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Sku# 58250-1014

\$159.95

- Easier to use software helps to determine batteries' parameters such as actual AMP hours
- Works with any battery type such as Lead Acid, Lithium-Ion or Alkaline
- Overlay multiple test results to compare battery performance over lifetime
- Ability to test power supplies with a constant load or characterize solar panels over various loads
- Solar Panel Testing

### Limited Time Offer!

In-Warranty Trade CBA III to IV.....\$80  
 Out-of-Warranty CBA III to IV.....\$100  
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 Offer Valid Thru October 31, 2012

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# QRP “Picnic Table Portable” for Field Day by K7TMG

One of the things many hams enjoy in Amateur Radio is operating a portable station for Field Day and other outdoor events. Working for West Mountain Radio I get to chat with many hams who have much interest in solar powered stations.

Outlined here is my solar powered portable station – I call it the “Picnic Table Portable”. I’m sure many readers are familiar with the Wilderness range of transceivers so I will concentrate more on the power supply side.



In the photo: 1) HQRP 10W Monocrystalline Solar Panel  
2) Wilderness Sierra QRP Transceiver, Sony Noise-Cancelling Headphones & Kent Twin Paddle Key.  
3) West Mountain Radio PWRcheck.  
4) West Mountain Radio “U1 Battery Buddy DC-to-GO Box w/ RIGrunner 4005” & Morningstar SunSaver 6 Solar Charge Controller.

The 10W “12V” HQRP panel puts out approximately 570mA (@ 17.1V) in full sunlight. I modified the panel by removing the regular DC connector and adding 15A Anderson PowerPoles. PowerPoles are a great choice to use on 12V solar panels like this and make interconnection much simpler.

Aiming the solar panel always used to be a bit hit-or-miss until I realized the West Mountain Radio PWRcheck was my new best friend! The 60V DC tolerant input and low quiescent current is ideal for this situation. Now I just have to watch the Ampere dial on the PWRcheck and move the panel for maximum output.

The output of the PWRcheck is fed to a Morningstar SunSaver 6 solar charge controller which is mounted on the top of the U1 Battery Buddy DC-to-GO Box w/ RIGrunner 4005 which houses a 35AH Power-sonic AGM battery.

The current demands of the Wilderness are very modest and some may question why I use such a large AGM battery? My answer to this is I really dislike running out of power!

A more technical reason is the Morningstar controller includes a LVD circuit (low voltage disconnect) which operates around 11.5V. By having a larger capacity battery I don't have to worry about hitting the LVD trigger voltage if conditions are cloudy or I am operating at night. For the same reason a larger capacity battery will keep its terminal voltage higher for longer which can result in increased power output on QRP radios.

It is very important to realize that an LVD circuit is crucial if you expect to keep your battery in good condition. Every time you drain an AGM battery to more than approximately 40% discharge you will do irreversible damage in terms of battery capacity and longevity.

Hint: *If your solar charge controller does not have the LVD circuit, then consider using the West Mountain Radio PWRguard+ which is a combination of LVD and HVD.*

The output of the charge controller is wired to a RIGrunner 4005 which is supplied with the U1 Battery Buddy DC-to-GO Box w/ RIGrunner 4005. Each outlet is protected by an ATC style fuse and low values are available to match your QRP equipment.

For simplicity I only run the Wilderness Sierra so I only need one outlet but it's nice to have more available just in case.

In terms of operation I can effectively run my picnic portable station indefinitely. The solar panel provides more current in full sunlight than my Sierra can convert to RF. When I'm operating, often miles from anywhere in the North Idaho forests & mountains, I can stop worrying about running out of power for the entire weekend and enjoy making some QRP contacts.

Hint: *The extra outlets on the RIGrunner can be used for other things such as the West Mountain Radio PWRbrite LED strip for operating at night or for slow charging your HT with a suitable cable.*

73



### U1 Battery Buddy DC-to-GO Box w/ RIGrunner 4005

SKU# 58513-1403

\$89.95

- Long lasting 12V DC portable power source for HT, QRP radios and scanners
- RIGrunner 4005 provides 5 fused Anderson Powerpole® outlets to protect your equipment
- Tough U1 polypropylene box makes for safe handling and battery charging
- Blown-fuse indicator LED allows easy fuse replacement
- Supplied with battery cable for easy connection to RIGrunner
- Wide range of Powerpole-to-radio cables available
- Typical U1 AGM battery capacity of 36 AH @ 20-hr rate
- ARES/RACES approved
- Dimensions-7" W x 8 3/8" L x 8 3/4" H

# The Antenna

## Part 1 of Series

by Michael Martin - W9TSQ

Your antenna is the most important part of your station. Its effectiveness can contribute to your station's performance in so many ways. An antenna will radiate your signal, provide effective impedance matching to keep your transmitter efficient and happy, or efficiently provide the maximum RF power radiated. Your antenna is truly "Your Tuning Fork to the Airwaves".

### Proven Antenna Sciences of the Past

Over the decades there have been a multitude of antenna designs. Some for a specific frequency band, while others attempt to cover all frequencies from DC to Daylight.

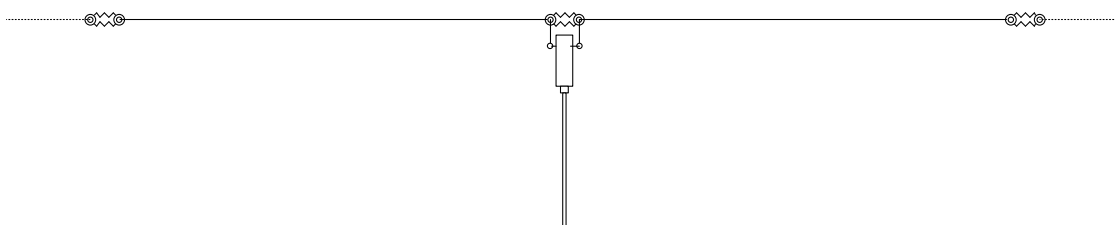
There are several advantages of a Single Band Antenna. The antenna can be designed for perfect resonance at the intended operating frequency, and at the same time, the antenna can be anti-resonant and afford harmonic suppression of an unwanted transmitter harmonic. Single band antennas that work very well can have a predictable antenna pattern.

### "Specsmanship" and Commercial Antennas, Published Gain Specs Vs. Reality

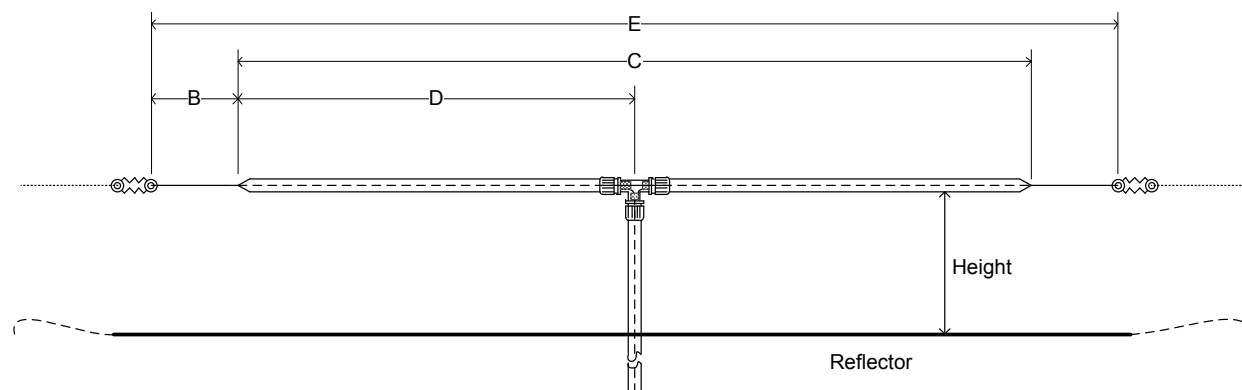
It is interesting to see how creative the manufacturers of commercially available antennas are getting at rating their products. I have seen several different dB Gain figures references for different antenna products over the years. dBd – (Gain over a Dipole), and dBi – (Gain referenced to an isotropic radiator), the latter being a theoretical reference point. The accepted numbers that can really be verified on an antenna range are those compared to a Dipole Antenna. The dBi numbers will just appear to have a 2.15 dB advantage over the dBd Numbers, and what is really measureable. I am waiting for someone to claim numbers in "dBdI" (Referenced to a Dummy Load)... They will really look good.

### Home-brew Antennas for the HF Bands

There are some antenna designs that are really easy to build in your own shop or back yard. The Basic Dipole Antenna is one of them. It is simple and easy to build, but because it has two radiating elements, it should be fed with a Balun or Open Wire Feedline with an antenna tuner.

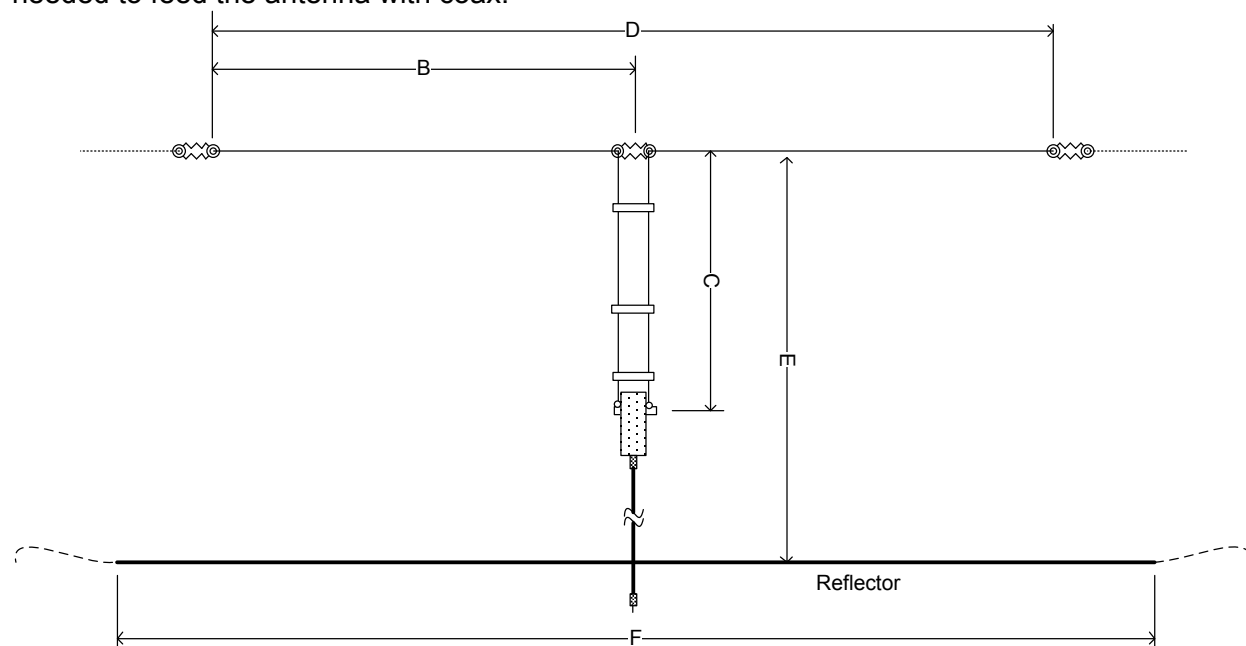


The double Bazooka is another that affords a little more bandwidth and acceptable SWR across that bandwidth. The Double Bazooka has an advantage that it can be fed without a balun but with straight 50 Ohm Coax Cable.



For those with the room for it ...and have more technical adventure, the Double Extended Zepp Antenna is a real performer if you have the space for one. The Zepp Antenna (Developed for use on the Zeppelins) was a voltage fed  $\frac{1}{2}$  wavelength antenna. Voltages at the output of the antenna tuner and at the end points would be very high requiring more spacing and ceramic insulators. However being voltage fed, the antenna has minimal current at the end feed point and needing a minimum of grounding at the antenna tuner.

The Double Extended Zepp adds a second element and extends the elements to  $\frac{5}{8}$  Wavelength for more gain in the antenna pattern. The extended length provides for a slightly lower feed impedance than the classic end fed  $\frac{1}{2}$  wave Zepp Antenna. The antenna can then be fed with a predetermined section of open wire "Ladder Line" that will also act as an impedance matcher. A Balun and an antenna tuner will also be needed to feed the antenna with coax.



Visit the following West Mountain Radio web site for our antenna calculator for the above mentioned antennas, and a table of antenna dimensions. Use these Antenna calculators to determine the antenna length for each band and which antenna would best fit at your location.

[http://www.westmountainradio.com/antenna\\_calculator.php](http://www.westmountainradio.com/antenna_calculator.php)

[http://www.westmountainradio.com/antenna\\_calculator\\_bazooka.php](http://www.westmountainradio.com/antenna_calculator_bazooka.php)

[http://www.westmountainradio.com/antenna\\_calculator\\_zepp.php](http://www.westmountainradio.com/antenna_calculator_zepp.php)

We will have more on Band Specific Antennas, Antenna Tuners, and Transmission Line Theory in subsequent newsletters. Like all new things from West Mountain Radio, they will be worth waiting for.

Michael Martin – W9TSQ

# PWRcheck Review

by Dustin Williams of  
HamRadioReview.net

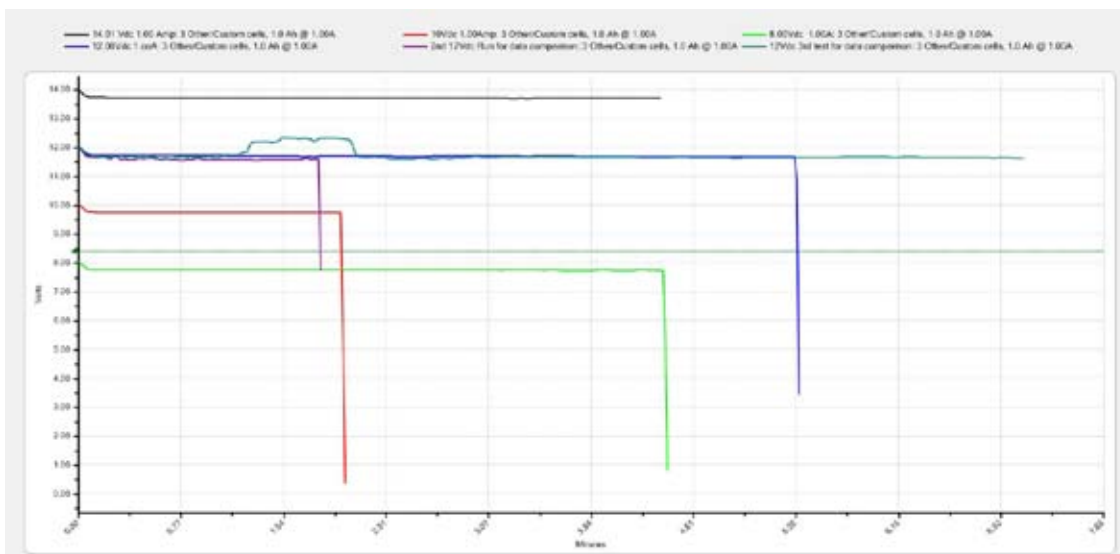
Everyone who has ever had to go through the trouble of setting up and maintaining emergency go kits are well aware of the amount of work that goes into keeping track of battery use charts, Maintenance logs, and keeping them charged. If you are ever operating in an emergency situation, knowing how much battery life you have left is always a plus. Yet there are very few tools available today that let hams keep track of this information, let alone do it all using one piece of hardware. That's where this little gem comes in. Not only does it have the capabilities of telling you how much current that's left in your go kit's batteries, but it will also tell you at a glance the Voltage, Wattage, amp-hours and voltage quality. This unit has the capability of logging all this data over an extended period of time, up to 174,000 data points, which is enough for 2 ½ months at one data point a minute. So let's get on to the technical stuff...

When we received the PWRcheck unit ,we were expecting it to be a little bigger. However, coming in slightly smaller than a typical smart phone, we didn't let that get us down. It went straight to the test bench to measure its accuracy. Our Voltage and Amperage accuracy test for this particular unit is:

## Simulated Typical 12 VDC Installation

	Lab output	PWRCheck	Digital Multi meter at Load
Test 1*	Simulated Car Running		
Voltage (green)	13.98 VDC	13.94 VDC	13.76 VDC
Amperage (yellow)	980 mA	950 mA	976 mA
Test 2*	12 VDC Battery Supply		
Voltage (green)	11.99 VDC	11.95 VDC	11.72 VDC
Amperage (yellow)	970 mA	910 mA	965 mA
Test 3*	12 VDC "Overdrawn"		
Voltage (green)	10.00 VDC	9.95 VDC	9.76 VDC
Amperage (yellow)	968 mA	920 mA	965 mA
Test 4*	12 VDC supply depleted		
Voltage (green)	7.99 VDC	7.95 VDC	7.76 VDC
Amperage (yellow)	970 mA	910 mA	966 mA

\*These test were not carried out on certified equipment \*\*Connected after the PWRCheck in the circuit



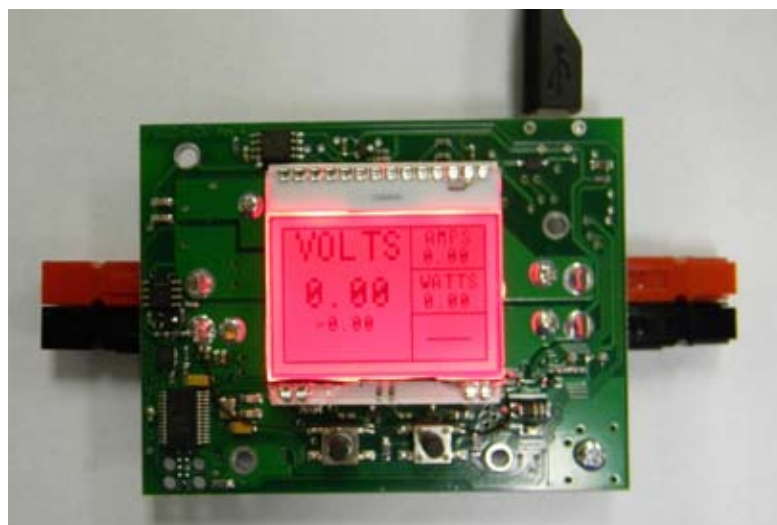
The Drop in the Voltage (green) and spike in Amperage (yellow) are voltage changes and recalibration of test equipment

Due to a strange reading at 12.00 VDC we check it 2 more times just to make sure our equipment wasn't malfunctioning. The rise in voltage visible on the 12 VDC chart was to check and see if the discrepancy continued if we raised the voltage slightly and of course it did We had intended on showing a screen capture from the PWRcheck Software however due to a glitch in the software this is currently not possible

So, with that done we will move on to the functionality of the unit. One of the features that caught our attention more than any other is the Battery Capacity Gauge (Fuel Gauge). It is supposed to be able to tell you how much charge you have left during battery operation. This feature would come in really handy during field day operations or for emergency go kits. This, combined with the logging capabilities of the PWRcheck, will let you see your usage over time and if you are getting what you should out of a battery. It will also let you see if your radio's power consumption has changed telling you there might be something wrong with the transceiver system.

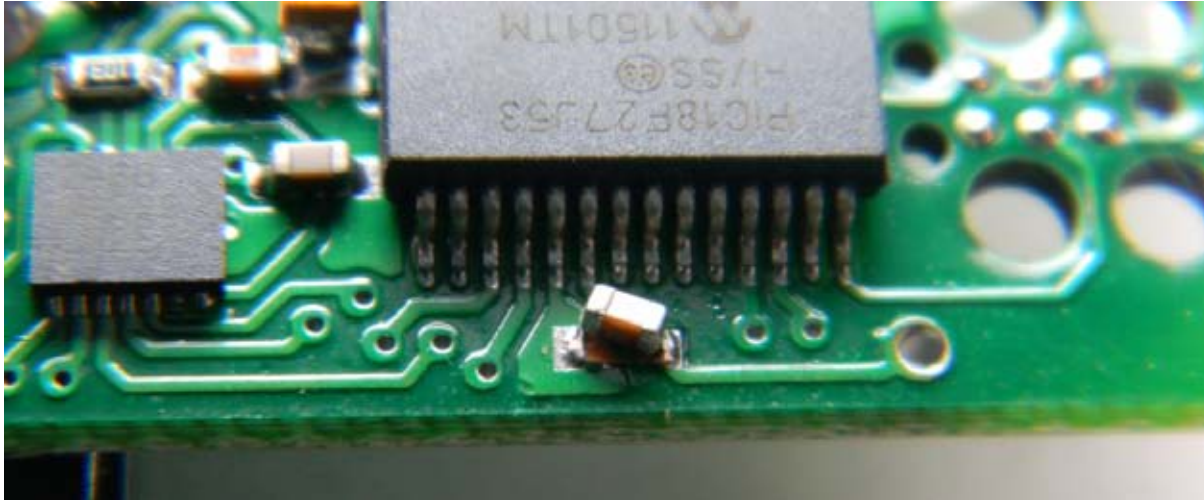
Our test for the battery capacity gauge was three 100 Amp/h lead acid batteries. We programmed the PWRcheck and connected the computer controlled load cell and started with a 10 Amp load. The timing cycle of the load is 5 minutes on and 5 minutes off (to simulate a normal rag chew group). This is also known as 50% duty cycle out of a 1-hour time period this battery will be under load for a total of 30 minutes and in a standby state for a total of 30 minutes. So mathematically with a 100 Amp/h battery under a 10 Amp load, 5 minutes on and 5 minutes off, it should take roughly 20 hours for complete discharge. Now, we decided to check the level every 5 hours, the first check was showing the gauge to be pretty much right on. At the 10 hour mark it was about right, maybe 1-2% off. You should NEVER drain a battery all the way down, because it shortens the overall life of the battery. We have already set the cut off voltage to 10 VDC for the battery, and at 18 hours and 45 minutes the voltage cut off kicked on and the PWRcheck showed about 5 percent left on the gauge and a voltage of 10.8 volts.

Another feature that we really like is the flashing low voltage indication, a user programmable low voltage warning can be set. When the voltage reaches the defined level the screen will begin flashing red to aid in getting some attention so you can keep operating without interruption. Emergency Service Coordinators read the previous sentence again...

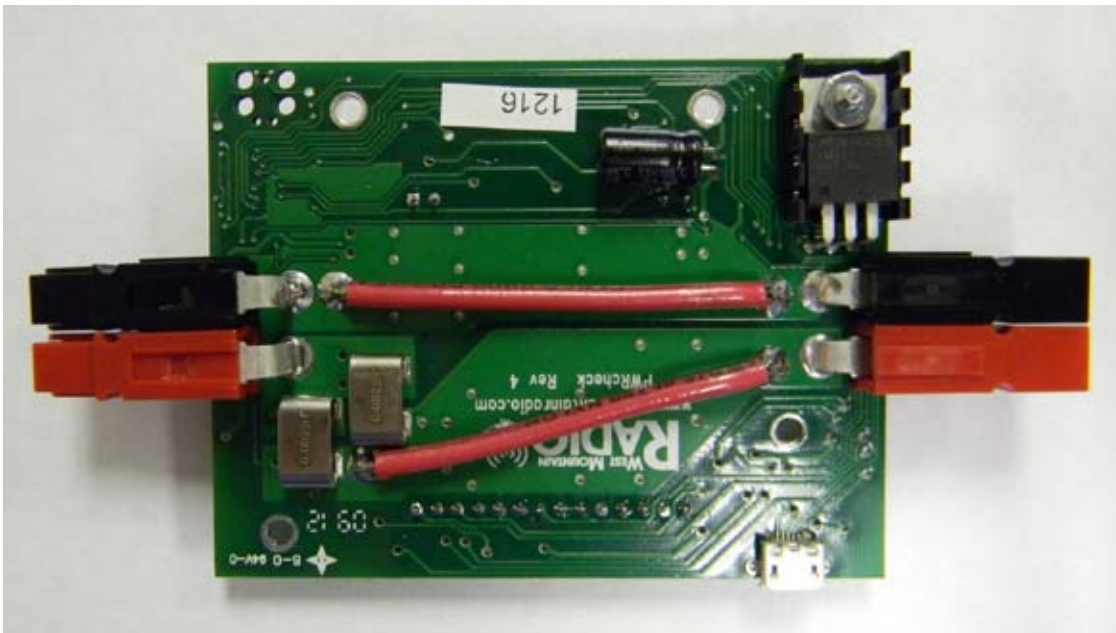


After our test, we decided to open it up and check the build quality of the circuit. On the top part of the board the biggest chunk of real estate belongs to the LCD screen. The rest belongs to various resistors, capacitors and the microcontroller. Right next to microcontroller we found something interesting...

We found a defect with this particular unit having a poorly soldered component in the photo below it is in the lower left hand corner right next to the pic .



That was the only major defect we found....

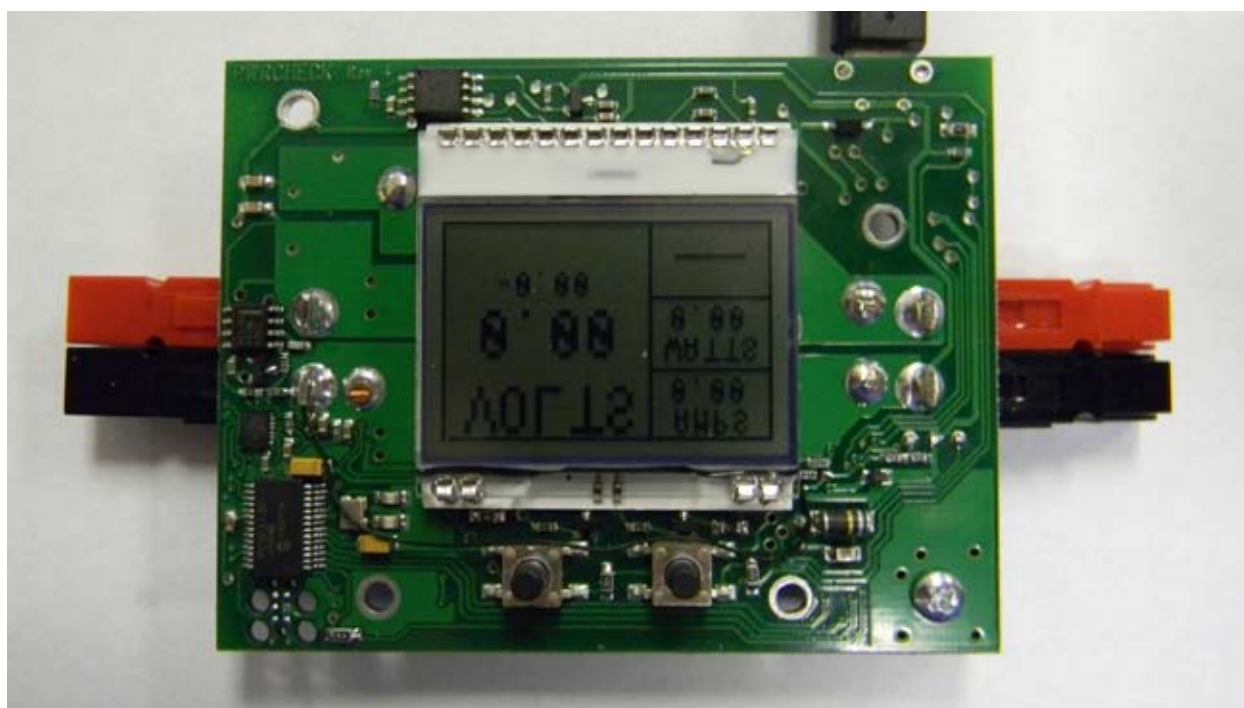


On the back side of the board are the main power connections using 40 Amp power-poles. The power traces on the board are capable of handling the 40 Amps they are rated for. However, this would cause a voltage drop across the circuit and massive amounts of heat due to the higher resistance of such a large trace, so to eliminate this issue they added the lower resistance wires to carry the bulk of the current. On the lower left hand corner of the block there are two .002Ω shunts which the unit uses for current measurement. In upper right corner is the Voltage Regulator and the Lower Right, the USB port.



All in all, West Mountain Radio's DC PWRcheck is a unique tool that belongs in every go kit or at least one in the tool box. Its design is small enough so it will not really get in the way but the amount of information it gathers and stores for you can be very helpful when it comes to battery maintenance. The unit's MSRP is \$184.95 which we feel is a good price for all these features. However, we think it could use a little larger screen to make it easier to read at a glance. The PWRcheck has a lot of areas where its features could be put to great use in a mobile installation, DXpeditions, Field Day, and a lot more. Its software needs some work before we would call it great, but we are going to be covering that all by its self.

We did, however, also discover a quirk in the unit we have, it is not really a defect as it does not affect the overall performance of the product. When we were photographing the unit for the article we noticed that whenever the flash, the screen flipped upside down and backwards. We contacted west Mountain Radio and they are looking into it.



Until Next Time,

73's De KK4HUS

Watch short videos for helpful hints and tips from the Hams at West Mountain Radio.

Available on YouTube and at:  
[www.westmountainradio.com](http://www.westmountainradio.com)  
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Video!!**