TRITON2™ EQ

INTRODUCTION

Triton2™ EQ offers all of the features of the original Triton2, and adds a built-in AC power supply, lithium balancing circuit, higher maximum charge current (up to 8 amps!), and a new reversed LCD with adjustable view angle. The huge charge current range plus a wide range of battery types and voltages make Triton2 EQ one of the most versatile chargers available for R/C. It's perfect for NiCd and NiMH Tx and Rx batteries and power batteries, lithium-ion, lithium-polymer, and lithium-ferrite nanophosphate power batteries, and lead-acid field batteries. The built-in lithium balancing function is perfect for today's electric flight applications. A Quick Reference Guide, plus state-of-the art programming and flowcharts make Triton2 EQ easy to understand and use. Its small size and light weight make Triton2 EQ extremely easy to transport.

It is strongly recommended to completely read this manual before use! Damage resulting from misuse or modification will void your warranty.

WARNING!! Charging lithium-based rechargeable batteries poses a risk of FIRE! NEVER treat lithium-based batteries in the same manner as other battery types. NEVER leave lithium batteries unattended while being charged! ALWAYS charge lithium-based batteries in a fireproof location! Failure to follow all care and handling instructions contained in this manual could result in quick, severe, permanent damage to the batteries and all surroundings!! Follow all safety precautions when using such batteries, as listed on pages 10-13 of this manual!

QUICK REFERENCE GUIDE

1. Connect Triton2 EQ to the AC or DC input power source. (See page 3 for details)
2. Find the programming flowcharts included in the package.
3. Press BATT TYPE to find the screen which matches your battery type. (See page 5 for details)
4. Connect the proper charge adapter to the "Output" jacks. Connect the battery to the charge lead, observing proper polarity.
5. To charge:
   a. For NiCd and NiMH batteries see page 7.
   b. For lithium based batteries see page 12.
   c. For lead-acid (Pb) batteries see page 13.
6. To discharge:
   a. For NiCd and NiMH batteries see page 8.
   b. For lithium based batteries see page 12.
   c. For lead-acid (Pb) batteries see page 14.
7. For cycling of NiCd and NiMH batteries see page 9.

INDEX

SPECIFICATIONS

AC input voltage:	110V 60Hz – 240V 50Hz (detachable AC cord)
DC input:	11-15.0V, banana plugs with mating gator clips included
Number of outputs:	one
Battery types, # cells:	1-24 NiCd, NiMH (1.2-28.8V) 1-6 LiPo, Li-Ion, LiFe (3.3, 3.6 or 3.7V cells) 6, 12, 24V Pb (2V per cell)
Fast charge current:	0.1-8.0A (1C max for lithiums) 120W max DC, 100W max AC
Fast charge termination:	peak detection NiCd, NiMH cc/cv for Pb and lithiums
Trickle current: (NiCd/MH only)	0-300mA
Peak sensitivity: (NiCd/MH only)	NiCd 5-20mV, NiMH 3-15mV
Peak delay at start: (NiCd/MH only)	0-60 minutes
Fast charge safety timer:	0-990 minutes
NiMH max. charge cap:	0-9900mAh
NiMH top off charge:	0-1000mA
Lithium balancing accuracy:	5mV per cell
Lithium balancing connector:	ElectriFly and FlightPower adapters included
Lithium max. node current:	300mA
*Thermal cutoff:	50-150°F (10-65°C)
Discharge current:	0.1-3.0A
Discharge cutoff voltage:	NiCd, NiMH 0.5-1.2V per cell LiPo and Li-Ion 3.0V per cell LiFe 2.5V per cell Pb fixed at 1.8V per cell
Cycle count (NiCd/MH only):	1-10 cycles
Cycle time delay: (NiCd/MH only):	1-60 minutes
Battery memories:	10 battery memories
Programming controls:	dial and 2 pushbuttons
Display type:	2x16 reversed LCD with backlight and adjustable view angle
Audible indicators:	10 melodies, on/off
Main output connection:	banana jacks
Case material:	aluminum
Cooling system:	built-in fan
Current overload:	solid state
Case size:	7.2 x 7.0 x 2.44 in. [184 x 178 x 62mm]
Weight:	54.5 oz. [1546g, w/o AC power cord]

*GPMM3151 – Triton Thermal Probe available separately

SPECIAL FEATURES AND FUNCTIONS

- Includes a tiny, lightweight built-in switching AC power supply
- A new easy to see 2x16 reversed LCD with backlight and 0-45 adjustable view angle
- Built-in balancing for 1-6S LiPo, Li-Ion, or LiFe (A123) cells, FlightPower and ElectriFly adapters included
- Tons of power, capable of up to 8 amps of charge current, and 24 NiMH cells or 6S LiPo packs
- Precision peak detection with adjustable sensitivity for NiCd and NiMH batts
- Constant current / constant voltage charge method for Pb and lithiums
- Temperature sensing capabilities (GPMM3151 Thermal Probe available separately)
- Top-off charge feature fully charges NiMHs without overheating
- 0.1-3.0A adjustable discharge current
- Adjustable discharge cutoff voltages for NiCd/MH, pre-set voltages for Pb and lithiums
- Perform 1 to 10 cycles (NiCd/MH only), and recall all data
- Configure up to 10 batteries in memory for instant, easy re-call and charger setup
- Banana plugs on DC input, mating gator clips included
- Displays input and output volts, peak volts, avg dsch volts, chg and dsch capacity, currents and time, data for 10 cycles, errors, and individual lithium cell voltages
- Audible sound cues aid in programming and notification of function changes.
- Warning messages for improper input voltage, poor connections, unsuitable battery condition, reverse polarity on output
- Safety features include cool-off time delay, maximum NiMH charge input, fast charge safety timer, current overload and reverse polarity protection
- A super-sturdy aluminum case for rugged durability
- Built-in cooling fan, for better charge efficiency and extends life of charger
- Full 1 year warranty

IMPORTANT WARNINGS

Disconnect the battery and remove input power from the charger immediately if the charger or battery become hot!! Allow the charger or battery to cool down before reconnecting.

- **NEVER** attempt to charge incompatible types of rechargeable batteries as permanent damage to the battery and charger could result.
- **NEVER** use automotive type battery chargers to power the charger.
- **NEVER** allow water, moisture or foreign objects into the charger.
- **NEVER** block the air intake holes or fan as this could cause the charger to overheat.
- **NEVER** attempt to use batteries with more cells or total voltage than listed in the specifications.
- **NEVER** leave the room where a battery is being charged or discharged.
- **NEVER** place the charger or battery on a flammable surface or near a flammable object while in use. Keep away from carpets, wood, paper, plastic, cluttered workbenches, etc.
- **NEVER** overcharge batteries as permanent damage could result. Do not use a charge or discharge current rate which exceeds the safe level of the battery. Do not attempt to charge or discharge a battery if it is hot.
- **ALWAYS** disconnect from power source when not in use.
- **ALWAYS** keep out of reach of children.
- **ALWAYS** connect the charge lead to the charger before connecting the battery to the lead. And ALWAYS disconnect the battery from the charge lead BEFORE disconnecting the charge lead from the charger. Otherwise, if the ends of the charge lead touch each other while the battery is still connected it will cause a severe and dangerous short-circuit condition.

GLOSSARY OF TERMS

Amps (A): The unit of measure for charge or discharge current.

Milli-amps (mA): A unit of measure for current, being amps (A) multiplied by 1000 and listed as “mA”. So 2.5A is the same as 2500mA (2.5 x 1000). Or, to convert mA to amps, divide the mA number by 1000. So 25mA is the same as 0.025A (25 divided by 1000).

Capacity, milli-amp hours (mAh), and amp-hours (Ah): Charge energy stored by a battery is called capacity, which is defined as how much current a battery can supply in one hour of time. Most hobby batteries are rated for capacity in **“mAh” or milli-amp hours**. A 650mAh battery can deliver 650mA of current for one hour (650mA x 1hr = 650mAh). A 3200mAh battery can deliver 3200mA (3.2A) of current for one hour (3200mA x 1hr = 3200mAh), etc. Very large batteries, such as lead-acid field batteries, are usually rated in **“Ah” or amp-hours**. A “12V 7A” field battery can deliver 7 amps of current for one hour (7A x 1hr = 7Ah).

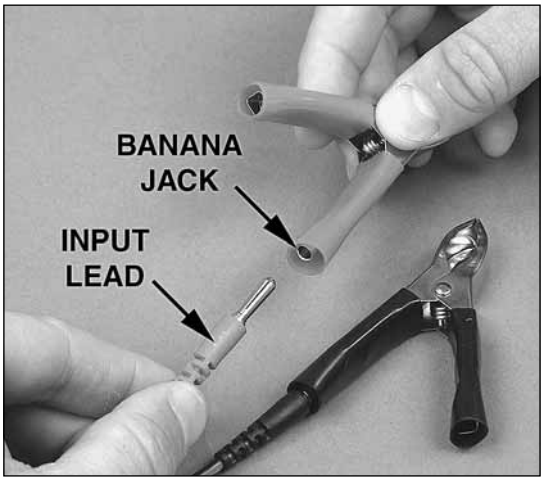
“C” rating: Capacity is also referred to as the “C” rating. Some battery suppliers recommend charge and discharge currents based on the battery’s “C” rating. A battery’s “1C” current is the same number as the battery’s rated capacity number, but noted in mA or amps. A 600mAh battery has a 1C current value of 600mA…a 3C current value of (3 x 600mA) 1800mA or 1.8A. The 1C current value for a 3200mAh battery would be 3200mA (3.2A), etc.

INPUT POWER – CONNECTION, PROTECTIONS AND LIMITATIONS

AC Input: For indoor use, this charger includes a built-in switching AC power supply that delivers power by connecting the AC power cord to a common 110V AC outlet. This built-in power supply is also compatible with 220V 50Hz sources (220V input power cord not included).

DC Input: This charger can also be powered by a portable 12V DC power source for use at the field. It’s best to use a clean DC power source whose output is filtered to remove unwanted electrical noise. Do NOT use an automobile battery charger as a power source. On the left side of the charger, connect the DC power cord to a 12V DC power source. Always match polarities (red lead to red “+” terminal, black lead to black “-” terminal). To utilize the charger’s **absolute maximum** power capabilities the DC power source must be capable of delivering at least 12 amps while maintaining 12 volts DC.

For connection to power sources not having banana jacks, find a unique set of alligator clip adapters included with the charger. A female banana jack is built into the handle of each clip. Slide each clip onto the charger's input banana plugs (matching colors). Securely connect the charger's red clip to the positive (+) terminal on the power source, and the black clip to the negative (-) terminal.



WARNING! Never accidentally short together the positive (+) and negative (-) DC input connections when connected to 12V DC power. Failure to do so could result in permanent damage to the power source and the charger.

Triton2 EQ has a maximum overall power rating of 120 watts with DC input, and 100 watts with AC input. If charging a battery with high voltage at high current, or if the input voltage is low, the charger might limit the output current as a result of the charger's maximum power rating. This is normal. Refer to the "Maximum Power Chart" included for more details about current limitations for higher voltage batteries.

The charger will be on at all times when connected to input power. Disconnect the charger from input power when not in use.

CHARGER CONTROLS AND OUTPUT CONNECTIONS

MENU button: To change between the Main and Setup menus.

BATT TYPE button: To change battery type, and move to the right through all menus.

DIAL: Turn or press to scroll through menus, adjust values, or start functions.

Lithium balancing jack: To connect an adapter for balancing of lithium batteries. See page 5.

Banana jacks: Main output for charging, discharging, and cycling.

Thermal probe jack: Use ONLY for connecting an optional Thermal Probe (GPMM3151). Do NOT connect batteries to this jack!

For best performance it's recommended to use pre-assembled leads to connect batteries to the charger. Always connect the charge lead to the charger FIRST. Then connect the battery to the charge lead. Always match polarities from the battery's lead to the banana jacks (red positive (+) lead to red banana jack, black negative (-) lead to the black banana jack).

WARNING! NEVER allow the positive and negative output connections to touch while a battery is connected to the output. Failure to do so could result in permanent damage to the battery and/or the charger and void your warranty.

Great Planes offers a large variety of charge leads which can be found at most hobby retailers nationwide:

Part Number	Description
GPMM3105	charge lead – banana plug to 2-pin connector
GPMM3148	charge lead – banana plugs to Deans® Ultra® male
GPMM3149	charge lead – banana plugs to Deans® micro
GPMM3200	Balancing lead – 1-6S ElectriFly LiPos
GPMM3201	Balancing lead – 1-6S FlightPower/Thunder Power LiPos
HCAP0101	Futaba J Tx and Rx charge leads, except 9VAP
HCAP0102	Futaba J Tx and Rx charge leads, 9VAP only
HCAP0104	Airtronics/Sanwa Tx and Rx charge leads
HCAP0105	JR/Spektrum Tx and Rx charge leads
HCAP0106	Hitec Tx and Rx charge leads
HCAP0108	Charge leads, banana plugs to alligator clips
HCAP0110	9V-style Tx connector, Futaba-J Rx charge lead
HCAP0310	Banana Plugs (3 pair)
HCAP0320	Heavy Duty Banana Plugs (2 pair)

DETERMINING BATTERY TYPE AND SPECIFICATIONS

IMPORTANT: It is always CRUCIAL to know your battery's exact type, rated voltage and capacity!! To avoid causing permanent damage to your battery, carefully read your battery's label and/or instruction sheet or consult your battery supplier and determine:

1. **Type:** Is the battery a nickel-cadmium (NiCd), nickel-metal hydride (NiMH), lithium-polymer (LiPo), lithium-ion (Li-Ion), lithium ferrite nanophosphate (LiFe), or lead-acid (Pb)?

2. **Rated capacity:** This should be listed on the battery's label in "mAh" ("milli-amp hours"). Capacity is also referred to as the "C" rating. Charge and discharge currents are also expressed as a function of this "C" rating. For example, a 2100mAh battery would have a "1C" charge or discharge current rate of 2100mA or 2.1 amps. This battery's 2C rating would be (2.1 x 2) 4.2 amps, etc.

3. **Rated voltage: NEVER** guess the rated voltage of a lithium battery! If not printed on the battery's outer label, consult your battery supplier or determine pack voltage as follows:

    a. NiMH and NiCd batteries: multiply the total number of cells in the pack by 1.20.
    b. LiPo batteries: multiply the total number of cells in the pack by 3.70.
    c. Li-Ion batteries: multiply the total number of cells in the pack by 3.60.
    d. LiFe batteries (A123): multiply the total number of cells in the pack by 3.30.
    e. Lead-acid (Pb): multiply the total number of cells in the battery by 2.0.

MENU STRUCTURE

Triton2 EQ contains three different menus. Refer to the included flowcharts when programming the charger.

Main Menu: For setting battery type, charge and discharge currents and voltages, and cycling currents. Starting charge, discharge, and cycles are done in this menu. Setting a battery memory is also done in the Main Menu.

Setup Menu: Various customizable features which support charge, discharge, and cycle are found in the Setup Menu, such as safety timers, time delays, thermal probe temperature settings, peak detection sensitivity, etc.

Data View Menu: Results of charge, discharge, cycle and balancing functions are displayed here, as well as input, output, peak charge, and average discharge voltages and battery temperatures.

GETTING STARTED

All main functions (charge, discharge, cycle) for all battery types are found in the Main Menu. Setting the battery type, charge, discharge, and cycle currents and voltages, etc. are found here as well. When power is applied the first time, the charger will automatically default to the “Memory (01) NiCd” screen as shown along the top of the Main Menu. More specific details about all settings for all battery types can be found in the included flowcharts.

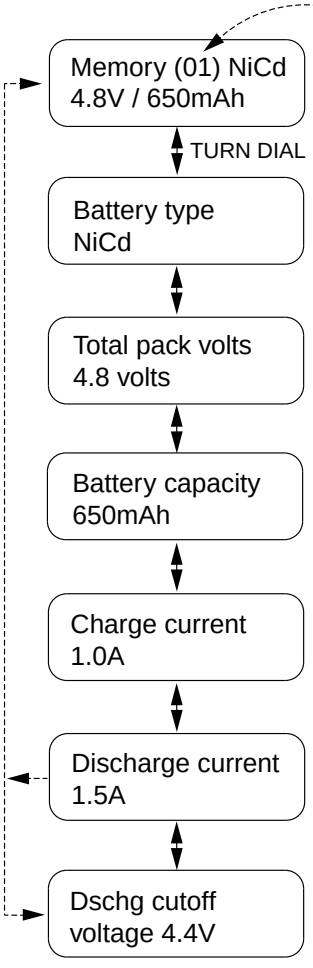
IMPORTANT: Different parameters exist for each battery type. It‘s CRUCIAL to use functions in the menu which are marked for your exact battery type!!

1. If your battery type does not match that shown on-screen, press BATT TYPE until the proper battery type is found (moving right across the programming flowchart).

2. Turn the dial to move up and down a menu. To adjust values on-screen, press the dial and the adjustable feature will flash. Turn the dial to adjust the setting, then re-press the dial to confirm the selection. If a screen shows two adjustable values, repeatedly press the dial to select the value to be adjusted.

3. **Battery Memories:** Skip to step 4 if you do not wish to use a memory.

Memory Screens



Press the dial, then rotate to select a memory (1-10). Re-press dial to confirm memory selction.

IMPORTANT: Press, then rotate dial to find the **EXACT** battery type to match your battery. Press dial to confirm.

Press, then rotate dial to find voltage which **EXACTLY** matches the nominal voltage shown on the battery pack. Press dial to confirm.

Press, then rotate dial to find the capacity value which MOST CLOSELY matches the capacity shown on the battery pack. Press dial to confirm.

Press, then rotate dial to find the desired charge current. Refer to the NiCd and “NiMH Charge and Discharge Current” chart for recommendations. Press dial to confirm. (Screen not shown for lithium batteries, as current will automatically be set to the battery’s 1C value.)

Press, then rotate dial to find the discharge current value. Refer to the NiCd and “NiMH Charge and Discharge Current” chart to determine the proper current. Press dial to confirm.

Press, then rotate dial to find the discharge cut-off voltage. Refer to the “Discharge Cutoff Settings - NiCd and NiMH” chart to determine the proper voltage. Press dial to confirm. (Screen not shown for lithium or lead-acid batteries.)

Once all memory settings have been entered, press “MENU” to confirm all settings. Triton2 EQ will automatically jump to the appropriate “charge” screen for the selected battery type.

Once all settings in a memory are selected, choosing that memory number will recall all such settings automatically. Setting any of the ten memories is done as explained in the diagram above.

Each memory is factory pre-programmed, as shown in the included BATTERY MEMORY CHARTS. If you wish to modify any memory, use the blank chart provided to record all settings. All memory settings will hold until changed again manually.

4. **Setting Battery Type:** If you do not wish to use the memories, press BATT TYPE to find the battery type on-screen which **EXACTLY** matches your battery. Select from NiCd, NiMH, LiPo (see the "Selecting LiPo, Li-Ion, and LiFe Battery Type" section for how to change to Li-Ion or LiFe), or Pb (lead-acid).

5. **STARTING CHARGE, DISCHARGE, OR CYCLE:** Read the sections below for how to set values for the selected battery type, and how to start charge, discharge, or a cycle.

CARE AND HANDLING INSTRUCTIONS FOR NiMH BATTERIES

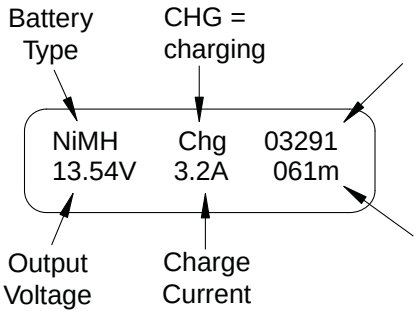
- **NEVER** allow NiMH batteries to overheat, as this could adversely affect their performance or damage the cells. If this happens, disconnect the battery from the charger immediately and allow to cool!
- **NEVER** deep cycle NiMH batteries as permanent damage could result.
- **NEVER** attempt to use the NiCd, Pb, or lithium functions with NiMH batteries.
- Store NiMH packs with some voltage remaining on the cells (refer to battery supplier).

CHARGING NiCd AND NiMH BATTERIES

1. In the Main Menu press BATT TYPE to find the "NiCd CHARGE" screen to charge a NiCd battery, or find the "NiMH CHARGE" screen to charge a NiMH battery.

2. To change the charge current, press the dial to cause the value to flash. Turn the dial to find the desired charge current. See the separate Triton2 EQ CURRENT CHART for recommended settings. A setting of "0.2A" is the same as 200mA, "0.7A" is the same as 700mA, etc. Press the dial to confirm the selection. Note: Rotating the dial fully to either direction will cause "auto" to show. See the "Notes" section below for details on the auto function.

3. To **START PEAK CHARGE**, press and hold the dial for 2 seconds. "BATTERY CHECK" will show while the charger evaluates the condition of the battery. If the battery is ready, peak charge will start automatically at which time you'll see a screen like shown here.



Charge capacity: This is how much capacity (energy, in "mAh") has been delivered to the pack during charge. For a battery which previously had some charge, this number could be low. For a battery which had little or no charge, this number should be higher (ideally within 10% of the battery's own mAh rating).

Elapsed charge time: This is the number of minutes the battery has been on charge. For a battery which previously has some charge, this number could be low. For a battery which previously had little charge, this number should be larger.

WARNING! It is normal for NiCd and NiMH batteries to become warm during charge. Disconnect batteries IMMEDIATELY if they become hot at any time! If batteries become overheated, it may be necessary to use a lower charge current in the future. Never attempt to charge batteries at excessive rates as permanent damage could result!

4. When peak charge is finished the screen will show "END" and tones will sound for 10 seconds. The charger will automatically go to trickle charge at this time (see the notes section on the next page for details), but the battery should now be ready for use. Other data measured during charge can be viewed in the DATA VIEW screens as shown on page 16.

Notes for charging NiCd and NiMH batteries:

- Lower current means it takes longer to charge but it's less stressful on the batteries, tends to result in more fully charged batteries, and helps to maximize the battery's lifespan.
- Larger "sub-C" size cells can handle peak charge currents up to 5.0 amps with little heat generation. Smaller "A" and "AA" cells overheat more easily and should be charged at much lower currents. Even smaller "AAA" and "N" cells should be charged at lower rates. Refer to the Triton2 EQ CURRENT CHART for recommended charge currents.
- To keep NiCd batteries in good operating condition, it's a good idea to properly discharge them before charging on a regular basis.
- NiMH batteries have a high self-discharge rate. Always recharge NiMH batteries just prior to use.
- The peak detection method is used to charge NiCd and NiMH batteries up to 95-98% full charge. A trickle charge current will automatically be delivered after peak charge ends to help the battery safely reach 100% full charge. Trickle charge is applied ***only*** after an individual peak charge (not after discharge or cycle), and will remain on until the pack is disconnected. Trickle current is automatically set, based on the fast charge current setting as listed below:

Fast charge current	Trickle current
0.0-0.9A	0mA
1.0-1.9A	50mA
2.0-2.9A	100mA
3.0-3.9A	150mA
4.0-4.9A	200mA
5.0-5.9A	250mA
6.0-7.0A	300mA

- Peak charge can be stopped manually by pressing the dial, or disconnecting the pack.
- In the "auto" current setting, the charger will automatically set the appropriate charge current based on the condition of the battery. It is NOT recommended to use the "auto" function if charging smaller electric flight type NiCd / NiMH batteries (smaller than "AA" cells).
- A backup safety timer can be set to automatically stop charge if peak has not been detected in a certain period of time. See page 14.

DISCHARGING NiCd AND NiMH BATTERIES

1. To discharge a NiCd battery, press BATT TYPE to find the "NiCd CHARGE" screen. Turn the dial to find the "NiCd DISCHARGE" screen, and skip to step 3.

2. To discharge a NiMH battery, press BATT TYPE to find the "NiMH CHARGE" screen. Turn the dial to find the "NiMH DISCHARGE" screen.

3. Discharge **current** and **cutoff voltage** can be adjusted in the discharge screens.

   a. Press the dial, then turn to adjust the discharge current value. See the included CURRENT CHART for recommended discharge current settings. **Note:** Rotating the dial fully to either direction will cause "auto" to show. See the "Notes" section below for details on the auto function.

   b. Press the dial again to cause the cutoff voltage to flash. This is the voltage of the entire pack (not per cell) where discharge will end. See the DISCHARGE CUTOFF VOLTAGES chart here for recommended settings.

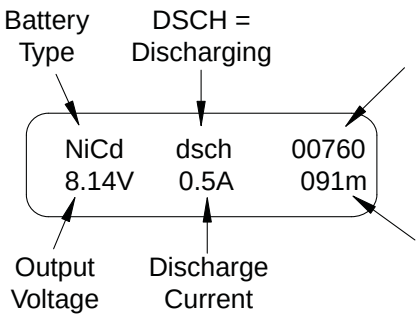
      To measure how much TIME a battery can realistically, safely power a transmitter or receiver, it's recommended to use the "1.1V per cell" settings.

      Otherwise, to measure a battery's ability to hold its manufacturer's rated capacity, or to measure how much time a battery can realistically power an electric motor, use the "0.9V per cell" settings.

4. To **START DISCHARGE**, press and hold the dial for 2 seconds. "BATTERY CHECK" will show briefly as the charger checks the condition of the battery. Discharge will start automatically if the battery is in suitable condition, at which time you'll see a screen like shown on the next page.

DISCHARGE CUTOFF SETTINGS - NiCd & NiMH

# cells in the pack	Rated pack voltage	Normal Cutoff Voltage (0.9V per cell)	Cutoff Voltage Tx and Rx batts (1.1V per cell)
1	1.2V	0.9V	-
2	2.4V	1.8V	-
3	3.6V	2.7V	-
4	4.8V	3.6V	4.4V
5	6.0V	4.5V	5.5V
6	7.2V	5.4V	-
7	8.4V	6.3V	-
8	9.6V	7.2V	8.8V
9	10.8V	8.1V	-
10	12.0V	9.0V	-
11	13.2V	9.9V	-
12	14.4V	10.8V	-
13	15.6V	11.7V	-
14	16.8V	12.6V	-
15	18.0V	13.5V	-
16	19.2V	14.4V	-
17	20.4V	15.3V	-
18	21.6V	16.2V	-
19	22.8V	17.1V	-
20	24.0V	18.0V	-
21	25.2V	18.9V	-
22	26.4V	19.8V	-
23	27.6V	20.7V	-
24	28.8V	21.6V	-



Discharge capacity: This is how much capacity (energy, in "mAh") has been delivered from the pack during discharge. For a battery which previously had little charge, this number could be low. For a battery which previously had been fully charged, this number should be high (ideally within 10% of the battery's own mAh rating).

Elapsed discharge time: This is the number of minutes the battery has been on discharge. For a battery which previously had little charge, this number should be low. For a battery which previously had been fully charged, this number should be larger.

5. When discharge is finished, the screen will show "END" and tones will sound for 10 seconds. The battery can now be re-charged, or disconnected. Other data measured during discharge can be viewed in the DATA VIEW screens (see page 16).

Notes about discharging NiCd and NiMH batteries:

- Some transmitters might contain a diode which could prevent its battery from being discharged through the radio's charge jack, causing a "No battery" error to show. It's best to remove the battery from the Tx and connect it directly to the charger for discharging (see page 5 for a list of adapters).
- For more accurate discharge readings, it's better to use a current which can discharge the pack in 1 or 2 hours.
- For packs having more than 6 volts, the actual amount of discharge current might automatically be limited due to the charger's maximum discharge ***power*** rating. See the included MAXIMUM POWER CHART for details.
- Compare the discharge capacity displayed to the capacity rating listed on the battery's label. If a battery provides less than 70% of its rated capacity it may need to be replaced. Additional cycles can be attempted to try and revive the battery, but if capacity measurements fail to improve the battery should be replaced.
- Do not attempt to discharge cells to voltages lower than recommended.
- Discharge can be stopped manually by pressing MENU, or disconnecting the pack.
- In the "auto" current setting the charger will automatically set the appropriate discharge current based on the condition of the battery. The voltage will automatically be set, based on the number of cells detected in the pack multiplied by 0.9V per cell. It is NOT recommended to use the "auto" function if charging smaller electric flight type NiCd or NiMH batteries (smaller than "AA" cells).
- Discharging a battery can determine if it's holding its rated capacity (see the CYCLING NiCd AND NIMH BATTERIES section). It can also determine how much capacity remains in the battery after a flying session. This can help you gauge how much energy your flight system is requiring from your battery.

CYCLING NiCd AND NiMH BATTERIES

Battery "cycling" is the process of fully charging then discharging a battery to a pre-determined cutoff point (or vise-versa). Cycling is only recommended for NiCd and NiMH batteries (never for lithium or lead-acid batteries). This charger can perform anywhere from one to ten cycles consecutively.

1. Decide if you want the battery to be discharged first (preferred if the battery is used often), or charged first (sometimes preferred if the battery is new or has not been used for some time).

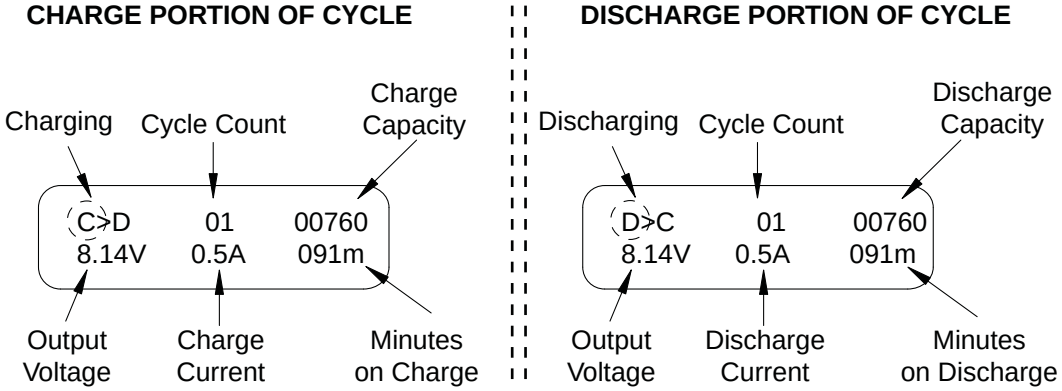
2. To cycle a NiCd battery, press BATT TYPE to find the "NiCd CHARGE" screen. Turn the dial to find either the "NiCd CHG TO DSCH" or "NiCd DSCH TO CHG" screen (depending if you want to charge or discharge first) and skip to step 4.

3. To cycle a NiMH battery, find the "NiMH CHARGE" screen. Turn the dial to find the "NiMH CHG TO DSCH" or "NiMH DSCH TO CHG" screen (depending if you want to charge or discharge first).

4. Two current values will show – one for charge (Chg), and one for discharge (Dsch). Press the dial to cause the first current value to flash. **It's very important to note whether this is the charge (Chg) or discharge (Dsch) current!** Turn the dial to find the desired current. Press the dial then turn to adjust the other current value. See the CURRENT CHART for recommended charge and discharge currents.

5. To set the number of times the battery will be cycled consecutively, press the dial until "1X" starts to flash. Turn the dial to adjust this setting as desired (1X is for one cycle, 9X is for nine cycles, etc.). Press the dial to confirm the setting.

6. To **START CYCLING**, press and hold the dial for 2 seconds. The "BATTERY CHECK.." message will show briefly, and cycling will start if the battery is in suitable condition at which time you'll see a screen like shown on the next page.



7. When all cycling is finished, “END” will show on-screen. To see measurements taken during cycling, see the DATA VIEW screens (see page 16).

Notes for cycling NiCd and NiMH batteries:

- Periodic cycling of NiCd batteries (once every month or two) can be beneficial in keeping them in good operating condition. Excessive cycling (more than once monthly) will unnecessarily shorten the lifespan of the battery.
- A short time delay can be set to occur between the charge/discharge functions to allow the battery to cool. This cycle time delay can be adjusted from 1-60 minutes in the Setup Menu (see page 15).
- During cycle mode, the discharge cutoff voltage for NiCd and NiMH batteries is FIXED (not adjustable) at 0.9V per cell.
- See the notes sections for NiCd/NiMH charge and NiCd/NiMH discharge for detailed information regarding charges and discharges.
- Cell manufacturers note three main benefits of cycling NiCd and NiMH batteries:
  1. Battery maintenance: NiCd batteries benefit the most from regular cycling to help keep them in good operating condition, and is recommended once monthly. NiMH batteries do not require as much cycling.
  2. Determining battery condition: NiCd and NiMH batteries are rated by how much charge energy or “capacity” they can store compared to their **rated** capacity. A battery that can supply only a small fraction of its rated capacity is likely reaching the end of its useful life and may need to be replaced.
  3. Breaking-in batteries: new NiCd and NiMH batteries may need to be broken-in before they will perform to their specifications. Older batteries which have been unused for an extended length of time may require to be broken-in again to regain their usefulness. Repeated cycling is the best way to revive such batteries.

IMPORTANT CARE AND HANDLING INSTRUCTIONS FOR LITHIUM-POLYMER BATTERIES

WARNING!! NEVER ATTEMPT TO CARE FOR LITHIUM-POLYMER (LiPo) OR LITHIUM-ION (Li-Ion) CELLS IN THE SAME WAY AS OTHER BATTERY TYPES! LiPo and Li-Ion cells are much more sensitive and volatile than NiCd, NiMH or lead-acid batteries. Misuse and overcharge can quickly result in LiPo/Ion cells getting hot and/or swelling, which could lead to **VIOLENT EXPLOSION AND/OR FIRE** and serious personal injury and property damage.

- **NEVER** leave the room while charging or discharging lithium batteries!
- **NEVER** place lithium batteries on flammable surfaces during charge, such as wooden or plastic workbenches, paper, carpet, cluttered areas, etc.
- **NEVER** attempt to use the NiCd, NiMH, or Pb functions with lithium batteries.
- **NEVER** continue to charge or use LiPo/Ion cells if they start to swell, become overly warm to the touch, or if they do not charge within the specified charging time. Failure to follow this guideline could cause the battery to become hot, and explode or ignite!!
- **NEVER** discharge Li-Ion cells lower than **2.5V per cell**.
- **ALWAYS** have a “class D” fire extinguisher available when handling LiPo batteries.
- LiPo/Ion cells hold charge very well, and should not be trickle charged or cycled.
- LiPo/Ion cells should be charged about once per year at a minimum to prevent over-discharge.
- LiPo/Ion batteries should be stored with about 30%-50% of capacity.
- If LiPo/Ion cells leak fluid, rinse the affected area well with water and seek immediate medical care.

SELECTING LiPo, Li-Ion OR LiFe BATTERY TYPES

Triton2 EQ can handle lithium-polymer (LiPo), lithium-ion (Li-Ion), and lithium ferrite phosphate (LiFe, such as A123 brand) battery types. While similar in many ways, there are some slight differences amongst these battery types. Setting Triton2 EQ for the proper lithium type is necessary for safety, and will result in better performance for your packs. Refer to the Main Menu flowchart:

1. If using LiPo batteries, skip to the next section. If using Li-Ion or LiFe packs, press BATT TYPE to find the "LiPo CHARGE" screen.

2. Turn the dial to find the "Lithium type" screen.

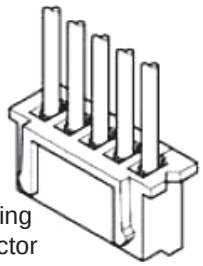
3. Press the dial, then turn to find the desired lithium type. Select "Li-Ion" for lithium-ion batteries. Select "LiFe" for lithium-ferrite nanophosphate batteries. Re-press the dial to confirm the selection. Once the lithium type has been changed in this screen, all screens and settings relating to lithium batteries will follow the nominal voltage ratings for the battery type selected (as explained on page 5).

BALANCED VS. NON-BALANCED LITHIUM PACKS

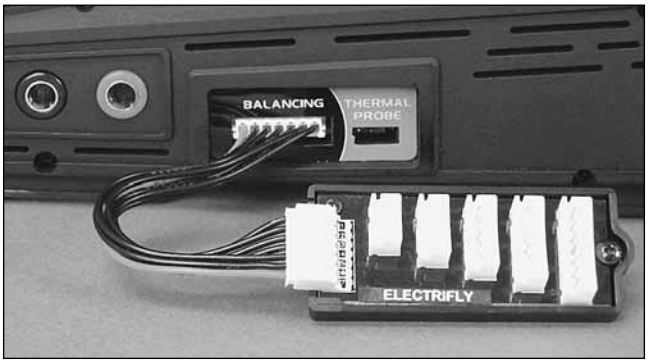
Lithium batteries for R/C are commonly available in two different assembly/wiring configurations: wired for balancing, and non-balanced. It's important to know which configuration you have before proceeding. **Consult your battery supplier if you are unsure if your battery is wired for balancing, if it's not wired for balancing but has a built-in safety circuit, or neither.**

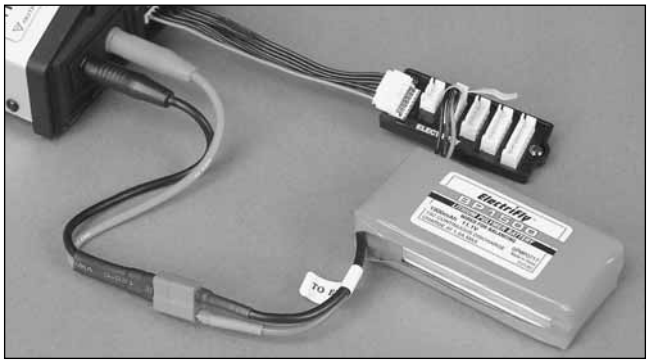
WARNING! It is NOT recommended to charge a LiPo battery which is not wired for balancing, or which does not have a built-in protection circuit! Such types of LiPo batteries have NO means to protect the equipment or the user from damage that could result from an overcharge condition of any single cell in the pack.

Packs wired for BALANCING have a unique connector which has more than two wires going to the pack itself. Each wire is connected to an individual cell inside the pack, by which the charger/discharger monitors the condition of the individual cell and controls whether it should be charged or discharged. Such packs SHOULD be charged with a LiPo charger that is capable of balancing, or with a LiPo charger that is connected to a separate LiPo cell balancer. Triton2 EQ has a built-in balancing circuit.



Balancing Connector





To balance a LiPo battery during charge or discharge, connect the appropriate adapter to match your battery to the charger's balancing jack (top left). The red wire will always be on the left. Then connect the battery to the balancing adapter. Lastly, connect the battery's main power lead to the adapter connected to the charger's banana jacks (note proper polarity). **Note:** Anytime a lithium battery is connected to the balancing jack – but NO fast charge or discharge is in progress – the charger will attempt to slowly balance the pack by discharging any cells of higher voltage. The LCD will briefly show "SLOW BALANCING" every five seconds during this time. See pages 12 and 13 for details about fast charging and discharging of lithium batteries.

NON-BALANCED packs are wired so the charger can only detect the voltage of the entire pack (not individual cells), so there is only one charge lead. It's highly recommended to ONLY use such types of LiPo packs if they have a built-in charge safety circuit which prevents any single cell in the pack from being overcharged. Simply connect the battery's main power lead to the charger's banana jacks (note proper polarity).

CHARGING LiPo, Li-Ion OR LiFe BATTERY TYPES

WARNING! Always follow the instructions below when charging LiPo/Ion batteries! LiPo/Ion batteries should NEVER get warm or change shape anytime during charge! Disconnect batteries IMMEDIATELY if they become excessively warm or hot or change shape at any time, and refer to the Troubleshooting Guide in the rear of this manual for details. LiPo/Ion cells are much more dangerous than NiCd or NiMH batteries, and pose a significant FIRE HAZARD which can result in causing bodily harm and/or permanent damage to the cells and the surrounding environment. It is recommended to use this charger's temperature cutoff function when charging lithium batteries, to provide an additional layer of safety. See page 15 for details.

1. Press BATT TYPE to find the "LiPo CHARGE" screen (or "Li-Ion CHARGE" or "LiFe CHARGE" screen if you selected either of those lithium types). **IMPORTANT: Two values MUST be set properly in this screen.**

    a. Press the dial to cause the battery **capacity** value to flash. Press, then turn the dial to find the capacity value that **most closely matches** the capacity rating marked on your battery. You will not set the actual charge current value for lithium batteries. The charger will automatically set the charge current based on this capacity setting (see notes section below for details).

    b. Press the dial to cause battery's **nominal voltage** value to flash. Press, then turn the dial to set this voltage to **EXACTLY MATCH** the nominal voltage rating shown on your pack. Press the dial to confirm this setting.

WARNING!! NEVER enter a capacity or voltage number that is higher than the value specified for your battery! Failure to follow this warning can cause permanent damage to your battery, charger and surroundings as a result of FIRE!

2. To **START CHARGE**, press and hold the dial for 2 seconds. The "BATTERY CHECK…" message will show briefly, and then charge will start automatically if the battery is in suitable condition.

3. When finished charging, the screen will show "END" and tones will sound for 10 seconds. The battery should now be ready for use. The charger will display details about the charge data for your battery, including charge capacity, elapsed charge time, etc. To see more measurement details see the DATA VIEW screens (see page 16).

Note: If cells within a pack had been badly out of balance, the charger might require extra time to balance all cells properly. If the battery does not seem to have become fully charged after the first charge is complete, lengthen the time set for the Safety Timer (see page 14), or attempt to re-charge the pack again.

Notes about charging LiPo, Li-Ion, and LiFe batteries:

- The actual level of charge current will be set automatically by the charger based on the battery's 1C rating. It's VERY IMPORTANT to enter the battery's exact rated capacity (in mAh) in the programming. If a capacity of 600mAh is entered the charger will set the charge current at 0.6A (600mA). For a capacity setting of 2500mAh, the charge current will automatically be set at 2.5A (2500mA).
- Lithium based batteries are charged using the "constant current / constant voltage" method (cc/cv). Constant current is delivered during the first part of fast charge. When the battery reaches a pre-set voltage, constant current is no longer delivered, and a constant voltage is applied to the battery. As the battery's voltage becomes equalized to the voltage on the charger's output, charge current will steadily begin to drop. This is normal. When current reaches an approximate value of 1/10C, the charge process will end completely.
- LiPo/Ion batteries do not need trickle charge, and therefore no such function exists.
- For LiPo/Ion batteries rated at 11.1V or greater, the **actual** amount of current delivered to the battery might be limited due to the charger's max. **power** rating. This is normal, due to various possible circumstances such as the condition of the battery, limitations of the input power source, charge connector, etc.
- For safety reasons, fast charge of LiPo/Ion batteries will automatically stop if the actual amount of capacity delivered to the battery reaches 110% of the capacity setting entered in point 1.a. of this section.
- The backup safety timer function can also be set to provide an additional layer of safety (see page 14).
- Charge can be stopped manually by pressing MENU or disconnecting the pack.

DISCHARGING LiPo, Li-Ion OR LiFe BATTERY TYPES

1. At the "LiPo CHARGE" screen (or "Li-Ion CHARGE" or "LiFe CHARGE" screens respectively) turn the dial to find the "LiPo DISCHARGE" screen (or similar).

2. Two values can be adjusted in this discharge screen:

    a. Press the dial to cause the discharge **current** value to flash, and turn the dial to find the desired setting. To determine if a lithium battery can deliver its rated capacity, set this current to the (C ÷ 5) value. So for a battery rated at 2100mAh, set this current to "0.4A" (calculated as 2100 ÷ 5 = 420mA).

b. Press the dial again to make the discharge **cutoff voltage** value flash. This is the total pack voltage where discharge should stop (not volts per cell). Turn the dial to find the proper voltage. Re-press dial to confirm the selection. Settings for LiPo and Li-Ion batteries are based on 3.0V **per cell**, and LiFe packs are based on 2.5V **per cell**, as follows:

LiPo and Li-Ion Packs		LiFe Packs	
pack size	**cutoff voltage**	**pack size**	**cutoff voltage**
1S	3.0V	1S	2.5V
2S	6.0V	2S	5.0V
3S	9.0V	3S	7.5V
4S	12.0V	4S	10.0V
5S	15.0V	5S	12.5V
6S	18.0V	6S	15.0V

WARNING!! Do not attempt to discharge a LiPo battery below its recommended cutoff voltage. Doing so may cause a failure later when attempting to re-charge the battery, and result in a FIRE!

4. To **START DISCHARGE**, press the dial for 2 seconds. The "BATTERY CHECK…" message will show briefly, and discharge will start automatically if the battery is in suitable condition.

5. When discharge is finished, the screen will show "END" and tones will sound for 10 seconds. The battery can now be re-charged or disconnected. To see details measurements press BATT TYPE and MENU simultaneously to see the DATA VIEW screens (see page 16).

Notes about discharging LiPo, Li-Ion and LiFe batteries:
* For more accurate discharge readings, it's better to use a current which can discharge the pack in 1 or 2 hours.
* For batteries having more than 6 volts the actual discharge current might automatically be limited by the charger's maximum ***power*** rating. See the included MAXIMUM POWER CHART for details.
* Discharge can be stopped manually by pressing MENU, or disconnecting the pack.

CARE AND HANDLING FOR LEAD-ACID (Pb) BATTERIES

Never attempt to care for lead-acid (Pb) batteries in the same way as other battery types! Lead-acid batteries commonly used in R/C hobby field boxes require unique care and handling methods as they contain different characteristics than other battery types.

- Do not attempt to use the NiCd, NiMH, or lithium functions on Pb batteries.
- Do not exceed 14.7V maximum charge voltage for batteries rated at 12V.
- Pb batteries have a self-discharge rate of 5-10%, meaning they hold charge well. There is no need to trickle charge Pb batteries. No cycling of Pb batteries is needed.
- Do not leave Pb batteries in the full discharge condition, which could cause the battery to lose its ability to regain full charge.

CHARGING LEAD-ACID (Pb) BATTERIES

1. Press BATT TYPE to find the "Pb CHARGE" screen.

2. Two values can be adjusted on the Pb charge screen:

   a. Press the dial to cause the charge **current** value to flash, and turn the dial to find the desired setting. For 12V 7Ah (7000mAh) lead-acid field batteries, a slow charge current value of (C÷10) is recommended, which would be "0.7A" (7000 ÷ 10 = 700mA). A faster charge current value of (C÷3) can be used, which would be (7000 ÷ 3 = 2333mA) "2.3A".

   b. Press the dial again to make the battery **voltage** flash. This is the nominal rated voltage of the entire battery. Set this voltage to the voltage printed on your battery. Most hobby field batteries have a nominal rated voltage of 12.0V. Turn the dial to find the proper voltage. Re-press dial to confirm the selection.

3. To **START CHARGE**, press the dial for 2 seconds. "BATTERY CHECK" will show briefly, and charge will begin automatically if the battery is in suitable condition.

4. When finished charging the screen will show “END” and tones will sound for 10 seconds. The battery should now be ready for use. To see measurements taken during charge press BATT TYPE and MENU simultaneously to see the DATA VIEW screens (see page 16).

Notes about charging Pb batteries:

* Lead-acid (Pb) batteries are charged using the “constant current / constant voltage” process (cc/cv) as explained in the section for lithium batteries. However, the charger will determine the battery is full when output current drops to approximately 90mA and will automatically stop charging at that time. The cutoff voltage for Pb batteries is also different from lithium batteries.
* Lead-acid batteries do not need trickle charge, and therefore no such feature exists.
* Lead-acid batteries have a nominal voltage of 2.0V **per cell**. For most field batteries, even though you cannot see any individual “cells”, there are 6 cells internally. At 2.0V per cell, this makes a total field battery voltage of 12V.
* For lead-acid batteries rated at 12V or greater, the **actual** amount of current delivered to the battery might be limited due to the charger’s max. **power** rating. This is normal.

DISCHARGING Pb BATTERIES

1. At the “Pb CHARGE” screen, turn the dial to find the “Pb DISCHARGE” screen.

2. Two values can be adjusted on this discharge screen:

   a. Press the dial to cause the discharge **current** to flash, then turn the dial to find the desired value. To determine if the battery can deliver its rated capacity, set this value to the battery’s capacity (in mAh) divided by 20. For a 7Ah battery the current setting would be “0.4A” (7000mAh ÷ 20 = 350mA).

   b. Press the dial to cause the discharge **cutoff voltage** value to flash, then turn the dial to find the desired voltage. Lead-acid batteries are discharged to 1.8V **per cell**. For hobby batteries with a nominal voltage rating of 12V (6 cells at 2.0V each), discharge cutoff should be set to “10.8V” (1.8V x 6 cells). Press the dial to confirm the value.

3. To **START DISCHARGE**, press the dial for 2 seconds. “BATTERY CHECK” will show briefly, and discharge will start automatically if the battery is in suitable condition.

4. When discharge is finished the screen will show “END” and tones will sound for 10 seconds. The battery can now be re-charged or disconnected. To see measurements taken during discharge press BATT TYPE and MENU simultaneously to see the DATA VIEW screens (see page 16).

Notes about discharging Pb batteries:

* For more accurate discharge readings, it’s better to use a current which can discharge the battery in 2 or 4 hours.
* The maximum discharge current is 3 amps. The actual amount of current drained from the battery might be limited for higher voltage Pb batteries due to the chargers max. **power** rating. This is normal.
* The proper discharge cutoff voltage for batteries with a nominal rated voltage of 6V is 5.4V, and 24V batteries should be discharged to 21.6V.

SETUP MENU

Features that support the charge, discharge, and cycle functions are found in the Setup Menu. It is not **necessary** to change anything in the Setup Menu, as all factory default settings allow for safe operation. If you do not wish to customize features in the Setup Menu, skip to the next section.

Refer to the Setup Menu flowchart included. Note that this menu is divided into four sections for the different battery types. From the Main Menu, press the MENU button to find the “Buzzer” screen at the top of the Setup Menu for the selected battery type. Turn the dial to move up/down through all screens. To adjust any function, press the dial then turn to find the desired setting, and then press the dial to confirm the selection.

Buzzer: Tones can sound to indicate functions have started or ended. Select from “Melody 1” to “Melody 10”. “Buzzer Off” will turn all tones off.

Safety Timer: If for some reason the charger does not recognize a battery has reached full charge, this backup safety timer can automatically stop charge after a certain period of time. This protects the battery from accidental overcharge. If fast charge IS shut down by this timer, do NOT assume the battery has reached full charge (especially if the battery is not even slightly warm to the touch). **It is strongly recommended to use this function for all battery types.**

To use this function, set a safety time in minutes which ranges from 1 to 990 minutes. See the “Safety Timer Calculations” section here for how to calculate a safety time limit. If the battery repeatedly does not seem to reach full charge, it may be necessary to lengthen the safety timer so the battery can reach full charge properly. **Note:** This function can be disabled for slow charging of NiCd or NiMH batteries by selecting “No time limit”.

Safety Timer Calculations

For NiCd and NiMH batteries, divide the battery’s rated capacity (mAh) by the fast charge current setting (A). Take that result, and **DIVIDE BY 11.1**. Set this number of minutes in the safety timer screen. If the charger stops charge at this time limit, approximately 150% of the battery’s rated capacity will have been delivered to the battery. For example:

NiCd/MH battery rated capacity	**Fast charge current setting**	**Safety timer calculated setting**
1500mAh	2.5A	((1500 ÷ 2.5) ÷ 11.1) = 54 minutes
3800mAh	2.3A	((3800 ÷ 2.3) ÷ 11.1) = 149 minutes
1000mAh	0.9A	((1000 ÷ 0.9) ÷ 11.1) = 100 minutes

For LiPo, Li-Ion, LiFe, and Pb batteries, divide the battery’s rated capacity (mAh) by the fast charge current setting (A). Take that result, and **DIVIDE BY 15.1**. Set this number of minutes in the safety timer screen. If the charger stops charge at this time limit, approximately 110% of the battery’s rated capacity will have been delivered to the battery. For example:

LiPo battery’s rated capacity	**Fast charge current setting**	**Safety timer calculated setting**
2100mAh	1.8A	(2100 ÷1.8) ÷ 15.1) = 77 minutes
900mAh	0.6A	(900 ÷ 0.6) ÷ 15.1) = 99 minutes
3200mAh	3.0A	(3200 ÷ 3.0) ÷ 15.1) = 70 minutes

Temperature Scale: When using the optional Thermal Probe and Temperature Cut-off function (see below), battery temperatures can be measured and displayed in degrees Fahrenheit (°F) or Celsius (°C). To change the setting, press then turn the dial. Press the dial again to confirm the setting.

Temperature Cut-off: This optional safety feature is **highly recommended when using lithium based batteries!** No battery of any type should **ever** get hot when connected to the charger. A Triton Thermal Probe is required (optional, part number GPMM3151). Do not connect a thermal probe to the charger if temperature monitoring will not be used.

Set the maximum temperature the battery should be allowed to reach during charge, discharge, or cycle. **A maximum setting of 100°F [37°C] is recommended for LiPo and Li-Ion batteries.** Connect the probe to the charger (see page 4) and the battery before starting a charge, discharge, or cycle. If the battery reaches the set temperature, charge, discharge, or cycle will automatically stop and the “Batt.T too high” error will show.

The following features apply to NiCd and NiMH batteries only:

Peak Delay at Start: The voltage of NiCd and NiMH batteries can be unstable during the very early stages of charge. This could cause the peak detection circuitry to accidentally stop charge too soon, and the battery will NOT likely become fully charged. This function will temporarily turn off the peak detection circuit only during the first few minutes of charge to prevent this from happening. Select the number of minutes for this delay to last. A 3 to 5 minute delay is usually enough. Setting a delay time of 0 minutes turns this function off.

Delay Between Charge / Discharge: This is a time delay designed to allow a battery to cool between the charge and discharge portions of a cycle. Select from 1 to 60 minutes. Warmer batteries will require this delay time to be longer for adequate cooling.

Peak Sensitivity: When peak charging NiCd/MH batteries, the charger should see the battery’s voltage increase to a peak – and then actually **decrease** very slightly. Fast charge should stop at that time. This setting allows you to customize how accurately the charger tries to detect peak, and is set in milli-volts per cell in the pack. A **higher** mV number can result in **less** precise peak detections. A **lower** mV number can result in **more** precise peak detections (but settings under 5mV can sometimes result in erratic operation depending on the quality of the input power source, input and output connections, battery, etc.). Recommended settings are 8-10mV for NiCd batteries, and 5-8mV for NiMH batteries.

The following features apply only to NiMH batteries:

NiMH Max. Charge Input: This is another backup safety feature to protect NiMH packs. IF peak voltage is not detected and the safety timer has not expired, this function will automatically stop charge when the amount of capacity delivered to the battery matches the value set in this screen. Setting this screen to 110% of the battery’s rated capacity is recommended. For a 650mAh battery, setting this screen to 715mAh would mean 110% full capacity can be delivered (650 x 1.1). For an 1800mAh battery, a setting of 1980mAh will result in 110% full capacity (1800 x 1.1). Setting this screen to 9900mAh will make this function ineffective for nearly most batteries.

Top-off Charge: After peak charge ends, delivering another short burst of charge can help to quickly fill a NiMH battery before trickle charge starts. The amount of current shown on this screen will be delivered to the battery for only **20**

minutes before trickle charge starts. Set this screen to somewhere near 7% of the current setting in the “NiMH CHARGE” screen. So if the “NiMH CHARGE” current is set at 3.5 amps, set this screen to “0.2A” or “0.3A” (calculated as 3.5A x 0.07 = 0.245A). If the “NiMH CHARGE” current is set to 850mA, set this screen to “0.1A” (0.85A x 0.07 = 0.059A). This feature can be turned off by setting this screen to “None”. “Top-off” will show on the LCD during top-off charge, and “END” will show when complete (and the charger will now be in trickle charge mode).

DATA VIEW SCREENS – CHARGE, DISCHARGE AND CYCLE DATA

This charger keeps track of measured data in the DATA VIEW MENU which can be viewed any time.

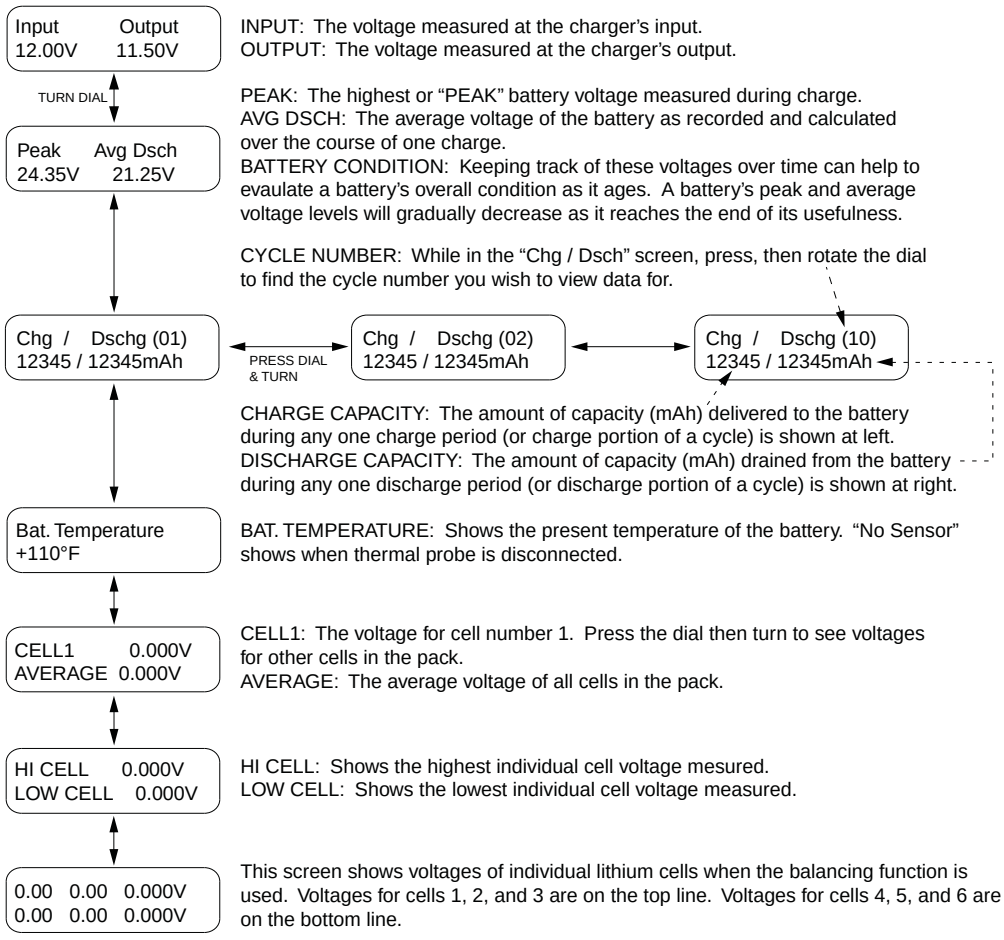
WHILE a charge, discharge, or cycle is occurring, press BATT TYPE to find the Data View screens as shown on the last page.

BEFORE OR AFTER a charge, discharge, or cycle, press BATT TYPE and MENU simultaneously to find the Data View screens.

To view capacity data for more than one cycle, turn the dial to find the “Chg / Dsch (01)” screen. The number on the top line is the cycle number. To view data for any cycle (1-10), press the dial, then turn to find the cycle number you wish to view. On the bottom line, capacity measurements in mAh are shown – charge data on the left, discharge data on the right.

Press MENU anytime to return to the Main Menu.

Data View Menu



*Press MENU CHANGE to return to the Main Menu.

COOLING FAN

A built-in cooling fan helps to keep the charger cool during operation, extend the service life of the charger, and allow it to function more accurately and efficiently. The fan will operate during discharge, or during charge if the temperature inside the charger exceeds 122°F, if the output current or power exceed a certain level, or if charging batteries which have 1-3 cells. If the internal temperature of the charger exceeds 212°F, the charger will temporarily stop all charge or discharge functions until the temperature drops below 158°F – but the fan should continue to run until the temperature drops below 113°F. **CAUTION: Do not block the vent holes for the cooling fan. Failure to do so could cause the charger to overheat and possibly cause permanent damage.**

ERROR INDICATIONS AND SAFETY WARNINGS

This charger uses solid-state circuitry to protect against potential damage which could be caused by short-circuit or reverse polarity conditions. If input power is connected backwards the screen might turn black and no other operation will occur, but the charger will be protected from damage. Re-check all input connections to make sure it is connected properly.

The following warning / error messages will show to protect the charger and battery from damage due to improper connection, input voltage, etc. These messages will be accompanied by loud tones on the buzzer. When any message appears, refer to the list of errors below or the Troubleshooting Guide below. Press MENU to clear the warning.

Error Displayed	**Problem and Solution**
Input voltage	When input voltage is under 11.0V or over 15V.
No battery	When a battery is not detected at the charger's output.
Open circuit	When a battery becomes disconnected while a function is in progress.
Reverse polarity	When a battery is connected to the output in reverse.
Overheating	All functions will pause when the temperature inside the charger exceeds 212°F [100°C]. Functions will automatically resume after the charger has cooled to 158°F [70°C].
Time limit over	When the time in the charge "Safety timer" screen has expired.
Batt.V too high	When the battery's voltage setting in the charger is too low. It may take up to 5 minutes for this error to show.
Batt.V too low	When the battery's voltage setting in the charger is too high. It may take up to 5 minutes for this error to show.
Batt.T too high	When the temperature of the battery exceeds the setting in the "Temp. cut-off" screen.
Communication	When an internal error occurs with the charger's calibration logic.

TROUBLESHOOTING GUIDE

PROBLEM: Display does not work or turns black when connected to power. Check power supply for proper power. Check input connections for proper contact, making sure it's not connected backwards.

PROBLEM: Charger doesn't recognize battery. Make sure battery is not connected backwards. Check for faulty connection or wiring. Perhaps there is a defective cell in the pack, in which case the pack should be replaced.

PROBLEM: Does not automatically stop charge after a reasonable amount of time. Charge current too low. Safety timer not short enough. Internal problem might exist. Disconnect battery IMMEDIATELY and contact Hobby Services.

PROBLEM: Battery voltage low after charge is completed. Make sure charge current setting isn't too low. Battery might be defective and require replacement. Check to see if the backup safety timer expired before full charge was reached. For lithium batteries, make sure the battery capacity value entered in the programming matches the rated capacity of the battery.

PROBLEM: Will not lock into discharge mode. An improper discharge voltage was entered for the battery. Adjust the battery voltage in the discharge screen to match the number of cells in the pack. Tx might have a diode in charge circuit, in which case it's best to connect the battery to the charger directly (outside of the Tx). Battery might be defective and require replacement. Battery might already be discharged.

PROBLEM: Low mAh readings after discharge. Batteries might not have been fully charged prior to discharge. Batteries might have been old or unused for an extended period of time, which may require additional cycles to see if capacity improves. Battery might be defective and require replacement. Discharge current setting might be too high, and should be lowered. An improper discharge voltage was entered for the battery. Adjust the battery voltage to the proper value for the battery. Battery might already be discharged.

PROBLEM: LCD and/ or controls do not function properly. Input power might be connected backwards, and require re-connection. Contact Hobby Services for further details.

*1-YEAR LIMITED WARRANTY – *U.S.A. AND CANADA ONLY*

Great Planes warrants this product to be free from defects in materials and workmanship for a period of one (1) years from the date of purchase. During that period, Great Planes will, at its option, repair or replace without service charge any product deemed defective due to those causes. You will be required to provide proof of purchase (invoice or receipt). This warranty does not cover damage caused by abuse, misuse, alteration or accident. If there is damage stemming from these causes within the stated warranty period, Great Planes will, at its option, repair or replace it for a service charge not greater than 50% of its then current retail list price. Be sure to include your daytime telephone number in case we need to contact you about your repair. This warranty gives you specific rights. You may also have other rights, which vary from state to state.

For service on your Great Planes product, warranty or non-warranty, send it post-paid and insured to:

HOBBY SERVICES
3002 N. Apollo Drive, Suite #1
Champaign, Illinois 61822
Tel: 217-398-0007

*For warranty and service information if purchased outside the USA or Canada, see the additional warranty information insert (if applicable) or ask your retailer for more information.

TRITON2 EQ

MAXIMUM POWER CHART

MAX. CHARGE POWER = 100 Watts (AC Input)
With charge current set to 8A, actual current will be limited as follows:

Voltage (V)	Current (A)	Watts (W)
1.00 - 12.00	8.00	100
13.00	7.69	100
14.00	7.14	100
15.00	6.67	100
16.00	6.25	100
17.00	5.88	100
18.00	5.56	100
19.00	5.26	100
20.00	5.00	100
21.00	4.76	100
22.00	4.55	100
23.00	4.35	100
24.00	4.17	100
25.00	4.00	100
26.00	3.85	100
27.00	3.70	100
28.00	3.57	100
29.00	3.45	100
30.00	3.33	100
31.00	3.23	100
32.00	3.13	100
33.00	3.03	100
34.00	2.94	100
35.00	2.86	100
36.00	2.78	100
37.00	2.70	100
38.00	2.63	100
39.00	2.56	100
40.00	2.50	100

MAX. DISCHARGE POWER = 20 Watts
At 12V input, current set to 3A, discharge current automatically limited as follows:

Voltage (V)	Current (A)	Watts (W)
1.00 - 6.00	3.00	20
7.00	2.86	20
8.00	2.50	20
9.00	2.22	20
10.00	2.00	20
11.00	1.82	20
12.00	1.67	20
13.00	1.54	20
14.00	1.43	20
15.00	1.33	20
16.00	1.25	20
17.00	1.18	20
18.00	1.11	20
19.00	1.05	20
20.00	1.00	20
21.00	0.95	20
22.00	0.91	20
23.00	0.87	20
24.00	0.83	20
25.00	0.80	20
26.00	0.77	20
27.00	0.74	20
28.00	0.71	20
29.00	0.69	20
30.00	0.67	20
31.00	0.65	20
32.00	0.63	20
33.00	0.61	20
34.00 - 40.00	<0.60	20

The Triton2 EQ charger might not deliver full charge current on batteries which are greater than 12.0V, or lithium or lead-acid batteries during the constant-voltage portion of charge. This is normal

TRITON 2 EQ

CURRENT CHART

NiCd and NiMH CHARGE AND DISCHARGE CURRENT CHART

Battery's Rated Capacity (mAh)	*Break-In Charge Current	*Break-In Charge Safety Timer Setting	2 Hour Current	1 Hour Current	Quick Charge Current	C/5 Discharge Current
100	0.1A	84 minutes	0.1A	0.1A	0.2A	0.1A
200	0.1A	168 minutes	0.1A	0.2A	0.4A	0.1A
300	0.1A	252 minutes	0.2A	0.3A	0.6A	0.1A
400	0.1A	336 minutes	0.2A	0.4A	0.8A	0.1A
500	0.1A	450 minutes	0.3A	0.5A	1.0A	0.1A
600	0.1A	540 minutes	0.3A	0.6A	1.2A	0.1A
700	0.1A	630 minutes	0.4A	0.7A	1.4A	0.1A
800	0.1A	720 minutes	0.4A	0.8A	1.6A	0.2A
900	0.1A	864 minutes	0.5A	0.9A	1.8A	0.2A
1000	0.1A	960 minutes	0.5A	1.0A	2.0A	0.2A
1100	0.2A	495 minutes	0.6A	1.1A	2.2A	0.2A
1200	0.2A	540 minutes	0.6A	1.2A	2.4A	0.2A
1300	0.2A	585 minutes	0.7A	1.3A	2.6A	0.3A
1400	0.2A	630 minutes	0.7A	1.4A	2.8A	0.3A
1500	0.2A	675 minutes	0.8A	1.5A	3.0A	0.3A
1600	0.2A	720 minutes	0.8A	1.6A	3.2A	0.3A
1700	0.2A	816 minutes	0.9A	1.7A	3.4A	0.3A
1800	0.2A	864 minutes	0.9A	1.8A	3.6A	0.4A
1900	0.2A	912 minutes	1.0A	1.9A	3.8A	0.4A
2000	0.2A	960 minutes	1.0A	2.0A	4.0A	0.4A
2100	0.3A	630 minutes	1.1A	2.1A	4.2A	0.4A
2200	0.3A	660 minutes	1.1A	2.2A	4.4A	0.4A
2300	0.3A	690 minutes	1.2A	2.3A	4.6A	0.5A
2400	0.3A	720 minutes	1.2A	2.4A	4.8A	0.5A
2500	0.3A	750 minutes	1.3A	2.5A	5.0A	0.5A
2600	0.3A	832 minutes	1.3A	2.6A	5.2A	0.5A
2700	0.3A	864 minutes	1.4A	2.7A	5.4A	0.5A
2800	0.3A	896 minutes	1.4A	2.8A	5.6A	0.6A
2900	0.3A	928 minutes	1.5A	2.9A	5.8A	0.6A
3000	0.3A	960 minutes	1.5A	3.0A	6.0A	0.6A
3100	0.4A	697 minutes	1.6A	3.1A	6.2A	0.6A
3200	0.4A	720 minutes	1.6A	3.2A	6.4A	0.6A
3300	0.4A	742 minutes	1.7A	3.3A	6.6A	0.7A
3400	0.4A	816 minutes	1.7A	3.4A	6.8A	0.7A
3500	0.4A	840 minutes	1.8A	3.5A	7.0A	0.7A
3600	0.4A	864 minutes	1.8A	3.6A	7.0A	0.7A
3700	0.4A	888 minutes	1.9A	3.7A	7.0A	0.7A
3800	0.4A	912 minutes	1.9A	3.8A	7.0A	0.8A
3900	0.4A	936 minutes	2.0A	3.9A	7.0A	0.8A
4000	0.4A	960 minutes	2.0A	4.0A	8.0A	0.8A
4100	0.5A	738 minutes	2.1A	4.1A	8.0A	0.8A
4200	0.5A	756 minutes	2.1A	4.2A	8.0A	0.8A
4300	0.5A	825 minutes	2.2A	4.3A	8.0A	0.9A
4400	0.5A	844 minutes	2.2A	4.4A	8.0A	0.9A
4500	0.5A	864 minutes	2.3A	4.5A	8.0A	0.9A
4600	0.5A	883 minutes	2.3A	4.6A	8.0A	0.9A
4700	0.5A	902 minutes	2.4A	4.7A	8.0A	0.9A
4800	0.5A	921 minutes	2.4A	4.8A	8.0A	0.9A
4900	0.5A	941 minutes	2.5A	4.9A	8.0A	1.0A
5000	0.5A	960 minutes	2.5A	5.0A	8.0A	1.0A

CHARGE CURRENT TIPS: This table shows recommended charge current settings for NiCd and NiMH batteries. Find the battery's rated capacity (mAh) in the left column. Determine how quickly you need to charge the battery, and find the corresponding current in the columns to the right. * Follow the "Break-In Charge" column for batteries which are new, which have been in long-term storage, or if a battery has accidently been discharged COMPLETELY (if a Tx or Rx power switch has been left on, for example). See the Setup Menu for setting the number of minutes in the "Safety Timer" screen. The minutes shown for here are NOT RECOMMENDED for 2 hour, 1 hour, or quick charge currents.

DISCHARGE CURRENT TIPS: More accurate mAh measurements can be achieved when using a C/5 discharge current (battery capacity divided by 5). Find the battery's rated capacity (mAh) in the left column. Then move across to the far right to the C/5 Discharge Current column to determine the proper discharge current setting to use.

TRITON 2 EQ

BATTERY MEMORY CHARTS

FACTORY DEFAULT MEMORIES

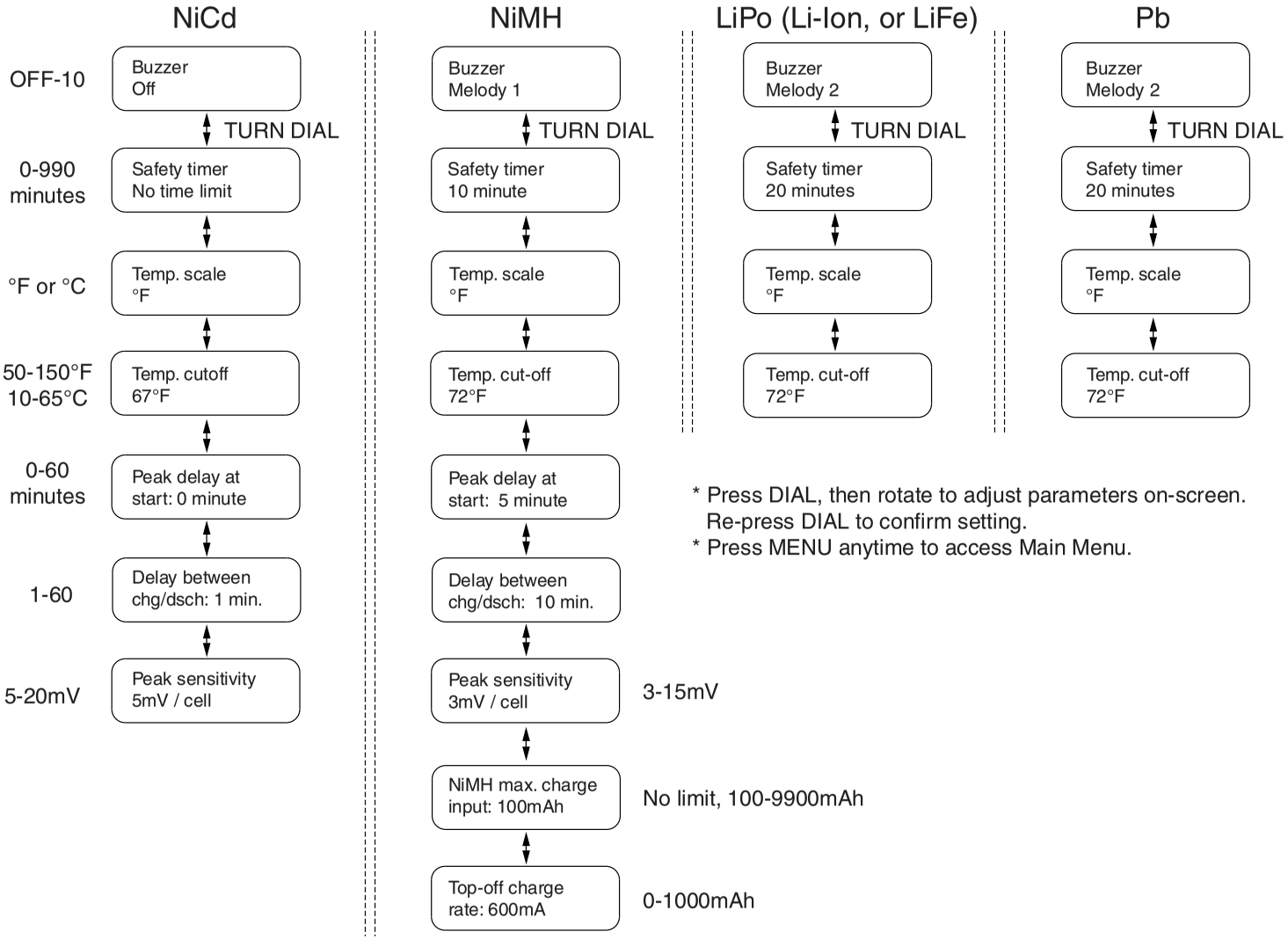
Memory	1	2	3	4	5	6	7	8	9	10
Battery Type	NiCd	NiCd	NiCd	NiMH	NiMH	NiMH	LiPo	LiPo	LiPo	Pb
Battery Volts	4.8V	9.6V	9.6V	4.8V	9.6V	8.4V	7.4V	11.1V	11.1V	12.0V
Battery Capacity	600mAh	800mAh	2400mAh	1400mAh	2000mAh	3600mAh	650mAh	1500mAh	3200mAh	7.0Ah
Charge Current	1.0A	1.0A	2.0A	1.4A	2.0A	3.6A	(fixed)	(fixed)	(fixed)	0.7A
Discharge Current	1.0A	1.0A	2.0A	1.0A	1.0A	2.0A	1.0A	1.0A	2.0A	1.0A
Discharge Cutoff Volts	4.4V	8.8V	7.2V	4.4V	8.8V	6.3V	(fixed)	(fixed)	(fixed)	(fixed)

BLANK MEMORY SHEET – RECORD CUSTOM MEMORY SETTINGS

Memory	1	2	3	4	5	6	7	8	9	10
Battery Type										
Battery Volts										
Battery Capacity										
Charge Current										
Discharge Current										
Discharge Cutoff Volts										

TRITON 2 EQ

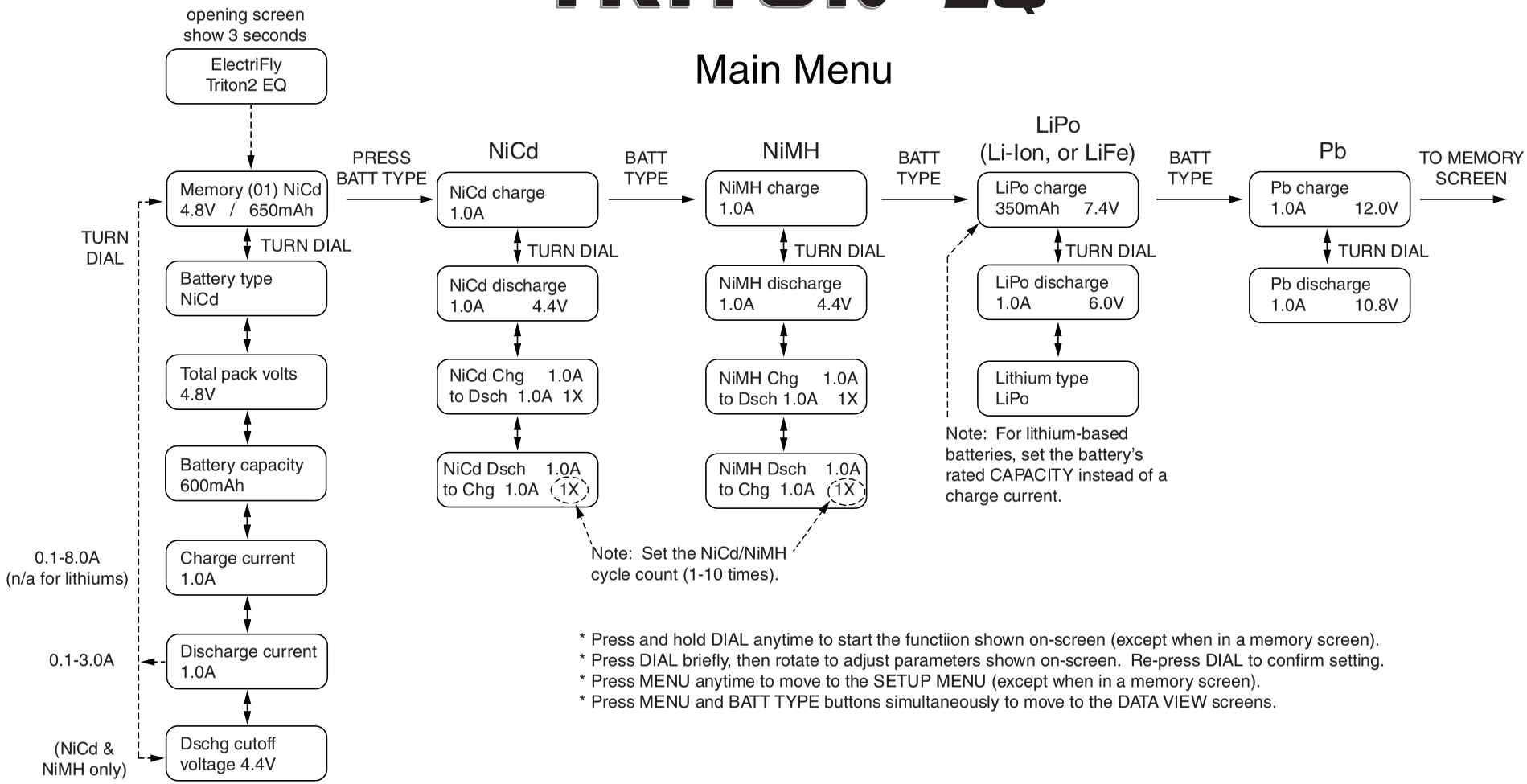
Setup Menu



* Press DIAL, then rotate to adjust parameters on-screen. Re-press DIAL to confirm setting.
* Press MENU anytime to access Main Menu.

TRITON2 EQ

Main Menu



In memory screen, press "MENU" to confirm all settings in memory, and automatically return to the appropriate "charge" screen for the selected battery type.

* Press and hold DIAL anytime to start the functiion shown on-screen (except when in a memory screen).
* Press DIAL briefly, then rotate to adjust parameters shown on-screen. Re-press DIAL to confirm setting.
* Press MENU anytime to move to the SETUP MENU (except when in a memory screen).
* Press MENU and BATT TYPE buttons simultaneously to move to the DATA VIEW screens.