” Video](#))

ESC Calibration Steps

“Throttle Range Setting”

FOR HOBBYWING FLYFUN 30A ESC

1. Plug in ESC to motor
2. Plug in ESC signal wire to throttle channel of receiver (ground wire DOWN)
3. Turn on transmitter
4. Move throttle stick to top position
5. Plug in battery to ESC – startup sound is three short tones increasing in pitch
6. Listen for two short tones
7. When heard, move throttle to bottom position
8. Listen for three short tones and one long tone



NAZA Calibration




FIRST: Fully assemble your quadcopter with electronics and have the TA check your wiring before receiving a battery.

SECOND: Plug in the quadcopter from the LED to your computer using the USB cord.

THIRD: Transmitter ON, Failsafe ON, Plug in the battery to your quadcopter during installation.

Install the NAZA M-Lite software: <http://www.dji.com/naza-m-lite/download>

Assistant Software & Driver

	<p>Naza-M Lite Assistant Software v1.00</p> <p>* Download the Firmware via Assistant software; the software only supports Windows XP or above (32bit/64bit).</p> <p>@Naza-M Lite Firmware* v1.00</p>	<p>2014-04-22</p>	PC Computer
	<p>DJI WIN Driver Installer</p> <p>supports Windows XP or above (32bit/64bit).</p>	<p>2013-01-18</p>	
	<p>Naza-M Lite Assistant Software v1.00</p> <p>* Download the Firmware via Assistant software. Mac OS X 10.9 or above.</p>	<p>2014-04-22</p>	MAC Computer

View (Summary) Screen

NAZA-M LITE English ▾ — ✕

View Basic Advanced Tools Upgrade Info

Basic

Mounting

GPS Location

X	0 cm
Y	0 cm
Z	0 cm

Aircraft

Mixer Type: NONE

RC

Receiver Type: NONE

Gain

	Pitch	Roll	Yaw	Vertical
Basic	100% INH ▾	100% INH ▾	100% INH ▾	100% INH ▾
Attitude	100% INH ▾	100% INH ▾		

Channel Monitor

A		0	U		0
E		0	X1		0
T		0	X2		0
R		0			

[OnLine Help](#)

Advanced

Motor

Motor Idle Speed: NONE
Cut Off Type: NONE

F/S

Failsafe Methods: NONE

IOC

Intelligent Orientation Control: NONE

Gimbal

Gimbal Switch: NONE

Voltage

Protection Switch: NONE
Current Voltage: NONE
Battery Type: NONE
First Level Protec: NONE
Second Level Protec: NONE

MODE: N/A MC OUTPUT: ON

NOTE: The software will prompt you to create a login when you open it. This is NOT necessary.

Calibration Setup

1. Plug in USB cable from NAZA LED unit to the computer.
2. Plug in battery to the quadcopter.

Before quadcopter is powered, the lower bar on the software screen should display:



After quadcopter is powered, the lower bar on the software screen should display:



If you do not see “MC OUTPUT: OFF”

UNPLUG THE BATTERY AND ASK TA FOR HELP!

Calibration Screens

Watch “[NAZA Calibration Video Tutorial](#)” for specific directions on each screen.

Basic: Aircraft Configuration, RC & Failsafe Calibration, Controller Response Speed

Advanced: Motor Idle Speed, Battery Voltage Cutoff

Tools: NAZA Gyroscope & Accelerometer Calibration