



Portable Solar Power

PRESENTED BY

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Amateur Radio Portable Power Solutions



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Project Objective

- ▶ To promote community wide understanding of the **amateur radio** communications service when operating off grid while being available to the public during times of emergency or natural disaster. Alternate power sources are available to power the radio, generators, battery power, solar power and combinations there of. To organize and train members capable of maintaining communications during emergencies as a public service.
- ▶ Field Day is a showcase for how amateur radio works reliably under any conditions from almost any location to create an independent communications network. “Ham radio functions completely independent of the Internet or cell phone infrastructure, can interface with laptops or smartphones, and can be set up almost anywhere in minutes. Most importantly amateur radio stations can operate independently of the local electrical grid. i.e. Solar/battery power.

ICOM IC-7300 HF Transceiver



- IC-7300 – The Innovative HF Transceiver with High Performance Real-Time Spectrum Scope

IC-7300 Power Requirements

<u>Portable Power Requirements</u>					
1	<u>Radio IC-7300</u>			Nom	
	a.	Power supply requirement: 13.8 V DC ($\pm 15\%$)		13.8V	
	b.	Power consumption: Receive Standby 0.9 A		0.9A	
	c.	Maximum audio 1.25 A		1.25A	
	d.	Transmit Maximum power 21.0 A		21A	
	e.	Transmit Maximum RF 100 Watts		100Wout	
	f.	DC power on transmit		289.8Win	
	g.	RF Pwr Amp efficiency		34.51%	
	h.	Duty Cycle, Tx to Rx ratio/min. Assume CQ, CQ, CQ, Callsign,			

Dell Inspiron 7706 2n1 Laptop



Dell Inspiron 7706 2n1 Laptop

- a. 8 hours /Li-Ion 4 cells 68 Whr (340 grams, 233 x 95.9 X 7.05mm)
- b. Processor wattage 28W
- c. Input current (maximum) 1.50A (Power adapter)
- d. Output current (continuous) 4.62A (Power adapter)
- e. Battery 4-cell 68 Wh “smart” lithium-ion
- f. Battery voltage 15.20 VDC

Base Battery Requirements



2 Bioenno Power BLF-1240A LiFePO4 Battery

- | | | | | |
|----|---|--|---------|--|
| a. | Charging Voltage 14.6V | | 14. | |
| b. | Charging Current 6A | | 6Vstart | |
| c. | Open Circuit Voltage | | 10Vend | |
| d. | Maximum Continuous Discharge Current 40A | | | |
| e. | Maximum Peak Pulse Current 80A (5 sec.) | | | |
| f. | The maximum continuous discharge current is 40A | | | |

Solar Charge Controller



Bioenno Power SC-4830JUD CC/CV Series - Solar Charge Controller

a.	Rated Voltage: 12V/24V/36V/48V	12V
b.	30A Maximum Load Current	30A
c.	Input Voltage Range: <50V*	12V
d.	Load Disconnect: 9.9V/11.2V/13.2V/14V (Depending on voltage of system)	

Solar Panel BSP-120



4 Bioenno Power 120 Watt Foldable Solar Panel for Charging Power Packs (BSP-120)

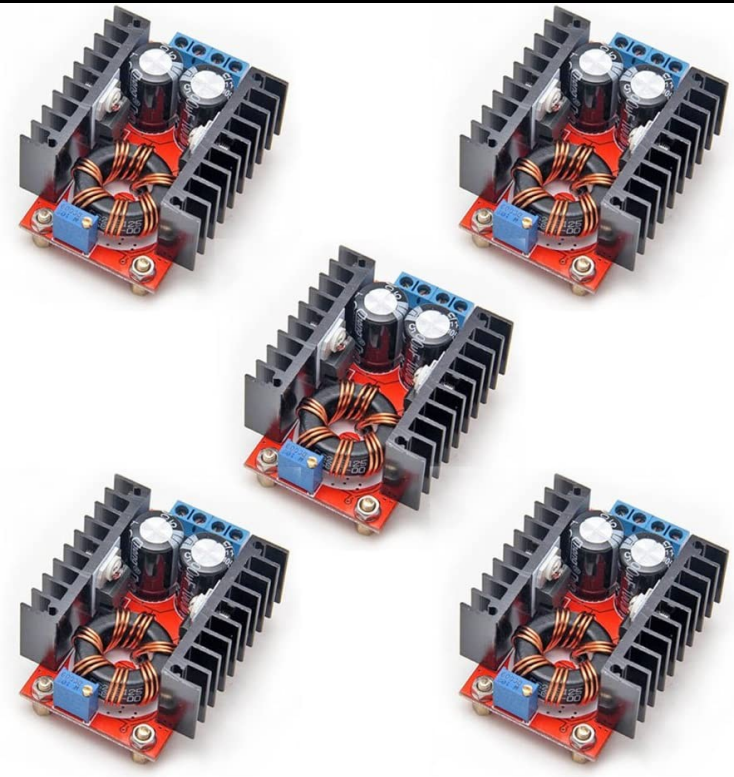
a. Maximum Voltage: 18V, Open Circuit
Voltage: 22V

18V

b. Maximum Current: 3.35A (per panel, so 6.7A in parallel)

3.35A

Boost Converter for PC



5a Step Up Boost Converter Module Adjustable Power Voltage (Use with Laptop Computer)

a. 150W DC-DC 10-32V to 12-35V

b. Computer requires operating voltage of 19.5VDC

Recommended Battery Charger



Home Battery
9 Charger:

Bioenno Power 14.6V, 10A AC-to-DC Charger (Anderson) for 12V LiFePO₄ Lithium Iron Phosphate Batteries (BPC-1510A)

Typical Breadboard Configuration

How to Guide solars.pdf

File | C:/Users/Ron%20Matussek/Documents/Amateur%20Radio/ICOM%207300%20Documentation/Bioenno%20Power/Pictures/How%20to%20Guide%20s... Sign in

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Page view | Read aloud | Add text | Draw | Highlight | Erase

(Solar Kit Set Up BSP40 - BSP180)



Bioenno Power®
www.bioennopower.com



Connecting Sequence:

1. Battery to Connector
2. Connector to Panel
3. Battery to Radio

See Diagram above



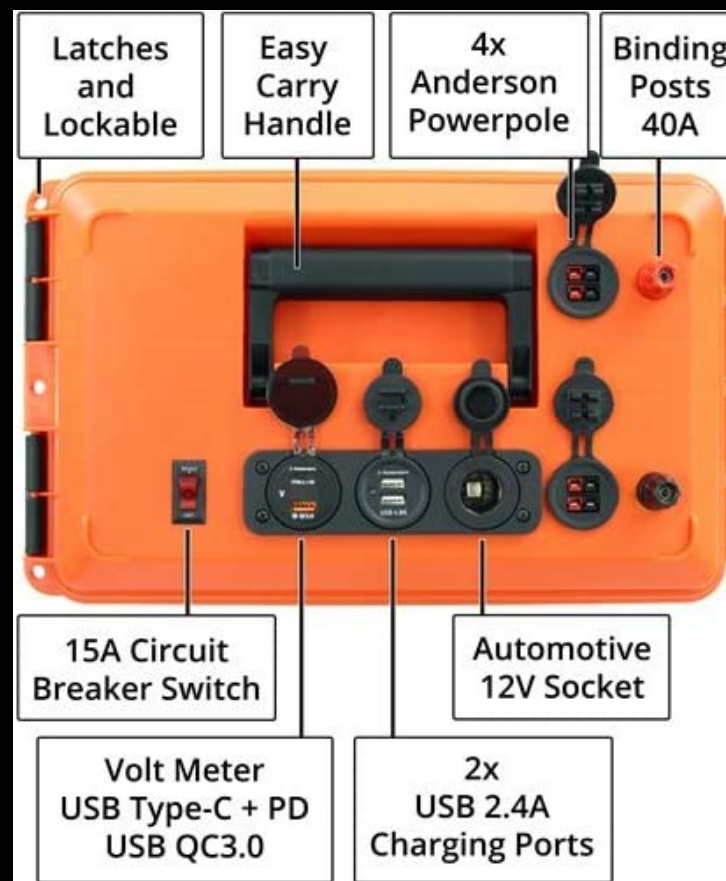
Materials needed before connecting solar panel with our battery that has Anderson Powerpole
-Phillips Head Screwdriver
-Strippers



Step 1 (Assembly)
Solar Panel
Will need BA-SB50-BARE (SB50 Powerpole to Bare Wire Adapter)

Recommended Battery Case

MEGAbox for 30-70Ah
Lithium Deluxe Box



Component Layout



Power Analyzer



Powerwerx Wattmeter-PP DC
Inline Power Analyzer, 45A
Continuous

Project Parts List

Page 1 of 5

<u>Description</u>	<u>Quantity</u>	<u>Source</u>	<u>Number</u>	<u>Cost</u>	<u>Basic Parts Needed</u>	<u>Alternate</u>	<u>Source</u>
MEGAbox for 30-70Ah Lithium Deluxe Box	1	Amazon		\$195.95	MEGAbox basic-BLK	\$109.99	Powerw erx
Bioenno Power 12V, 40Ah LFP LiFePO4 Lithium Iron Phosphate Battery	1	Amazon	PVC, BLF-1240A	\$413.99	Bioenno Power 12V, 20Ah LFP LiFePO4 Lithium Iron Phosphate Battery	\$192.99	Powerw erx
Bioenno Power 14.6V, 10A AC-to-DC Charger	1	Amazon	BPC-1510A	\$63.34	Bioenno Power 14.6V, 10A AC-to-DC Charger	\$48.99	Powerw erx
Powerwerx Wattmeter- PP DC Inline Power Analyzer, 45A Continuous	1	Amazon	Wattmeter-PP	\$64.49	Optional		
Bioenno Power 12V/24V/36V/48, 30A Universal Solar Charge Controller	1	Amazon	SC-4830JUD	\$87.39	Bioenno Power 12V/24V/36V/48, 20A Universal Solar Charge Controller	\$64.44	

Parts List

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Bioenno Power 120 Watt Foldable Solar Panel	1	Amazon	BSP-120	\$236.94		Bioenno Power 120 Watt Foldable Solar Panel	\$236.94	
Powerwerx PanelPole1, Panel Mount Housing	1	Amazon		\$25.49		Optional		
Powerwerx SB50-PP45 SB50 Gray to PP45 Adapter Cable	1	Amazon	SB50-PP45	\$19.49		Optional		
YCIND 3/8" Ring Eyelet Terminal Battery Boost Cable Heavy-Duty 30A Fuse 12V/24V 12AWG Cord 3Ft	1	Amazon		\$11.99		Optional		
Anderson Power Products SB50 Connector Kit, 50 Amps, 36V Gray Housing, w/ 6 AWG, 6319 (Pair)	1	Amazon	SB-50	\$9.99		Optional		

Parts List

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GAMA Electronics 30 Amp Toggle Switch DPDT 3 Position On-Off-On	1	Amazon	\$17.95	Optional
Xaugiry 1ft 10AWG Solar Weatherproof SAE Power Socket Sidewall Port + 1.3ft SAE Connector Extension Cable	1	Amazon	\$14.99	Optional
DAMAVO YM1218 Female USB C & USB A Dual Port Car Charger Socket Power Outlet Type C USB Car Charger Socket Waterproof with Cap	1	Amazon	\$13.99	Optional
10pcs FR PVC Cover Flame Retardant Sleeve for ANDERSON Powerpole Connector Housing	1	Amazon	\$8.99	Optional
GS Power 100% Copper 10 AWG OFC Wire. 25 FT Red & 25 FT Black Bonded Cable	1	Amazon	\$39.99	Optional
1 Pc, 8 X 8 Inch X 1/2 Inch Thick Plywood Squares-Thick	1	Amazon	\$13.04	Optional

Parts List

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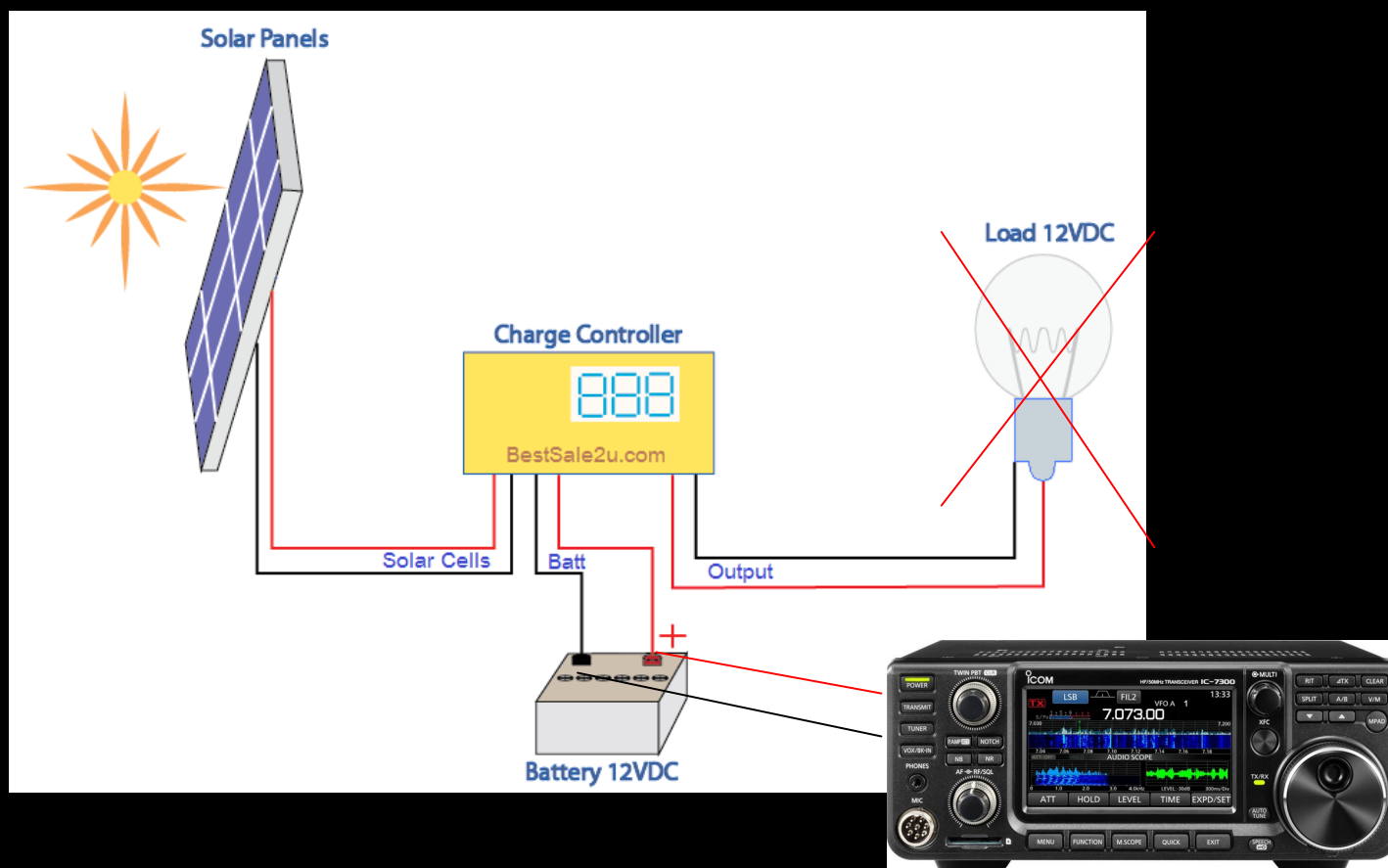
USB C to 4.5mm Laptop Charging Cable Adapter Male Type C to DC 4.5 x 3.0mm Converter Braided 6.5ft Fast 100W	1	Amazon		\$14.88	Optional	
QTEATAK 10Pack 5.5MM x 2.5MM DC Male Power Plug Solder Power Jack Adapter Connector and 10Pack DC Female 3Pin Panel	1	Amazon		\$7.99	Optional	
Gowoops 5PCS 150W DC-DC 10-32V to 12-35V Step Up Boost Converter Module Adjustable Power Voltage	1	Amazon	Laptop PWR	\$19.99	Gowoops 5PCS 150W DC-DC 10-32V to 12-35V Step Up Boost Converter Module Adjustable Power Voltage	\$19.99
SolarEnz 30' Anderson Connector Extension Cable for Portable Solar Panel Kit 10AWG	1	Amazon		\$56.60	SolarEnz 30' Anderson Connector Extension Cable for Portable Solar Panel Kit 10AWG	\$56.60
Ratcheting Crimper for use with 15/30 and 45 Amp Powerpole Connectors	1	Amazon	TC-1	\$37.95		
3drcparts SERMOS Anderson POWERPOLE Battery Charge	1	Amazon		\$8.40		

Parts List

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Powerwerx PanelPlateSB1 for Anderson SB50 Series Connectors	1	Powerwerx		\$9.99		SB1-Panel	\$9.99	Powerwerx
Powerwerx Powerpole Insertion, Removal & Extraction Tool	1	Powerwerx		\$9.99		Optional		
Red/Black Bonded Zip Cord Easy ID Low Voltage Cable	1	Powerwerx	Wire-RB-12- 25	\$24.09		Optional		
150 Piece Assorted 15/30/45A Anderson Powerpole Case by Powerwerx	1	Powerwerx		\$49.99		Optional		
Total Parts Cost not including shipping and Tax				\$1,483.16			\$739.93	

Configuration and Operational Hours



Link to Spreadsheet:
[Ron's Park System.xlsx](#)

Show calcs and discuss

1. Assumptions & Definitions
2. Tx/Rx Profile
3. Calcs
4. Solar Power Profile
5. Graph