Competition Electronics

TurboCharger Competition Electronics Pit Bull

R/C battery charger

Thanks for purchasing the Pit Bull charger. This charger is designed and built in the USA, with the same engineering know-how and quality construction that goes into all of our R/C racing products. It is rich with features, and built with performance in mind. Not only this, but the programmable sounds and graphics enhance its usefulness, and make it truly fun to operate! Once you start to use it, we believe it will quickly become an indispensable part of your racing gear.

Pit Bull Features

Here s a quick rundown of the great new features built into your Pit Bull:

- SMPS Technology means cool temperatures, light weight, enhanced reliability, and efficient operation, and it s quiet! (No fan)
- It s small. It easily fits in your pit kit.
- Programmable sound and display graphics. Personalize your Pit Bull and keep track of cycle status from across the room or pit area! Or, turn off all the sounds for silent operation.
- .012 to .192 volts programmable peak detect.
- .15 to 7 amps programmable charge rate.
- Two selectable, programmable charge cycles for NiCd and NimH packs means you can have two different setups stored for your packs!
- Automatically stores and displays detailed charge cycle data for the last charge cycle. Stores data independently for both NimH and NiCd cycles!
- 16x2 character backlit alphanumeric LCD display is easy to read.
- Selectable Trickle Charge.
- Long Lockout eliminates early shutdown due to false peaking. Especially important for charging NimH packs.
- The same Competition Electronics performance and quality as our high-end chargers in a new, lower cost unit!

Important Precautions

Before you operate your new Pit Bull, please take a moment to read over these precautions. This will ensure that you get the results you desire.

Lead-Acid Batteries Produce Explosive Hydrogen Gas.

It is dangerous to work in the vicinity of a lead-acid battery since they generate explosive gasses during normal battery operation. To prevent an explosion while using a lead-acid battery, such as an automobile battery, you MUST disconnect the Pit Bull power cable from the Pit Bull before connecting or disconnecting the power cable to the lead-acid battery terminals. Operate the Pit Bull as far away from the lead-acid battery as possible. This will keep any sparks or arcing away from the lead-acid battery.

Charge ONLY NiCd or NimH cells with the Pit Bull charger.

To reduce the risk of injury, use only high-rate rechargeable NiCd or NimH batteries with the Pit Bull. Any other type of battery may burst and cause personal injury.
If charging smaller NiCd or NimH batteries such as those commonly used in transmitter packs, for example, be sure to reduce the charge current rate appropriately. These batteries are not designed for the high charge rates used on typical R/C power packs.

Always make sure all cells are in the same state of discharge before charging.

If you do not do this, the cells that are partially charged will get extremely hot, and bursting or venting of battery acid may occur. Your cells may be damaged.

Do not obstruct vents on the Pit Bull or allow liquids or other foreign materials to enter the Pit Bull charger s case.

The Pit Bull needs unobstructed airflow to work properly. Obstruction of the Pit Bull case vents may cause overheating.

Introduction of liquids or foreign materials through the Pit Bull case vents may cause damage or faulty operation.

Do not allow the power supply output voltage to exceed 15 volts.

The Pit Bull circuitry is designed for a maximum of 15 volts on its power supply inputs. Exceeding this WILL damage the charger.

Do not charge packs whose voltage exceeds the power supply voltage.

The Pit Bull cannot do this, and it will result in a blown fuse.

Do not leave the Pit Bull charger unattended while charging.

The remote possibility of an electronic failure could cause extreme overcharge. This could cause the battery to burst, or cause a fire hazard.

Always wear safety glasses when operating the Pit Bull charger.

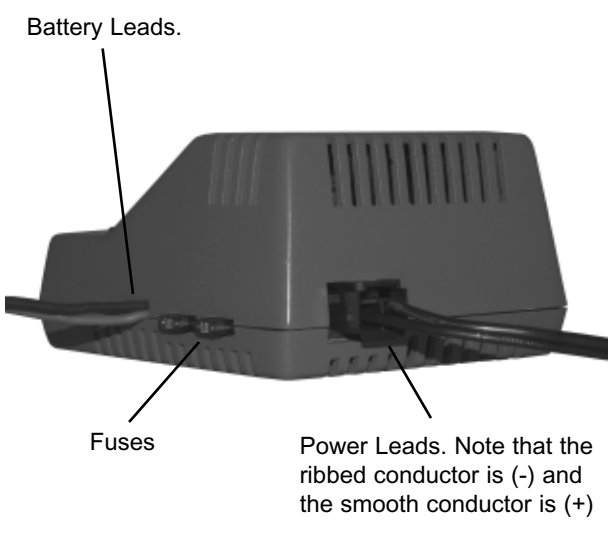
This is just good safety practice.
Charging at elevated currents and large peak detect voltages will cause very high temperatures in battery packs.
Also, be careful not to handle hot cells until they cool down.

Connecting your Pit Bull

In order to operate the Pit Bull, you must first connect it to power and to the battery pack. Here s how.

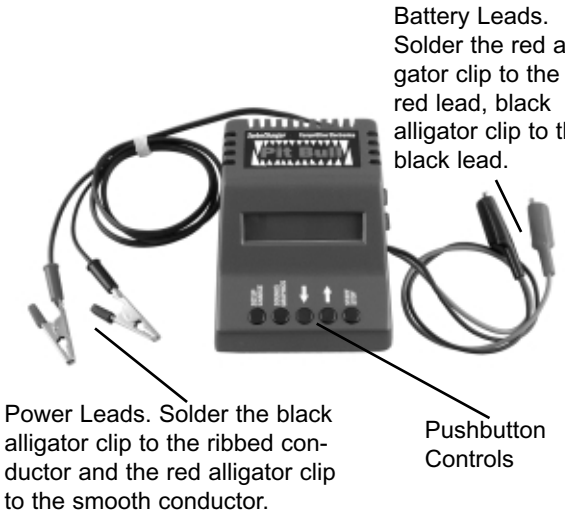
Connecting Power

The power connector is located at the back of the Pit Bull. Viewing the connector from the back, the (+) terminal is on your right (closest to the center of the charger) and the (-) terminal is on your left.



Assembling the Power Cable and Alligator Clips

Alligator clips are supplied separately; if you decide to use them, you must solder them to the supplied power cables. Use the Red clip for the positive, and the black clip for the negative side of the cables. You may desire to use some other type of connector.



After assembling the cable, plug it in to the back of the Pit Bull, and connect it to your DC power supply, being careful to observe the proper polarities. As soon as you apply power, the display will illuminate and display the sign-on message. After this, it will display the message, PITBULL Ready!

Connecting Battery Packs

Again, the red alligator clip goes to the positive side of the pack and the black alligator clip goes to the negative side of the pack. Most cells will be clearly marked as the polarity of their terminals, but in general the end with the smaller terminal is the positive side. Make certain you have good, solid connections. Bad connections here can cause false peaking; see the troubleshooting section for details.

Display and Control Pushbuttons

The Pit Bull has a menu-based display scheme that is easy to use and intuitive once you get the hang of it.

Selecting the Charge Setup or Sounds & Graphics Menus

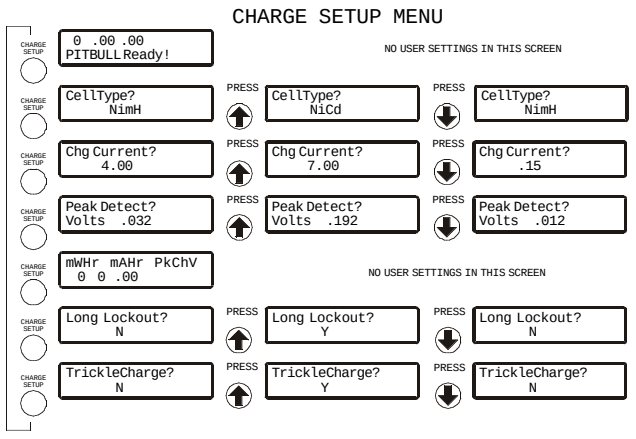
The Pit Bull menu display system is divided into two sections: the CHARGE SETUP menu and the SOUNDS & GRAPHICS menu.
Whenever the Pit Bull is not charging a pack, these two menus may be accessed at any time by pressing either the CHARGE SETUP pushbutton or the SOUNDS GRAPHICS pushbutton.
Repeatedly pressing the CHARGE SETUP or SOUNDS & GRAPHICS pushbuttons will advance the display to the next screen in the menu.
Pressing these pushbuttons at the last screen in the menu will reposition the display to the first screen in the current menu.

Navigating the Selected Menu: Up/Down Pushbutton

In any screen that has a user-settable parameter, the DOWN and UP pushbuttons are used to set that parameter. For Yes/No setting, a single push will toggle the setting from Y to N . For numeric settings such as Peak Detect or Charge Current, a single press will increment the setting one time. Holding either down will cause an accelerating, continuous increment to occur. The numeric settings will stop incrementing at their programmed limits.

The Charge Setup Menu

The various screens contained in the CHARGE SETUP menu are described below.



The Ready screen

This is the screen displayed while the Pit Bull is charging.
In the upper left portion of the screen, it shows elapsed time for the charge cycle.
In the upper center portion of the screen, it shows the instantaneous pack voltage.
In the upper right portion of the screen, it shows the charge current being delivered to the pack.
In the lower line of the screen the Pit Bull will tell you what it is currently doing. It will also indicate any errors or problems here.

The Cell Type screen

The Pit Bull stores a complete set of charging parameters for two separate charging cycles in its nonvolatile memory. One is intended for NiCd and the other for NimH packs, as designated by the words NiCd and NimH. However, either cycle can store any Pit Bull setup.
The Pit Bull arrives factory-programmed with typical values for NiCd and NimH packs preprogrammed for immediate use.

The Chg Current screen

Here, the user can select the charge rate for the pack during a charge cycle. It can be set from a lower limit of .15 amps all the way up to 7 amps.

The Peak Detect screen

This is the change in voltage, or delta-V of the pack which the charger will use to determine when the pack is fully charged.

The Charge Data screen

Here the Pit Bull will display data it collected from the last charge cycle for the selected Cell Type (above.) It displays the following data:

mWHr: This stands for milliwatt-hours and is a measurement of the power delivered to the pack over time during the charge cycle.
mAHr: This stands for milliamp-hours and is a measure of the current delivered to the pack over time during the charge cycle.
PkChV: This is the highest voltage reached by the pack during the charge cycle.

Together, these parameters, along with the charge time on the Ready screen will allow you to assess the condition of your packs.

The Long Lockout screen

Here, the user may select or deselect the long-lockout function. With this feature not selected, the charger will ignore peaks on the pack for the first 60 seconds of the charge cycle. When long-lockout is selected (Y), peaks will be ignored for a full 10 minutes. This is useful for packs that tend to false-peak. That is, their voltage peaks as though they are completely charged, even though they have not been charging for sufficient time to be fully charged. This setting is NOT stored, but resets itself each time a

cycle terminates, whether it terminates normally, or because of an error, or because the user cancels it. You must enable it each time you run a cycle.

The Trickle Charge screen

After the charge cycle, this causes the charger to deliver a constant .15 amps into the pack, trickle-charging the pack to keep it fully charged.

The Sounds and Graphics Menu

It is in the Setup menu that you can set the sounds and graphic displays associated with each charge status. Here are the screens contained in the Setup menu.

SOUNDS AND GRAPHICS MENU

SOUNDS & GRAPHICS	Lock sound? 1	PRESS	Lock sound? 2	PRESS	Lock sound 0
SOUNDS & GRAPHICS	Lock msg? 2 Peak lockout ON	PRESS	Lock msg? 3 Peak lockout ON	PRESS	Lock msg? 1 Peak lockout ON
SOUNDS & GRAPHICS	Chg done sound?2	PRESS	Chg done sound?3	PRESS	Chg done sound?1
SOUNDS & GRAPHICS	Chg done msg? 2 PITBULL DONE	PRESS	Chg done msg? 3 PITBULL DONE	PRESS	Chg done msg? 1 PITBULL DONE
SOUNDS & GRAPHICS	Charge sound? 1	PRESS	Charge sound? 2	PRESS	Charge sound? 0
SOUNDS & GRAPHICS	Charge msg? 2 PITBULL CHARGING	PRESS	Charge msg? 3 PITBULL CHARGING	PRESS	Charge msg? 1 PITBULL CHARGING
SOUNDS & GRAPHICS	Peak det sound?1	PRESS	Peak det sound?2	PRESS	Peak det sound?3
SOUNDS & GRAPHICS	Peak det msg? 2 PITBULL PEAKING	PRESS	Peak det msg? 3 PITBULL PEAKING	PRESS	Peak det msg? 1 PITBULL PEAKING
SOUNDS & GRAPHICS	Error sound? 1	PRESS	Error sound? 2	PRESS	Error sound? 0
SOUNDS & GRAPHICS	Error msg? 2 AARGH! LO VOLTS!	PRESS	Error msg? 3 AARGH! LO VOLTS!	PRESS	Error msg? 1 AARGH! LO VOLTS!
SOUNDS & GRAPHICS	Tricklesound?1	PRESS	Tricklesound?2	PRESS	Tricklesound?0
SOUNDS & GRAPHICS	Tricklemsg? 2 Tricklecharging	PRESS	Tricklemsg? 3 Tricklecharging	PRESS	Tricklemsg? 1 Tricklecharging
SOUNDS & GRAPHICS	PB sound? 1	PRESS	PB sound? 2	PRESS	PB sound? 0

The Sounds and Graphics menu allows the user to select from an assortment of sounds and graphics effects which will be active when associated functions are active during the Pit Bull charge cycles.

Sound screens

Select one of three sounds, or silence, by selecting 0-3 for the indicated portion of the cycle.

Message screens

Select one of two scrolling display effects, or no effect, for the indicated portion of the cycle.

Charging a Pack

All right, then how do I charge a pack? Here s how.

Start Pushbutton

After making sure to select the correct cycle (NiCd or NimH) for your pack, just press the start button. The Pit Bull will immediately begin charging. To stop the charge cycle at any time, press the Start button again.

Information Displayed while Charging

When the start button is first pressed, the Pit Bull will ramp up to the selected charge current. Then, the cycle will begin.
During a normal charge cycle, the Pit Bull goes through a three-stage process.

* Lockout. The Pit Bull has a built in 60-second lockout during which it ignores peaks. This feature lets the Pit Bull ignore false peaks. For old packs, or packs which are in an extreme state of discharge, you may need to set the Long Lockout on. In this case, the Lockout portion of the cycle lasts 10 minutes.
* After the Lockout phase of the cycle, the Pit Bull then goes into the normal charge mode. The Pit Bull continues in this mode for as long as it takes for the pack to begin peaking.
* Then, the Pit Bull enters the peak detect phase of the charge cycle. It monitors the pack voltage and continues charging until the pack drops from it s maximum voltage during the cycle down to a level which equals that peak voltage minus the peak detect voltage setting.
* At this point, the Pit Bull signals that the charge cycle is complete. Press any button other than the start button to return to the Ready screen.
* The user may optionally enable trickle charge. If Trickle charge is enabled, the Pit Bull will automatically go into a trickle charge mode at the end of the charge cycle, delivering .15 amps to the pack to keep it fully charged. This will continue until the user presses the START button.

At all times during charging, the instantaneous pack voltage and current are displayed, along with the accumulated charge time, and a periodic status message to show you what phase of the charge cycle the Pit Bull is currently in. Every ten seconds during the cycle, the Pit Bull will give an audio prompt to signal what part of the cycle it is currently in.

Error Conditions/Messages

The Pit Bull can detect error conditions such as low battery voltage, or bad connections, and give an error message to tell you what the problem is. The messages are self-explanatory. Once the problem is corrected, press START again to charge the pack.

Non-volatile Memory

The Pit Bull has an on board nonvolatile memory which stores all your programmed settings for the two charge cycles. It will also store the recorded data for both cycles. This includes the following:
* Charge time
* mWHr
* mAHr
* PkChV
* Peak Detect Voltage setting
* Charge Current setting
* Currently Selected Cycle
* All Selected status sounds and graphic effects

When you change a nonvolatile setting, the Pit Bull will wait for an opportune moment and then inform you as it saves the data.

Troubleshooting

In the event you experience a problem with your Pit Bull, check these remedies first:

Power Supply/Maximum and Minimum Voltage/Current Limits

The Pit Bull requires a DC power supply capable of 7 amps (in order to achieve maximum current out) and a nominal 12-15 volts. As a battery pack is charged, it s voltage rises steadily, peaking at some value higher than it s actual output voltage. The Pit Bull will charge properly only if there is sufficient voltage available for it to maintain the current setting as this voltage rises. If the power supply voltage is too low, the current will drop off as the battery peaks and in some cases fuses may blow.

In practice, this means that the Pit Bull's practical limit for the number of cells in a pack is 8.

Power Supply/Supply Regulation

The Pit Bull has been tested and works well with as much as 2 volts peak-to-peak ripple voltage on its power supply, depending on the number of cells and the output voltage of the supply. However, there are all kinds of power supplies out there and it is quite possible to get one that will limit the performance of your Pit Bull. Check with other racers at the track and see what they are using. You ll soon find out what works well.

Power Supply/Guidelines for Using Lead-Acid Batteries

The Pit Bull works fine with a Lead-Acid battery, such as one found in cars. Remember that a lead acid battery can only supply about 12 volts. This limits the max number of cells you can charge. You may want to consider this as a source of portable power to use when there s no AC power available for your power supply. Be sure to read about lead-acid batteries under the Important Precautions section, above.

Fuses

Always check the fuses first when you have a problem with your Pit Bull. Fuses protect the Pit Bull and your packs by self-destructing, so it s a good idea to get some extras now; you should be able to get them at any automotive store. Sooner or later, you ll need them.

False Peaking

Be aware that deeply discharged packs, and older packs can exhibit a phenomenon known as false peaking. They peak way too early in the cycle and fool your Pit Bull into thinking that the pack is fully charged. If you see this, just turn on the Pit Bull's Long Lockout. This will cause the Pit Bull to ignore all peaks for 10 minutes at the beginning of the charge cycle. After this, most all packs will have enough charge in them to prohibit false peaks.

Bad Battery Connections

During testing of the Pit Bull, it was discovered that an intermittent or faulty connection between the Pit Bull and the pack could cause problems with false peaking. Because NimH packs have smaller peak voltages, the Pit Bull is necessarily more sensitive to changes in resistance in the circuit formed by the pack, the charge leads, and the alligator clips.
We have found that clipping the leads to bare copper bus bar, such as that commonly used on an R/C battery pack, provides only marginal contact between the alligator clips and the buss bar. At higher charge currents, resistance between the alligator clips and the buss bar may suddenly change, causing a change in the voltage across the Pit Bull's voltage sensing circuit. This may cause the Pit Bull to think the pack is peaking when it is not, and it may also cause premature shutdown of the charge cycle, leaving a partially discharged pack.
Competition Electronics recommends that you put a thick coating of solder on the buss bars and attach the alligator clips to the soldered area. An alternative is to use copper braid. Both of these methods maximize the area of contact on the alligator clip s jaws and greatly reduce the possibility of introducing random, unwanted resistance into the connection. Be sure to consider this if you are having odd peaking problems with your Pit Bull.

Getting Help

Competition Electronics provides phone support for the Pit Bull. Ask to speak to a technician and be sure to have a good description of the problem you are experiencing. If the problem cannot be resolved over the phone, we can repair the unit.

Repair Policy

All repairs are normally completed within 5 working days from the time we receive your unit. Total charges will include parts cost, labor and return shipping.
Before you send it back, please call us. The method of payment will be established at this time, and you will enable us to serve you more efficiently by avoiding irritating delays.
The preferred method of payment is MasterCard or Visa. Include your card type (MasterCard or Visa only,) card number, your name as it appears on the card, and the card s expiration date.
If you do not contact us and arrange payment, your repair will be returned cash UPS COD. Please be sure to enclose a daytime phone number so that we can contact you to arrange for return and payment.
When you return your Pit Bull, include your return UPS address, a daytime phone number, and an explanation of the problem. For warranty repairs, include a dated receipt of purchase. The warranty appears at the end of this manual.

Competition Electronics, Inc.
3469 Precision Dr.
Rockford, IL 61109
Phone 815-874-8001 (support 7:00AM to 4:30PM Mon-Fri)
FAX 815-874-8181
www.CompetitionElectronics.com

Specifications

Power Supply:	12-15 VDC @ 7 amps
Maximum Power Supply Voltage:	15 VDC
Cell Types Supported:	NiCd, NimH
Pack Size:	4 to 8 cell packs
Fuses:	qty. (2), 10 amp miniature flat-blade automotive type Littelfuse¤ type MINI¤
Display:	2x16 character LCD, backlit
Controls:	pushbuttons control charge setup menu, sounds & graphics menu, navigate up, navigate down, and start/stop
Case:	blue translucent plastic.

Additional Features:

Nonvolatile memory stores charge settings and data

Two separate charge cycles

Programmable sounds and graphics effects

.012 to .192 volts programmable peak detect.

.15 to 7 amps programmable charge rate.

SMPS charging technology

Limited Warranty

COMPETITION ELECTRONICS, INC., warrants the product manufactured by it to be free from defects in material and workmanship for a period of 90 days from date of purchase by the original purchaser for use. COMPETITION ELECTRONICS, at its option, will repair or replace without charge, or refund the purchase price of, any product which fails during the warranty period by reason of a defect in material or workmanship found upon examination by COMPETITION ELECTRONICS, INC., to have been the cause of the failure. This warranty does not cover any failures attributable to abuse, mishandling, failure to follow operating instructions, alteration or accident.

To make claim under this warranty, the purchaser must return the product to COMPETITION ELECTRONICS, INC., at the address shown below, properly packed and with shipping charges prepaid. All claims must be made in thirty (30) days after the product failure and, in any event, within thirty (30) days after the expiration of the 90 day warranty. All claims must be accompanied by a sales slip or other written proof of date of purchase.

TO THE EXTENT PERMITTED BY LAW, ANY AND ALL IMPLIED WARRANTIES, INCLUDING MERCHANTABILITY AND FITNESS FOR PARTICULAR PURPOSE, ARE EXCLUDED; ANY IMPLIED WARRANTIES NOT EXCLUDED ARE LIMITED IN DURATION TO 90 DAYS FROM DATE OF PURCHASE. INCIDENTAL AND CONSEQUENTIAL DAMAGES ARE EXPRESSLY EXCLUDED FROM THE REMEDIES AVAILABLE TO PURCHASER, AND THE REMEDIES PROVIDED IN THIS WARRANTY SHALL BE EXCLUSIVE TO THE EXTENT PERMITTED BY LAW.

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

If any product returned by the purchaser is found by COMPETITION ELECTRONICS, INC., to require service not covered by warranty, COMPETITION ELECTRONICS, INC., will so advise the purchaser and request further instructions. COMPETITION ELECTRONICS, INC., will recondition to working order any product returned to it regardless of condition upon the purchaser s remittance of payment of 1/2 current retail price, if it is still manufactured by COMPETITION ELECTRONICS, INC.

Other Great Products

Be sure to check out these other fine Competition Electronics R/C racing products.

TurboMatcher 4

This is the gold standard for matching your cells. Used by most professional matching companies, the TurboMatcher 4 will let you characterize 4 individual cells at a time. Using this unit, you can test all of your cells and match them into packs to get improved performance. A must for all serious R/C racers!

Turbo35

The ultimate pack maintenance machine! Charge, discharge and cycle packs, and gather data. Match individual cells. Condition packs using our oval and off-road conditioning cycles. Measure both relative and actual internal resistance. We think this is the best charger available on the market today.

TurboLabel

TurboLabel is a Windows-based data collection and label printing program for use with the TurboMatcher 4 and the Turbo35. You can set up large matching systems using TurboLabel with multiple TurboMatcher 4 s,

TurboLabel also works for the Turbo35 user, letting you create custom labels with color and graphics.

See our website, www.CompetitionElectronics.com, for more info on these and other fine Competition Electronics products.