



# Super Brain 992 Palm Charger

## INSTRUCTION MANUAL

### Features and Specifications

- DC charger with separate AC power supply included (DC input of 12V to 18V)
- Large backlit LCD
- Adjustable charge rate from 0.2 to 5.0 amps in 0.05 amp increments (Approx. 50 Watt max)
- Balance charger for 1-4 cell LiPo, Li-Ion, and LiFE batteries (4 cell capability with included AC power supply only, or other DC input of at least 17V.)
- XH style balance leads
- Can be used to balance Li batteries without having to charge (100mA balance circuit)
- Charges 1-10 cell NiCd/NiMH, 6-12V Pb/Gel
- Fixed Delta Peak Thresholds for NiCd and NiMH
- Backlit LCD shows: Amps, Volts, mAh, Charge Time, Cell Type, Cell Count, and Individual Cell Voltage for Li batteries
- Ball bearing cooling fan
- Intuitive set up and operation
- Optional computer interface (consult our website at [www.modelrectifier.com](http://www.modelrectifier.com) for details on the interface and software)



# ***Super Brain 992 Palm***

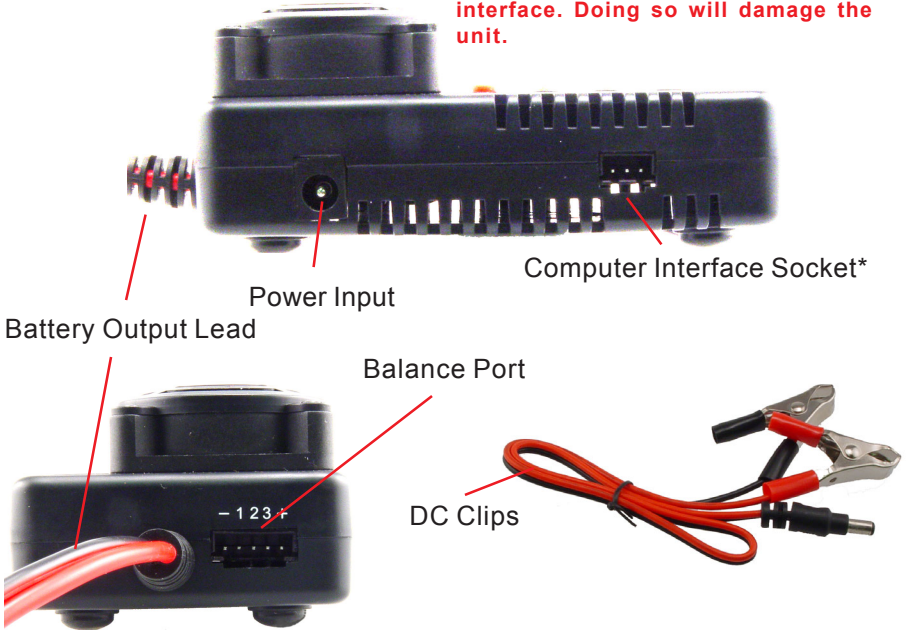
Thank you for purchasing the Super Brain 992 Palm charger. This lightweight, palm sized charger, is small in size, yet full in features. It's sure to give you many years of service charging your batteries.

***Please read this entire manual, including all Safety Cautions and Warnings before operating this charger. Never leave the charger unattended when in use. Adult supervision required for children less than 14 years of age.***

## **SAFETY CAUTIONS & WARNINGS**

1. Never leave the charger unattended when in use.
2. Do not connect the unit to the DC power supply while there is a battery attached to the unit. You should disconnect the battery first and then connect the unit to DC power supply.
3. Do not leave the battery inside of any product while charging.
4. Always place the charger and battery on a solid, uncarpeted surface with good ventilation.
5. Do not charge the battery inside a full-size automobile as damage to interior can result.
6. Battery damage can occur if the charge current (Amps) rate is set too high. Different capacity batteries may require a higher or lower charge rate. Consult battery manufacturer for appropriate charge rates.
7. If the battery or the charger becomes extremely hot, immediately disconnect the charger from the power source and allow the battery and charger to cool.
8. Because of the volatile nature of Lithium batteries, great care must be taken when charging these cells. If improperly or over charged, there is the risk that the battery will explode or catch fire. Please follow the instructions, recommendations, and warnings from the battery manufacturer when charging these batteries and selecting the proper charge rate.
9. Discontinue use if the charger casing becomes damaged or cracked.
10. Do not use the DC power source of a full-size automobile when the motor is running.
11. Always disconnect the charger from the power source and any battery when not in use.
12. If at any time the cooling fan should fail, discontinue use and return for service. Fan will turn on at 3 amp charge rate.
13. Adult supervision is required for ages 14 and under.

**\* Warning: Do not plug the battery balance plug into the computer interface. Doing so will damage the unit.**



## OPERATING INSTRUCTIONS

### BASIC CHARGING (NiCd/NiMH)

- 1) Depending on which power source you choose to use, connect either the included AC power supply or the DC clips to the charger, and then to the power source by either plugging into the wall or connecting the DC clips.
- 2) Attach the battery you wish to charge to the battery output leads on the charger.
- 3) Once the charger is powered on and a battery is attached, the first screen shown has the settings that are currently loaded in the charger. They are shown as follows:
  - a) Top Left – Voltage of the battery attached to the charger
  - b) Bottom Left – Current (amp) setting
  - c) Bottom Right – Battery type (See back of manual for abbreviations)
  - d) Top Right – Number of cells in the pack
- 4) Pressing the “MENU” button will cycle through your available setting options. Pressing the “MENU” button once will bring you to the selection for battery type. Pressing either the up or down arrows will cycle through the available battery types. Be sure to select the correct type for the battery you are charging. Please refer to the back of the manual for battery type abbreviations.
- 5) Press the “MENU” button again and “CEL” will begin to flash. This designates the number of cells in the battery you wish to charge. Pressing the up or down arrows, select the correct number of cells for

your pack. Be sure to enter the correct number of cells for the battery you are charging.

- 6) Press the "MENU" button again to display the charge current (A). Pressing the up or down arrow buttons will change the charge current appropriately from 0.2 to 5.0 amps in 0.05 amp increments. Holding the arrow button down will allow for 0.25 amp increment changes.
- 7) Pressing the "MENU" button again will bring you to the battery capacity setting. For safety, the Super Brain Palm will charge a battery to no more than 10% above the entered capacity. If the charger reaches a capacity approximately 10% above the entered capacity, and the charge has not terminated by either peak detection or by CC/CV, the charger will automatically terminate the charge. If the charger detects the peak or the proper voltage, the charge will terminate automatically before it reaches the entered capacity. By entering in "0" for the capacity, you will disable this safety measure, and termination will be determined by either peak detection or CC/CV only.
- 8) Pressing the "MENU" button again will return you to the main screen.
- 9) At this point you are now ready to begin charging your battery. Press the "START" button to begin the charge process. The word "Charge" will slowly flash to indicate the charge process has begun. At any time during the charge process, you can press the "Start" button again to stop the charge.

During the charge process, the LCD will display differently depending on the type of battery you are charging. When charging anything but a "Li" type battery with the balance leads plugged in, the display will show the following:

- a) Top Left - The voltage of the battery you are currently charging (V)
- b) Bottom Left - The rate at which the battery is being charged (A)
- c) Bottom Right - The type of battery being charged
- d) Top Right - The number of cells in the battery (C. #)

While charging a battery, pressing the up arrow button you can display the PWM duty\*, the mAh's going into the battery, and the peak voltage of the battery. Pressing the down arrow button will display the time of the charge and the input voltage of your power source.

When the charge is complete, the charger will beep three times, and the word "Charge" will flash quickly to indicate the charge has terminated, and the trickle has begun. At this time, the display will show the following:

- a) Top Left – The voltage of the battery
- b) Bottom Left – Trickle current
- c) Bottom Right – Termination code (C0 - Normal Finish)
- d) Top Right – The word "End"

After 30 minutes, the trickle will and the word "Charge" will no longer flash.

## **CHARGING A "LI" BATTERY**

***Because of the volatile nature of some Lithium based batteries, it is extremely important to follow the warnings and charging instructions supplied with these batteries. Please consult the battery manufacturer***

**for proper care and charging of your Lithium batteries. Failure to do so can result in fire, explosion, and serious injury to persons or property.**

- 1) Attach the battery to the battery output leads on the charger. Paying close attention to polarity, and with the negative wire towards the front of the charger, insert the balance plug into the side of the charger.
- 2) Following the “Basic Charging” instructions, select the proper battery type, number of cells, charge current (amperage), and capacity of the battery you wish to charge. We recommend a charge rate no higher than 1C. LiFe batteries can be charged at a higher rate than other “Li” batteries. Please consult the battery manufacturer for proper charge rates.

***Note: While there are safeguards built into the charger to help prevent overcharging or damaging a Lithium battery, it is especially important to make sure your settings are correct when selecting settings for a Lithium based battery.***

- 3) Once you confirm that all of your settings are correct, you can then hit the “Start” button to start the charge process. At any time during the charge, you can press the “Start” button again to stop the charge.
- 4) During the charge process the Palm Charger will show you the individual cell voltage of the Lithium battery you are charging. Each cell will be displayed in one of the corners of the LCD as follows:
  - a) Top right corner – Cell # 1
  - b) Bottom right corner – Cell # 2
  - c) Bottom left corner – Cell # 3 / Amperage
  - d) Top left corner – Cell # 4 / Total pack voltage
- 5) The Palm Charger constantly works to balance your battery while it charges. While charging, if a cell’s voltage becomes higher than others in the pack, the Palm Charger will work to bring that cell’s voltage in balance with the others in the pack. While balancing a cell, the number on the display that corresponds to that cell will flash. If a cell reaches the maximum of 4.2 volts prior to other cells, the charger will then cut the amperage to 0.00, and then slowly discharge the highest voltage cell until it reaches a voltage below 4.2 volts. Once the cell reads below 4.2 volts, the Super Brain Palm will then continue the charge. This process will continue until all cells are within balance and at 4.2 volts each.

## **CHARGING A LITHIUM BATTERY WITHOUT BALANCING**

While we do recommend balancing your Lithium Battery while it charges, this may not be necessary every time you charge your battery. Balance charging can take slightly longer than charging without balancing. Also, newer and/or better quality batteries tend to stay in balance better than older or lower quality batteries. Balance charging a newer or higher quality pack every 6 – 10 charges is not uncommon.

- 1) Attach the battery to the battery output leads on the charger. Do not plug in the balance leads.
- 2) Follow the “Basic Charging” instructions, and select the proper battery type, number of cells, charge current (amperage), and capacity of the Lithium Battery you wish to charge. We recommend a charge rate no

higher than 1C. LiFe batteries can be charged at a higher rate than other “Li” batteries. Please consult the battery manufacturer for proper charge rates.

Note: While there are safeguards built into the charger to help prevent overcharging or damaging a Lithium battery, it is especially important to make sure your settings are correct when selecting settings for a Lithium based battery.

- 3) Once you confirm that all of your settings are correct, you can then press the “Start” button to start the charge process. At any time during the charge you can press the “Start” button again to stop the charge.
- 4) The LCD will display almost the same as it would as if you were charging a non Lithium battery. However, in the bottom right corner, instead of the battery type, “nbL” will be shown to indicate you are charging a Lithium battery without the balance leads attached. You will not be able to view individual cell voltages without the balance lead attached.
- 5) The charge will proceed as normal. When the “Constant Current” portion of the charge is complete, the charger will beep three times, and then switch to the “Constant Voltage” part of the charge. The “Constant Voltage” will continue for approximately 30 minutes. Once the amps drop to 0.00, the charge is complete.

## **BALANCING WITHOUT CHARGING**

If you wish to balance a Lithium Battery without charging it, attach the battery to the charger just like you would if you were going to charge it. Enter in the correct number of cells and set charge current to 0.00A. Capacity is not relevant while balancing only. You can now press the start button and the Palm Charger will balance the pack. While balancing, the number that corresponds to the cell being balanced will flash. Once the numbers no longer flash, the pack is considered to be in balance. The Palm Charger will balance to the lowest voltage cell in the pack, but not below 3.2 volts. The cells will be balanced to within 15mV, or 0.015 of each other.

## **CHARGING A LEAD ACID OR GEL CELL BATTERY**

The Super Brain Palm Charger is capable of charging either a 6V or 12V Lead Acid or Gel Cell battery. If you wish to charge a 12 Volt battery, this can only be done by using the included AC power supply.

- 1) Follow the “Basic Charging” instructions for setting up the charger. When selecting the correct number of cells, Lead Acid/Gel Cell batteries have 2 volts per cell. For a 6 volt battery use 3 cells, and for a 12 volt battery use 6 cells.
- 2) We recommend charging a Lead Acid/Gel Cell battery at no higher than C/10, or 1/10 of the battery’s rated capacity.
- 3) Once you confirm that all of your settings are correct, you can then press the “Start” button to start the charge process. At any time during the charge you can press the “Start” button again to stop the charge.
- 4) Once the charger beeps three times, the charge is complete.

## OPTIONAL COMPUTER INTERFACE

The Super Brain Palm Charger offers the ability to use an optional computer interface, item # RB502. With the interface and free software, you can now have a graphical display of your battery's condition while it charges. This will also allow you to more closely monitor individual cell voltages while charging Lithium batteries that are attached to the balance port. You can also create a battery profile for every battery you own, with predetermined settings that can be loaded into the charger with a click of the mouse. Ask your local Hobby Shop to order the interface. If they don't carry it, the interface and free software can be found by visiting our website: [www.modelrectifier.com](http://www.modelrectifier.com)

## FREQUENTLY ASKED QUESTIONS

1. What do the battery abbreviations mean?  
LiP = Lithium Polymer (LiPo), Lio = Lithium Ion (Li-ion), LiF = LiFePO<sub>4</sub>/A123 (LiFe), Pb = Gel Cell/Lead/Acid, NiC = Nickel Cadmium (NiCd), NiH = Nickel Metal Hydride (NiMH)
2. Why is my Palm charger displaying an error? (Err)  
Make sure that you have the correct settings for your battery entered and that the proper voltage for your battery is on the display. You can confirm the voltage reading with a voltmeter.
3. What does "nBL" mean after I press the "START" button?  
When you see "nBL" on the display that means you are charging a Lithium battery without using the built-in balancer. If you wish to balance your battery, or monitor individual cell voltages while you charge, stop the charge and plug in the balance lead. Re-confirm your settings and start the charge process again.
4. Can I charge my AA, AAA, 2/3A, etc. battery pack?  
The Super Brain Palm charger can charge any NiCd or NiMH battery from 1-10 cells. However, smaller batteries may require lower charge rates. If you are not sure of what settings to use, please consult the battery manufacturer or call our Customer Service number for assistance.
5. Why can't I select a higher amp rate for my higher cell batteries?  
The Super Brain Palm Charger has a maximum output, and it knows for a given battery attached what the maximum charge rate that it can deliver. It will not allow you to enter in a higher rate if the charger can not deliver it. Pressing the up arrow button during the charge, you can check the PWM duty. If you see a reading of 100, then the charger is supplying the maximum output it can for the battery attached.
6. What does "1C" or "C/10" mean?  
Charge rates are often expressed as a function of the capacity of the battery, where C is the capacity. For example, a battery that has a 4000mAh (milliamp hour) capacity, is also said to be a 4Ah (Amp hour) battery. So a 1C charge rate for this battery would be 4 amps. For a 7Ah Gel Cell battery, a C/10 charge rate would be 0.70 amps.

7. Can I exceed the 1C charge rate on a Lipo battery?  
You should only charge at a rate of more than 1C if the battery manufacturer states it is safe to do so. The documents that came with your battery should state if it is possible to charge it at a higher rate. If you are not sure, please contact the battery manufacturer before attempting to charge at a rate higher than 1C.

## WARRANTY/RETURN PROCEDURE

Model Rectifier Corporation (MRC) will, subject to the conditions explained and set forth below, repair at its expense within one calendar year from the date of sale, any component of this MRC Charger which is proven defective by reason of improper workmanship or materials. MRC will repair said component(s) without charge for necessary parts or labor. If the unit can not be repaired, it will be replaced with another unit or similar charger of equal or greater value.

### **Conditions**

1.) **Limitation of original purchaser and proof of date of purchase:** The obligations of MRC set forth herein shall only extend to the original purchaser. The burden of proof as to the date of purchase is on the purchaser, thus it is recommended that you retain your bill of sale or sales receipt and include it with the return of your unit, keeping a copy of same for your records. This bill of sale or sales receipt must have the date of purchase and the name and address of the dealer.

2.) **Validation of the Warranty:** The validity of the above stated warranty is contingent upon the original purchaser possessing and original copy of the sales receipt that shows the product's name and/or model number, purchase date, name of the dealer, and the address of the dealer. The burden of proof rest solely with the purchaser of the charger.

3.) **Exclusions from Warranty:** The warranty does not apply to (a) any marring, scratching, or defects in decoration and/or finish, (b) any damage or defect resulting from misuse, abnormal service, water, or weather damage, (c) any damaged incurred in shipping and handling, (d) any incidental or consequential damage(s) caused by or resulting from a defect in material or workmanship or other equipment failure, (e) any damages arising from the charger not being used in accordance with the instructions provided. Your sole remedy shall be repair or replacement as herein above expressed. Under no circumstances shall MRC be liable for any losses or damages, direct or consequential, arising out of the use or inability to use this MRC charger. No implied warranty shall continue beyond the one calendar year from the date of purchase. Further, any modification, alteration, or tampering with the MRC charger or any repair other than that done at the factory automatically voids the warranty.

4.) **Notice:** Some states do not allow limitations on how long an implied warranty lasts or the inclusion or limitation of incidental or consequential damages, so the above state limitations or exclusions may not apply to you. This warranty gives you specific legal rights and you may have other rights which vary from state to state.

Please contact us at 732-225-6360 or at: [chargersupport@modelrectifier.com](mailto:chargersupport@modelrectifier.com) before sending your charger in for repair. If it should become necessary to return the charger for warranty repair, **please include a copy of the original sales receipt**. Please include a letter (printed clearly) with your name, address, daytime phone number, and a detailed description of the problem you are experiencing. Please also include a check or a money order for \$9.00 to cover return shipping and handling. If the charger is no longer considered under warranty, then please include a check or a money order for \$35.00 to cover the cost of repair and return shipping and handling.

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80 Newfield Avenue  
Edison, NJ 08837

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