

# ***RIGrunner***

*for models*

**4004USB**

**4006U**

**4005 / 4005H**

**4008 / 4008H**

**4012**



**[www.westmountainradio.com](http://www.westmountainradio.com)**

1020 Spring City Drive  
Waukesha, WI 53186  
262-522-6503

[sales@westmountainradio.com](mailto:sales@westmountainradio.com)

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Thank you for choosing the West Mountain Radio RIRunner! You will enjoy having a RIRunner with durable, standardized Powerpole® connections. Having proper DC distribution should make a long overdue improvement to the convenience and safety of your station. The RIRunner is a simple device, with obvious function. Think of a RIRunner as the DC equivalent of a 120 VAC power panel in a house.

There are some considerations to think about. Please read these instructions carefully before setting up your RIRunner.

## **Choosing a mounting location**

Pick a location that is close, or central to, most of your radios and accessories; especially those that draw large amounts of current. Locate your power source as close as possible to the RIRunner. Remember that every wire has resistance, longer wires have more resistance. More than a 10' run of #10 wire is not quite adequate to supply the RIRunner to full output without a significant voltage drop. Determine the voltage loss for a cable run by using the online calculator at:

[www.westmountainradio.com/find\\_cable\\_size.php](http://www.westmountainradio.com/find_cable_size.php)

Install in a cool dry place with good ventilation. For example, do not put it on top of your amplifier or room heater, or cover it with something. It is recommended to not put it in the engine compartment of your car, or directly on the floor of a car; rain from open windows or snow covered boots may cause water damage.

## **Connecting your equipment**

Recognizing that RIRunner comes standard with Powerpole®, updating your cables that supply or use DC with Powerpole® will improve the convenience of quick connections and use of your equipment. Remember, Powerpole® are genderless and the same connector arrangement works for both supply and load. Powerpole® can be used to charge or power batteries, all using the same connectors.

Powerpole® can be installed by soldering or crimping. Be sure to make good connections. For detailed Powerpole® connector installation tips see RIRunner support pages at <http://www.westmountainradio.com/supportrr>.

**IMPORTANT!!** It is essential that assembly of the pairs is correct. Follow the amateur radio standard used by the RIRunner. **DO NOT PLUG IN** without verifying that **RED + PLUS** and **BLACK – MINUS** is correct.

The far left connector is labeled DCIN with a 40 amp fuse, and is normally used to connect to the power supply; but, any output may be used as the input with an appropriate fuse. Plug in your equipment starting with the highest power connections to the left and the lower power drain units to the right, notice the supplied fuse ratings next to

the connector chosen. Typically amplifiers and 100 watt RF output transceivers should be first, VHF radios next and smaller accessories last.

Multiple amplifiers and/or transceivers may be connected to the RIGrunner. There is a 40 amp maximum that would be exceeded if trying to transmit all connected units at once. Most radios and amplifiers draw less than 3 amps in receive, but require many more amps in transmit. Therefore, the limiting factor is total current draw while transmitting. To determine how many radios may be used to transmit at one time, consult the radio manual for power consumption specifications. In the event that the total current goes over the 40 amp maximum, a fuse will blow or make an undersized power supply unhappy. The RIGrunner and any equipment plugged into the RIGrunner should go unharmed.

## Voltage

The 4004U, 4006U, 4008 and 4012 operate from 11.5 to 15V. Contact West Mountain Radio for special versions of these RIGrunners for other specified voltages.

The 4005, 4005H, and 4008H can operate on positive voltage systems up to 48V. Contact West Mountain Radio for negative voltage system devices.

## Using the proper fuses

The RIGrunner comes supplied with a range of fuses installed. This assortment should be suitable for most stations, but can be changed easily. Every RIGrunner output is safe up to 40 amps, but the total allowable is also 40 amps.

A fuse **MUST** be in each position in use. **ANY ATTEMPT TO BYPASS OR SHORT ACROSS THE FUSES IS DANGEROUS AND VOIDS THE RIGRUNNER WARRANTY.** Since the maximum available automotive fuse is 40 amps, the RIGrunner will be protected as long as any value ATC/ATO fuse is installed. Choose the correct fuse for your equipment. Standard ATC/ATO automotive blade fuses are used. These fuses are available in 10 values ranging from 1 amp to 40 amps.

The DC input should have a fuse that is appropriate for the power supply rating. If using a smaller power supply, consider using a lower value fuse than the 40 amp value supplied. Ideally all of the outlets should have a fuse that is the next higher value above the maximum current draw of the unit on that fuse. If using a power cord with a fuse, match that value or go one or two values higher. Sizing each fuse for each unit is desirable, but not absolutely necessary. Having a higher value than the minimum will offer less protection for that unit, too low a value and the fuse will blow out prematurely.

Note that each fuse position has a LED blown fuse indicator that will conveniently light up if an output fuse is blown. There must be power to the RIGrunner and a load on the circuit that has the blown fuse for the blown fuse LED to light.

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## The 12V voltage comparator & audible alert

A feature of the RIRunner 4012 and 4008 is the precision expanded scale voltage comparator display with audible alert. (The 4004U, 4005, 4006U, 4005H and 4008H models do not have this feature.) A basic explanation of 12 volt systems will aid in understanding this feature. Equipment commonly referred to as 12 volt is actually a nominal 13.8 volts. For example, a lead acid battery is a nominal 12.6 volts when charged and not under load, and approximately 14.0 volts under charge. A quality 12 volt power supply will have its regulated output set to 13.8 volts. Most radios are specified to require 13.8 volts +/- 15%. 12 volt automobile or aircraft alternators have voltage regulation set between 13.5 and 14.3 volts.

The RIRunner provides an accurate and unambiguous display of voltage. There are three LEDs: red overvoltage, green normal, and yellow undervoltage. The points at which the LEDs change are set accurately to 11.5 and 15.0 volts. The selection of these points gives a reliable indication of proper and safe operation of your power supply, battery or alternator. A green or normal indication is all you need to look for.

An undervoltage indication, shown by the yellow LED, is less than 11.5 volts. This should be safe for your radio, but may cause improper operation. Low voltage on a modern radio can cause a loss of phase lock and a frequency error. This is a definite indication of a problem with the power source; a bad connection, an unregulated power supply, a bad alternator or dying battery. It is normal with most cars to have less than 11.5 volts when cranking the starter motor.

A normal indication with the green LED illustrates, everything is good and you are between 11.5 and 15.0 volts, do not worry about a thing.

A red overvoltage indication with the red LED is a warning, **DISCONNECT OR TURN OFF YOUR POWER SUPPLY IMMEDIATELY!** It is possible to overheat or damage a radio or other equipment. An overvoltage will sound an audible alert; no need to watch the LEDs to signal a problem.

When running strictly on a 12 volt battery, an overvoltage condition will not occur. The RIRunner's audible alert can be reconfigured for a low battery warning. By removing the four cover screws and move the P14 jumper to the "LO" position. Remember to move it back to "HI" when changing back operation from power supply or alternator.

**Note:** Due to the characteristics of the comparator chip it is normal for the undervoltage LED to glow very dimly with a normal or overvoltage indication. It is also normal for the LEDs to change intensity while stepping through 10 precision points.

In the event of a bad power source or power connection, the yellow LED may flash or come on during transmit. If this happens, check the power source and connections. It is also possible for RF from a transmitter to cause an electronically regulated power supply to lose regulation and cause an overvoltage alert during transmit. The RIRunner

is extensively RF bypassed and should actually cure this problem. If you do have an overvoltage condition during transmit especially with a VHF high power amp, it is due to inadequate RF filtering on the DC lead of the amplifier, or poor RF immunity of the power supply regulator circuit.

Special Note for RIGrunner 4004USB:

The maximum current for the USB outlet is 2 amps and is controlled by the type of device plugged into the USB jack.

## **RIGrunner Accessories**

|   | <u>Order Sku#</u>  |
|---|--------------------|
| <b>Fuse Assortment Low Value (8pcs)</b><br>3- 1A, 3- 5A & 2- 10A  | <b>#58537-1085</b> |
| <b>Fuse Assortment High Value (8pcs)</b><br>2 ea. of 15A, 20A, 30A, 40A   | <b>#58537-1086</b> |
| Buss 10A ATC Circuit Breaker  | #58537-1087        |
| Buss 15A ATC Circuit Breaker  | #58537-1088        |
| Buss 20A ATC Circuit Breaker  | #58537-1089        |
| Buss 25A ATC Circuit Breaker  | #58537-1090        |
| Buss 30A ATC Circuit Breaker  | #58537-1091        |
| <b>Powerpole® Extension Cable, 3 ft.</b><br>#12 Red/Black Wire w/ Powerpole® ends   | <b>#58531-1082</b> |
| <b>Powerpole® Extension Cable, 6 ft.</b><br>#12 Red/Black Wire w/ Powerpole® ends   | <b>#58531-1083</b> |
| <b>Powerpole® Extension Cable, 10 ft.</b><br>#12 Red/Black Wire w/ Powerpole® ends  | <b>#58531-1084</b> |
| <b>15A. Powerpole® Connector-12 Pair</b>  | <b>#58257-1093</b> |
| <b>30A. Powerpole® Connector-12 Pair</b>  | <b>#58257-1095</b> |
| <b>45A. Powerpole® Connector-12 Pair</b>  | <b>#58257-1099</b> |
| <b>Powerpole® Retention Clips -12 Pack</b>  | <b>#58257-1092</b> |
| <b>PowerLock - RIGrunner Retainer Kit</b>   | <b>#58512-1060</b> |
| <b>PWRcrimp Crimp Tool</b>  | <b>#58568-1049</b> |
| <p><i>To purchase or view other accessories available,<br/>call or go online at:</i><br/><b><u><a href="http://www.westmountainradio.com/shop">www.westmountainradio.com/shop</a></u></b></p> |                    |

### **ADDITIONAL RESOURCES**

Go to our support page for more assistance:  
**<http://www.westmountainradio.com/supportrr>**

Go to our OpTips page for connection tips:  
**<http://www.westmountainradio.com/optips>**

## Powerpole® Wiring Guide

| Powerpole® Series Contact | Recommended Wire Gauge |
|---------------------------|------------------------|
| 15 A                      | 20-16 AWG              |
| 30A                       | 20-12 AWG              |
| 45A                       | 14-10 AWG              |

*Additional Resources for Anderson Powerpole® go to: [www.andersonpower.com](http://www.andersonpower.com)*

*Details and a video demonstration for using PWRcrimp Tool with Powerpole®, go to: [www.westmountainradio.com/crimptool](http://www.westmountainradio.com/crimptool)  
[www.westmountainradio.com/videos](http://www.westmountainradio.com/videos)*

## Specifications

### 4004 USB

|  |                          |
|--|--------------------------|
| Overall Dimensions (maximum, w/o cables) | 1.4" H x 4.7" W x 3.0" D |
| Weight                                   | 0.45 lb.                 |
| Maximum total current                    | 40 amps                  |
| Maximum single individual outlet current | 40 amps (fuse protected) |
| 4ICAS current rating (fuse limited)      | 37 amps                  |
| USB current charge                       | 4A max for both ports    |

### 4006U

|  |                          |
|--|--------------------------|
| Overall Dimensions (maximum, w/o cables) | 1.4" H x 6" W x 3.0" D   |
| Weight                                   | 0.55 lb.                 |
| Maximum total current                    | 40 amps                  |
| Maximum single individual outlet current | 40 amps (fuse protected) |
| 4ICAS current rating (fuse limited)      | 37 amps                  |
| USB current charge                       | 4A max for both ports    |

### 4005 and 4005H

|  |                          |
|--|--------------------------|
| Overall Dimensions (maximum, w/o cables) | 1.4" H x 5.7" W x 2.7" D |
| Weight                                   | 0.45 lb.                 |
| Voltage                                  | Positive up to 48 VDC    |
| Maximum total current                    | 40 amps                  |
| Maximum single individual outlet current | 40 amps (fuse protected) |
| 4ICAS current rating (fuse limited)      | 37 amps                  |

## 4008

|   |                                 |
|---|---------------------------------|
| <b>Overall Dimensions (maximum, w/o cables)</b> | <b>1.4" H x 9" W x 3.0" D</b>   |
| <b>Weight</b>                                   | <b>0.65 lb.</b>                 |
| <b>Maximum total current</b>                    | <b>40 amps</b>                  |
| <b>Maximum single individual outlet current</b> | <b>40 amps (fuse protected)</b> |
| <b>4ICAS current rating (fuse limited)</b>      | <b>37 amps</b>                  |
| Precision comparator window points              | 11.5, 15.0V                     |
| Metering accuracy                               | better than 2% @ 25 deg. C      |
| Audible alert SPL output                        | ~60dB SPL @ 1 meter             |
| Maximum voltage (meter circuit)                 | 32 volts                        |
| Reverse polarity protection (meter circuit)     | Yes                             |

## 4008H

|   |                                  |
|---|----------------------------------|
| <b>Overall Dimensions (maximum, w/o cables)</b> | <b>1.4" H x 9.75" W x 3.0" D</b> |
| <b>Weight</b>                                   | <b>0.65 lb.</b>                  |
| Voltage   | Positive up to 48 VDC            |
| <b>Maximum total current</b>                    | <b>40 amps</b>                   |
| <b>Maximum single individual outlet current</b> | <b>40 amps (fuse protected)</b>  |
| <b>4ICAS current rating (fuse limited)</b>      | <b>37 amps</b>                   |
| Precision comparator window points              | 11.5, 15.0V                      |

## 4012

|   |                                   |
|---|-----------------------------------|
| <b>Overall Dimensions (maximum, w/o cables)</b> | <b>1.4" H x 11.75" W x 3.0" D</b> |
| <b>Weight</b>                                   | <b>0.90 lb.</b>                   |
| <b>Maximum total current</b>                    | <b>40 amps</b>                    |
| <b>Maximum single individual outlet current</b> | <b>40 amps (fuse protected)</b>   |
| <b>4ICAS current rating (fuse limited)</b>      | <b>37 amps</b>                    |
| Precision comparator window points              | 11.5, 15.0V                       |
| Metering accuracy                               | better than 2% @ 25 deg. C        |
| Audible alert SPL output                        | ~60dB SPL @ 1 meter               |
| Maximum voltage (meter circuit)                 | 32 volts                          |
| Reverse polarity protection (meter circuit)     | Yes                               |