



TME XTREMA LiPo Charger and Wattmeter



Lithium batteries have become the standard for many modelers. The amount of power that these batteries can pack into a small space makes them at once uniquely suited to electric powered models.

While Lithium battery technology has been making great strides over the last three years, Lithium charging technology has been lagging behind. Unfortunately, the basic elements of Lithium charging are well understood, but adapting that to consumer-friendly units that charge these batteries quickly and safely has proven more of a challenge than expected. Modelers have been both excited by the prospect of such extreme high energy density in rechargeable batteries and horrified by tales of cars, houses and garages being burned to the ground from battery charging accidents. At the same time, the prices of Lithium packs—particularly

larger packs—have made many shy away from transitioning to the new batteries for fear of making an error when charging, thus ruining the battery.

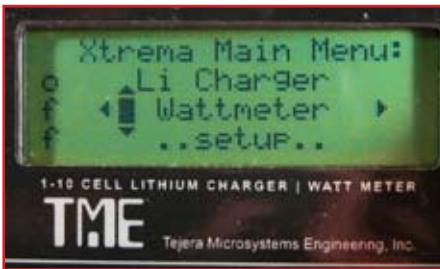
Tejera Microsystems Engineering, Inc. (TME) of Florida unveiled its new Xtrema charger in mid-2006. Designed to address some of the issues related to charging and maintaining LiPo packs, the Xtrema offers modelers an unprecedented degree of control and functionality in Lithium charging. The unit can also act as a wattmeter, thus providing double the bang for the buck.

Jaded readers are no doubt saying, “Big deal. Another Lithium charger. So what?” And rightly so, we’ve been bombarded with units that were supposed to be the last word in Lithium chargers. If we have learned anything in the last few years, it’s that there isn’t a “last word”, but the Xtrema just may come close.

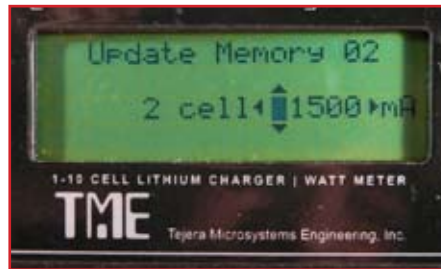
Charge It!

The Xtrema’s primary function is a Lithium battery charger. TME has worked diligently to make the Xtrema as simple to operate as possible while retaining as much operational flexibility and safety as possible. The result of all this effort is a well thought out display and control system.

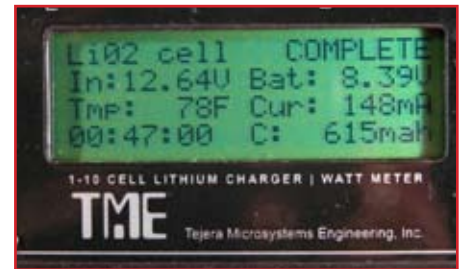
The sole control on the Xtrema is a joystick. You use it to navigate through the various menus and select the appropriate settings for the task at hand. Although it is not mistake-proof, it is actually very easy and intuitive to use. Let’s go through the process of charging a simple 2-cell 1500-mAh LiPo pack.



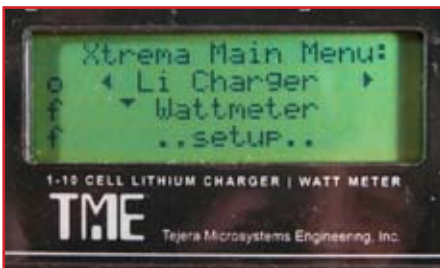
This is the initial menu screen for the Xtrema. Using the joystick, you can move the cursor up or down to select the function you want.



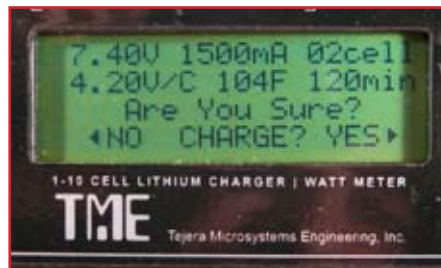
Pushing the joystick to the right shifts the cursor to the right and lets us adjust the charger to match the capacity of the pack we want to charge. Push the joystick up or down to change the mAh number.



When the pack is completely charged, the Xtrema beeps and displays "COMPLETE" in the upper right. The charge took 47 minutes and the battery absorbed 615-mAh. The pack's final voltage is 8.39



Here we have moved the cursor up to "Li Charger" as we prepare to select the charging function.

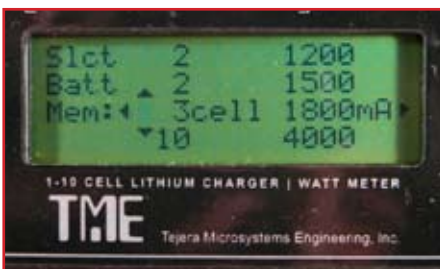


Pushing the joystick to the right confirms the 1500-mAh setting and brings up this screen. The Xtrema displays the previous choices and asks for confirmation before charging.

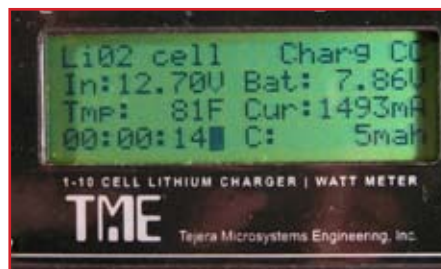
More Great Features

The Xtrema provides a lot of information on the state of the charge as it progresses. That information can also give you some clues about the health of a pack. Keeping track of the data, particularly how capacity was used and the pack's final voltage, which can help you determine if a pack is beginning to degrade is important.

The Xtrema can also be set to partially recharge a pack. This is useful if you don't plan on using a pack for a few months. When trying to discharge the pack to the correct storage level, rather than guessing, you can simply run it down to normal cut-off voltage, then set the Xtrema to charge the pack to 3.7 volts per cell. Your Lithium pack will then be ready to hibernate for the winter.



Pushing the joystick to the right brings up this screen. The last battery charged as a 3-cell 1800-mAh pack.



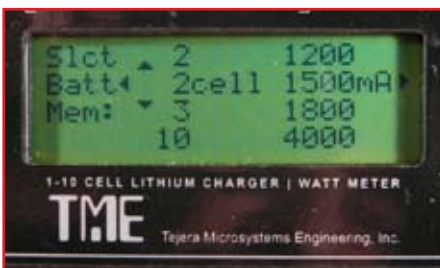
Pushing the joystick right confirms the settings and begins charging. Our pack has been charging for 14 seconds, has taken in 5-mAh and is getting 1493-mAh input current. The "CC" in the upper right corner denotes that the charger is in Constant Current mode.

Future Proof

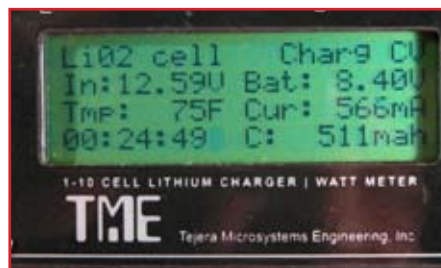
You can get similar performance from other Lithium chargers currently on the market. So one is left to ask, is the Xtrema worth the investment of your hard-earned dollars? Is the addition of a wattmeter really worth that much more money?

Indeed, if the above were all that the Xtrema had to offer, you probably wouldn't be reading this review. However the Xtrema has one important feature that makes it a downright cheap investment over the long run: It can be easily expanded and updated.

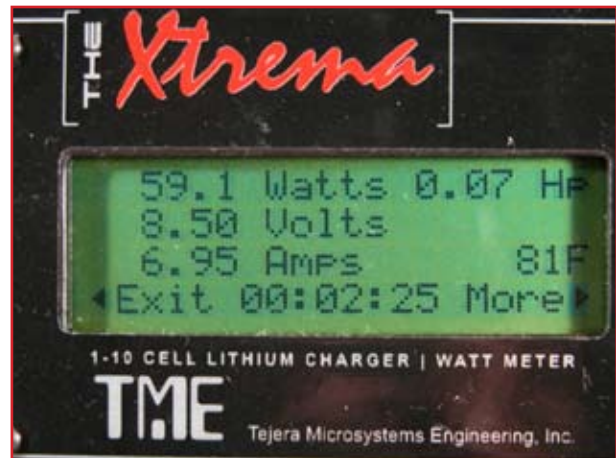
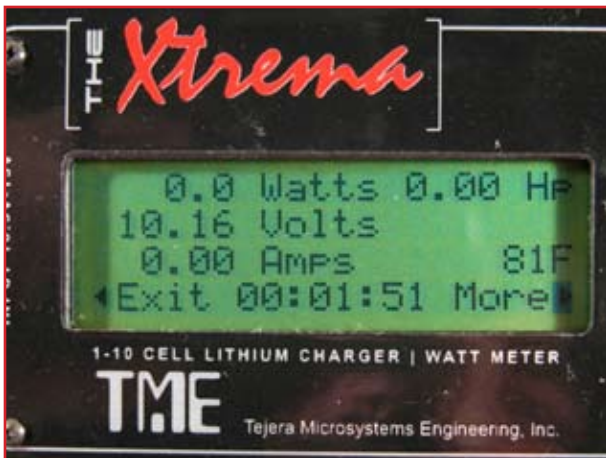
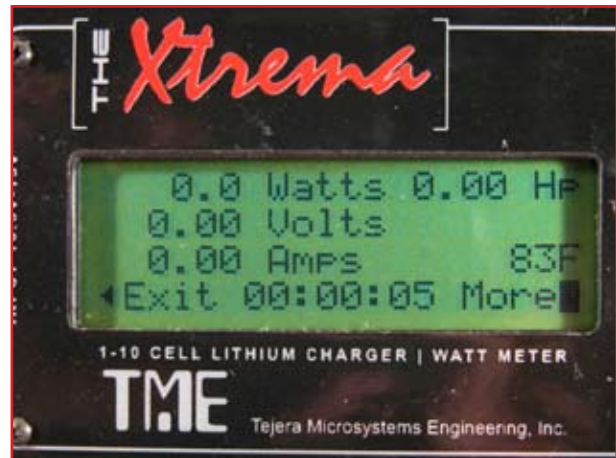
The latest round of software updates allows you to capture and analyze data from the Xtrema on your PC. You can select from a host of parameters to include in your analysis, and they can be presented graphically to make interpretation easy. Even better, you can compare the data with previous runs to get trend information.



To charge a 2-cell 1500-mAh pack, push the joystick up to select "2 cell" as the charger cell-count setting.



Our pack has charged for 24 minutes and 49 seconds. The "CV" in the upper right shows charger has switched over to Constant Voltage mode. The pack temperature, provided by the optional thermal probe, is 75 degrees.



As this is being written, TME is working on the next round of expansions and updates. Using the optional data cable, you can connect your Xtrema to your PC to update its software (software updates are free from TME). Present plans call for TME to add integrated and stand-alone cell balancing. In addition, an integrated tachometer is being designed that will make the wattmeter function more of a complete power system diagnostic and tailoring suite. Add-on expansion memory is also in the works.

In short, the Xtrema can change and grow to match the constant evolution of Lithium battery technology. In fact, the Xtrema presently has the flexibility to change the volts per cell that the charger uses so that you can safely charge the new M1 Hypersonic Lithium cells sold by A123 Systems. The ability to easily update and expand the Xtrema's capabilities means that it may well be the last Lithium charger you will ever have to buy. And in the long run, that's a very good investment. **QF**

The Xtrema Specifications

| | |
|-----------------------------------|------------------------------------------------------|
| Cells | 1-10 cells |
| Input Voltage | 10.5V - 15V DC @ up to 20 A |
| Input Connectors | Super heavy duty Alligator Clips with 3 ft. cord |
| Case Size | 6.25 x 3.25 x 2.25 in. |
| Weight | 22 oz Three-blade collective pitch |
| Charger Output Connections | 14 gauge fine strand silicon wire |
| Volts per Cell | 3.60V (m1 cells) - 4.20 volts in .05 volt steps |
| Charge Rate | 50mA - 8000mA in 50 mA steps (4000mA max @ 10 cells) |
| Battery Types | Lithium Ion, Lithium Polymer |
| Safety Timer | 10 - 990 minutes (120 default) |

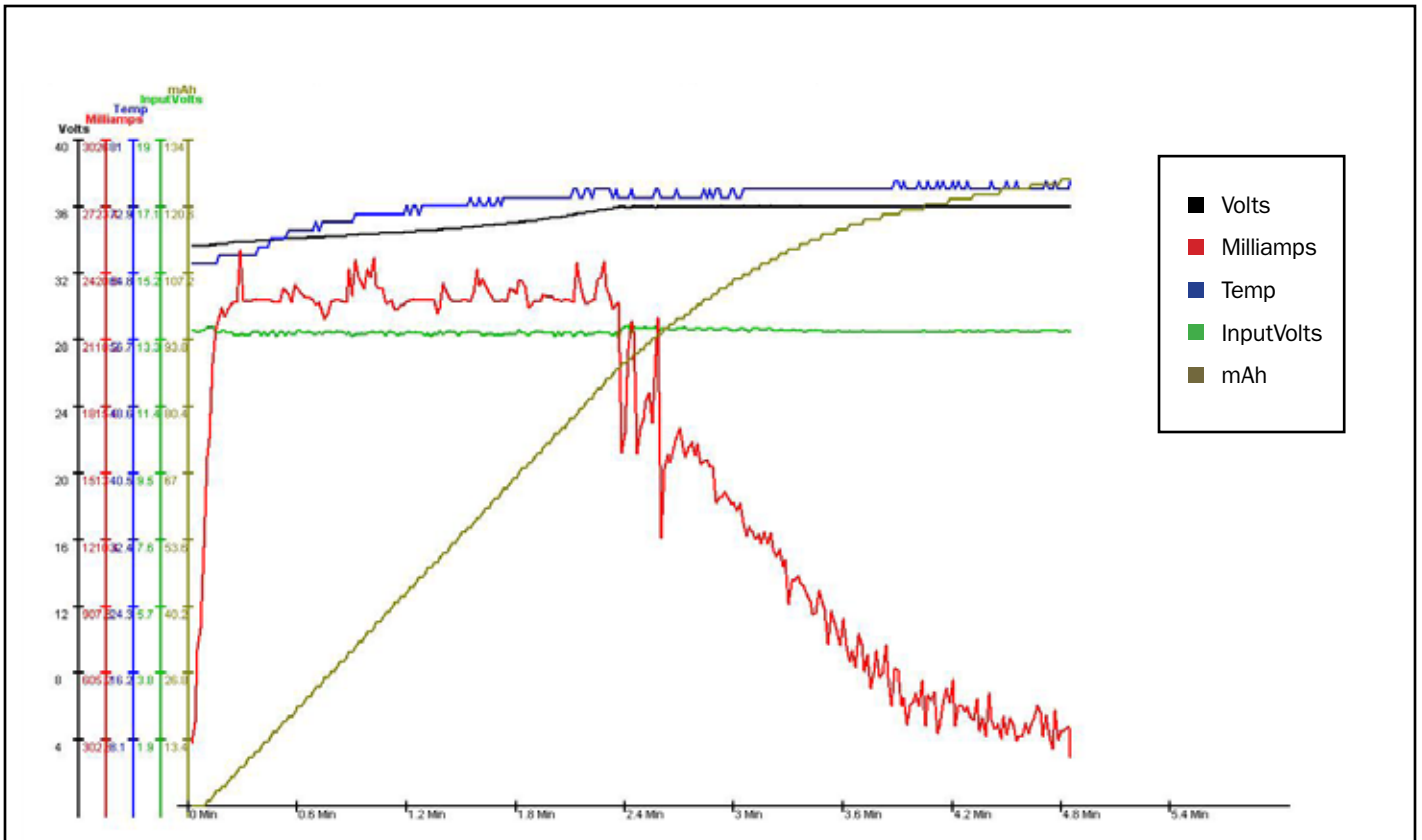
The Xtrema Wattmeter Specifications

| | |
|----------------------------------|-------------------------------------------------------|
| Fan | On only when needed for longer life |
| Safety Temperature Cutoff | 60°F - 130°F (104°F default) |
| Display | 4 line x 20 character LCD display |
| Audible Alarms | Piezo speaker alarms 15 seconds, beep once or disable |

The Xtrema Wattmeter Specifications

| | |
|-----------------------------|----------------------------------------------------|
| Input Supply Voltage | 6.5V - 15V DC < 40 mA |
| Output Connections | 14 gauge fine strand silicon wire |
| Voltage | 0 - 60 V, resolution 0.01 V |
| Current | 0 - 100 A peak, 50 A continuous, resolution 0.01 A |
| Power | 0 - 6000 W, resolution 0.1 W |
| Temperature | up to 302°F |

Charge Capture



Motor Run

