

Bill of Materials for PCB-based IV Swinger 2

PV type
PV module

Relay
Type
SSR

| Description | Quantity | Name(s) | Unit Price | Total Price | Purchase From | Notes |
|--|----------|-------------------|------------|----------------|---------------|---|
| On-PCB parts | | | | | | |
| 10-pin stackable female header | 1 | A1 | \$1.50 | \$1.50 | Digi-Key | Purchased as a kit of all four. Note, however, that A4 is not needed at all, and A1 can be 8-pin instead of 10-pin (pins 9 and 10 are not used). Digi-Key PN: 1568-1413-ND |
| 8-pin stackable female header | 2 | A2, A3 | | | | |
| 6-pin stackable female header | 0 | A4 | | | | |
| 1000µF 100V capacitors | 2 | C1, C2 | \$2.42 | \$4.84 | Digi-Key | Digi-Key PN: 1572-1313-ND |
| 0.1µF capacitor | 2 | C3, C6 | \$0.28 | \$0.56 | Digi-Key | Op amp and ADC Vdd filter. Digi-Key PN: BC2665CT-ND |
| 2.2nF (2200 pF) capacitor | 2 | C4, C5 | \$0.35 | \$0.70 | Digi-Key | Voltmeter and ammeter op amp circuits. Digi-Key PN: 399-4166-ND |
| 4-pin female header | 1 | FH | \$0.47 | \$0.47 | Digi-Key | Extra +5V and GND for temperature and irradiance sensors. Can be omitted if no plans for those (or can be added later). Digi-Key PN: S7037-ND |
| 2-pin or 3-pin screw-terminal block | 1 | J1 | \$0.96 | \$0.96 | Digi-Key | Can 'steal' 3-pin screw-terminal blocks from spare relay modules. Otherwise, can use 2-pin. Digi-Key PN: A97996-ND |
| 8-pin DIP socket (optional) | 2 | MCP3202, TLV2462 | \$0.47 | \$0.94 | Digi-Key | IC sockets. Recommended so ICs can be replaced more easily. Digi-Key PN: 1212-1003-ND |
| ADC - MCP3202 | 1 | MCP3202 | \$2.98 | \$2.98 | Digi-Key | Digi-Key PN: MCP3202-BI/P-ND |
| Op amp - TLV2462 | 1 | TLV2462 | \$2.67 | \$2.67 | Digi-Key | Ammeter. Digi-Key PN: 296-1892-5-ND |
| 150kΩ resistor - 1/4W | 1 | R1 | \$0.01 | \$0.01 | Amazon | Voltmeter - divider |
| 7.5kΩ resistor - 1/4W | 1 | R2 | \$0.01 | \$0.01 | Amazon | Voltmeter - divider |
| 1kΩ resistor - 1/4W | 3 | R3, R4, R6 | \$0.01 | \$0.02 | Amazon | Voltmeter and ammeter op amp circuits, relay input |
| 22kΩ resistor - 1/4W | 1 | R5 | \$0.01 | \$0.01 | Amazon | Arduino output pull-ups |
| 180Ω resistor - 1/4W | 3 | R6, R7, R8 | \$0.01 | \$0.02 | Amazon | SSR pull up/downs |
| 75kΩ resistor - 1/4W | 1 | RF | \$0.01 | \$0.01 | Amazon | Ammeter - op amp circuit |
| Not present in module version | 0 | RF1 | \$0.01 | \$0.00 | Amazon | Ammeter - op amp circuit |
| 47Ω 5W resistor | 1 | RB | \$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: PPC5W47.0CT-ND |
| 0.005Ω shunt resistor | 1 | SHUNT | \$2.12 | \$2.12 | Digi-Key | Ammeter. Digi-Key PN: LVRB-.005RCT-ND |
| Not present in module version | 0 | JP | \$0.13 | \$0.00 | Digi-Key | Low current jumper header. Digi-Key PN: 732-5315-ND |
| Not present in module version | 0 | JP | \$0.11 | \$0.00 | Digi-Key | Low current jumper. Digi-Key PN: S9337-ND |
| Not present in module version | 0 | OFF=LO_CUR | \$0.88 | \$0.00 | Digi-Key | Alternate to jumper. Digi-Key PN: 732-3831-5-ND |
| CPC1718J | 3 | SSR1, SSR2, SSR3 | \$6.55 | \$19.65 | Digi-Key | Solid State Relays (SSRs). Digi-Key PN: CLA315-ND |
| 15SQ100 Schottky bypass diode | 1 | D1,D4 | \$0.75 | \$0.75 | Digi-Key | Reverse connection bypass diode. Connect one 15SQ100 (100V) between pads D1 and D4 or connect one 15SQ045 (45V) between pads D1 and D2 and another between pads D3 and D4. Digi-Key PN: 1655-1355-1-ND (100) Digi-Key PN: 1655-1354-1-ND (45) |
| Off-PCB parts | | | | | | |
| Arduino Uno clone | 1 | Arduino | \$10.86 | \$10.86 | Amazon | Elegoo UNO R3 Board ATmega328P ATMEGA16U2 with USB Cable Compatible With Arduino UNO R3 |
| Donation to arduino.cc | 1 | Donation | \$5.00 | \$5.00 | arduino.cc | |
| Binding posts | 1 | Binding posts | \$3.69 | \$3.69 | Digi-Key | Digi-Key PN: 501-1713-ND |
| Not present in SSR version | 0 | EMR | \$1.80 | \$0.00 | Amazon | 5V 1 Channel Relay Shield Module Optocoupler For PIC AVR DSP ARM Arduino TE213 |
| 18ga solid wire or zip cord | 1 | Load circuit wire | \$0.96 | \$0.96 | Amazon | For load circuit wires: MC-4 to binding posts, binding posts to PCB. Scrap appliance cord is fine. Just want a heavier duty than hookup wire. |
| Cable ring connectors | 2 | Cable rings | \$0.20 | \$0.40 | Digi-Key | Binding post internal connections. Digi-Key PN: 277-11154-ND |
| Not present in SSR version | 0 | Jumpers | \$0.07 | \$0.00 | Amazon | Relay to stack connector wires. GenBasic 80 Piece Male to Female Solderless Ribbon Dupont Jumper Wires (4 and 8 Inch) for Breadboard Prototyping |
| Enclosure | | | | | | |
| Ultra Pro Baseball Clear Square Holder | 1 | Case | \$5.75 | \$5.75 | Amazon | Price goes up in baseball season |
| M3 15mm body, 6mm thread nylon male-female standoff spacer | 4 | Standoffs | \$0.05 | \$0.22 | Amazon | uxcell 50pcs M3 15+6mm Male Female Thread Nylon Hex Standoff Spacer Screws PCB Pillar Black (also available from Digi-Key or eBay) |
| M3 screws (1/4 inch) | 4 | Screws | \$0.10 | \$0.41 | Amazon | StarTech PC Mounting Computer Screws M3 x 1/4-Inches Long Standoff - 50 Pack SCREW M3 (also available from Digi-Key or eBay) |
| M3 nuts | 4 | Nuts | \$0.06 | \$0.22 | Amazon | Shapenty 100PCS 3mm Small Stainless Steel Female Thread Hex Screw Nut Fastener Tool, M3 (also available from Digi-Key or eBay) |
| MC-4 connector (male/female pair) | 1 | MC-4 | \$1.60 | \$1.60 | Amazon | Sun YOBA 5 Pairs of MC4 Male/ Female Solar Panel Cable Connectors |
| Bias Battery | | | | | | |
| Not present in module version | 0 | | \$2.64 | \$0.00 | Digi-Key | Digi-Key PN: BH2DL-ND |
| Not present in module version | 0 | | \$7.47 | \$0.00 | Amazon | Or at grocery store, Target, etc. |
| Total | | | | \$68.11 | | |

Amazon wish list: <http://a.co/gWW20Gs>

Digi-Key cart: <https://www.digikey.com/short/p7m811>

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