

INTERACTIVE 2000™ BATTERY SYSTEM

HyTRON 120

HyTRON 50

OWNER'S MANUAL

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IMPORTANT

The InterActive 2000 HyTRON battery represents the latest in video battery technology. Nickel Metal Hydride (NiMH) is similar to NiCad batteries in most characteristics. However, NiMH has more sensitive charging and discharging parameters and requires a longer charge time for optimum performance. The charge time is approximately 3 hours. Therefore, the HyTRON battery can only be charged, **with a software chip upgrade**, on the following chargers:

- QUAD Fast charger with serial number 8000 and higher
- MP4-D Logic Series charger with serial number 8000 and higher
- Any LifeSaver DUAL charger
- Any InterActive 2000 PowerCharger
- Any XM 2002/2004 Charge Module
- Any MP-2 charger
- Any ABC-800 Charger

THE HYTRON 120 BATTERY WILL ONLY CHARGE ON ONE OF THE ABOVE MENTIONED CHARGERS WHICH HAS SOFTWARE REVISION 3.2 OR HIGHER

DO NOT attempt to charge on any charger that is not listed above. Contact the Anton/Bauer Customer Support Group at (203) 929-1100 if any questions of applicability exist.

INTRODUCTION

The development of the new InterActive 2000 HyTRON battery system has been made possible by recent advancements in a cell technology originally designed for the mobile computing industry. These nickel metal hydride cells provide the highest energy density cell available. The high performance of the new batteries is assured through the incorporation of the pioneering InterActive technology of the Anton/Bauer Digital system. Each battery is equipped with an on board "fuel computer" which monitors energy put into and taken out of each HyTRON battery, as well as critical operating characteristics and conditions. This data is communicated to the InterActive charger to ensure safe and optimize reliable performance.

In addition, remaining battery capacity information is available to the operator by means of an LCD display on each battery and in the viewfinder of the most popular broadcast and professional camcorders. The patented interface from the Digital battery to the camera viewfinder is factory standard equipment in over 30 camera/camcorder models from five leading manufacturers.

HyTRON is compatible with existing Anton/Bauer Logic Series InterActive chargers already in the field, as well as the InterActive 2000 PowerCharger line. Anton/Bauer Logic Series InterActive chargers were designed in anticipation of new cell technologies, so chargers in the field require only a single chip update to effectively address this new battery system, as well as the standard ProPac and TrimPac battery products. This upward and downward compatibility uniquely allows Anton/Bauer to introduce new high performance cell technology seamlessly into existing battery inventories. The new HyTRON battery will automatically identify itself to the InterActive charger, activating the specialized charge routines necessary to effectively utilize this new technology.

FEATURES

1. **Microprocessor Fuel Computer** - Accurately monitors the energy put into and taken out of the battery. This data is processed with sophisticated programs that take into account battery age, self discharge, charge/discharge rate, cell imbalance and previously experienced charge/discharge cycles. The HyTRON battery constantly “learns” its precise state of charge and remaining capacity. This data is automatically transmitted to an InterActive charger.
2. **Integral ‘LCD’** - Accurately displays the percentage of remaining battery capacity at all times.
3. **Viewfinder Fuel Gauge Display** - The HyTRON battery was developed in cooperation with all the major equipment manufacturers including Sony, Ikegami, Panasonic, JVC, BTS, and Hitachi. Virtually all new cameras and camcorders available feature Anton/Bauer compatible InterActive systems that connect with the HyTRON battery “Fuel Computer” and display an accurate “Fuel Gauge” of remaining battery capacity in the viewfinder. Reference your camera/camcorders owners manual for proper menu settings.
4. **Battery Management Data** - The built-in two level LCD in the Logic Series InterActive PowerChargers, MP-4D, or MP-2 chargers provides access to vital performance and historical data such as present available battery capacity, calibrated battery capacity, battery serial number, date of manufacture, and number of charge/discharge cycles. This data, which is vital to creating an effective battery management and maintenance program, can also be automatically accessed with a printer when using a PowerCharger or MP4-D.

5. **High Voltage Design** - The 14.4 volt design of the HyTRON battery complies precisely with equipment manufacturers' specifications, eliminating all the problems that cripple 12 volt batteries.
6. **Impac Case design** - The computer designed high impact case eliminates conventional stress points. This feature protects the cells from impact that would damage or destroy conventional batteries.
7. **Gold Mount Interface** - The solid metal "H" design mounting studs assure a smooth, precise mounting for the life of the battery. The Logic Series connector assembly features multiple gold plated, self aligning contacts and is compatible with all existing Anton/Bauer camera mounts and accessories.
8. **Individual Computer Testing** - Like all professional Anton/Bauer batteries, the InterActive 2000 HyTRON battery has been individually computer tested. For assurance of optimum capacity, voltage and overall quality, a computer print-out is enclosed.

HIGH VOLTAGE DESIGN

Virtually all cameras/camcorders will indicate a low voltage warning or cease to operate at about 11 volts. Unfortunately, a 12 volt battery must be discharged to 10 volts for full discharge. Thus, a camera/camcorder operating on a 12 volt battery will always cease to operate before fully discharging the battery, leaving 50% of the total capacity unused under certain conditions. The amount of this wasted capacity can vary each day depending on temperature, etc., thus creating what appears to be totally inconsistent performance.

The InterActive 2000 HyTRON battery is designed only in a 14.4 volt configuration with full discharge rating of 12 volts. Thus, the HyTRON battery will always deliver 100% capacity before the equipment ever reaches its cutoff point. Moreover, this dependability is not effected by memory, age or any of the other factors that can cripple a 12 volt battery.

Virtually all cameras, camcorders, and other video field equipment specifies a maximum voltage of 17 volts. The 14.4 volt HyTRON battery will provide superior performance and greater run time on that equipment. **CAUTION: Certain older equipment is not designed to accept 14.4 volt batteries. A 14.4 volt battery could damage such equipment. Check with the equipment manufacturer or the Anton/Bauer Customer Support Group prior to using a 14.4 volt battery.**

CHARGING WITH LOGIC SERIES INTERACTIVE CHARGERS

Charge this battery fully before using. Allow the battery to reach a steady green (LifeSaver) mode before using. Charging is automatic on all Logic Series InterActive chargers. The flashing red and green lights indicate the charger and battery are establishing communications. The following are the standard indications on any Logic Series InterActive Charger (Please refer to the Charger manual for complete charging instructions):

- Alternating red and green: Evaluating battery and/or rejuvenating low voltage battery.
- Steady red: Battery waiting to charge (may either be in line to charge or holding for temperature stabilization).
- Flashing red: Charging.
- Flashing green: Balancing mode or Ready/Verifying. Battery is typically more the 80% charged.
- Steady green: LifeSaver mode. Batteries will remain 100% ready for use indefinitely.

The battery should remain on the charger until just prior to being used. The patented LifeSaver maintenance routine keeps the battery 100% charged and balanced by eliminating the typical self-discharge that can cripple a battery that is stored for any length of time on the shelf. Do not remove the HyTRON batteries from the charger more than 8 hours prior to actual use. For best results, this battery should be returned to the Logic Series InterActive charger within 48 hours of being used. Please read the individual charger Owner's Manual to become acquainted with the many unique features of the chargers.

OVER-DISCHARGED BATTERIES

Warning: The HyTRON battery has specialized circuits which typically will not allow a battery to overdischarge during extended storage (more than 90 days). However, if the battery is left on a load, such as a light, and allowed to discharge to 0 volts, the battery can be irreversibly damaged. Never leave any battery unattended on equipment.

An “over-discharged” voltage state is caused by leaving a battery operated device unattended and allowing the battery to drain beyond the low voltage warning point of the equipment and/or the “Flashing 15 minute segment” indication on the LCD of the HyTRON battery.

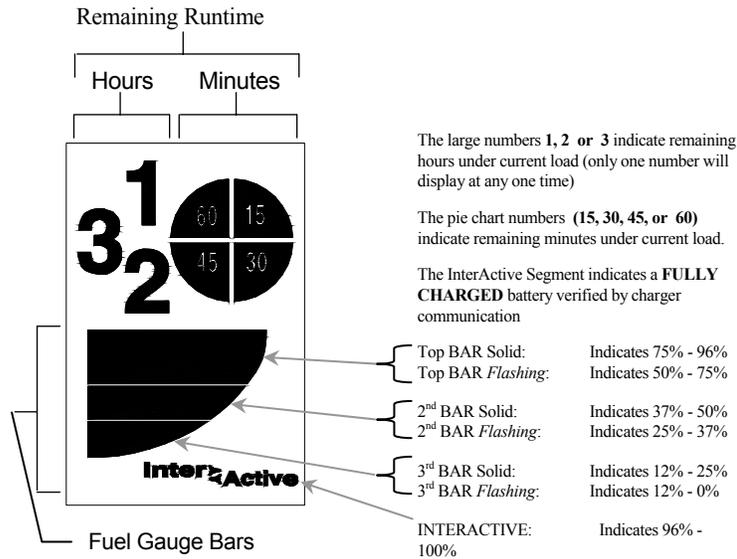
Low voltage “over-discharged” batteries can also be caused by allowing batteries to remain off the charger for extended periods. Returning batteries to the Logic Series InterActive Charger as soon as possible after use, and leaving batteries in the LifeSaver mode until just prior to using will avoid this type of “over-discharge” condition.

A battery that has been inadvertently allowed to become “over-discharged” will automatically trigger a special rejuvenation routine contained in all Anton/Bauer Logic Series InterActive Chargers. In such cases the red/green alternating LED’s, on the charger, indicate that the automatic rejuvenation cycle is bringing the battery back up to a safe charging voltage. When the charger verifies there are no thermal violations, it will begin a complete charge cycle (Red flashing LED).

In the extreme case that a battery is over-discharged, indicated by a blank LCD on the battery, the rejuvenation charge routine will not be initiated by the charger until all other batteries have completed their fast charge routines. Therefore, an extremely over-discharged battery can be installed on a Logic Series InterActive Charger without the charger indicating recognition. The battery should remain on the charger until it is recognized and charging is complete.

LIQUID CRYSTAL DISPLAY (LCD)

The “RealTime” LCD display provides on-the-fly remaining run time estimates in 15 minute increments as well as *simultaneously* providing remaining capacity information using the traditional “Fuel Gauge” approach. No special adapters or set up is required. RealTime *automatically calculates the load and displays capacity information and battery status at all times.*



If the INTERACTIVE segment flashes, this indicates the battery has requested to be fully charged and discharged in order to update its “learned capacity”. This “learning” or “calibration” should typically occur during normal equipment operation. However, if the battery has not been fully charged and discharged for some time, this indication will appear.

To remove the flashing INTERACTIVE segment, fully charge the battery (STEADY GREEN indication) on the InterActive 2000 charger. Then either:

- (a) Discharge the battery on a camera in normal operation continuing to keep the camera “hot” until it shuts down. Then return the battery to the charger. When the battery is full remove it from the charger.
- (b) This can be done automatically with an InterActive2000 PowerCharger with a DDM (Diagnostic Discharge Module installed. This unique feature is called “AUTOCAL” and is included as standard on the DUAL 2702 and QUAD 2702 PowerChargers. (Please reference the appropriate PowerCharger Owner’s Manual.)

IMPORTANT NOTE: The flashing INTERACTIVE segment indication is not a warning indication. The battery will operate perfectly normal while awaiting a “learning” cycle. Rather than relying on an “assumed” capacity, as with some imitation fuel gauges, the battery relies on the Digital Battery electronics to update capacity information as the battery sees different operating conditions and ages normally. The flashing INTERACTIVE segment is merely an indication that the battery has not updated this information for some time and is requesting a confirmation of its “learned” capacity.

RealTime Display Indications

- When the battery is being charged no remaining runtime is displayed.
- Remaining run time is calculated using the present available battery capacity and a constantly updated accurate measurement of the present load on the battery.
- If no load is detected, or if the battery is removed from the charger before any discharge load is applied, the default assumed power for remaining run time calculations is 20 Watts.
- When the battery determines that a load is attached, remaining run time will be calculated based on that load and the time remaining will be updated.
- The battery will “learn” this new load and retain that load information in non-volatile memory. If the battery is removed from the camera it will retain this information for 30 minutes or until it is returned to the charger or sees a new load. After 30 minutes the battery will return to the default load of 20 watts.
- **OVERCURRENT INDICATION**
If the battery is subjected to a load that exceeds specifications all status icons on the LCD will flash at a once per second rate. When the over-load condition is removed, the display will return to normal.
- When the battery is completely discharged the LCD will flash the 15 minute icon until the battery is returned to a charger.

PREVENTATIVE MAINTENANCE

The HyTRON battery incorporates unique battery management features. Together with Anton/Bauer diagnostic accessories, an effective preventative maintenance program can easily be created to optimize the return on battery investment and greatly simplify battery management operations.

The PowerCharger, coupled with a DDM (Diagnostic Discharge Module), will provide a complete battery management system. The PowerCharger will allow you to run diagnostic evaluations as well as “Calibrate” your battery with the new “AUTOCAL” feature. The “AUTOCAL” feature will automatically “Calibrate” your battery without any operator input. Please reference the PowerCharger Owner’s Manual for additional information.

The older style MP4-D, coupled with a DM-4 will allow you to run similar diagnostic programs as a PowerCharger.

It is strongly recommended that all users of the InterActive 2000 HyTRON Battery System have at least one PowerCharger complete with a DDM or MP4-D/DM-4 combination. Such a combination can also interface via the RS-232 port provided to a printer producing hard copy battery reports automatically, including battery serial number, date of manufacture, number of charge/discharge cycles, calibrated capacity, and a complete voltage/time discharge graph.

InterActive 2000 HyTRON batteries and Logic Series Chargers together form a battery management system that will maximize battery performance, eliminate battery problems in the field and reduce costs by prolonging battery life and precluding equipment down time.

**GUIDELINES FOR OPTIMUM PERFORMANCE
AND MAXIMUM LIFE**

1. Keep batteries cool or at room temperatures whenever possible. Sustained elevated temperatures are the primary reason for premature failure of NiMH batteries:
 - a. Charging - Charge batteries at room temperature. In warm climates keep chargers in air conditioned rooms that are maintained between 65°F to 85°F for best performance.
 - b. On assignment - Do not leave batteries in a hot vehicle trunk or out in direct sunlight unnecessarily.
 - c. Storage - If batteries are not going to be used for several months, they should be fully discharged, sealed in a plastic bag and stored in a refrigerator.
2. Use only Anton/Bauer Logic Series InterActive LifeSaver Chargers and keep batteries on the charger until just prior to being used.
3. Return batteries to the Logic Series InterActive Charger as soon as possible after use, preferably within 24 hours.
4. **Do not over-discharge batteries** - It is quite proper to discharge a battery until a low voltage warning in the camera or VTR is observed. However, a switch to a fresh battery should occur as soon as possible following such indication.
 - a. A HyTRON battery should be changed as soon as possible after a "flashing **'RES'** segment" is indicated. **Never** continue to use a HyTRON battery after the "**EOD**" segment has appeared.
 - b. Never leave a battery operated device unattended while it is running.
 - c. **DO NOT LEAVE A BATTERY ATTACHED TO A CAMERA/CAMCORDER** during transit or storage. "Keep warm" circuitry in the camera can overdischarge the battery.

5. Routine use of a battery at discharge rates greater than the battery rating (e.g. >50w for Hytron 50) can reduce overall service life. Always select the proper size battery for your application.
6. Discharging the battery for diagnostic purposes should only be performed on an occasional basis (once every 6-8 weeks at most). Unnecessary discharging only detracts from overall life.
7. Periodic cleaning of both the charger terminals and battery terminals will ensure continued reliable operation. Dirty terminals may cause the battery to indicate a steady red ("Hold") mode on the charger. Clean the terminals with a pencil eraser or lightly scrape the surface with a blunt instrument to help reduce this situation.

Anton/Bauer publishes a comprehensive "Video Battery Handbook" to help you further understand the care and use of video batteries. This guide is available at no charge by contacting Anton/Bauer at 1-800-422-3473 or 203-929-1100 or fax 203-929-9935.

SERVICE

In the unlikely event a HyTRON battery fails to deliver acceptable performance, it must be returned to the Anton/Bauer Service Department, the only facility qualified and equipped to service the InterActive 2000 HyTRON batteries and calibrate the electronic components and sensors. Any attempt by the user or any other unauthorized persons to service this battery will surely result in improper calibration of the electronic components resulting in severe battery damage and/or safety hazards to the operator, in addition to voiding any/all remaining unconditional or pro-rated warranty conditions.

Therefore:

1. **DO NOT** attempt to service this battery under any circumstances.
2. **DO NOT** send this battery for service to anyone other than the Anton/Bauer Service Department.
3. **DO NOT** rebuild this battery - At the end of its useful life contact the Anton/Bauer Service Department.

SPECIFICATIONS

	HYTRON 120	HYTRON 50
OUTPUT VOLTAGE	14.4v Nominal 12 ~ 16.8v Operating	14.4v Nominal 12 ~ 16.8v Operating
CAPACITY (CELL CAPACITY)	120 WH Nominal (8.5 AH Rated)	50 WH Nominal (3.5 AH Rated)
FUSE	12.5amp/125volt	Internal (7amp)
RECOMMENDED OPERATION (MAXIMUM DISCHARGE RATE)	15-100 watts (175 watts)	15-50 watts (100 watts)
TYPICAL RUN-TIME	@ 20w - 6 hrs. @ 25w - 4.8 hrs. @ 40w - 3 hrs.	@ 10w - 5 hrs. @ 20w - 2 1/2 hrs. @ 25w - 2 hrs.
WEIGHT	5.5 lbs	1.9 lbs
SIZE	5 5/16 X 4 1/2 X 3 3/4	5 1/4 X 3 1/2 X 2 1/8

Warranty - InterActive 2000 HyTRON Battery

IMPORTANT: WARRANTY REGISTRATION CARD MUST BE MAILED WITHIN 10 DAYS OF PURCHASE TO QUALIFY FOR THIS WARRANTY. Proper registration will also enable us to send you important update information.

This new InterActive 2000 HyTRON battery has been 100% tested prior to shipment and is warranted against defects in materials and workmanship when this battery is used in conjunction with Anton/Bauer Logic Series LifeSaver Chargers. If the battery is found to be defective or fails to meet minimum* capacity specifications, the following will apply:

HyTRON 120: 0-36 MONTHS – “Anton/Bauer will repair or replace the product at Anton/Bauer’s option - FREE OF CHARGE.”

HyTRON 50: 0-12 MONTHS – “Anton/Bauer will repair or replace the product at Anton/Bauer’s option - FREE OF CHARGE.”

WARRANTY REGISTRATION, INCLUDING SERIAL NUMBERS OF LOGIC SERIES LIFESAVER CHARGERS, MUST BE ON FILE AT ANTON/BAUER TO QUALIFY FOR THIS WARRANTY.

This warranty does not cover damage resulting from accident, misuse or abuse, neglect, improper service or maintenance. Use of unauthorized service, replacement parts or attachments will void this warranty. Misuse includes any use of this product in other than its intended applications.

No responsibility is assumed for any special, incidental or consequential damages. No other Warranty, written, oral or implied is assumed or authorized by Anton/Bauer. The liability of Anton/Bauer hereunder is expressly limited to a claim for a repair or replacement for the goods sold or as otherwise stated herein.

This Warranty is to be construed and enforced in accordance with the law of the State of Connecticut, including the provisions of the Uniform Commercial Code as adopted and from time to time amended in the State of Connecticut, and not the Convention for the International Sale of Goods. This choice of Connecticut law is exclusive of any Connecticut law that would require reliance on any law foreign to Connecticut. Should any action of law or in equity be brought by any person under this Warranty, such action shall be brought only in the United States District Court for the District of Connecticut, or in any Superior Court in Fairfield County, Connecticut, U.S.A.

*Performance is warranted at a minimum of 70% of rated capacity.

If you have any questions regarding applications or specifications, or to obtain warranty service on this or any Anton/Bauer product, contact the Anton/Bauer Customer Support Group. See back page for contact information.

One or more of the following patents may apply:

4,218,107
4,810,204
4,822,296
4,965,738
5,057,383

Other patents, U.S. and International pending.

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The worldwide standard, Triconn, TrimPac, Ultralight, Ultrakit

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