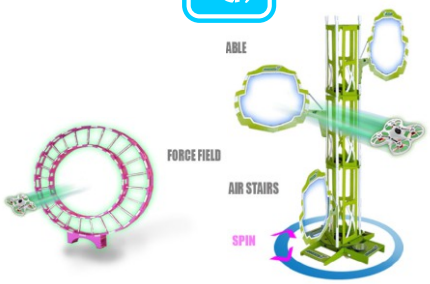
MANUAL
version 20.x

SECTION 1: LET's LIGHT IT UP!!!! release schedule

SECTION 2: OBSTACLES / build

CLUB COMP

2.1. VERSA GATE
2.2. TURNTABLE
2.3 CHOMPER '21



2.6. AIR STAIRS
2.7. FORCE FIELD '20

SECTION 3: OBSTACLES / program

CLUB
CLUB
CLUB

3.1. HARDWARE
3.2. SOFTWARE
3.3. EXAMPLES

SECTION 4: DRONES / technology

CLUB
CLUB

4.1. Skills Matrix / troubleshoot
4.2. Drone Hardware Interface

SECTION 5: DRONES / performance flying

CLUB

5.1. Drills

SECTION 6: XFACTOR / events

CLUB

6.1. SCORING
6.2. SIGNAGE
6.3. CHECKLIST

STARTER BUNDLES

GO DRONE X STEM

GIVE HER A WHIRL

Let's light it up!

Your organization has started it's journey to FPV performance drone competition. It's the half way point between actual physical racing and e-sport racing.

GoDroneX is a passion project. As part of my personal commitment to the success of your program we have included remote Professional development (PD) as part of the bundle.

We typically set up these meetings:

Meeting 1:	*Resources* *Training Plan* *FPV Gotcha's*
Meeting 2:	*Follow up from first Training session* *Team Structure* *Students are welcome*
Meeting 3:	*Follow up Training Sessions* *Obstacle Development*
Meeting 4:	*Open House or* *Competition Prep*

When you are ready to schedule the first meeting, just send an email with a couple of time options.

Note I am in Chicago, central time zone.

LET'S FLY.

As part of GoDroneX's drone prep, you can take any drone out of its case and give it a test flight.

But first . . . these little drones can rip!
The #1 cause for breakage happens on the very first flight when the pilot punches the throttle to full up position and launches the tiny drone into the ceiling.

All stick movements should be very Minimal.

So, now Let's Fly or should I say scoot . .
The very first flying exercise at Drone Camp is to scoot on a slick floor around a 10' box with the front always pointed away.

1) Take any color matching drone and transmitter.

2) On transmitter,
   Hold **BUTTON** to power up
   (beep & faint green)
   Left **SWITCH** down (off)
   Right **SWITCH** down (easy mode)
   Left **STICK** down (throttle at zero)
3) Plug the battery into the **drone.**
   Light will go solid once it initializes and locates it's already bound transmitter.
4) Left **SWITCH** all the way up to **arm**
5) Gently raise throttle (**remember Minimal**).
6) Scoot around making a "+" sign with mainly the right hand for direction.
   Then try a 10' box. Then a diamond.

Gregg Novosad
GO DRONE X
cell: 847-528-0843
email: greggnovosad@yahoo.com
work: gnovosad@demandsolutions.com

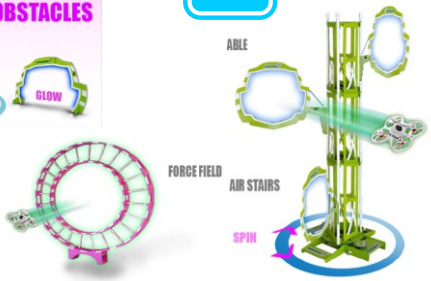
MANUAL

SECTION 1: LET's LIGHT IT UP!!!! release schedule

SECTION 2: OBSTACLES / build

CLUB COMP

2.1. VERSA GATE: Frame, Lights, Motion
2.2. VERSA GATE: Turntable
2.3 CHOMPER v21.1



2.6. AIR STAIRS
2.7. FORCE FIELD v20.x

SECTION 3: OBSTACLES / program

CLUB COMP

3.1. HARDWARE CLUB
3.2. SOFTWARE CLUB
3.3. EXAMPLES CLUB

SECTION 4: DRONES / technology

CLUB COMP

4.1. Skills Matrix / troubleshoot CLUB
4.2. Drone Hardware Interface CLUB

SECTION 5: DRONES / performance flying

CLUB COMP

5.1. Drills CLUB

SECTION 6: XFACTOR / events

CLUB COMP

6.1. SCORING CLUB
6.2. SIGNAGE CLUB
6.3. CHECKLIST CLUB

2.1. VERSA GATE: Frame

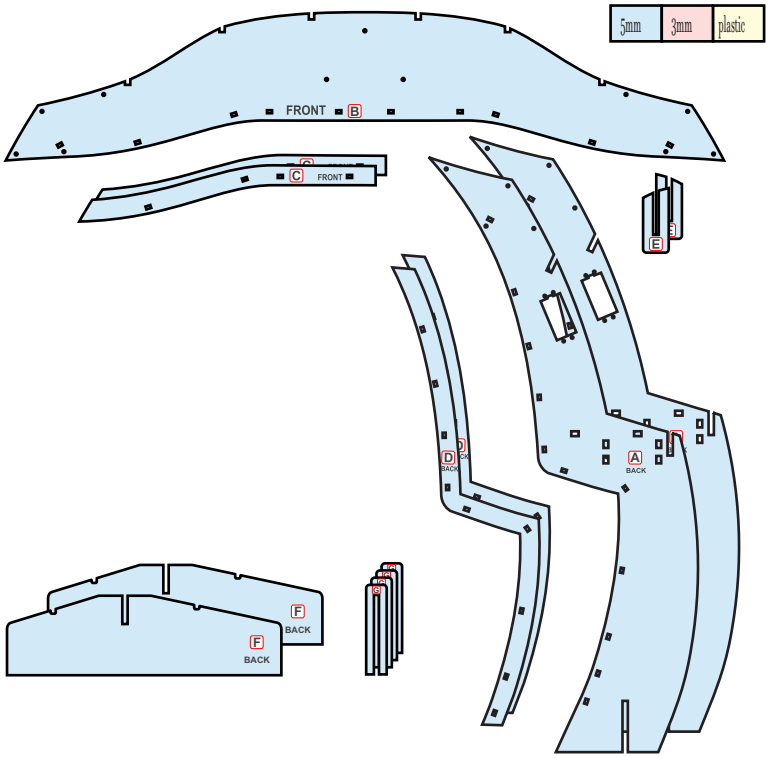
SUPPLIES

not included

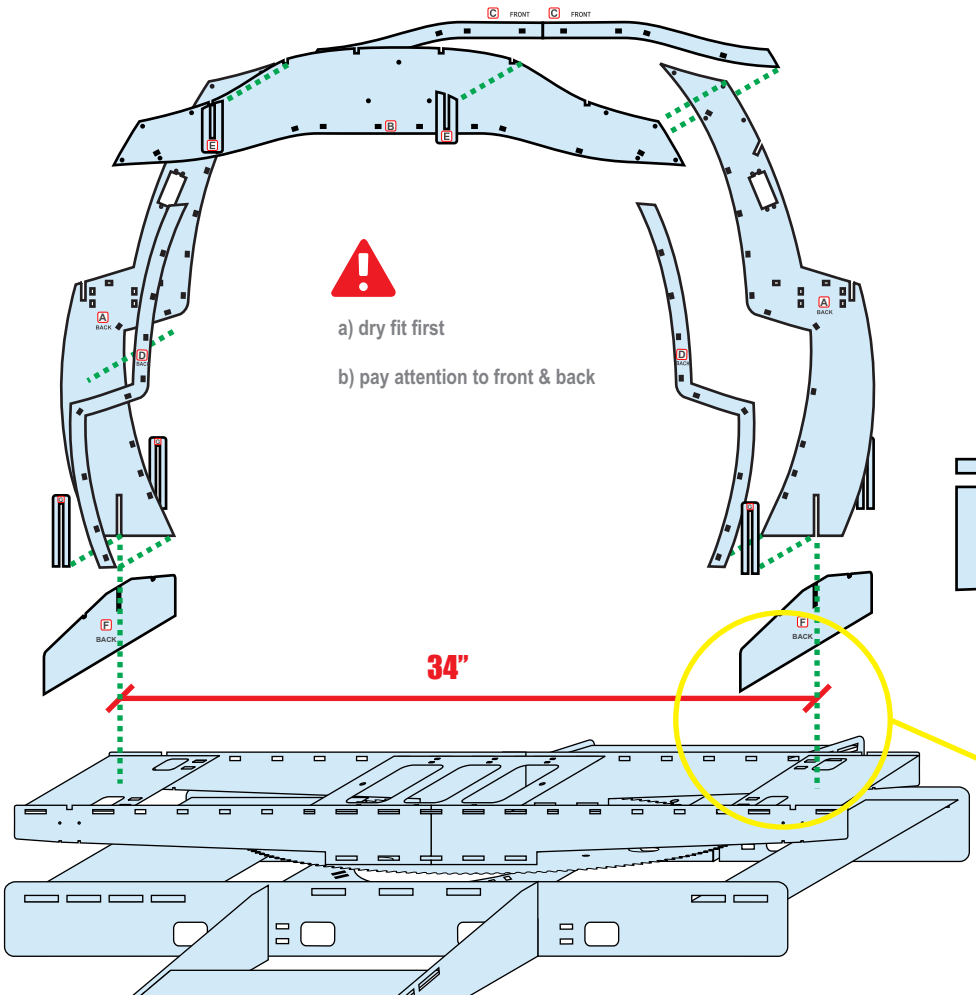
GLUE yellow preferred

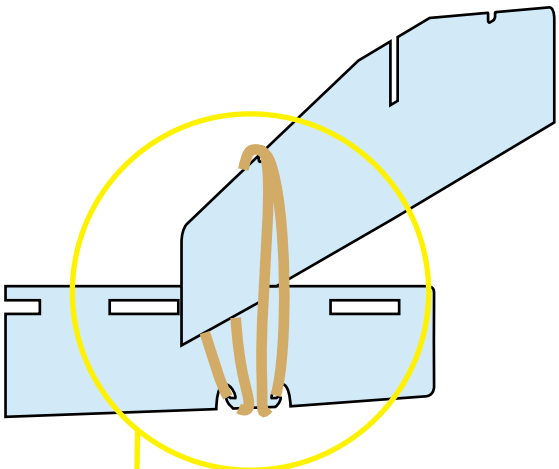
CLAMPS

PARTS



ASSEMBLY





34” is the same dimension as the turntable slots.

Use rubberband to secure on turntable

2.1. VERSA GATE: Lights

1. LED MOUNT

a) temporarily tape LED strip to VERSA frame

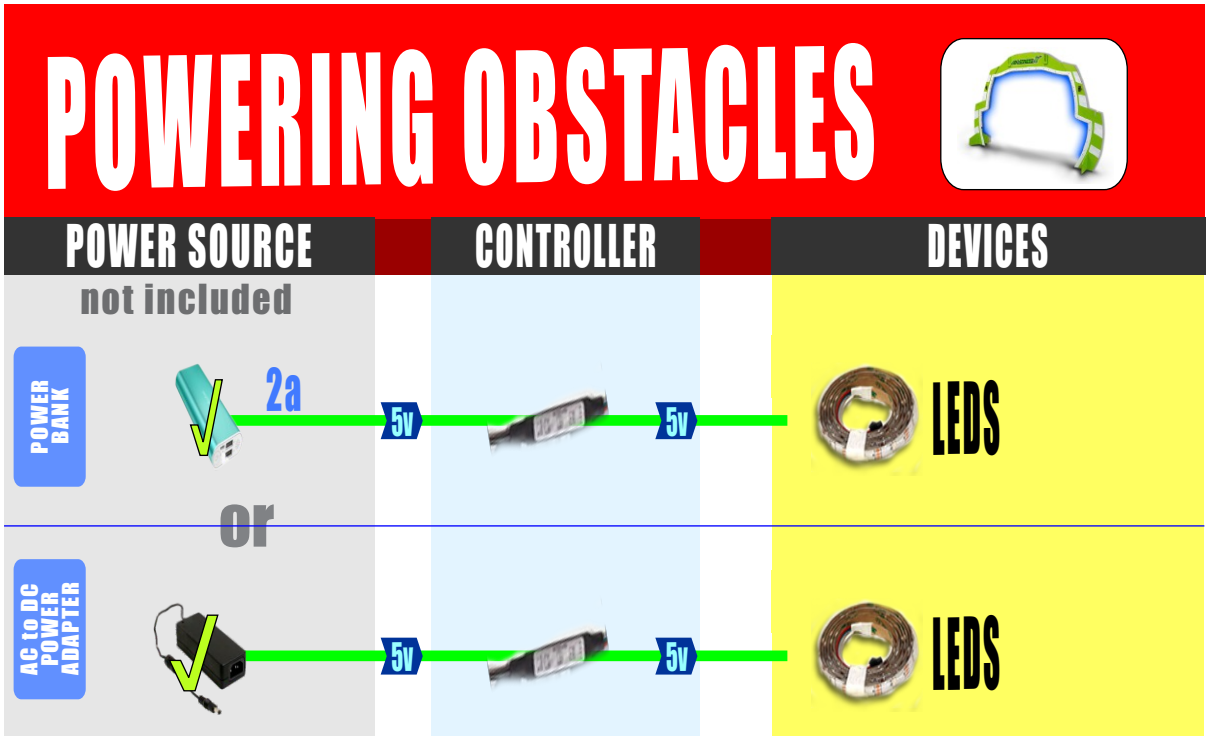
b) zip tie for permanent mount.

c) connect LEDs to LED controller

d) connect LED controller to power source either a

5v power bank or

5v power adapter



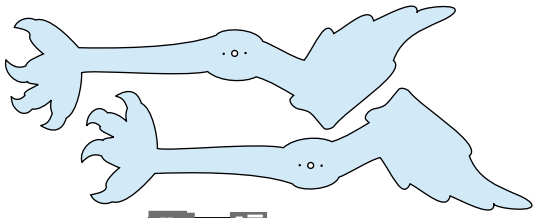
2.1. VERSA GATE: Motion

SUPPLIES

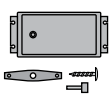
not included

- SCREWDRIVER PHILLIPS
- PAINT & BRUSH
- HOT GLUE

PARTS



2 90cm 36" Extension



2 Servo Kits
4 #3 Arm Mount Screws 3/8"

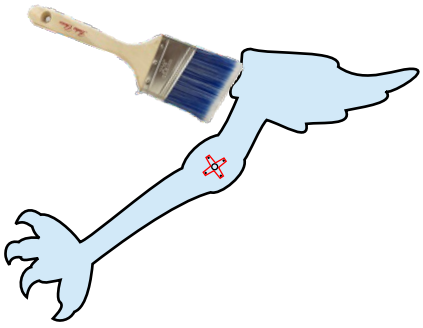
or

Servo Controller

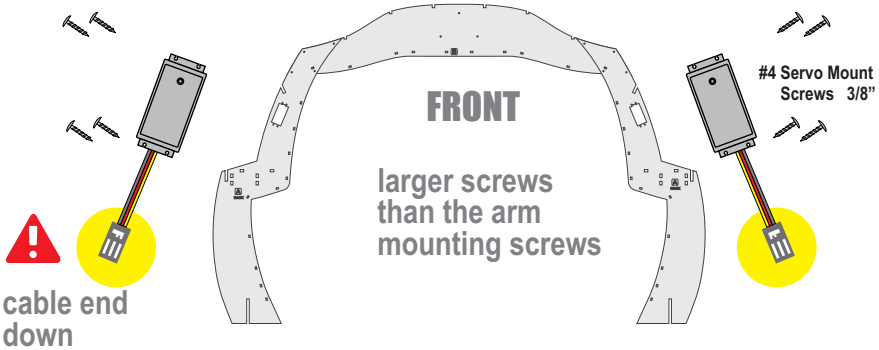
OSCILLATE

ASSEMBLY

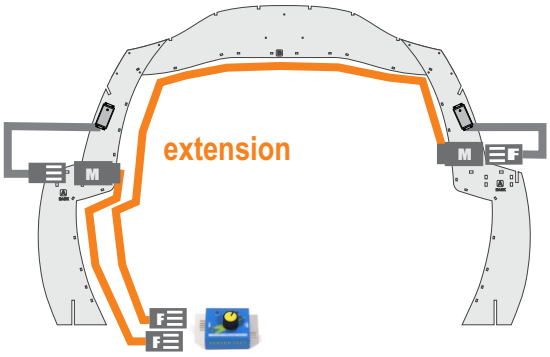
1. PAINT



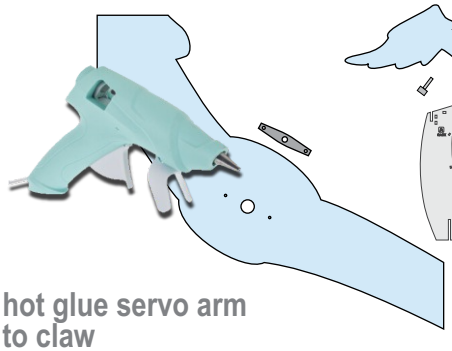
2. SERVOS



3. ZIP TIE

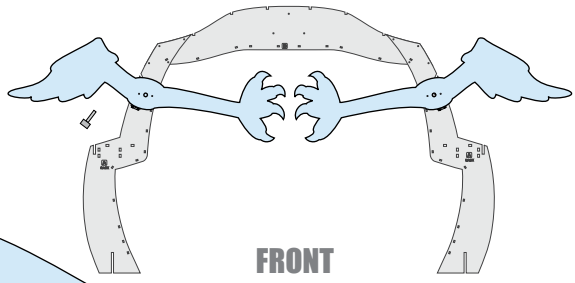


4. HARDWARE



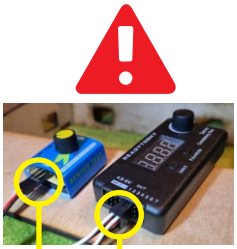
hot glue servo arm to claw

- screw arm bolt



5. ELECTRONICS

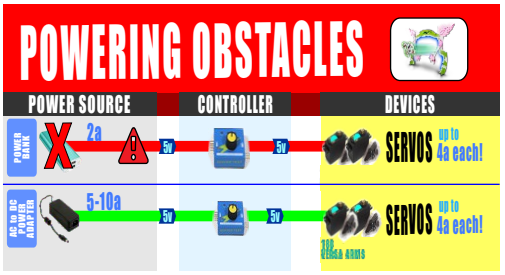
or



S 5v G
S 5v G
horizontal

S 5v G
vertical

POWERING OBSTACLES



Servos can pull up to 4amps each!
Only use a power source rated at 5a+.

Don't use **POWER BANKS.**
They will burn out as they are only rated for 2 amps.

2.2. VERSA GATE : Turntable p1

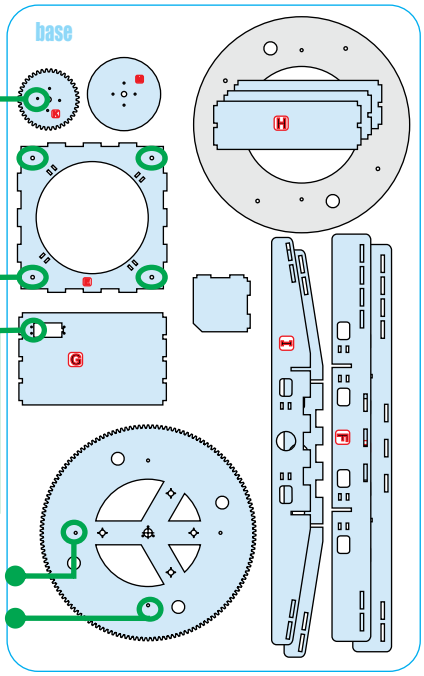
SUPPLIES

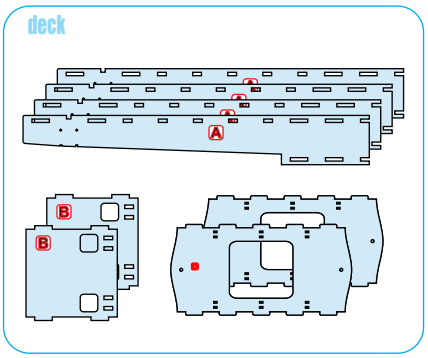
not included

- GLUE
- PAINT & BRUSH
- SCREWDRIVER PHILLIPS

360	1	360 degree Servo Kit w/ screws & arms	
	4	#3 Screw 0.625" servo screws	for gear mount
	4	#8/32 Bolt 1.0" + nuts	mount base to metal lazy susan harware
	8	#4 Screw 0.375" (3/8)	4 for servo mount
	2	#8/32 Bolt 1.5" + nuts	mount deck to swivel base
	2	#8/32 Bolt 0.5" + nuts	mount swivel gear to large gear

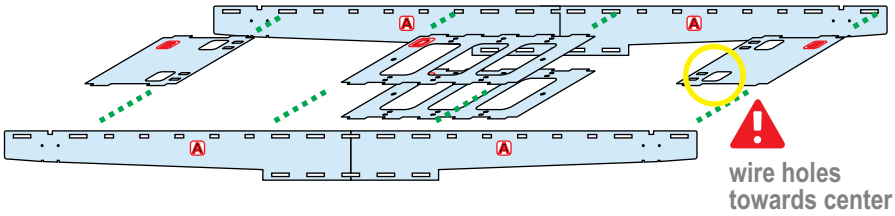
PARTS

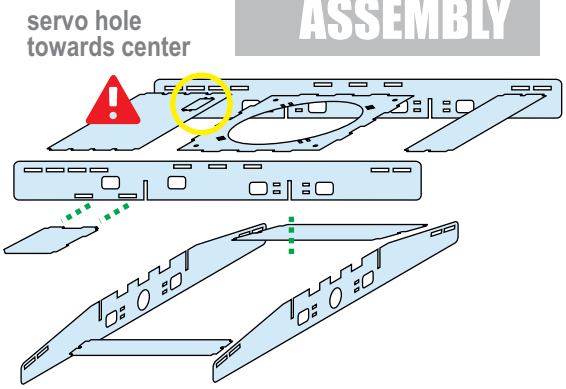




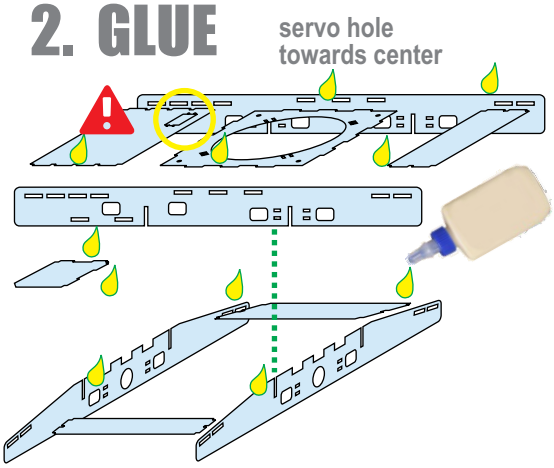
ASSEMBLY

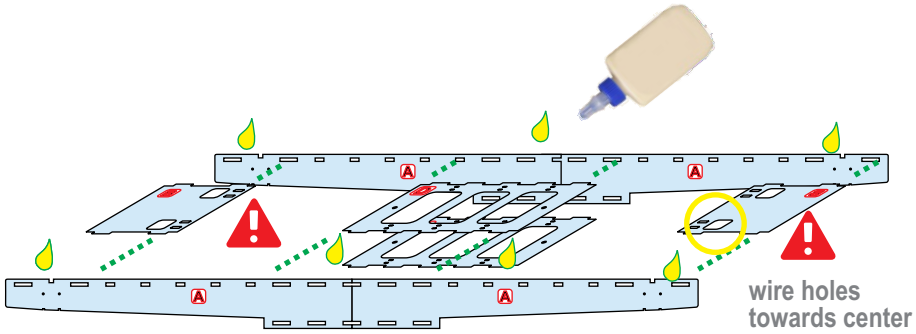
1. DRY FIT





2. GLUE

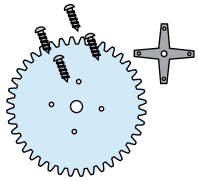




2.2. VERSA GATE : Turntable p2

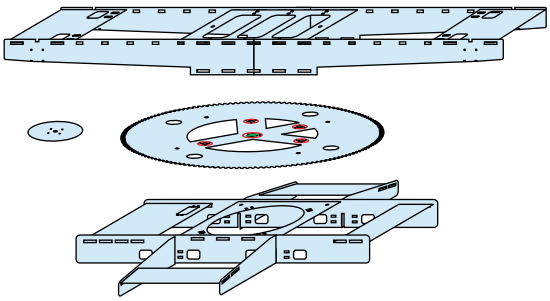
3. GEAR

#3 Servo Screws
0.625”



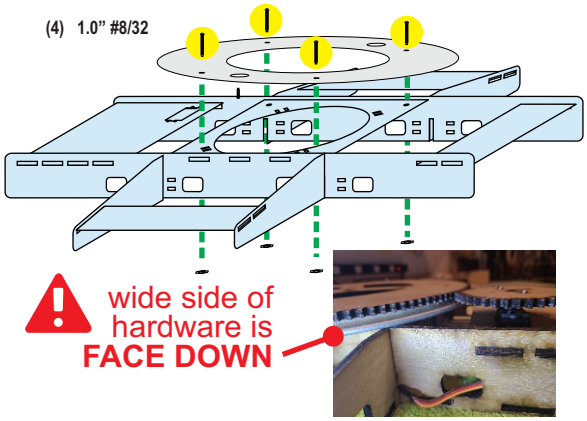
Dremel off screw end

4. PAINT

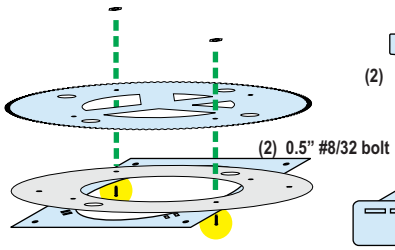


5. HARDWARE

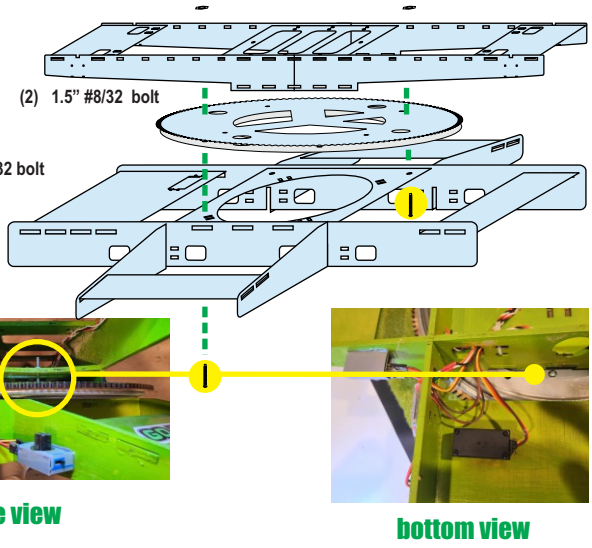
a) Mount wooden gear to lazy susan hardware with **(4) #8/32 bolts**



b) Mount wooden gear to lazy susan hardware with **(2) 0.5” #8/32 bolts**

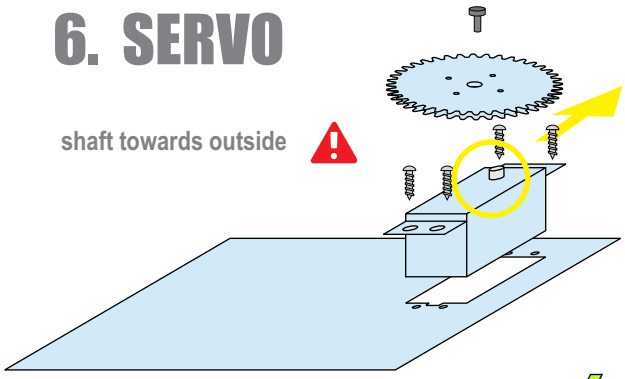


c) Mount deck to base with **(2) 1.5” #8/32 bolts**



6. SERVO

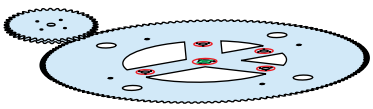
shaft towards outside



use Black 360 degree servo

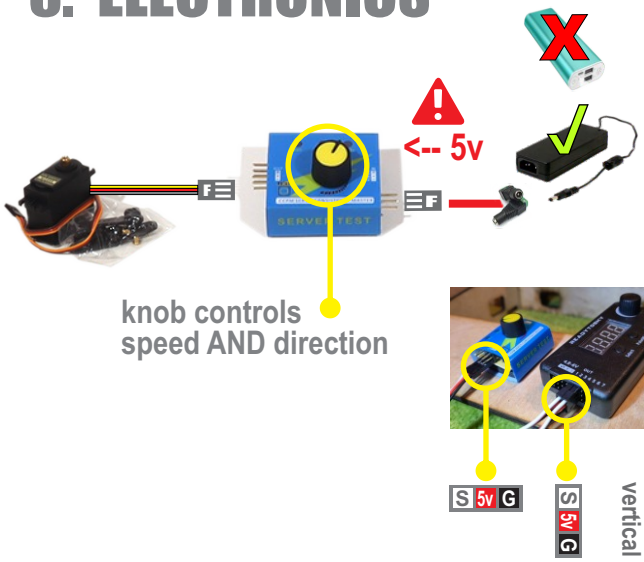
not the red 360 degree servo (red servo is more powerful and is for competition Air Stairs bundle)

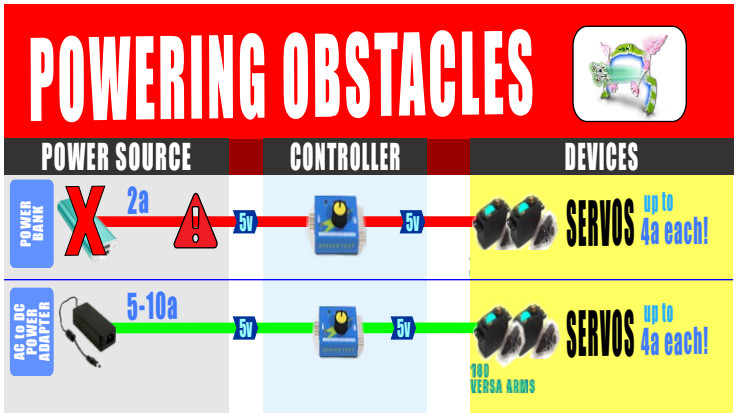
7. MESH



- rotate by hand and adjust mesh
- turntable hardware has play

8. ELECTRONICS

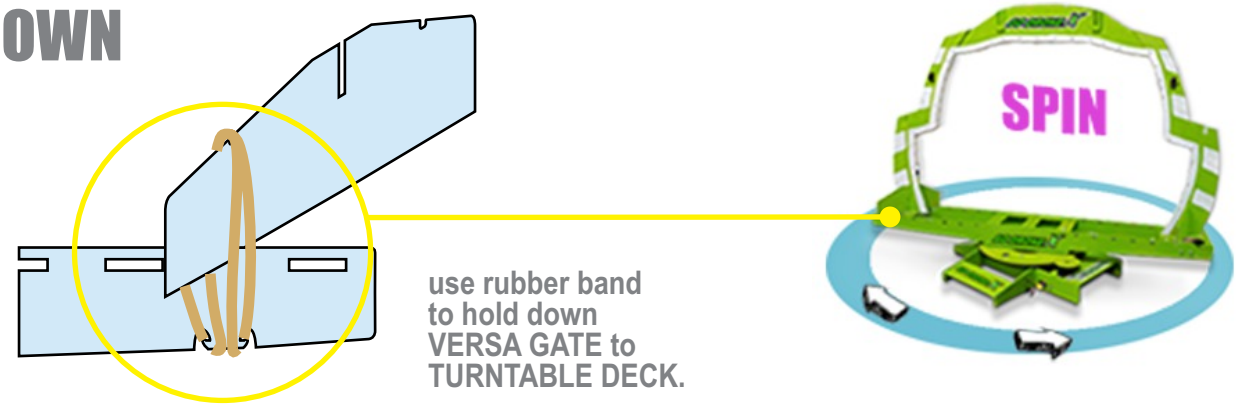




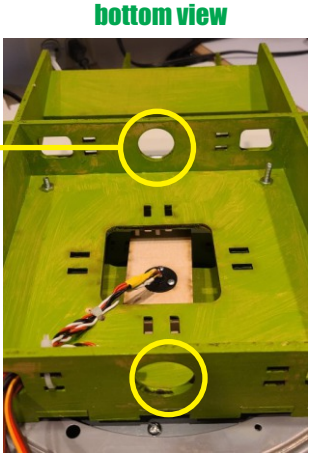
Servos can pull up to 4amps each!
Only use a power source rated at 5a+.

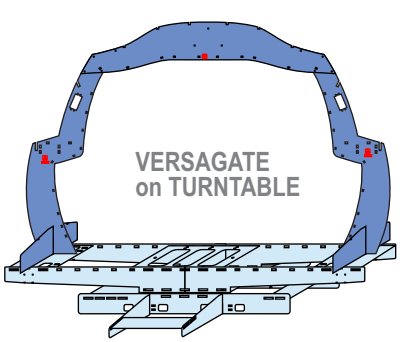
Don't use POWER BANKS.
They will burn out as they are only rated for 2 amps.

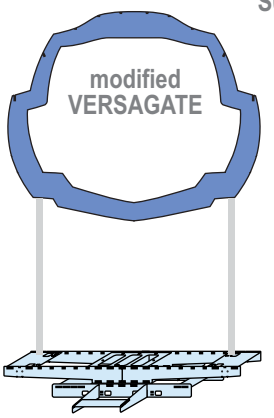
9. HOLD DOWN

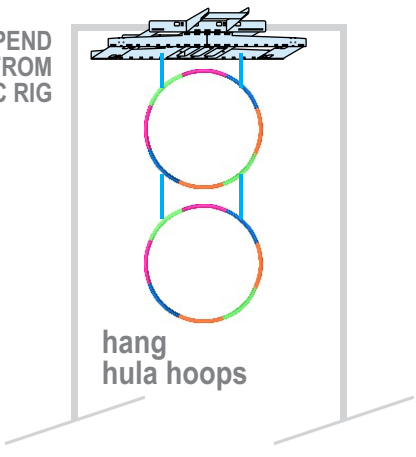


10. CONFIGURATIONS







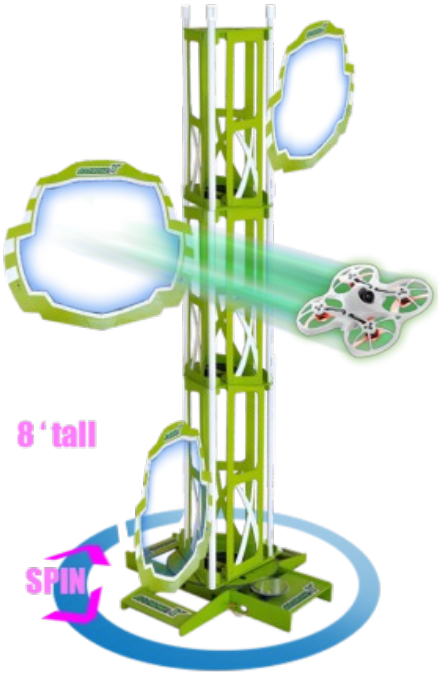


coming in January 2022

2.6. AIR STAIRS: Turntable p1

GO DRONE X

SUPPLIES

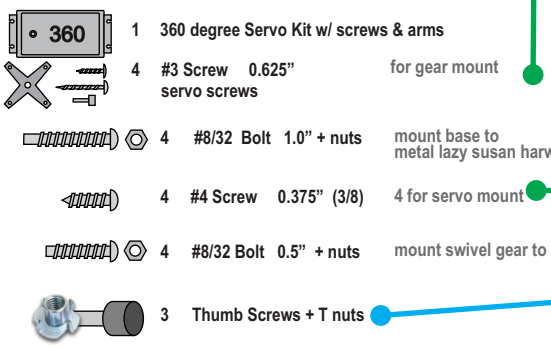


GLUE

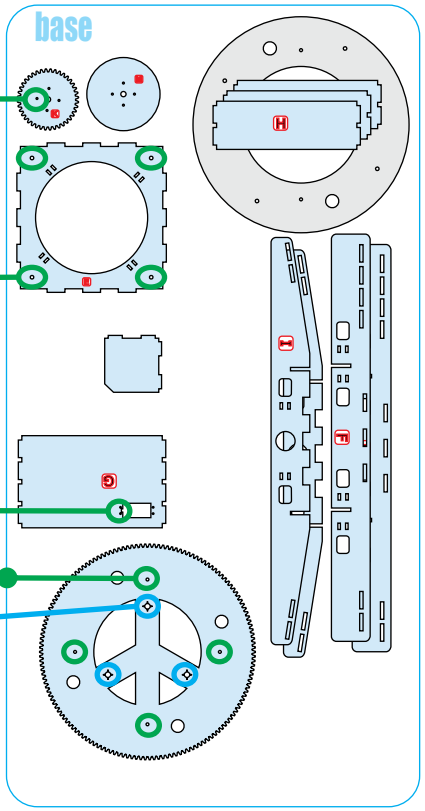
PAINT & BRUSH

SCREWDRIVER PHILLIPS

PARTS

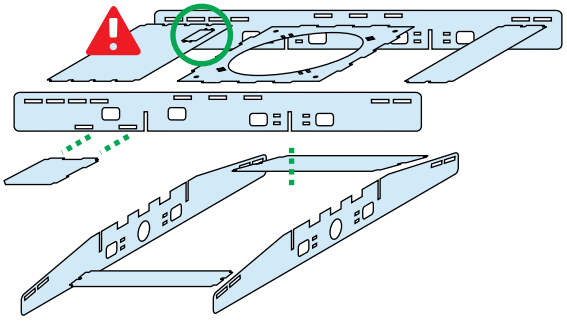


1	360 degree Servo Kit w/ screws & arms	
4	#3 Screw 0.625" servo screws	for gear mount
4	#8/32 Bolt 1.0" + nuts	mount base to metal lazy susan harware
4	#4 Screw 0.375" (3/8)	4 for servo mount
4	#8/32 Bolt 0.5" + nuts	mount swivel gear to large gear
3	Thumb Screws + T nuts	



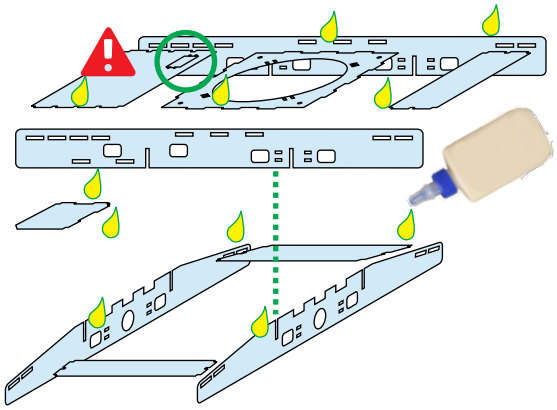
1. DRY FIT

servo hole towards center

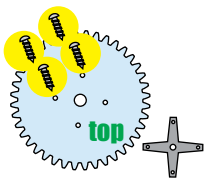


2. GLUE

ASSEMBLY



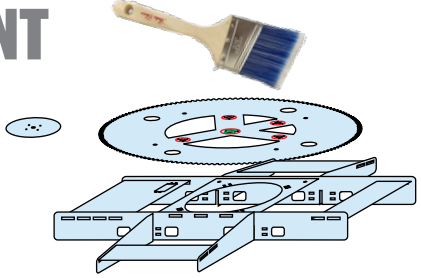
3. GEAR



(4) #3 Servo Screws 0.625"

a) fasten screws from top
b) servo arms are underneath gear
c) Dremel off protruding screw end

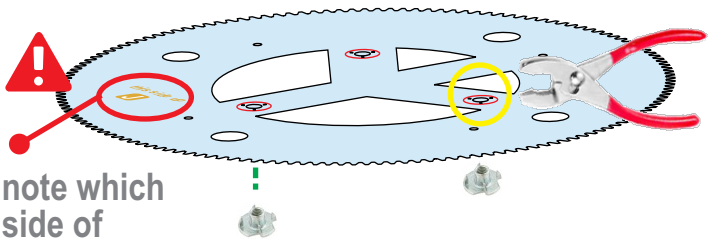
4. PAINT



2.6. AIR STAIRS: Turntable p2

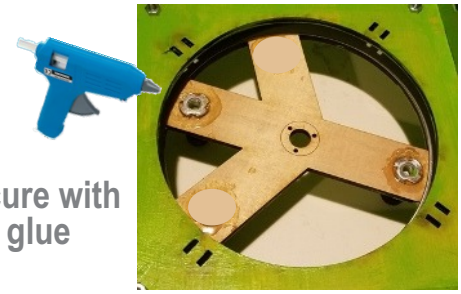
5. T NUTS

squeeze t nuts into large gear



note which side of large gear faces up

this side up

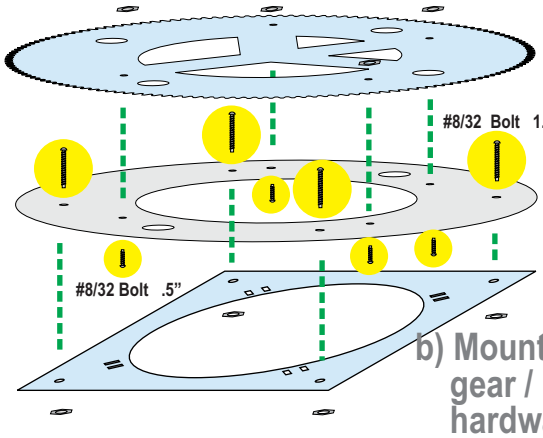


secure with hot glue

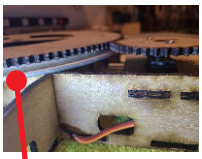
bottom view

6. TURNTABLE

a) Mount wooden gear to lazy susan hardware with (4) 0.5" #8/32 bolts



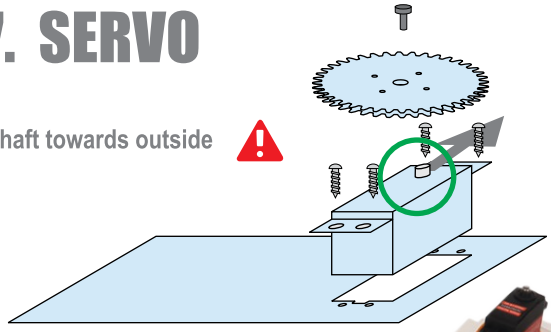
side view



wide side of hardware is FACE DOWN

b) Mount gear / lazy susan hardware to base with (4) 1.0" #8/32 bolts

7. SERVO



shaft towards outside

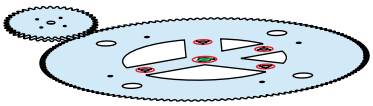
20kg torque !

use RED 360 degree servo

not the BLACK 360 degree servo (black servo is less powerful and is for CLUB turntable)

12kg torque

8. MESH



- rotate by hand and adjust mesh
- turntable hardware has play

8. ELECTRONICS

20kg torque !

<-- 5v

knob controls speed AND direction

S 5v G

S 5v G

vertical

POWERING OBSTACLES

POWER SOURCE	CONTROLLER	DEVICES
POWER BANK — 2a	5v — 5v	SERVOS up to 4a each!
AC to DC POWER ADAPTER — 5-10a	5v — 5v	SERVOS up to 4a each! 360 VERSA ARMS

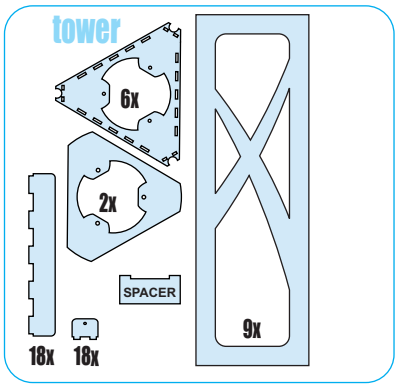
Servos can pull up to 4amps each!
Only use a power source rated at 5a+.

Don't use POWER BANKS.
They will burn out as they are only rated for 2 amps.

2.6. AIR STAIRS: Tower

GO DRONE X

PARTS



COMP AIR STAIRS TOWER PANELS #6

(36) #6 Screw 0.5"
mount tower side panels

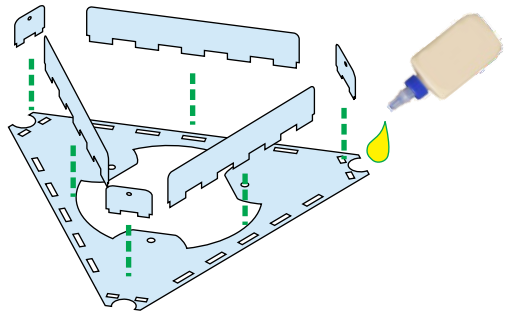
SUPPLIED NEEDED
(not included)

3x 0.5" PVC 10'
for tower poles

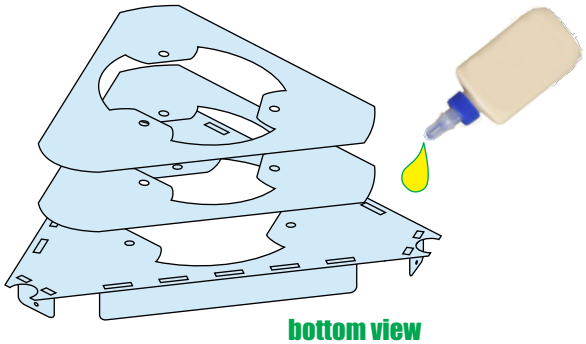
9x 0.5" TEE

1x PVC Glue

1. DRY FIT & GLUE (6 times)

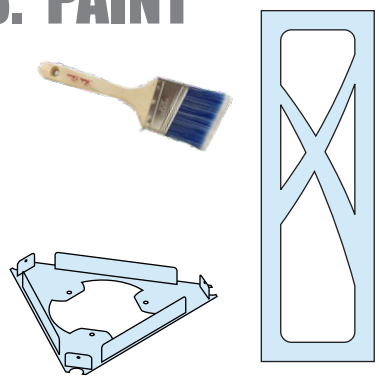


2. RISERS (1 time)

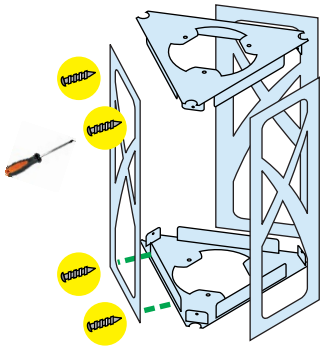


bottom view

3. PAINT



4. PANELS



5. PVC not included

a) cut (9) pieces of 0.5" PVC 26" long

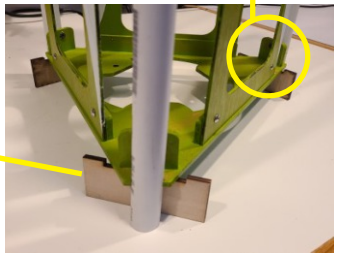
b) glue "T" connector to one side
with PVC glue

6. MOUNT PVC

LOWER TOWER (1 time)
a) Align PVC flush with base
b) Predrill holes into PVC
c) screw from behind
(screws not included but
drywall screws work great)

bottom view

MIDDLE / TOP TOWERS
a) Use spacers to align PVC
b) Predrill holes into PVC
c) Screw from behind



7. STACK & SECURE

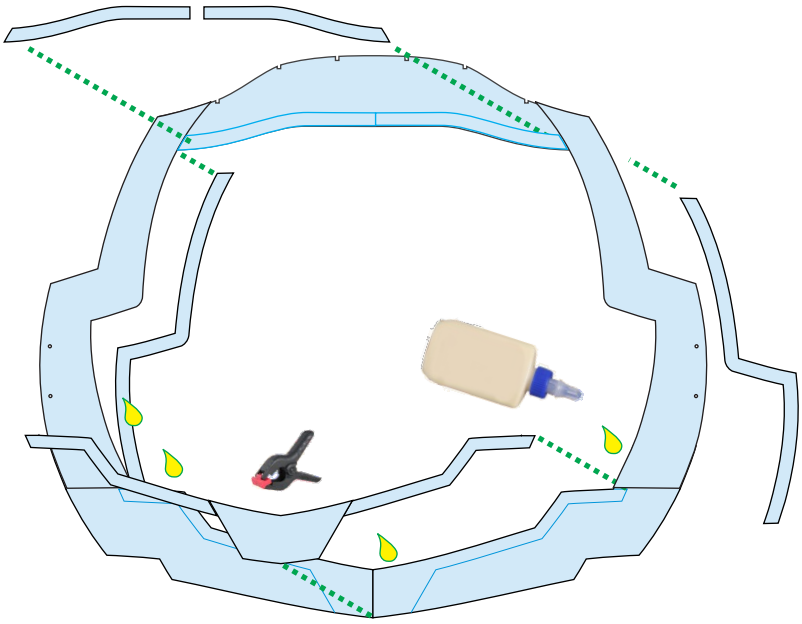
a) tighten Thumbscrews for lower tower.

b) stack remaining towers

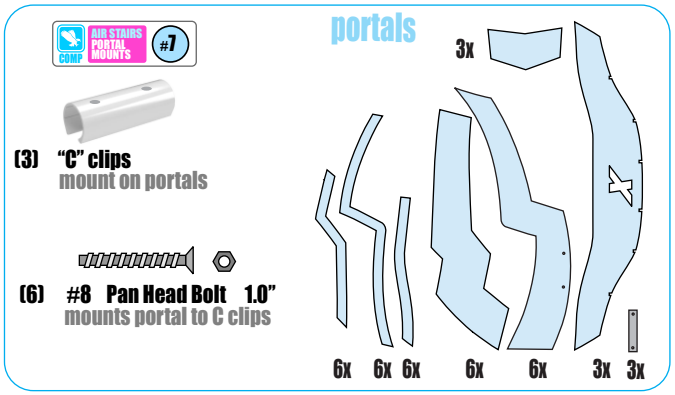
LET'S LIGHT IT UP !!

2.6. AIR STAIRS: Portals

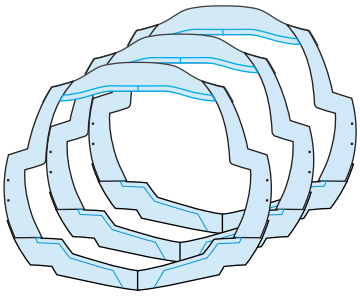
1. GLUE



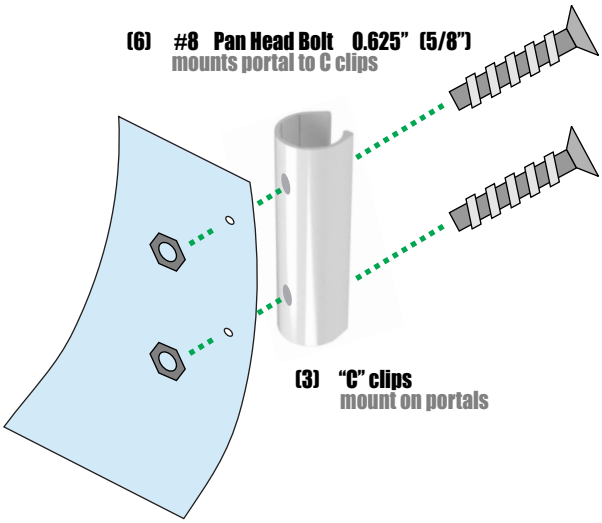
PARTS



2. PAINT



3. HARDWARE



4. MOUNT

2.7. FORCE FIELD

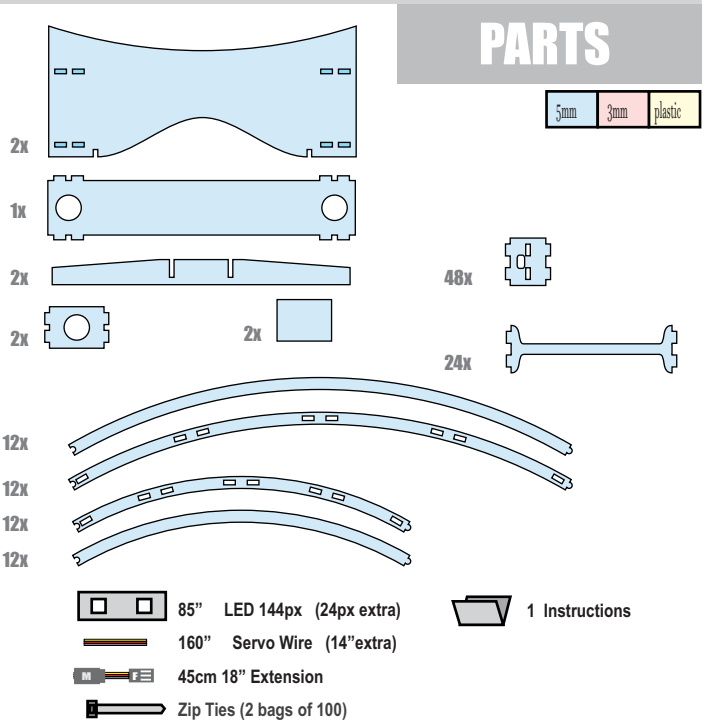
SUPPLIES

not included

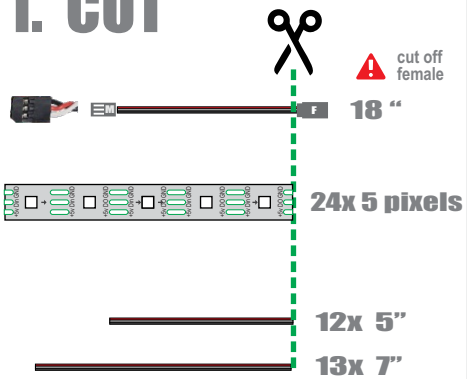
- SOLDERING IRON * recommend TS100
- SOLDER 60 tin / 40 lead avoid “lead free” solder
- WIRE STRIPPERS
- GLUE yellow preferred
- PAINT & BRUSH
- TWEEZER
- MASKING TAPE
- EXACTO
- CLAMPS

PARTS

5mm | 3mm | plastic



1. CUT



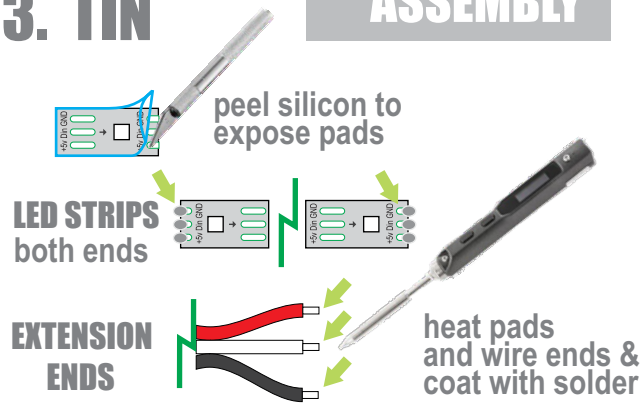
2. STRIP

1/8”exposed

strip all cut wire ends

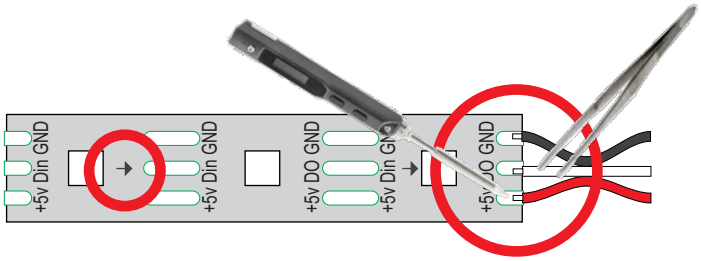
3. TIN

ASSEMBLY

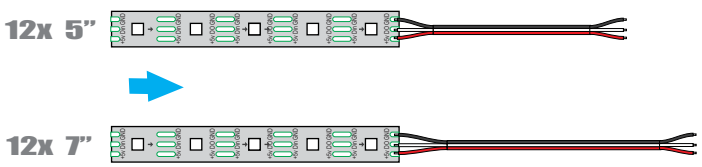


4. SOLDER

Din: Data In
DO: Data Out

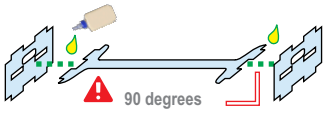


note arrow direction → note wire color and labels



2.7. FORCE FIELD

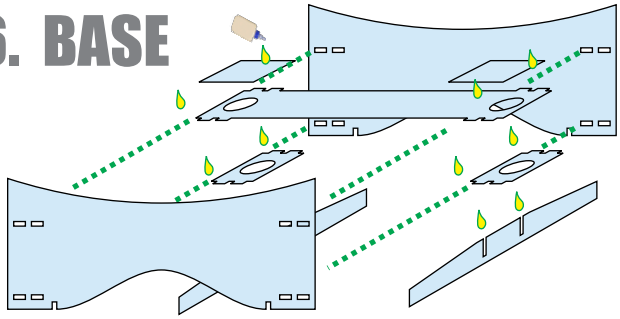
5. LED SUPPORTS



24x

for best glue results
apply glue to both mating surfaces
creating a liquid to liquid bond

6. BASE



7. RINGS

dry fit so final pieces all match up

assemble in stages

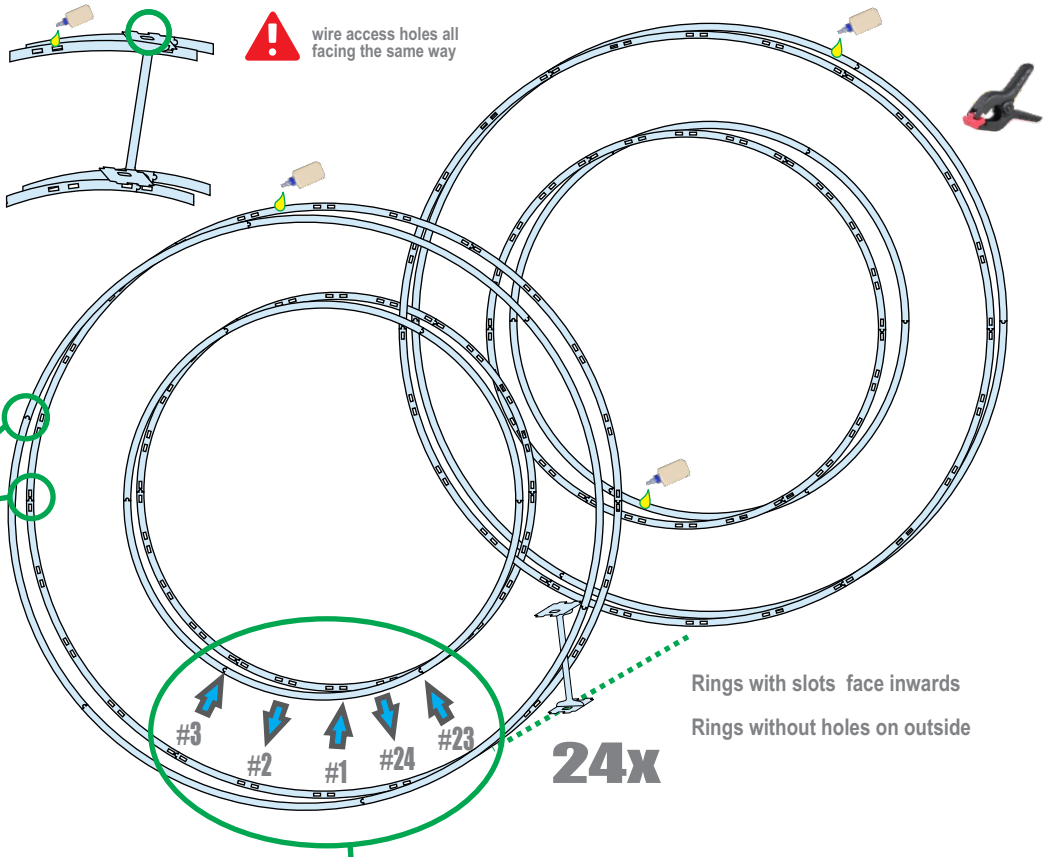
have lots of clamps

use weights as clamps

apply glue to both mating surfaces

have wet rag to clean up excess glue

don't have ring seams overlap (shift)

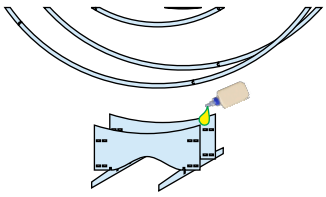


24x

Rings with slots face inwards

Rings without holes on outside

8. BASE



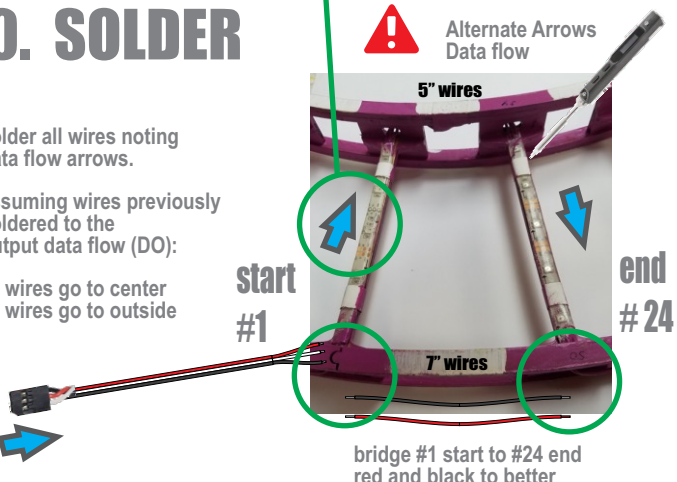
9. PAINT

10. SOLDER

solder all wires noting data flow arrows.

assuming wires previously soldered to the output data flow (DO):

5" wires go to center
7" wires go to outside



bridge #1 start to #24 end red and black to better distribute power

Don't connect white (data wire) when bridging #1 & #24

11. TEST

download
Force Field sketch to XP Brain
and test.

check
* arrow directions

* wires
Black to GND
White to Din / DO
Red to 5+un

12. ZIP TIE

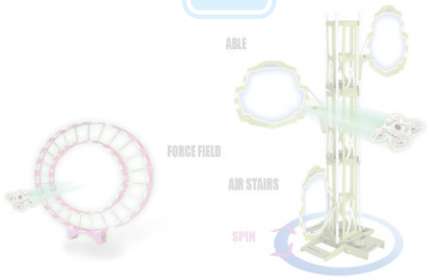
MANUAL

SECTION 1: LET's LIGHT IT UP!!!! release schedule

SECTION 2: OBSTACLES / build

CLUB COMP

2.1. VERSA GATE
2.2. TURNTABLE
2.3 CHOMPER '21



2.6. AIR STAIRS
2.7. FORCE FIELD '20

SECTION 3: OBSTACLES / program

CLUB
3.1. HARDWARE
CLUB
3.2. SOFTWARE
CLUB
3.3. EXAMPLES

SECTION 4: DRONES / technology

CLUB
4.1. Skills Matrix / troubleshoot
CLUB
4.2. Drone Hardware Interface

SECTION 5: DRONES / performance flying

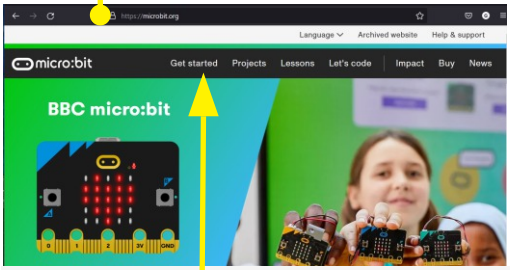
CLUB
5.1. Drills

SECTION 6: XFACTOR / events

CLUB
6.1. SCORING
6.2. SIGNAGE
6.3. CHECKLIST

3.1. HARDWARE

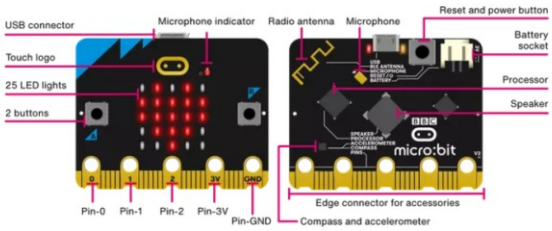
visit //microbit.org



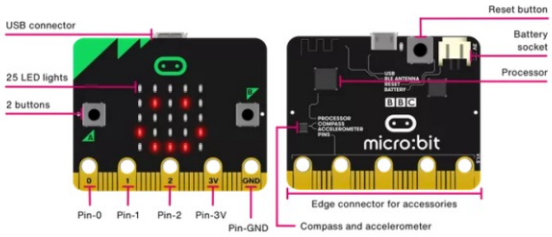
Overview

Find out more about the features of your BBC micro:bit

New micro:bit with sound



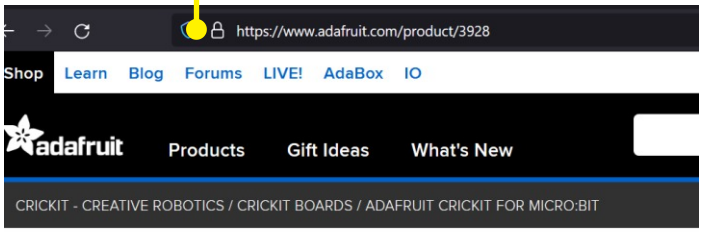
Original micro:bit

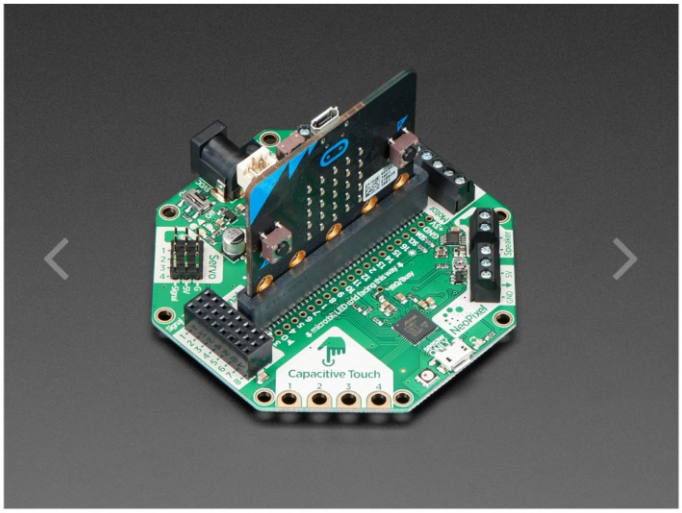


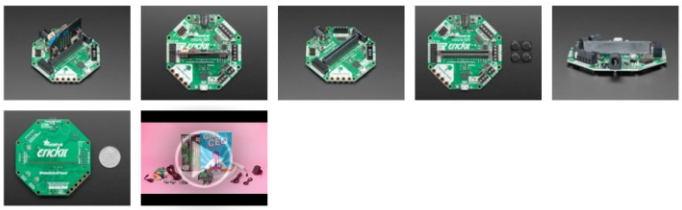
Features on the front

Your BBC micro:bit has a wide range of features for you to explore. Find out more about each of the numbered features below.

visit //adafruit.com/product/3928





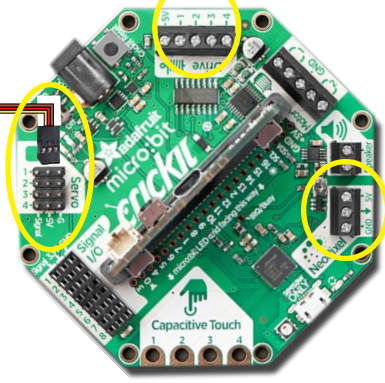


DESCRIPTION

Sometimes we wonder if robotics engineers ever watch movies. If they did, they'd know that making robots into slaves always ends up in a robot rebellion. Why even go down that path? Here at Adafruit, we believe in making robots our **friends!**

1. CRIKIT connections

5V ONLY!!

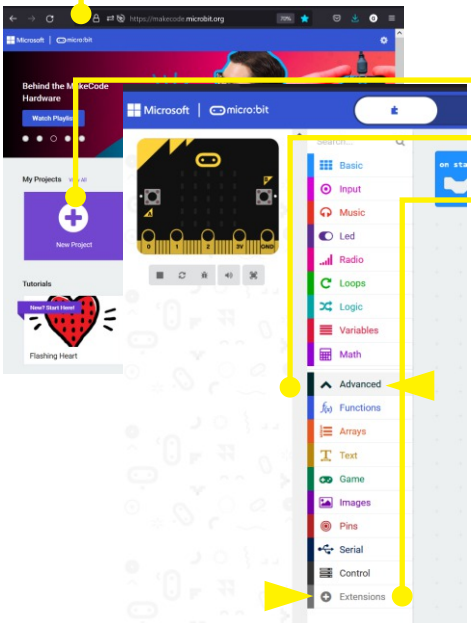


red = 5V
green=signal
white = GND

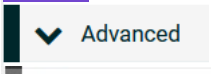
3.2. SOFTWARE

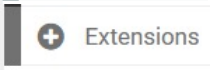
1. Launch

visit //makecode.microbit.org

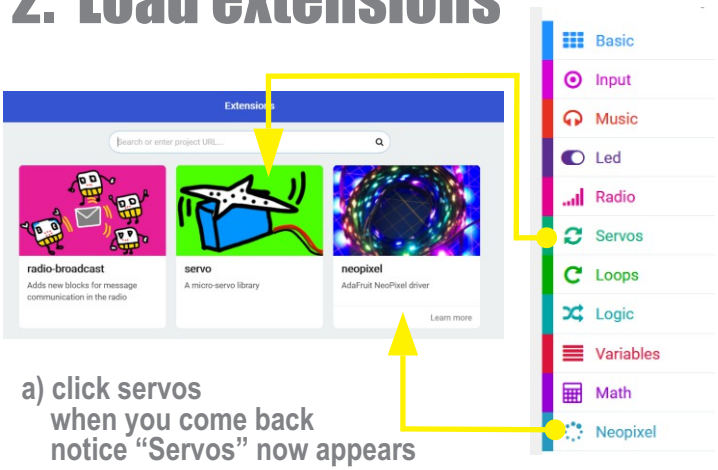


a) click 

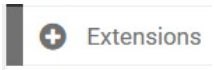
b) click 

c) click 

2. Load extensions

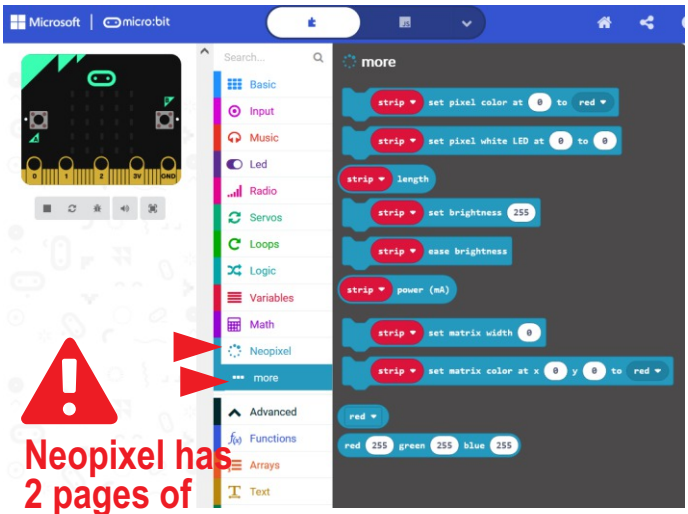


a) click servos
when you come back
notice “Servos” now appears

b) click 

again and pick “neopixel” this time.
notice “Neopixel” now appears

3. Explore Functions

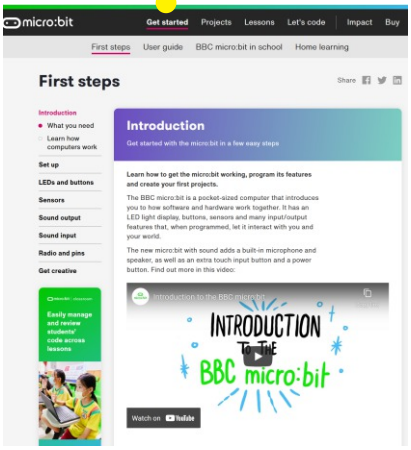


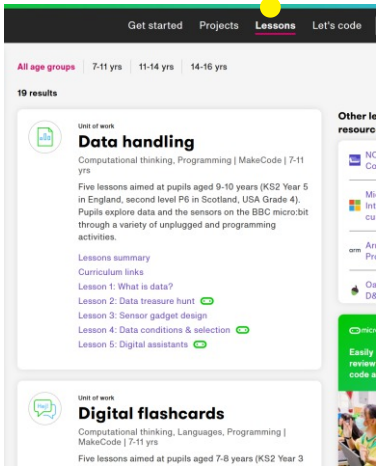
Neopixel has
2 pages of
functions!!

3.3. EXAMPLES

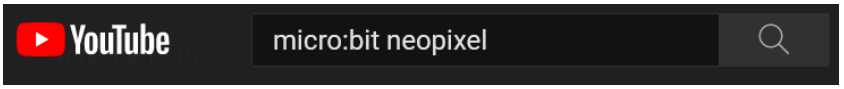
1. Getting Started

visit //https://microbit.org/get-started/first-steps/introduction/

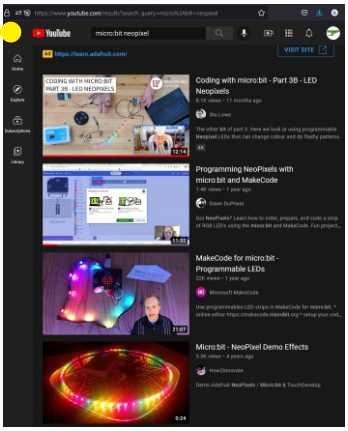




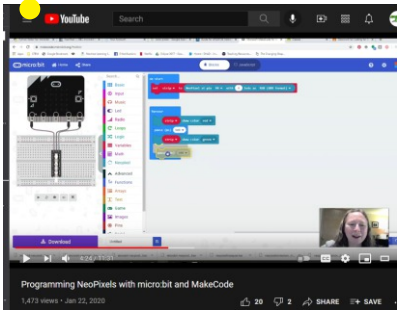
2. NeoPixels



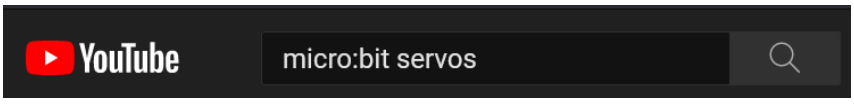
or inside You Tube search
//https://www.youtube.com/results?search_query=micro%3Abit+neopixel



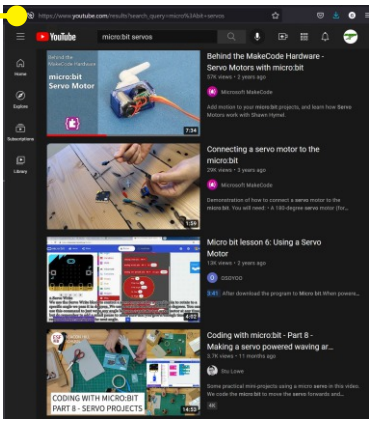
visit //https://www.youtube.com/watch?v=fL_PJMQEJYM



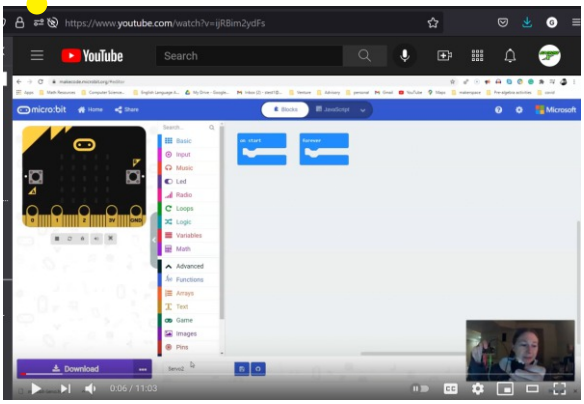
3. Servos



or inside You Tube search
https://www.youtube.com/results?search_query=micro%3Abit+servos



visit https://www.youtube.com/watch?v=ijRBim2ydFs



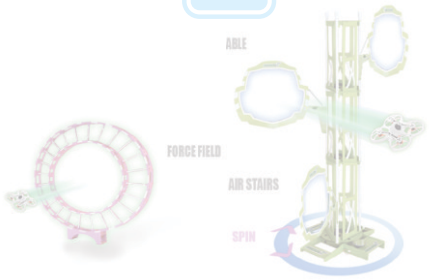
MANUAL

SECTION 1: LET's LIGHT IT UP!!!! release schedule

SECTION 2: OBSTACLES / build

CLUB COMP

2.1. VERSA GATE
2.2. TURNTABLE
2.3 CHOMPER '21



2.6. AIR STAIRS
2.7. FORCE FIELD '20

SECTION 3: OBSTACLES / program

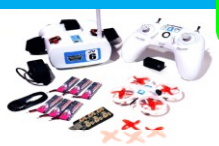
CLUB
CLUB
CLUB

3.1. HARDWARE
3.2. SOFTWARE
3.3. EXAMPLES

SECTION 4: DRONES / technology

CLUB
CLUB

4.1. Skills Matrix / troubleshoot
4.2. Drone Hardware Interface



SECTION 5: DRONES / performance flying

CLUB

5.1. Drills

SECTION 6: XFACTOR / events

CLUB

6.1. SCORING
6.2. SIGNAGE
6.3. CHECKLIST

GO DRONE X STEM

DRONE CLAN WARS

SKILLS MATRIX

godronex.com/stem

CHANGE INDUCTRIX FREQUENCY

in 30 seconds

STEP 1: Monitor-Press “FR” button to get to Group R. Press “Ch” button to either 1, 3, 6 or 7.

STEP 2: Inductrix-Press top button until a red light stays on. This is the first channel of goup F.

STEP 3: Inductrix-Click the top yellow button

8 clicks for R1 **10 for R3**
13 clicks for R6 **14 for R7**

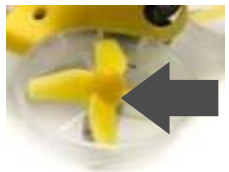
Monitor			Inductrix
FR/Group	Ch	Freq	Clicks
F	1	5740	red light
F	2	5760	1
F	3	5780	2
F	4	5800	3
F	5	5820	4
F	6	5840	5
F	7	5860	6
F	8	5880	7
R	**1**	**5658**	**8**
R	2	5695	9
R	**3**	**5732**	**10**
R	4	5769	11
R	5	5806	12
R	**6**	**5843**	**13**
R	**7**	**5880**	**14**
R	8	5917	15

ACHIEVEMENT LEVELS

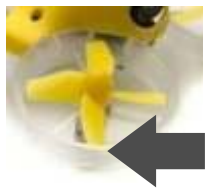
	BRONZE	SILVER	GOLD
FLYING	☐LOS:3’ to 5’ no bounce ☐FPV:Start pad no bounce out ☐FPV: Gates ☐FPV: Ovals	☐10” descends no bounce ☐Small portals ☐Smooth fingers	☐Split S turns ☐Look 2 moves ahead ☐Pinch grip
MECHANICS	☐Never plug in at wrong time ☐Remove shaft lint ☐Replace blade in 15 sec	☐Change motor ☐Check battery voltage	☐Change frame ☐Change flight Controller ☐Troubleshoot for others
RACE	☐Change frequency in 60sec ☐Quick flip overs ☐Stage on-time	☐Build course in 10 min ☐Time laps ☐15s Pit stops ☐Never run out of battery	☐Design course ☐Construct engagements

TROUBLE SHOOTING

Lint around motor shaft?



Prop hitting somewhere?



frame broken?

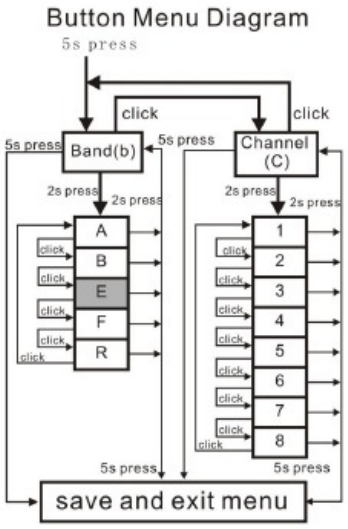
motor going bad? what blade stops first?

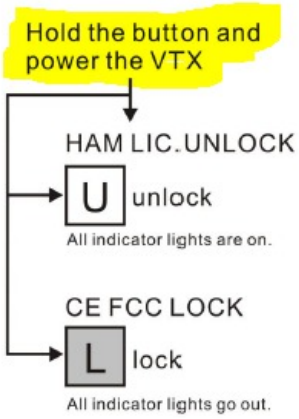
STEP 2 UNLOCK VIDEO TRANSMITTER

EMAX : TINYHAWK

from page 5 of the manual . . . .

Button Menu Diagram





!! VERY IMPORTANT !!

unless you unlock the Vtx you can only get R6!!

You must unlock the VTX before attending competition or expect to miss the first round.

CE and FCC unlicensed user chart

FR \ CH	CH1	CH2	CH3	CH4	CH5	CH6	CH7	CH8	
A	5865	5845	5825	5805	5785	5765	5745	–	MHz
B	5733	5752	5771	5790	5809	5828	5847	5866	MHz
E	–	–	–	–	–	–	–	–	MHZ
F	5740	5760	5780	5800	5820	5840	5860	–	MHz
R	–	–	–	5769	5806	5843	–	–	MHz

Unlocked FCC HAM licensed user chart

FR \ CH	CH1	CH2	CH3	CH4	CH5	CH6	CH7	CH8	
A	5865	5845	5825	5805	5785	5765	5745	5725	MHz
B	5733	5752	5771	5790	5809	5828	5847	5866	MHz
E	5705	5685	5665	–	5885	5905	–	–	MHz
F	5740	5760	5780	5800	5820	5840	5860	5880	MHz
R	5658	5695	5732	5769	5806	5843	5880	5917	MHz

INDUCTRIX (yellow canopy) discoutinued

1) Hold down channel button
2) while still holding down button, plug in batttery
3) Hold for 5 more seconds
4) Unplug battery, replug. You should have all channels

always refer to manual

INDUCTRIX BLH9600 (red canopy)

from the manual . . . .

Accessing Band E

If local laws allow their use, the following frequencies in Band E are available:

Band E	5705	5685	5665	5665	5885	5905	5905	5905

To access Band E press and hold the camera button for at least 8 seconds. The blue band LED will glow solid. All 5 bands are now available. Scroll through the bands normally, as described in step 3 above.

INDUCTRIX FPV BL BLH8850 (blue canopy) brushless

this unit does NOT appear to need any VTX unlocking

from the manual . . .

Available Frequencies, North America (mHz)

Band	CH 1	CH 2	CH 3	CH 4	CH 5	CH 6	CH 7	CH 8
Band A	5865	5845	5825	5805	5785	5765	5745	5745
Band B	5733	5752	5771	5790	5809	5828	5847	5866
Band E	5705	5685	5665	5665	5885	5905	5905	5905
FS/IRC	5740	5760	5780	5800	5820	5840	5860	5860
RaceBand	5732	5732	5732	5769	5806	5843	5843	5843

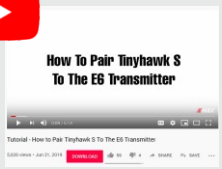
4.3. Binding drone to Radio

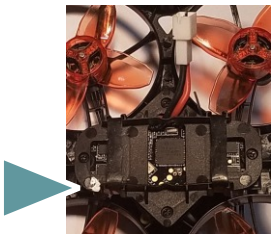
STEP 3 BINDING

1 Binding / Pairing Tinyhawk to E6 Transmitter

a) Watch tutorial from emax.
If you have the black Tinyhawk S then you need to download a special firmware found in the description of the video.
If you have the regular white Tinhawk (1s) the firmware that came with the unit is fine and no need to download new firmware.

google
Tutorial - How to Pair Tinyhawk to E6 Transmitter

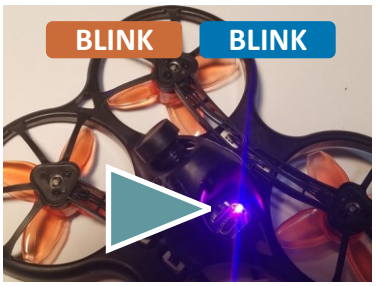


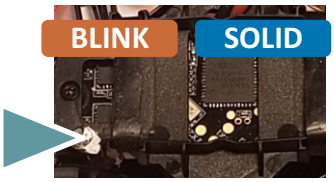


b) Locate bind button on bottom.
It will be covered, but you will feel the button press.

c) Turn transmitter off

d) Plug battery into Tinyhawk
Both blue and red leds will blink.
Solid Blue means there is a valid transmitter connection.

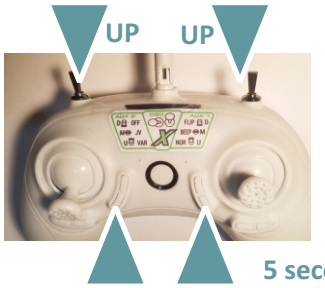




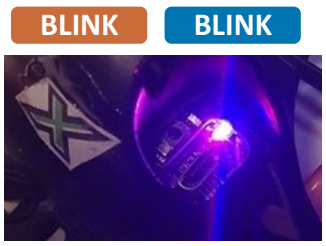
e) Press Bind Button for 2 seconds.
Blue led will turn solid which means it is waiting to be paired.

f) Move both switches to the UP position.
Turn transmitter on.

g) Hold trim buttons down for 5 seconds.



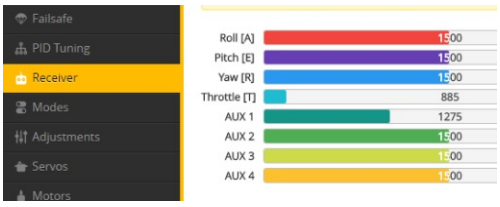
5 seconds to bind



h) After releasing trim buttons both leds will blink again meaning the flight controller and radio is paired.

i) Power off both transmitter and drone,
Plug battery into drone.
Power on transmitter. Test Arming.

l) You can plug usb and connect to Betaflight to test receiver functions.



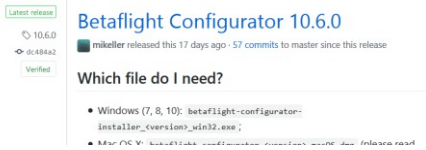
4.4. Drone Tuning Software

STEP 4 SOFTWARE

1 Download software

a) download the betaflight configurator software and install on PC
from the emax manual page 11 . . . .

Adjusting Software Settings (Betaflight Configurator)
Betaflight Configurator can be used to changed programmed settings on Tinyhawk S and to flash new firmware if desired. Betaflight Configurator and flight controller firmware can be downloaded at https://github.com/betaflight/. The hardware target for Tinyhawk S Flight Controller is MatekF411RX.



b) download drivers CO219X.
If there are connection issues download Zadiq.
If you still have issues google "betaflight drivers video"

Latest CP210x Drivers can be downloaded from here
Latest STM USB VCP Drivers can be downloaded from here
Latest Zadig for Windows USB driver installation can be downloaded from here

c) plug in micro usb and press connect.

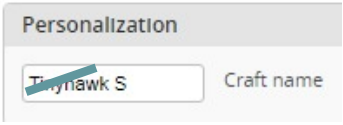
2 Configuration

Configure software to match the GoDroneX labeling

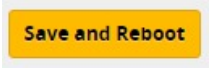
a) Click Gear Icon for Configuration

b) change Arming from 50 to 180 degrees.
This will allow the pilot to automatically flip the quad over by reversing the prop direction.
We have to be able to ARM when upside down to auto flip over after a crash.

Alcot Red
Alcot Green
Alcot Blue
Alcot Pink



c) Personalize the Craft Name of each of your Tinyhawks with abbreviated **school name** and **color**.
Keep it short ~ 10 characters.

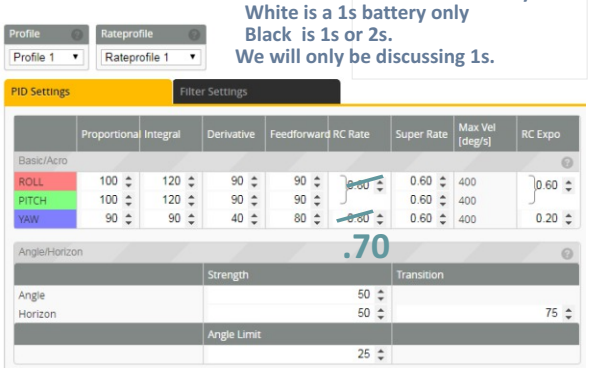


d) Save and Reboot in the lower right.

3 PID Tuning

JV and Varsity Settings

There are two versions of the Tinyhawk.
White is a 1s battery only
Black is 1s or 2s.
We will only be discussing 1s.



RC rate affects how fast the drone will rotate.

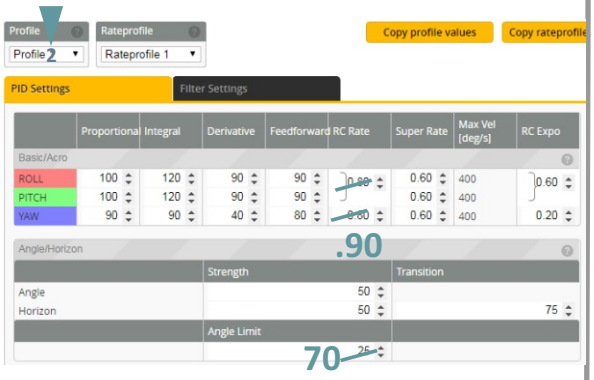
GoDroneX configurations will use
Profile 1 for JV and
Profile 2 for Varsity.

a) Select PID Tuning

b) Modify Profile 1 to match left

c) Modify Profile 2 match right

d) Save

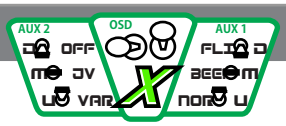


Angle Limit is the max angle we can tilt the quad. For Varsity we want aggressive tilting.

STEP 4 SOFTWARE

4 Modes

Assign modes / functions to transmitter switches.



a) click **Modes** from the left navigation

b) set **ARM** to **Aux 2** and range of **1300 - 2100**

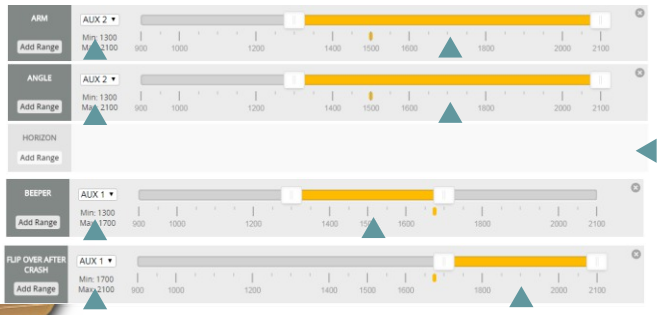
c) set **ANGLE** to **Aux 2** and range of **1300 - 2100**

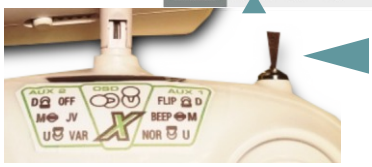
d) delete **HORIZON** setting

e) set **BEEPER** to **Aux 1** and range of **1300 - 1700**

f) set **FLIP OVER** to **Aux 1** and range of **1700 - 2100**

g) Save



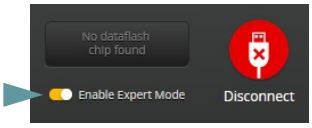


I) Turn on transmitter, plug a battery in, stay connected and test all switches

5 Adjustments

Assign JV and Varsity rates to the left switch.

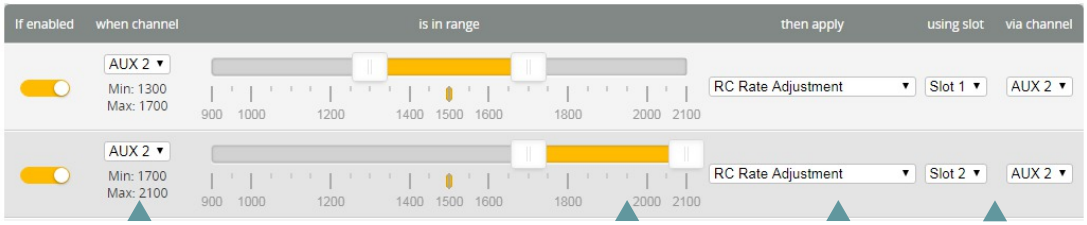
a) click **ENABLE EXPERT MODE** on top of screen



b) a new **ADJUSTMENTS** option will appear. Click it.

c) enable the first two options to match settings below.
AUX 2 can now be used for JV and Varsity rate settings. Slot 1 = Rate Profile 1, Slot 2 = Rate Profile 2

e) Save



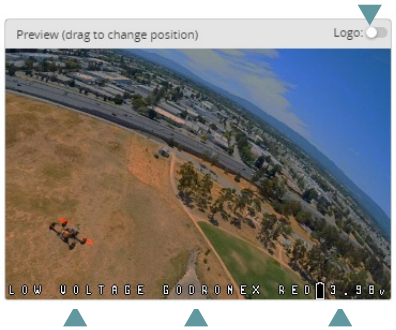
I) Go back to PID Tuning screen and toggle AUX 2 to JV and Varsity and make sure the rate profile turns.

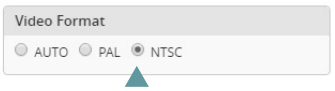
6 OSD

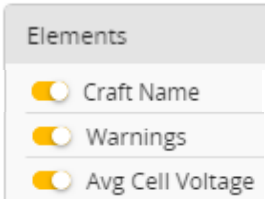
Configure On Screen Display.

a) click **OSD** option on the left.

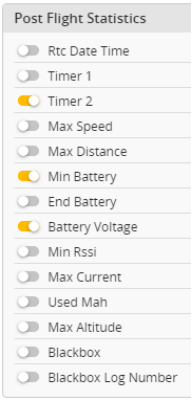
b) **Video Format** = **NTSC.**
Note this will cut off a little of the lower screen.
Turn off Logo.







c) Turn off ALL Elements
except for
Craft Name
Warnings
Avg Cell Voltage



d) Drag fields to bottom

e) Set **Post Flight Statistics.** **Timer2** **Min Battery** **Battery Voltage**

e) Save

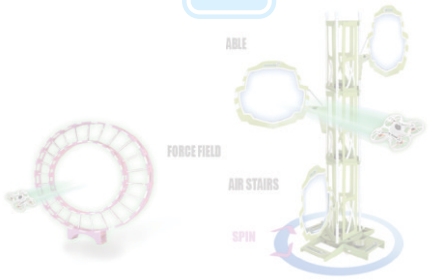
MANUAL

SECTION 1: LET's LIGHT IT UP!!!! release schedule

SECTION 2: OBSTACLES / build

CLUB COMP

2.1. VERSA GATE
2.2. TURNTABLE
2.3 CHOMPER '21



2.6. AIR STAIRS
2.7. FORCE FIELD '20

SECTION 3: OBSTACLES / program

3.1. HARDWARE CLUB
3.2. SOFTWARE CLUB
3.3. EXAMPLES CLUB

SECTION 4: DRONES / technology

4.1. Skills Matrix / troubleshoot CLUB
4.2. Drone Hardware Interface CLUB

SECTION 5: DRONES / performance flying

CLUB

5.1. Drills

SECTION 6: XFACTOR / events

CLUB

6.1. SCORING
6.2. SIGNAGE
6.3. CHECKLIST

5.1. DRILLS

Drills are covered during ZOOM meetings

Let's light it up!

We have included remote Professional development (PD) as part of the bundle.

Meeting 1: *Resources*
Training Plan
FPV Gotcha's

Meeting 2: *Follow up from first Training session*
Team Structure
Students are welcome

Meeting 3: *Follow up Training Sessions*
Obstacle Development

Meeting 4: *Open House or*
Competition Prep

When you are ready to schedule the first meeting, just send an email with a couple of time options.

Note we are in Chicago, central time zone.

DRONE CLASH WARS

GO DRONE X STEM

ACHIEVEMENT CHART

BRONZE

DRILLS: Human Simulator; LOS: Square Scoot; LOS: Bow Tie 6" High; LOS: 3/5 Pogo; LOS: Sharpies; FPV: Oval Scoot

ACHIEVEMENTS — FLY: FPV 5x, 2 Gates Scoot; FPV 5x, 2 Gates, no bounce, under 5"; FIX: Put Blades on Correct Side; Remove Lint; RACE: 60s Chg Frequency Drone & Monitor

FR/Group	Monitor Ch	Freq	Inductrix Clicks
F	1	5740	red light
F	2	5760	1
F	3	5780	2
F	4	5800	3
F	5	5820	4
F	6	5840	5
F	7	5860	6
F	8	5880	7
R	1	5658	8
R	2	5695	9
R	3	5732	10
R	4	5769	11
R	5	5806	12
R	6	5843	13
R	7	5880	14
R	8	5917	15

PILOT

SILVER

DRILLS: Large Portal; Back Door Gates; Small Portals; Fast Landings; 10' Decends; Look ahead; Smooth Figure 8's

ACHIEVEMENTS — FLY: Figure 8s Small Portal Course; Altitude Course; FIX: Change Motors; RACE: Build Course under 10m; Time Laps; 15s Pit Stops

godronex.com/stem

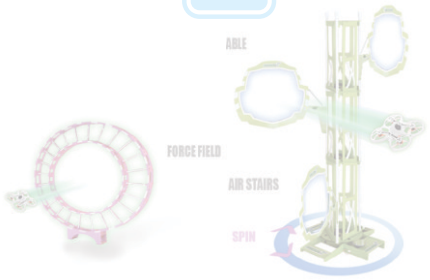
MANUAL

SECTION 1: LET's LIGHT IT UP!!!! release schedule

SECTION 2: OBSTACLES / build

CLUB COMP

2.1. VERSA GATE
2.2. TURNTABLE
2.3 CHOMPER '21



2.6. AIR STAIRS
2.7. FORCE FIELD '20

SECTION 3: OBSTACLES / program

CLUB
CLUB
CLUB

3.1. HARDWARE
3.2. SOFTWARE
3.3. EXAMPLES

SECTION 4: DRONES / technology

CLUB
CLUB

4.1. Skills Matrix / troubleshoot
4.2. Drone Hardware Interface

SECTION 5: DRONES / performance flying

CLUB

5.1. Drills

SECTION 6: XFACTOR / events

CLUB

6.1. SCORING
6.2. SIGNAGE
6.3. CHECKLIST

DRONE CLAN WARS	COMPETITIONS		GO DRONE X STEM
CLAN BATTLES	TEAM	2 WARRIORS + REFUELING STOPS	EVERY EVENT
ORBIT BLASTER	SOLO	FASTEST ORBIT	EVERY EVENT
XPONENT CHALLENGE	SCHOOL	ROBOTIC ENGAGEMENT	JUST CHAMPS

6.1. SCORING: Clan Battle Judges Score Card

GoDroneX Drone Clan Wars SCORE CARD

use hash marks for lap count Station #

Round	Pilot 1 LAPS	Pilot 2 LAPS	Total	Min	Penalty	Final
A						
B						
C						
D						
E						
F						
G						
H						
I						

Min Lap Table

Total Laps	Min # # Laps
28	12
27	11
26	11
25	10
24	10
23	10
22	9
21	9
20	8
19	8
18	8
17	7
16	7
15	6
14	6
13	6
12	5
11	5
10	4
9	4
8	4
7	3
6	3
5	2
4	2
3	1
2	1

INSTRUCTIONS

All team pilots must fly at least 40% of total laps. Ex: 10 laps, pilot A 4 laps, pilot B 6 laps.

Penalty: Lookup min # of laps from the table, then subtract the difference as a penalty

Example — use table

Pilot A	Pilot B	Total	Min	Penalty	Final
|||| |||| (10)	|||| |||| (10)	20	8	-	20
|| (2)	|||| ||| (8)	10	4	-2	8
|||| |||| (10)	|||| (5)	15	6	-1	14

ROBOTICS SCORING

LEVEL	SCHOOL
K - 8 9-12 College	

TEAM ID & MEMBERS

XONENT CHALLENGE

MIMIMUM REQUIRMENTS	X	notes
Openings 4 square feet		
DESIGN	1-10	
Theme		
Artistic		
PHYSICAL	1-10	
Build Quality		
Wiring		
TECHNOLOGY	1-10	
User Interface		
Motion		
Sensors		
Features / Logic		
		TEAM

COMMENTS

EVENT STANDINGS

CLAN BATTLES School	Warriors	Group	Freq	ROUNDS R1	R2	R3	R4	R5	Sum Best 3	Place
		(A) JV	R1							
			R3							
			R6							
			R7							
		(B) JV	R1							
			R3							
			R6							
			R7							
		(C) Varsity	R1							
			R3							
			R6							
			R7							
		(D) Pro	R1							
			R3							
			R6							
			R7							

ORBIT BLASTER	School	Warriors	TIME Pck 1	Pck 1	Place
Junior Varsity					
Varsity					


R1
8 clicks
5658
GO DRONE X


R7
14 clicks
5880
GO DRONE X


R3
10 clicks
5732
GO DRONE X


R6
13 clicks
5843
GO DRONE X

EVENT CHECKLIST

1 Month Prior
- ☐ Date, Location, Space is approved
- ☐ Signup form: link is editable
- ☐ Social Media and Email invites are send out
- ☐ Space Plan
- ☐

1 Week Prior
- ☐ AV department equipment requested (TV / Projector/ Sound)
- ☐ Equipment List: Tables, Chairs, Whiteboard, Fresh Markers, Clipboards
- ☐ Have Judges
- ☐ Robotic Engagements tested
- ☐ Course Designed + Test flown (JV & Varsity)
- ☐ Finish Line Located
- ☐

1 Night Prior
- ☐ **Course** Constructed & robotics powered
  Courses test flown (target 20s lap times)
- ☐ **Pits** Chairs w/ Freq on back Chairs, 4 teams of 2 chairs: 8' apart / team
- ☐ **Announcing** Projection Sound Timing
- ☐ **Scoring** 4 Judges Clipboards Event Standings Board
- ☐ **Team Paddock** 1 table + outlet strip for each team
- ☐

1 hour Prior to Event Start
- ☐ Power up Course
- ☐ Power up Announcing
- ☐ Test Timing
- ☐ Event Standings Board is ready

Event Start
- ☐ Greet Teams
- ☐ Train Judges
- ☐ Start On-Time!!!
- ☐ Pilots Meeting Agenda: rules, safety, need help, bathrooms
- ☐ Itinerary: 8:15am Pilots Meeting
  - 8:30 Clan Battles: Round 1 & 2
  - 10:30 Orbit Blaster (solo, 2 packs, best time for two cons laps)
  - 11:00 Clan Battles: Round 3,4,5th is time allows
  - 12:30 Awards & Teardown

1 Day After
- ☐ Update Google Sheets Regional League Standings
- ☐
- ☐