

# A.L.I.S.H.A. (TH Version)

*Arduino nano LED & Integrated Servo Helmet Actuator* version 1.0 is a simple to install Arduino Nano shield module that allows DIY people to easily motorize and light up their favorite 3D printed Iron Man helmet or any other helmets (i.e. Batman, Gray Fox, etc.). Drives up to 2 MG90S servos (recommended), 2 LEDs independently controllable for eyes (PWM), 1 button/switch, 1 auxiliary LED port (non-PWM), and an expansion port for additional features.

**Recommended operating voltage between 5v-6v (not to exceed 6v due to MG90S servos.)**

Each LED port has a 100ohm current limiting resistor.

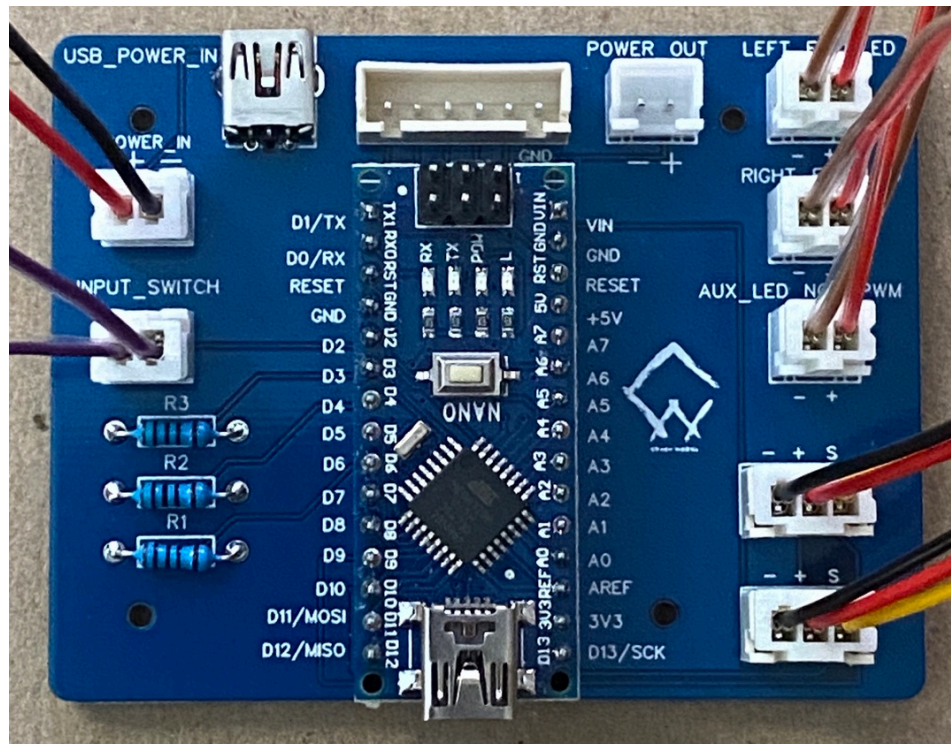
Full documentation, instructions and code can be found on the ***Thingiverse Crash Works 3D page & Crash Works 3D GitHub Page.***

## **Board size:**

Through Hole – 73.025mm x 56.134mm

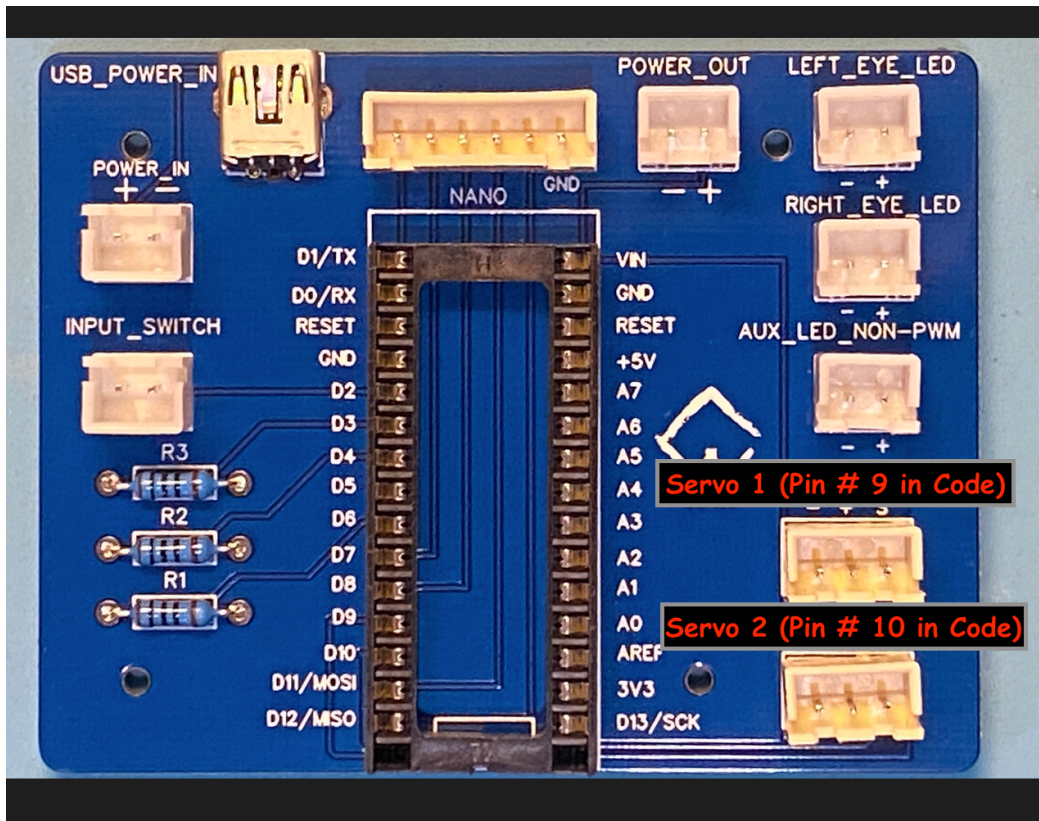
## **Includes:**

- Arduino Nano with CH340G driver
- SMT board with JST-XH female pin headers for easy jumper wire connection
- 2 - JST (3-pin) headers for easy jumper wire connection to Servos
- 1 - JST (2-pin) header for easy jumper wire connection to Power In or Power Out Port
- 4 - JST (2-pin) headers for easy jumper wire connection to LEDs & Input Switch



Included are pre-wired connectors to make connection to your components / parts easier.

- There are two 3-pin wired connectors for your servos. They are color coded (Black = Ground / Red = + / Yellow = S). **\*\*MG90s servos S = Orange\*\***
- There is one 2-pin wired connectors that can be used for your power input or power output. (Red = + / Black = Ground)
- There is one 2-pin wired connector for your switch input (Purple wire / Purple wire) **\*\*\* Switch input is not polarity sensitive\*\*\***
- There are three 2-pin wired connectors for your LEDs (Red = + / Brown = Ground)



The board can be powered with a mini-USB connected to the top-left of the board **-or-** using the “Power-in” connection on the top-left of the board with the included 2-pin wired connector. **\*\*\* Do not power the board by plugging a USB cable directly into the Arduino Nano, also the input voltage should be between 5V DC ~ 6V DC, do not exceed 6V DC\*\*\***

There is also a “Power-out” connection on the top right side of the board, which can be used to power something externally if you choose. This port will output the same amount of power as the power being provided to the board. If you wish to use the “Power-out” port, please use the included 2-pin wired connector.

The LED outputs are separated into “Left”, “Right”, and “Aux”. You can connect to these using the included 2-pin wired connector. The **Red** connects to the positive of your LED & the **Brown** connects to the negative/ground of your LED.

*\*\*\*Note the “Left” & “Right” LEDs are PWM controlled, and through coding can have their intensity adjusted as well as the option to have them blink. The “AUX” LED is non-PWM controlled and can only operate either on / off and does not have intensity control\*\*\**

The Input is triggered by a momentary type switch, which you provide. This can be a: “Reed” switch, momentary push button, hall-effect sensor, etc. You can use the provided 2-pin wired (**Purple / Purple**) connector to add your switch for controlling the board operation.

The Arduino nano is already pre-flashed with the Crashworks 3D code. Once you have correctly wired your board to your Servos and LEDs, upon initial power up the LEDs will blink and the servos will move to their home position. Upon the 1<sup>st</sup> input (Button press from switch) it will let the system know you are ready for operation. Every button press after this will trigger a function to either open the helmet and turn the LEDs off –or- close the helmet and turn the LEDs on.

**\*\* New Button Feature \*\*** If you “**Double Tap**” the Button it will turn “**Off / On**” the LED eyes. If you “**Press & Hold**” the Button it will adjust the brightness of the LED eyes.

If you need to adjust the code, for servo angle / range of motion or enable/disable the LED eye blink sequence, the Crashworks 3D Arduino code can be found on Github.

[https://github.com/crashworks3d/Iron\\_Man\\_Servo](https://github.com/crashworks3d/Iron_Man_Servo)

If you decide to adjust the Arduino code listed above, just upload the new code to the board using the Arduino IDE software, select Arduino Nano as the board type, and connect a USB cable from your computer to the USB port directly on the Arduino Nano.

*\*\*\*Note the USB port on the Arduino Nano is only for programming; you should never power the board by connecting your power supply (USB Power bank, battery, etc.) directly to the USB Port on the Nano\*\*\**

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If you are looking for 3D printable file kits for Iron Man helmet motorization, you can visit the Crash Works 3D Thingiverse page, which contains kits and documentation for Iron Man MK7, Iron Man MK46, and Iron Man MK85 helmets.

<https://www.thingiverse.com/crashworks3d/designs>

Thank you for your purchase, we hope you enjoy using our system and wish you the best with your project.