Bill of Materials for PCB-based IV Swinger 2

PV type	Relay Type
PV module	**EMR**

Description	Quantity	Name(s)	Unit Price	Total Price	Purchase From	Notes
On-PCB parts						
10-pin stackable female header	1	A1				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	$1.50	$1.50	Digi-Key	
6-pin stackable female header	0	A4				
1000μF 100V capacitors	2	C1, C2	$3.77	$7.54	Digi-Key	Digi-Key PN: 1572-1313-ND
0.1μF capacitor	2	C3, C6	$0.26	$0.52	Digi-Key	Op amp and ADC Vdd filter. Digi-Key PN: BC2665CT-ND
2.2nF (2200 pF) capacitor	2	C4, C5	$0.38	$0.76	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	2	J1, J2	$0.99	$1.98	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	$0.45	$0.90	Digi-Key	IC sockets. Recommended so ICs can be replaced more easily. Digi-Key PN: 1212-1003-ND
ADC - MCP3202	1	MCP3202	$3.77	$3.77	Digi-Key	Digi-Key PN: MCP3202-BI/P-ND
Op amp – TLV2462	1	TLV2462	$2.82	$2.82	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, RG	$0.01	$0.02	Amazon	Voltmeter and ammeter op amp circuits, relay input
22kΩ resistor - 1/4W	2	R5,R6	$0.01	$0.01	Amazon	Arduino output pull-ups
Not present in EMR version	0	R7-R11	$0.01	$0.00	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	$3.04	$3.04	Digi-Key	Ammeter. Digi-Key PN: 13FR005E-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	$0.10	$0.00	Digi-Key	Low current jumper. Digi-Key PN: S9337-ND
Not present in module version	0	OFF=LO_CUR	$0.91	$0.00	Digi-Key	Alternate to jumper. Digi-Key PN: 732-3831-5-ND
Not present in EMR or FET version	0	SSR1-SSR6	$7.00	$0.00	Digi-Key	Solid State Relays (SSRs). Digi-Key PN: CLA315-ND
Not present in EMR or SSR version	0	FET1, FET2, FET3	$1.23	$0.00	Digi-Key	Field Effect Transistors (FETs). Digi-Key PN:IRF540NPBF-ND
Not present in EMR or SSR version	0	CPC1596	$2.78	$0.00	Digi-Key	Gate driver for FET1. DigiKey PN:212-CPC1596G-ND
15SQ100 Schottky bypass diode (100V)	1	D1,D4	$0.84	$0.84	Digi-Key	Reverse connection bypass diode. Connect between pads D1 and D4. Digi-Key PN: 1655-1355-1-ND
Off-PCB parts						
Arduino Uno clone	1	Arduino	$14.99	$14.99	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	$4.09	$4.09	Digi-Key	Digi-Key PN: 501-1713-ND
Relay module, active-low trigger	1	EMR	$1.80	$1.80	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	$2.94	$2.94	Amazon	For load circuit wires: MC-4 to binding posts, binding posts to relay/PCB, relay to PCB. Scrap appliance cord is fine. Just want a heavier duty than hookup wire.
Cable ring connectors	2	Cable rings	$0.21	$0.42	Digi-Key	Binding post internal connections. Digi-Key PN: 277-11154-ND
4 inch Male to Female jumpers (1 blue, 1 red, 1 black)	3	Jumpers	$0.07	$0.22	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	$5.99	$5.99	Amazon	Price goes up in baseball season
M3 15mm body, 6mm thread nylon male-female standoff spacer	8	Standoffs	$0.24	$1.90	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)	8	Screws	$0.07	$0.53	Amazon	StarTech PC Mounting Computer Screws M3 x 1/4-Inches Long Standoff - 50 Pack SCREWM3 (also available from Digi-Key or eBay)
M3 nuts	8	Nuts	$0.06	$0.50	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	$4.99	$4.99	Amazon	JYFT Solar Panel Cable Connectors Male/Female IP67 30A 1000V DC (1Pair)
Bias Battery						
Not present in module version	0		$3.14	$0.00	Digi-Key	Digi-Key PN: BH2DL-ND
Not present in module version	0		$7.98	$0.00	Amazon	Or at grocery store, Target, etc.
Total				$68.35		

Amazon wish list: http://a.co/eATZzyu

Digi-Key cart: https://www.digikey.com/short/p8m7zfhr

Digi-Key/Mouser CSV: https://raw.githubusercontent.com/csatt/IV_Swinger/master/PCB/BOM/DigiKeyMouser/emr_mod_DigiKey_Mouser.csv

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