

## Ham 61 – Battery, Maintainer, Solar

Dr. Marc & Rosemary © 220821

1. You are following the ham advice of *Be Prepared: Get licensed, Get a real-radio, Get radio-active.*
2. 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.
3. Too many get their license, but are not radio-active, so the radio is unusable when wanted.
  - a. Ham is not like CB; there is no Channel 19 to call your local trucker, when you want to know the road ahead.
  - b. If you are not radio-active on a Net, there is no one to talk to in an emergency.
  - c. A Net comprises three crucial things.
    - i. Who: The people with whom you can talk.
    - ii. Where: The frequency on which you talk.
    - iii. When: The time that someone will be there.



4. 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	



5. **BATTERY Emergency:** Select a 12 Vdc rated battery, that is sealed and does not vent.
  - a. Gel-cell used for alarms is a good choice. Deep cycle is a necessary idea.
  - b. LiFePO4 (Lithium Iron Phosphate) is smaller with greater energy density and greater cost.
  - c. Radio power demand stays constant, so as battery voltage runs down, the current draw by the radio goes up.
  - d. The battery size is determined by how long you intend to operate and other added devices.
6. **BATTERY Size:** Size is total Amp-hour (Ah). How big do you need \_\_\_\_? 35 Ah ~\$80.
7. **MAINTAINER Wall-wart:** A maintainer is just to keep an unused battery charged.
  - a. 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.
  - b. Two quality devices stand out as acceptable. Larger versions of both are available.
  - c. *Noco Genius* is preferred choice. It is suitable for lead-acid & LiFePO4. It has top safety features. Genius1= 1 A, 15W, up to 30Ah battery. Genius2= 40Ah, Genius5= 120Ah. Genius1= \$30.
  - d. *Deltran Battery Tender Jr'* is for lead-acid only. ~\$39.



8. **MAINTAINER Solar:** A small solar system controller is a viable alternative.
  - a. *Suner Power BC-6W* delivers 6W, ~\$40.
9. **SOLAR Background:** Continuous operation without infrastructure requires much larger solar & battery.
  - a. Size in Watts \* peak sun hours = daily Watt-hour energy available.
  - b. Ratings at max (peak sun) include power (Pmx), current (Ipm), and voltage (Vpm) ~ 17V.
  - c. Voltage and resulting power vary with sun level, so a controller is required.
  - d. Average peak OK sun is 4.5 hours / day, with more in summer and less in winter.
10. **SOLAR Panel:** Select panel size (Watts) to supply the current (A) desired.
  - a. 100-Watt panel typically delivers about 5 A at maximum sun.
  - b. 8 hours of summer sun yields (5A \* 8hr) = 40 Ah. Winter is one-half that.
  - c. In summer, this panel restores all power used. In winter, you need two panels for full power.
  - d. *Renogy 100 W* solar panel is adequate, depending on sun. ~\$100.
  - e. *Dokio* portable units are foldable and come with a controller. Same price range.



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

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

12. Life is good. Enjoy!

