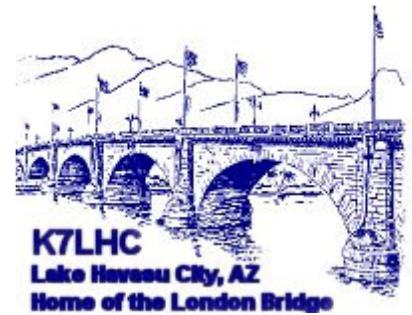


# STATIC



September, 2006

## BATTERIES

### (PART IV)

Presented by Bob Brunskill, KC5GMZ

Garland Radio Amateur Civil Emergency Service

### **Things to Know About a Battery (Cont.)**

Keep in mind this simple formula, called the "Power Law" :

***AMPS times VOLTS equals WATTS.***

So for a fixed amount of watts required or desired, if the volts go down, the amps have to go up. For that reason, rigs designed to work on "12 volt" power supplies, specifically for Car battery systems for mobile use etc., work better on 13.8 volts since they require less amps to get the same power input demand. That is another reason why most battery substitute A/C line driven power supplies, even though called "12 volt supplies" actually crank out a fixed 13.8 volts.

By the same token, if a battery drain is excessive, the internal resistance drags down the voltage. The net result is that the amps demanded goes up in a vicious cycle. This is why there is a reasonable maximum drain you should expect from any battery, based on its amp/hour capacity.

The power in a battery can be impressive. Take a standard car battery. It is rated at 45 amp/hours. That means it can crank out 2.25 amps for 20 hours. Also it will start out at about 12.9 volts and drop to about 11 volts, averaging about 12 volts during the period. 2.25 amps times 12 volts equals 27 watts. 27 watts times 20 hours equals 540 watt/hours, a half a kilowatt/hour, not bad at all for portable power.

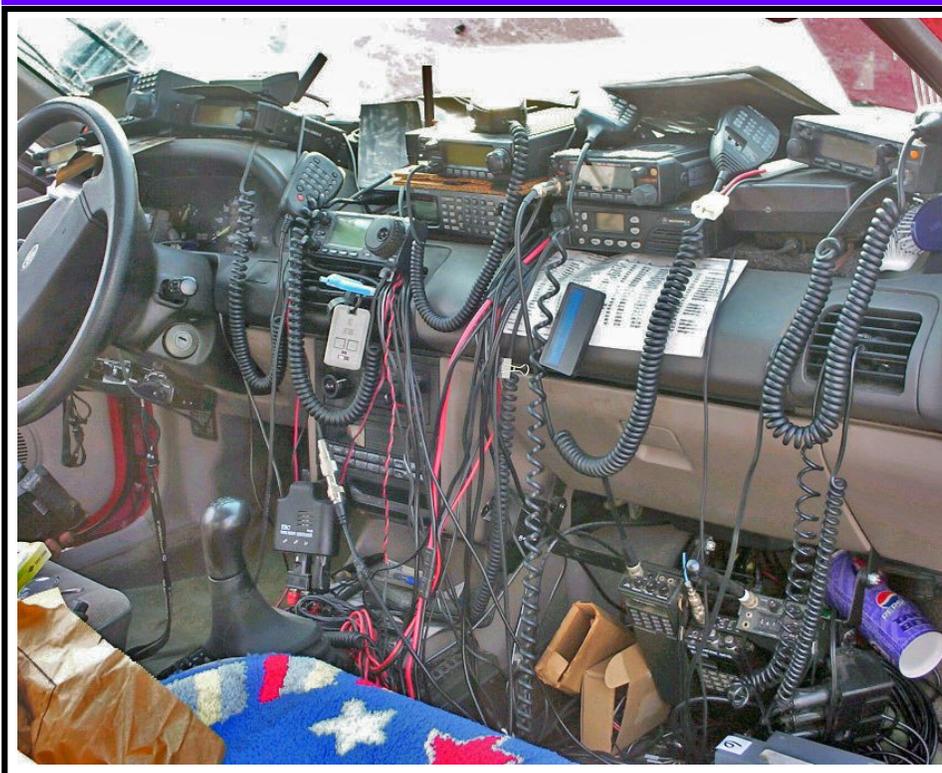
### **How Large a Battery is Needed?**

It is important to know how many amps your rigs draw in order to estimate how big a battery you are going to need. The manuals will give you a wild guess. It really needs to be measured. Such measurements are best done with the rig connected to an adequately rated, voltage regulated power supply like an Astron.

(Cont. Page 3)

## LBARA MEETING SCHEDULE

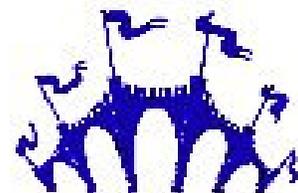
| MONTH    | BOARD | REGULAR |
|----------|-------|---------|
| SEPT     | 9/16  | 9/21    |
| OCTOBER  | 10/17 | 10/19   |
| NOVEMBER |       |         |
| DECEMBER |       |         |
|          |       |         |



**So.....you hear your call letters.....how do you know which mike to pick up.**

### Monday Night Net (7 PM)

| System | Location           | Freq   | Offset | PL    |
|--------|--------------------|--------|--------|-------|
| MCARS  | Bullhead City      | 145.27 | -      | 131.8 |
|        | Kingman            | 146.76 | -      | 131.8 |
|        | Kingman            | 448.25 | -      | 131.8 |
|        | Lake Havasu        | 146.62 | -      | 131.8 |
|        | Willow Beach       | 147.12 | -      | 131.8 |
| CRRRA  | Lake Havasu City   | 146.96 | -      | 162.2 |
|        | Lake Havasu City   | 224.24 | -      | 156.7 |
|        | Lake Havasu City   | 146.64 | -      | 156.7 |
|        | Lake Havasu City   | 449.95 | -      | 141.3 |
| BARN   | Lake Havasu City   | 447.54 | -      | 136.5 |
|        | Las Vegas, NV      | 449.95 |        | 136.5 |
|        | Onyx(Palm Springs) | 449.34 | -      | 136.5 |
|        | Orange County, CA  | 447.54 | -      | 100   |



(Batteries, Part IV, continued from page 1)

If your meter has a heavy duty amps scale, it can be hooked in series with the rig and you can read it directly. If not you need a series resistor. Remember that:

***AMPS times OHMS equals VOLTS***

so if one knows how many ohms the resistor is and you measure how many volts of drop there are across it, you can easily calculate the amps.

You do not want a lot of voltage drop! or resistance in series in this application. Also you need a beefy resistor for the high power measurements and a DVM with an accurate scale that can measure millivolts. I use a 200 watt by .01 ohm precision resistor. Yes, that is one hundredth of an ohm! It is a huge device with big lugs on the end and can easily measure current draws of 50 amps or more, converting currents to easily read voltage drops in the millivolt range.

A typical 100 watt HF transceiver is going to demand 20 to 25 amps. You can see at once that you are going to need a **BIG battery** for this. In a car, the alternator and not the battery powers the rig when the motor is running. Using the HF rig without the battery running at these power levels will strand you beside the road fairly fast.

You can also make a wild guess at the power required for any rig if you have a good idea of its transmit power. Take the rated power output, assume about 33% total efficiency so take that times three, and compute how many amps are needed to make that many watts at 12.6 volts. For instance, a rig designed to crank 100 watts is:  $100 * 3 = 300$  watts  $300 \text{ watts} / 12.6 \text{ volts}$  equals about 24 amps. If you are lucky and the rig is well designed it should need a bit less than this on key down CW transmit.

To take such a rig to the field you are looking at 80 to 100 amp/hours of battery minimum, two Car batteries in parallel, or one really beefy heavy equipment, or large marine battery. I have seen batteries easily available at up to 120 amp/hours each, but they are whoppers and back breakers to pick up.

Many batteries today are rated in **CCA** or **RC**. CCA is Cold Cranking Amps. CCA is approximately equal to the RC of a battery times five. [1000 CCA is about 190 RC]. RC is Reserve Capacity. You can convert RC to amp/hours by the following formula:

***Amp/Hours = (Reserve Capacity / 2) plus 16***

One solution to battery mass, is to turn down the power on the rig for portable service [QRP]. Few will notice if you reduce power from 100 watts to 50 or 25 watts, but you will decrease the power demand on transmit and the size of the battery sharply. This is a case where the FCC precept that you use the minimum power required to communicate makes a lot of sense.

In an emergency, a few S units on someone's distant receiver sacrificed for additional hours of operation on your end could be crucial. Remember battery life is not linear, if you half the power demand you may well more than double your operating time. Also remember that reducing power six DB, or to one fourth the transmit power, will only cut your received signal strength by one S unit on the other end.



## The ARES Organization

First let me say, “Welcome back” to everyone. I know some of you may not have gone anywhere, but whether you stayed here in our beautiful city or traveled to some other exotic location I hope you had a great summer.

I would like to discuss ARES. ARES is one of the many acronyms the amateur radio service has created. ARES is the acronym for Amateur Radio Emergency Service. ARES is a group of Amateur Radio Operators organized primarily emergency communications. Of course they can do more than just emergency communications, they can assist with communications for all kinds of community events.

The basic ARES organization and how it works is that there is a local ARES group, typically the town level. In large cities, the city may be separated into multiple geographic areas or by area of interest. The local group(s) reports to the EC (Emergency Coordinator). The EC works with the DEC (District Emergency Coordinator). The DEC would typically be at a county level. If the EC for one area needed additional resources for an event or emergency, they would contact the DEC to request additional resources. The DEC would contact a neighboring EC and get the necessary resources if the emergency was local and reasonably isolated. If the emergency were more widespread the DEC might have to go to the SEC (Section Emergency Coordinator) to request additional resources. This chain of command and support is very effective as it keeps the people with the local knowledge in the loop.

If you are interested in emergency communications, you should contact your local EC to get information about ARES and joining the local ARES organization. Additionally you can sign up on the Arizona ARES website, which is:

<https://www.az-arrrl.org/secure>

**For additional information on ARES, contact the following:**

- For Lake Havasu, contact Bruce Hunt (N6BRH) at 928-453-1946
- For Kingman, contact Bruce Dumke (KD7CYO) at 928-692-5440
- For Bullhead City, the position is open.
- For Mohave County, the position is open.

If you have any questions, contact Bruce Hunt (N6BRH) at 928-453-1946.

73 de N6BRH (Bruce)

n6brh@arrrl.net

## UPCOMING ACTIVITIES AND HAMFESTS

**SOUTHWEST DIVISION CONVENTION** - hosted by the San Diego County Amateur Radio Council, Marriot Mission Valley Hotel, Camino Del Rio North, San Diego, CA. September 22 – 24, 2006

**TUCSON HAMFEST**– sponsored by the Old Pueblo Radio Club, Tucson Repeater Association, and the Radio Society of Tucson, Kino Sports Park, 2500 East Ajo Road, October 21

### 2006 LONDON BRIDGE DAYS PARADE

**SATURDAY, OCTOBER 28th**

**LBARA NEEDS YOUR HELP TO  
PROVIDE COMMUNICATIONS FOR THE PARADE  
(See Bruce Hunt...N6BRH)**

### **W7ZR SETS WORLD RECORD!**

**At least that is what we are all hoping for! Dick Zalewski, W7ZR will be operating from Morocco as CN2ZR in the 2006 CQ World Wide DX Contest, October 28-29 . Dick will be working as a single operator on a single band—20M SSB.**

**Look for him and give him a contact.**

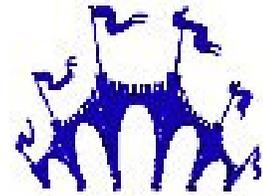
### **FOR SALE/TRADE**

**ALINCO DX70 MOBILE TRANSCEIVER** - 100 w, 166-6m, CW filter, Removable Face Plate, Jim Varner, AE6N, 680.7259

**YAESU VX-6R** - 144/220/440 handheld, new in the box, \$235, Jim Gould, KF7X, 680.7705



**Take a look at the new amateur radio license plate!**



## **ARIZONA TRAFFIC AND EMERGENCY NET (ATEN)**

Interested in Traffic Handling? Well The Arizona Traffic and Emergency Net, (ATEN), a member of the National Traffic System, is still very much active on 3992 kHz at 7pm MST every night of theyear. Hi, I'm Tomy Ivan, KF7GC, Net Manager. I would like to invite you to join with us. We have agrowing number of new and experienced traffic handlers that get together each night to pass and receive message traffic and have a lot of fun doing that. We practice message origination, sending, receiving, and delivery. We use mostly ARRL Radiograms, butlately we have been practicing the ICS-213 form also. Young or old, rural or from the city, there is a place reserved for you on our Net. Young people often can gain respect among much older peer group and obtain high levels of responsibility through the Traffic Nets. If you are still workinglike myself, you still can find 15 to 30 minutesto participate innet operating at least once a week. Retired people can stay active in an important activity, while helping to provide a service to the general public. Traffic Handling is probably one of the most highly organized special interests of Amateur Radio. Come and join the most active Section Traffic Net in Arizona. All you need is a strong willingness to learn to send and receive Messages. To become a member, you must be willing to check into the net onceeach week, and willing to accept traffic for your area. If you have any desire to join please contact me any time at: Tomy IvanKF7GC 928-636-7782 [kf7gc@arrrl.net](mailto:kf7gc@arrrl.net) or on the net at 3992 kHz 7pm



**Take a look at Lakeland, FL's Field Day generating system. Hummm.do you get extra points for going green?**

## **SOME RANDON THOUGHTS**

Ham and eggs. A day's work for a chicken, a lifetime commitment for a pig.

The original point and click interface was a Smith and Wesson.

Be thankful we're not getting all the government we're paying for.

A hangover is the wrath of grapes.

Wrinkled Was Not One of the Things I Wanted to Be When I Grew up

Being "over the hill" is much better than being under it!

God must love stupid people; He made so many.

Don't take life too seriously; No one gets out alive.

Consciousness: That annoying time between naps.

Ever stop to think, and forget to start again?

The trouble with life is there's no background music.

## 220 Volt Wiring as Explained by Tom Gauldin

I think its time for me to explain about 220 current and why it is so different from 110 volt service. First of all, it's twice as big.

Secondly, it'll shock you more. Outside of that, 220 is really two 110 volt lines coming to your house from different parts of the globe.

The up and down 110 comes from the northern hemisphere, and the down and up version comes from below the equator.

Without trying to get technical, it all boils down to the direction water flows when it goes down the drain. In the top of the earth, it goes clockwise, while on the bottom of the earth it goes counter clockwise. Since most electricity is made from hydro dams, the clockwise flow gives you an up and down sine wave, while the counterclockwise version gives you a down and up sine wave. Between the two, you have 220 volts, while either individual side only gives you 110 volts.

This is particularly important to know when buying power tools- which side of the globe did they come from? If you get an Australian saw, for instance, it will turn backwards if connected to a US generated 110 volt source. Sure, you can buy backwards blades for it, but that is an unnecessary burden. Other appliances, like toasters cannot be converted from Australian electricity to American electricity, without horrible results. I knew one person who bought an Australian toaster by mistake and it froze the slices of bread she put in it.

If you wire your shop with 220 and accidentally get two US-generated 110 volt lines run in by accident, you can get 220 by using a trick I learned from an old electrician. Just put each source into its own fuse box and then turn one of the boxes upside down. That'll invert one of the two up and down sine waves to down and up, giving you 220. DO NOT just turn the box sideways, since that'll give you 165 volts and you'll be limited to just using Candian tools with it.

### LBARA OFFICERS AND DIRECTORS

|                      |                        |
|----------------------|------------------------|
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### **VISIT OUR WEBSITE**

[www.lbara.net](http://www.lbara.net)

### FROM THE EDITOR

If you have anything you would like to see included in these issues, please let me know. I'm always looking for articles, news items, construction articles, or anything that might be of interest to our readers. You can contact me at 928.855.7941 or email at [grf@unedspeed.net](mailto:grf@unedspeed.net) or [francej@ajsinsurance.com](mailto:francej@ajsinsurance.com).

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# STATIC

## ATTENTION READERS

Please note that this issue represents a “work-in-progress” and there are a number of changes to be made in subsequent issues. I would greatly appreciate your comments, both good and bad, as well as any suggestions for future issues. This issue also begins our first attempt to deliver the **STATIC** to your doorstep electronically. Please keep me abreast of any email address changes you may have and I promise to have this delivered promptly and accurately. Also, I still have a number of articles awaiting publication and will do so in the future. This is your newsletter, so keep the articles, letters, and pictures coming. I can be reached at home (855.7941), at work (855.3081) or via email at [grf@uneedspeed.net](mailto:grf@uneedspeed.net) .

## EQUIPMENT FOR SALE

**EDITOR'S NOTE:** List your items for sale here. Ham radio related only, please. Include a picture if you like (please use a jpg format). Email all to me at [grf@uneedspeed.net](mailto:grf@uneedspeed.net) along with your name and phone number.

