



Patco Electronics announces the ZipCord, an exciting new source of renewable energy. Utilizing the latest technology in Lithium Ion cells, and a precision converter for charging, the Zip Cord offers 60 watt-hours of renewable energy in a two pound package.

The ZipCord is recharged using an external 24 volt, 1 amp power source. Recharge times average 5 hours for the standard power source, or as little as 2 hours with a 24 volt, 3 amp power source. The ZipCord has an output regulator that can be ordered in any voltage from 5 volts to 25volts out. In addition to this flexibility, the ZipCord contains a "Gas Gauge" that indicates the remaining available energy to an accuracy of better than 5%. Because the ZipCord keeps the heat away from the batteries, battery life is more than doubled.

The ZipCord can be configured to supply the power needs of many DC powered instruments.. Examples of this feature are:

1. To power the ubiquitous Iomega Zip Drive, the output would be configured to 5 volts. At an average current demand of .3 amps, the ZipCord would provide 33 hours of operating time.
2. To power a camcorder requiring 12 volts at 1 amp, the ZipCord would permit 4 hours of continuous filming.
3. To power a AST Ascentia P Series portable computer requiring 19 volts at an average 1.2 amps, the ZipCord would provide over two hours of additional operating time.

---

### Indicators:

1. A Green light on means the ZipCord has been connected to external power, and is monitoring the battery's State Of Charge.
2. A Flashing Green light means the computer determined that the battery needed charging, and is proceeding to restore full charge to the battery.
3. The Gas Gauge informs the user of the battery's Sate Of Charge, and is continuously available, during both charge and discharge

The ZipCord uses an advanced Programable-Current/Constant-Voltage Battery Charger. This advanced circuit will operate with a wide range of input power. The 500 kHz current mode switching regulator is specifically configured as a constant-current/constant voltage Lithium Ion charger with a .5% accuracy. This means perfect charge each time, every time. Consistent power delivery from a fully charged battery means you will get every electron possible from

each charge. Careful battery management means you replace your battery pack less than half as often as competing portable energy systems. That translates into money in your pocket, and performance in your environment.

The ZipCord utilizes the latest in lookup table technology for Lithium Ion Gas Gauging. With temperature compensation, 1% current sensing, and .25% voltage measurement, the State of Charge indication is remarkably accurate. A five segment LCD display, always on, provides an exact representation of just how ready your ZipCord really is.

Finally, the ZipCord features an internal DC-DC converter. From the nominal 14.4 volt battery pack, the DC-DC converter supplies any load requirement from 5 to 24 volts with precision and efficiency. Nominally efficient at 85% over its operating range, the ZipCord delivers the maximum power to its designed load.



The front panel of the ZipCord has two displays. The first, a green light, indicates the activity when external power is applied. A steady green light indicates external power applied, and the battery fully charged. If the computer determines that the battery needs charging, the green light will blink at a one second rate while charging. The five segment display indicates the State of Charge (SOC). All five segments will be on if the SOC is between 80% and 100% of capacity. As the battery capacity falls below 80%, the fifth segment will extinguish, leaving four on, and so forth down to full depletion, or 0% available. If the ZipCord is asked to supply power beyond full discharge, the internal pack protect circuitry will open, preventing damage to the batteries.

A switch on the front panel activates the internal DC/DC converter. When not in use, switching off the converter will eliminate a drain on the batteries, preserving the available energy.

In order to understand the utility of the ZipCord, it is necessary to examine the failure modes of battery packs, such as portable computer batteries. Two primary factors determine the life expectancy of a battery.

One is the depth of discharge each time the battery is cycled. As more of the available energy is extracted each cycle, the number of cycles that the battery can respond is decreased. A battery that is never discharged over 50% may provide 500 cycles. That same battery with 75% of its capacity extracted each cycle may only provide 250 cycles. Extract 100% of available energy each cycle, and the number of available cycles may approach 100.

The next critical factor is heat. Batteries are composed of two electrodes and an electrolyte. As the temperature of the battery rises, the electrolyte evaporates. Additionally, some electrolyte is lost each discharge/charge cycle due to electrolytic conversion. In a portable computer, the heating produced by the electronics shortens the average battery life to 6-9 months, whereas if the same battery were maintained external to the computer and its internal heat, it would last 3 years.

By providing the primary source of power for a portable instrument separate from the heated environment so destructive to the life of the battery, the ZipCord is a choice investment that will provide years of service before its batteries must be replaced.

#### SPECIFICATIONS

WEIGHT:	2LBS, 8 OZ
HEIGHT:	1.6 IN.
WIDTH:	5.625 IN.
LENGTH:	5.75 IN.
CHARGE VOLTAGE:	24 VDC, 1A
OUTPUT VOLTAGE:	5 - 24VDC, 25W
PRIMARY POWER:	120 VAC, 60 Hz, 40 VA, or 220 VAC, 50 Hz, 20 VA
ENERGY AVAILABLE:	60 WATT-HOURS

**PATCO ELECTRONICS, INC. / 1855 Shepard Drive / Titusville, FL  
32780 [321] 268-0205 / FAX 264-4253  
www.patcoelectronics.com**