

Description	Quantity	Unit Price	Total Price	Purchased From	Notes
Load circuit					
Binding posts	1	\$4.09	\$4.09	Digi-Key	Digi-Key PN: 501-1713-ND
Relay module	1	\$1.80	\$1.80	Amazon	5V 1 Channel Relay Shield Module Optocoupler For PIC AVR DSP ARM Arduino TE213
1000µF 100V capacitors	2	\$3.77	\$7.54	Digi-Key	Digi-Key PN: 1572-1313-ND
MC-4 connector (male/female pair)	1	\$4.99	\$4.99	Amazon	JYFT Solar Panel Cable Connectors Male/Female IP67 30A 1000V DC (1Pair)
47Ω 5W resistor	1	\$0.78	\$0.78	Digi-Key	Bleed resistor. Needs to be able to handle 6.4J pulse energy (for 80V Voc; less for lower Voc: 0.5 * 0.002F * Voc^2). Digi-Key PN:PPC5W47.OCT-ND
18ga solid wire or zip cord, 3ft	1	\$2.94	\$2.94	Amazon	For load circuit wires: MC-4 to binding posts, PV+ binding post to relay, PV- binding post to Perma-Proto, relay to Perma-Proto. Scrap appliance cord is fine. Just want a heavier duty than hookup wire.
15SQ100 Schottky bypass diode	1	\$0.84	\$0.84	Digi-Key	Reverse connection bypass diode. Connect between binding posts. Digi-Key PN: 1655-1355-1-ND
Cable ring connectors	2	\$0.18	\$0.36	Digi-Key	Binding post internal connections. Digi-Key PN: 277-11154-ND
Meters					
ADC - MCP3202	1	\$3.77	\$3.77	Digi-Key	Digi-Key PN: MCP3202-BI/P-ND
Op amp – TLV2462	1	\$2.82	\$2.82	Digi-Key	Ammeter. Digi-Key PN: 296-1892-5-ND
0.005Ω shunt resistor	1	\$3.04	\$3.04	Digi-Key	Ammeter. Digi-Key PN: LVRB-.005RCT-ND
0.1µF capacitor	2	\$0.26	\$0.52	Digi-Key	Op amp and ADC Vdd filter. Digi-Key PN: BC2665CT-ND
8-pin DIP socket (optional)	2	\$0.45	\$0.90	Digi-Key	IC sockets. Recommended so ICs can be replaced more easily. Digi-Key PN: 1212-1003-ND
150kΩ resistor - 1/4W	1	\$0.01	\$0.01	Amazon	Voltmeter - divider
7.5kΩ resistor - 1/4W	1	\$0.01	\$0.01	Amazon	Voltmeter - divider
75kΩ resistor - 1/4W	1	\$0.01	\$0.01	Amazon	Ammeter - op amp circuit
1kΩ resistor - 1/4W	3	\$0.01	\$0.02	Amazon	Voltmeter and ammeter op amp circuits, relay input
22kΩ resistor - 1/4W	2	\$0.01	\$0.01	Amazon	Arduino output pull-ups
2.2nF (2200 pF) capacitor	2	\$0.04	\$0.09	Amazon	Voltmeter and ammeter op amp circuits
Computer and Electronics					
Arduino Uno clone	1	\$14.99	\$14.99	Amazon	Elegoo UNO R3 Board ATmega328P ATMEGA16U2 with USB Cable Compatible With Arduino UNO R3
Donation to arduino.cc	1	\$5.00	\$5.00	arduino.cc	
Adafruit Perma-Proto half-size breadboard	1	\$4.50	\$4.50	Digi-Key	Digi-Key PN: 1528-1195-ND
22 AWG solid core hookup wire - 6 colors - 25' each	5	\$0.18	\$0.88	Amazon	Elenco Solid Hook-Up Wire Kit 6 Colors in a dispenser box # WK-106
4" Male to Female jumpers (1 blue, 1 red, 1 black)	3	\$0.07	\$0.22	Amazon	GenBasic 80 Piece Male to Female Solderless Ribbon Dupont Jumper Wires (4 and 8 Inch) for Breadboard Prototyping
StarTech PC Mounting Computer Screws M3 x 1/4-Inches Long Standoff - 50 Pack SCREWM3	10	\$0.08	\$0.78	Amazon	1 per standoff
M3 nuts	10	\$0.06	\$0.63	Amazon	1 per standoff
uxcell 20pcs M3 8+6mm Female Male Thread Brass Hex Standoff Spacer Screws PCB Pillar	10	\$0.30	\$3.00	Amazon	Standoffs
Enclosure					
Ultra Pro Baseball Clear Square Holder	1	\$5.99	\$5.99	Amazon	

Total

\$70.52

Was under \$50 in 2017

Amazon wish list: <http://a.co/8RzkH2P>

Digi-Key cart: <https://www.digikey.com/short/q99cnzz1>

Digi-Key/Mouser CSV: https://raw.githubusercontent.com/csatt/IV_Swinger/master/docs/IV_Swinger2/Perma_Proto_construction/PermaProto_Digikey_Mouser.csv

Only purchase items with ALT_# in Customer Reference if primary has Availability = "Backorder"