Ardweeny MultiPack

Turn your Arduino-compatible Ardweeny into a portable powerhouse!
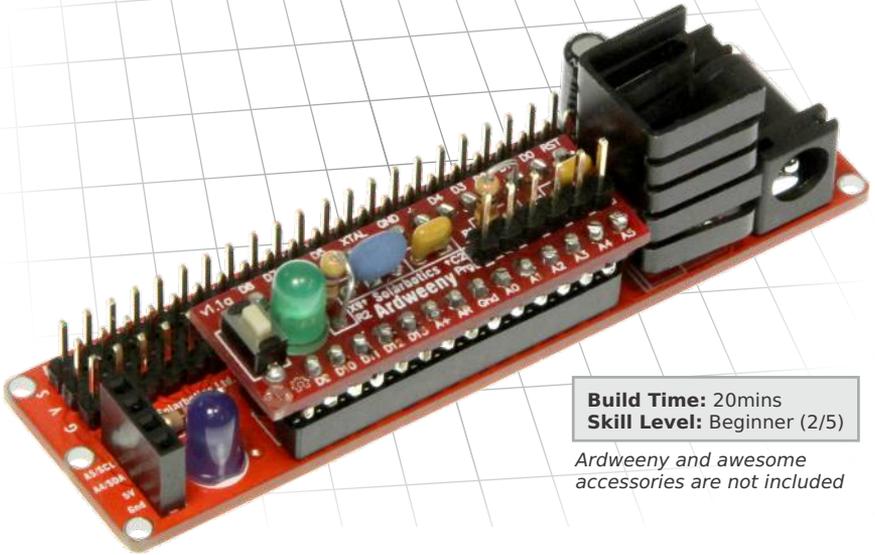
Build Time: 20mins
Skill Level: Beginner (2/5)

Ardweeny and awesome accessories are not included

Give your Ardweeny *MUSCLE!*

- Ideal for driving multiple servos
- Ground / Voltage / Signal (GVS) pinout for *all* Ardweeny pins
- Powerful Low-dropout, *high* current 5V, <u>5A</u> voltage regulator
- 4-pin I^{2}C / Blink-M header
- 2-position power jack (end or side-mount)

SOLARBOTICS Ltd

Introductory Stuff

We've written this manual *assuming* you have an Ardweeny, soldered it together, and now have a general knowledge of how to solder. If not, go back to your Ardweeny instructions, and build it first!

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Circuit Diagram
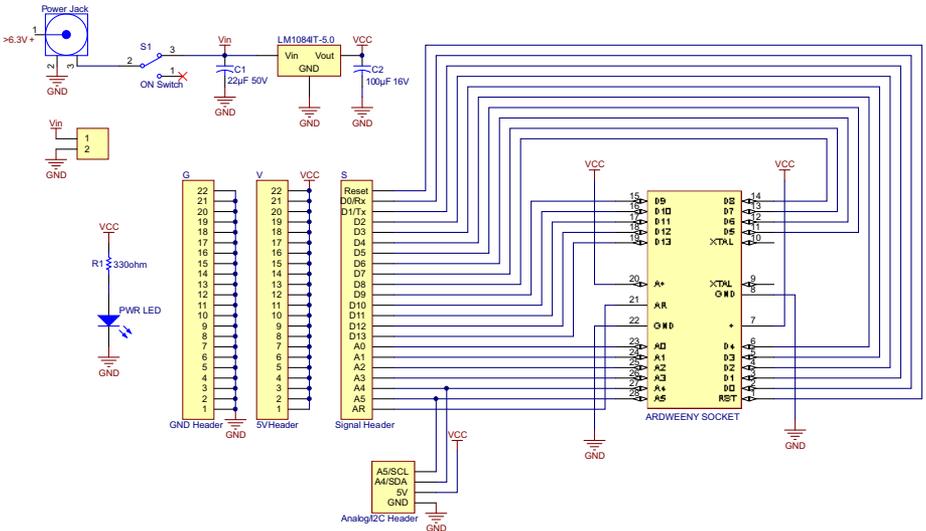
Parts List

- ❏ 1 x Printed Circuit Board (PCB)
- ❏ 1 x LM1084 Voltage Regulator
- ❏ 1 x LED (Power indicator)
- ❏ 1 x 330 ohm resistor (Orange / Orange / Brown)
- ❏ 1 x 100µF-16V Electrolytic Capacitor (power filtration)
- ❏ 1 x 22µF-50V Electrolytic Capacitor (power filtration)
- ❏ 1 x 2.1mm DC Power Barrel Jack
- ❏ 1 x SWT1 Power Switch
- ❏ 1 x DC28-Pin Socket header (Ardweeny nest)
- ❏ 2 x 36-pin Male headers
- ❏ 1 x 4-Pin female header (BlinkM / Analog Header)

36-Pin male headers

LM1084 Voltage Reg

Heatsink

100µF Cap

22µF Cap

Power LED

Power Jack

Power Switch

DC-28pin Ardweeny "Nest"

330 ohm Resistor

4-Pin Female Header

PCB
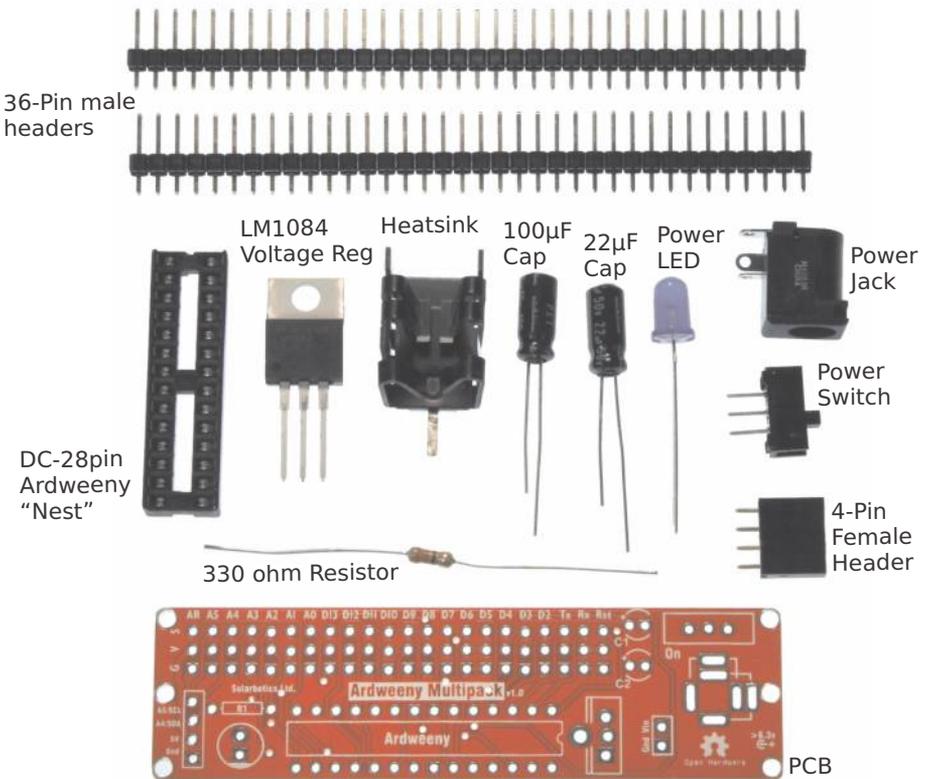
We strongly suggest you count the parts in your kit to make sure you have all the parts listed (c'mon - there's barely a handful of parts, so count them!). If anything is missing, contact Solarbotics Ltd. for replacement parts information.

Construction!

Step 1 - Electrolytic Capacitors: There are 2 types, the *high* voltage 22µF and *low* voltage 100µF capacitor. These have to be installed in the right place, and the right-way around.

Install the 22µF capacitor to position 'C1' and the 100µF to 'C2'.

22µF to 'C1'

100µF to 'C2'

Note: Shorter lead is inserted into the <u>square</u> pad.
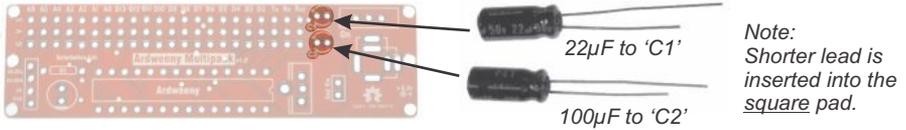
Step 2 - Power Switch: This is installed right beside the capacitors.
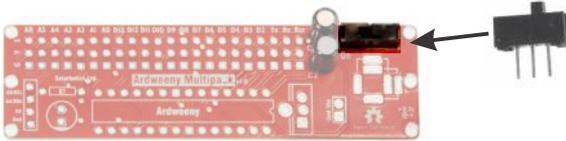
Step 3 - Barrel Jack: Time for power! Decide it you want it side-mount, or end-mount. Pick a direction, plug in the jack, and solder it in!

Power Jack End-mounted

Choose your own adventure, uh, power jack position and solder it in!

Power Jack Side-mounted
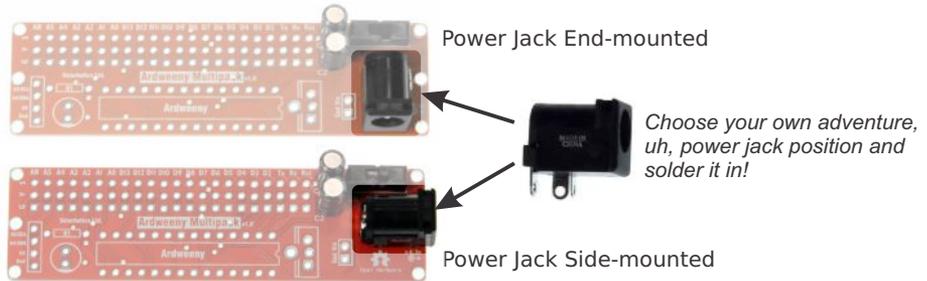
Step 4 - Ardweeny "Nest": The 28-pin DIP carrier is your Ardweeny socket, or you can go hard-core and solder your Ardweeny directly in. Install the carrier with the notch at the end matching one on the PCB.

Note: Match the notch positions

Tack solder or bend the corner leads to hold it in while soldering
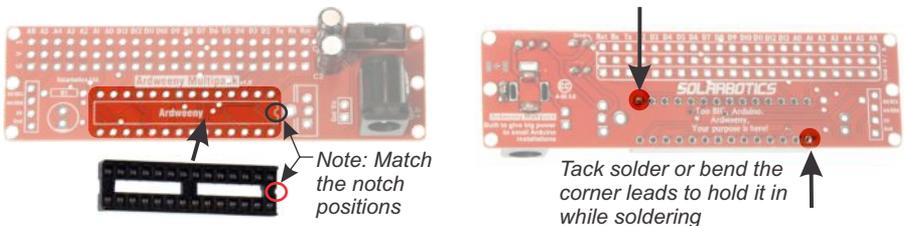
Step 5 - 330 ohm resistor: This current-limiting LED resistor is tucked into the 'R1' position. Bend the legs down close to the body of the resistor to make it fit.

1. Bend the legs down
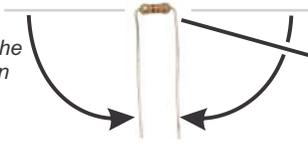
2. Install at 'R1'
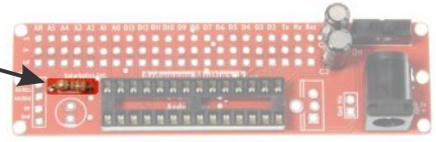
Step 6 - Power LED: Put it in the right-way around. Get it in backwards, and it'll light up when there's no power. Make sure the shorter lead (Flat side of the LED) goes into the square pad & matches the outline on the PCB. And *yes,* we're joking about the backwards thing. It'll actually starts beeping the theme to "Super Mario Bros."

Match LED outline to PCB's!
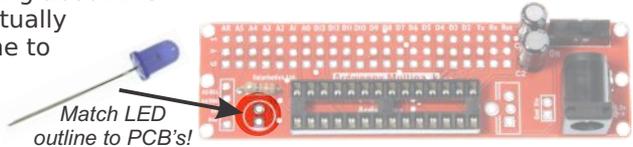
Step 7 - 4-Pin Female Header: It isn't essential, but it gives you a quick interface to I²C devices, such as BlinkM LEDs or other Ardweenys.
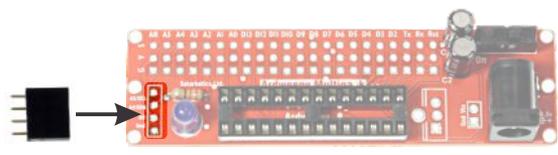
Step 8 - Install the male header pins: Break up the two male header strips each into a set of 22, 11, and 3 pins (as shown below). Solder the two sets of 22 and place them in the **'G'** and **'V'** locations (marked at the end of the PCB). The two sets of 11 are installed in the **'S'** row, end-to-end.

The spare 3 pin headers can be used for the Gnd / Vin line if desired.

Turn these...

...into these!

SNAP!

36 pins

22 pins

11 pins
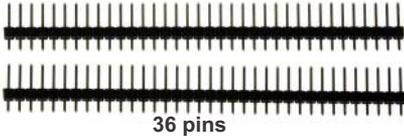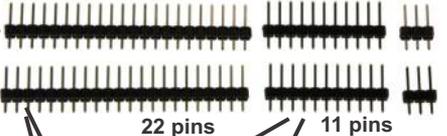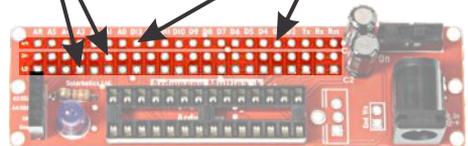
Install them here!

Step 9 - Voltage Regulator & Heatsink: Let's put these together *before* soldering them to the PCB. Assemble the pair so all the pins are pointed in the same direction. It will be tight, but manageable. Then install this regulator / heatsink package to the PCB, between the chip carrier and power jack.

You won't be able to install this assembly backwards. If you do, send us a picture (one before you power it up, one of the smoking mess afterwards).
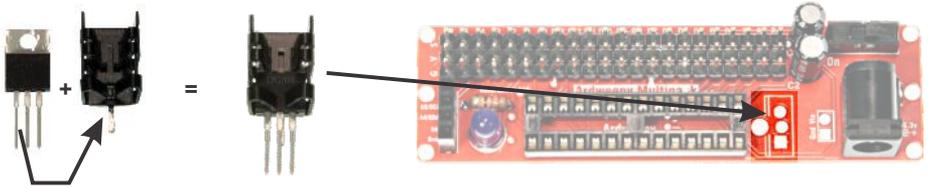
Step 10 - Powering it up!:
Plug in a 6.5~30VDC 2.1mm (tip positive) adapter into the jack, and hit the power switch. If the power LED lights up, your MultiPack is ready to take an Ardweeny!

Gently plug your Ardweeny into the carrier (LED close to the MultiPack LED). Now you're ready to go portable with *power*, and use some of the extra features offered by the MultiPack!
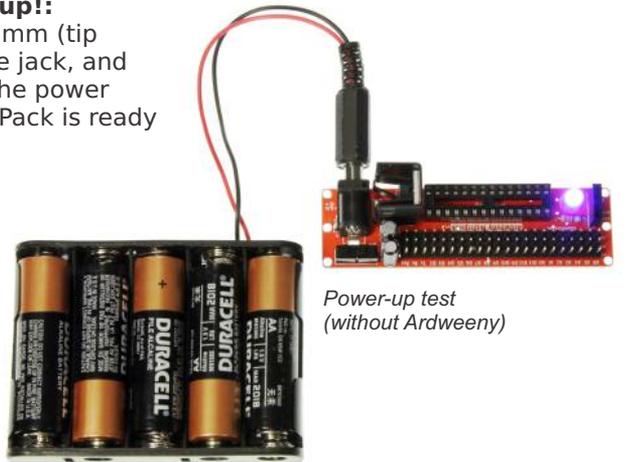
Power-up test
(without Ardweeny)

Final Ardweeny MultiPack Installation:
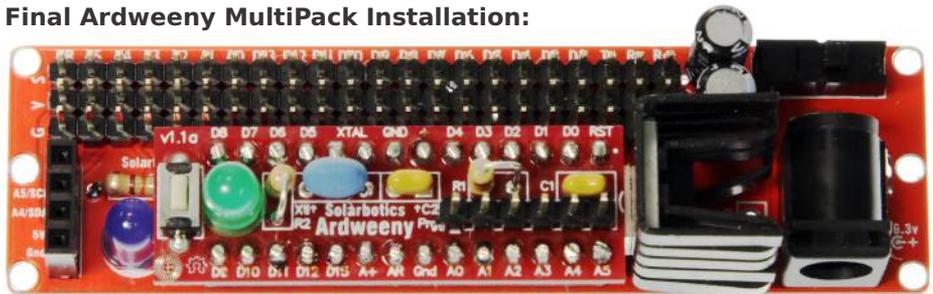
Testing

Limitations:
Before you hook everything on your workbench to the Multipack, there *are* some limitations to the design. The board is designed for 5A. The voltage regulator / heat sink can push 5A (for a while). What *can't* handle 5A is the switch (0.2A @ 30VDC) and barrel jack (2.5A @ 16VDC).

Although limits may be pushed on these parts, be aware that a hard-wire jumper will be safer than the switch/jack at higher currents.

Our 12-Servo exercise lasted 4min45s on 8V input, surging to 3A before the VReg went into thermal shutdown.
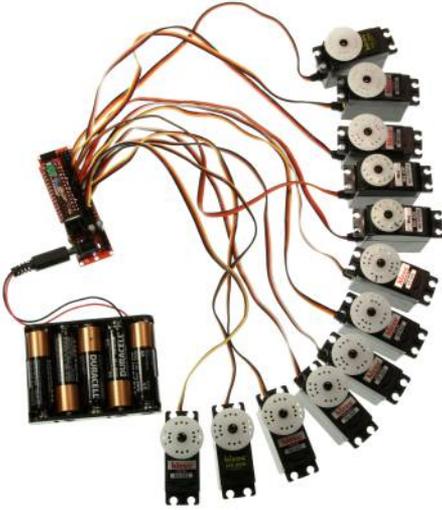
Our standard servo test using ports D2-D13 uses the default Arduino "Servo -> Sweep" Sketch, with the servos hooked up with:
- **G** - Ground - Black or Brown wire
- **V** - +5V from LM1084 - Red wire
- **S** - Signal - Yellow, Orange, or White wire

Analog ports A0-A5 are similarly available, using the sample Arduino sketch "AnalogInput",
hooked up with:
- **S** - Signal - Yellow or White wire
- **V** - +5V from LM1084 - Red wire
- **G** - Ground - Black wire

In short, the Ardweeny Multipack acts exactly like a standard Arduino, in a more compact and powerful package!
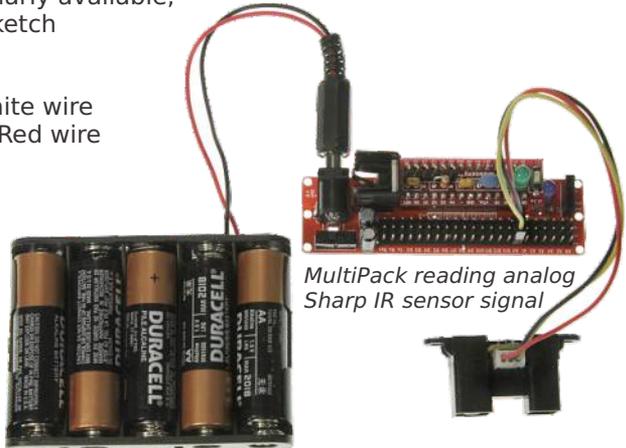
MultiPack reading analog Sharp IR sensor signal

The Ardweeny MultiPack:
Get that Ardweeny into Action!
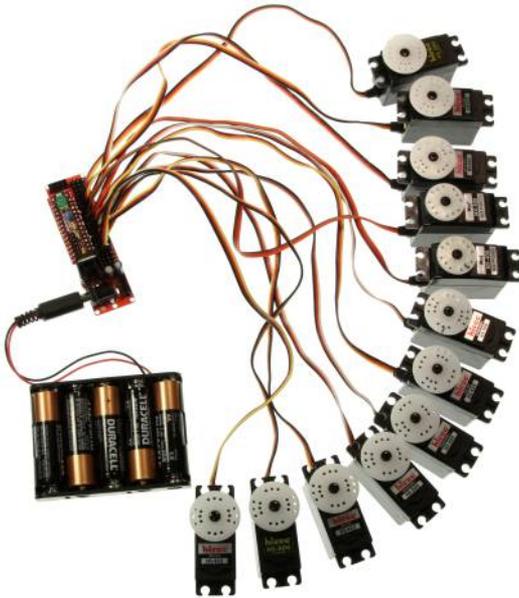
Where the Ardweeny succeeds as a great prototyping tool, it fails as an in-the-field tool. But the Ardweeny MultiPack fixes that, and with muscle! Send your Ardweeny into the field as a robot controller. Make it monitor that ear of corn, read that iguana-mounted GPS, and report it back with servo-controlled semaphore flags.
You decide!
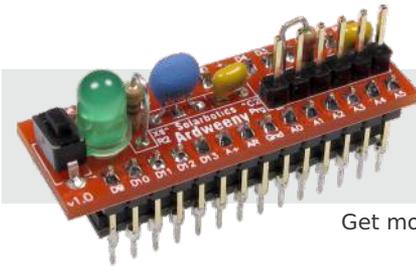
Don't forget your Ardweeny!
The MultiPack is only useful when mounted to an *Ardweeny* - the Arduino-compatible microcontroller kit!

Get more info at www.solarbotics.com/product/kardw/

Visit us online for more info and cool stuff:

www.solarbotics.com

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