

## Ham 61 - Battery maintainer solar

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**You are** following the ham advice of *Be Prepared: Get licensed, Get a real-radio, Get radio-active.*

**What** is the number one stated purpose for why most people get their ham license? Be prepared for emergency operations. That covers a lot of options from power outage, to cell outage, to weather, to other disturbances.

**Too many** get their license, but are not radio-active, so the radio is unusable when wanted. Ham is not like CB; there is no Channel 19 to call your local trucker, when you want to know the road ahead. If you are not radio-active on a Net, there is no one to talk to in an emergency.

**A Net** comprises three crucial things.  
 Who: The people with whom you can talk.  
 Where: The frequency on which you talk.  
 When: The time that someone will be there.

**To be** radio-active, there must be a real-radio, that is working.  
 So, back-up power becomes necessary regardless of the infrastructure.

Radio Specs	Receive	Transmit	Total
Current, 12V full charge	1.4 A	10 A	
Current, 7.4V drained	1.7 A	13 A	
Typical operating day	8 hr	20%	
Amp-hours battery capacity for day	1.4A * 8h = 11.2 Ah	10A * 1.6h = 16 Ah	27 Ah
Watt-hours = Ah * 12V	136 Wh	192 Wh	328 Wh
How long will 7 Ah battery operate	7Ah / 1.4A = 5 h	7Ah / 10A = 0.7 h	



**Battery Emergency.** Select a 12 Vdc rated battery, that is sealed and does not vent. Gel-cell used for alarms is a good choice. Deep cycle is a necessary idea. LiFePO4 (Lithium Iron Phosphate) is smaller with greater energy density and greater cost. Radio power demand stays constant. So as battery voltage runs down, the current draw by the radio goes up. The battery size is determined by how long you intend to operate it and other added devices.

**Battery Size.** Size is total Amp-hour (Ah). How big do you need \_\_\_\_? 35 Ah ~\$80.

**Maintainer Wall-wart.** A maintainer is just to keep an unused battery charged. The maintainer **MUST** be rated for the chemical type battery you are using, whether lead-acid or LiFePO4 (lithium-ion). The battery charging is very different. Wrong charger will cause a fire. Two quality devices stand out as acceptable. Larger versions of both are available.

*Noco Genius* is preferred choice. Suitable for lead-acid & LiFePO4, with top safety features. Genius1= 1 A, 15W, up to 30Ah battery. Genius2= 40Ah, Genius5= 120Ah. Genius1= \$30. *Deltran Battery Tender Jr'* is for lead-acid only. ~\$39.

**Maintainer Solar.** A small solar system controller is a viable alternative. *Suner Power BC-6W* delivers 6W, ~\$40.

**Solar System.** Continuous operation without infrastructure requires much larger solar & battery. Size in Watts \* peak sun hours = daily Watt-hour energy available. Ratings at max (peak sun) include power (Pmx), current (Ipm), and voltage (Vpm) ~ 17V. Voltage and resulting power vary with sun level, so a controller is required. Average peak OK sun is 4.5 hours / day, with more in summer and less in winter.



**Solar Panel.** Select panel size (Watts) to supply the current (A) desired. 100-Watt panel typically delivers about 5 A at maximum sun. 8 hours of summer sun yields (5A \* 8hr) = 40 Ah. Winter is one-half that. In summer, this panel restores all power used. In winter, you need two panels for full power.

*Renogy 100 W* solar panel is adequate, depending on sun. ~\$100. *Dokio* portable units are foldable and come with a controller. ~same price.

Typical Photovoltaic Specs	
Max Power P (Pmx)	100 Watts
Max Power V (Vmp)	18.1 Volts
Max Power I (Imp)	5.5 Amps

**Solar Controller.** Controller manages battery charging. PWM is inexpensive. Pricy MPPT (maximum power point) optimizes voltage. The controller size is the current put in the battery. *Renogy Wanderer 10 Amp, 12V, PWM* is adequate, ~\$20.

**Life is good.** Enjoy!

