A.L.I.S.H.A. (MK4 Version) w/ Audio

*A*rduino nano *L*ED & *I*ntegrated *S*ervo *H*elmet *A*ctuator version MK4 is a simple to install Arduino Nano shield module that allows DIY people to easily motorize, light up their favorite 3D printed Iron Man helmet or any other helmets (i.e. Batman, Gray Fox, etc.), and add sound effects. Drives up to 2 MG90S servos (recommended), 2 LEDs independently controllable for eyes (PWM), 1 button/switch, 1 auxiliary LED port (non-PWM), 1 Data Port (Tx/Rx), 2 expansion ports (1 Digital & 1 Analog) for additional features, 1 Speaker (8Ω), or a powered speaker via the audio out connector.

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

Each LED port has a 100 ohm current limiting resistor.
The Analog Expansion Port 5v Reference Pin has a 100 ohm 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:
MK4 - 55mm x 55mm

Includes:
- Arduino Nano with CH340G driver
- MK4 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 headers for easy jumper wire connection to Power In & Power Out Ports
- 4 - JST 2-pin headers for easy jumper wire connection to LEDs and Input Switch
- 1 – JST 2-pin header for easy jumper wire connection to a speaker

Included are pre-wired connectors to make connection to your components 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 connector for your optional power input & power output. (Red = + / Black = Ground)
- There is one 2-pin wired connector for your switch input (Green wire / Green wire) **** Switch input is not polarity sensitive****
- There are two 2-pin wired connectors for your LEDs (Red = + / Black = Ground)
- There is one 2-pin wired connector for your speaker (Black Wire / Green Wire)
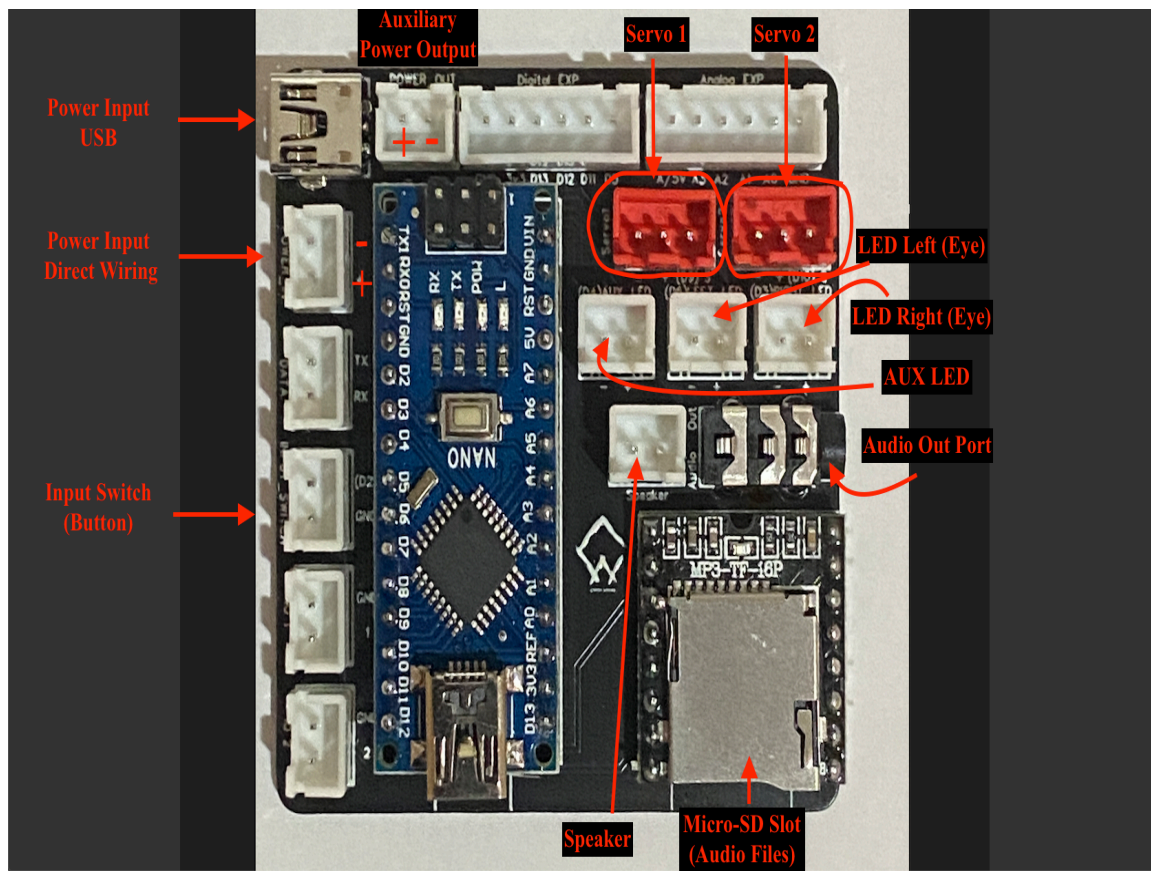
The board can be powered with a mini-USB connected to the top-left of the board, **or** using the "Power-in" connection on the top-left of the board with the included 2-pin wired connector. ***** Do not power the board by plugging a USB cable directly into the Arduino Nano, also the input voltage should be between 5V DC ~ 6V DC, do not exceed 6V DC*****

There is also a "Power-out" connection on the top board to the right of the USB connector, 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" 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 wire connects to the positive of your LED and the Black wire 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 (Green / Green) connector to add your switch for controlling the board operation.

The Audio output is via the speaker connector; you can use the provided 2-pin wired (Black / Green) connector to connect to a speaker, which you provide. The recommended speaker is an 8Ω (ohm) / 3 Watt maximum. Or you can use a powered speaker by connecting to the Audio Out Port, which uses a 3.5mm Stereo Jack.

The Micro-SD Card Audio slot can support up to a 8gb card (Maximum), which you provide, and needs to be formatted as FAT32. *(See Attached Document on SD Card Formatting)*

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 with blink and the servos will move to their home position, and you will hear the JARVIS Audio/Helmet Close Sound. Upon the 1st 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 (turn the LEDs off & Helmet open sound) –or- close the helmet (turn the LEDs on & Helmet Close Sound). 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, enable/disable the LED eye blink sequence, or adjust the sound effects volume, the Crashworks 3D Arduino code can be found on Github.

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 used 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. Also when uploading new code to the Arduino Nano it is recommended that you disconnect the attached Servos, to prevent them from drawing power from the computer. The servos can be reconnected once you are done uploading the new code, and have disconnected from both the computer and the Arduino Nano's USB port****

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 the 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.