



## Bretford Intelligent Laptop Computer Cart Power Management System (The Brain)

Bretford's new **Intelligent Laptop Computer carts** are here! The new line – Bretford's fifth generation of laptop carts -- includes two different models with plenty of space for either 20 horizontally stored or 30 vertically stored laptops. The laptop carts are designed primarily for use in educational environments.

But there's much more to these new carts than meets the eye. They are the first of their kind to incorporate a sophisticated **Power Management System (patent pending)** or “**brain**” that decreases heat and electrical stresses while proportionally distributing power to the laptops.

### **What are the key benefits of the brain?**

The brain helps minimize wear and tear on the batteries to extend battery life and save energy. This ultimately protects and preserves the life of the laptops.

### **Why was the brain created?**

Simply put, to take care of the laptop batteries. Modern laptop computers use leading-edge technology in every facet of their design. Some of this technology is obvious -- vivid high-definition displays and lightening-fast program response times. Other technology, like the batteries that make laptops portable, is not as obvious. In fact, batteries usually don't warrant center-stage attention until they become a problem.

### **What are some of the advantages associated with laptop batteries?**

Today's laptops rely on storing their portable power in either nickel metal hydride (NiMH), or increasingly, lithium-ion polymer (Li-ion) rechargeable batteries. These battery technologies allow for longer operating life and smaller size and less weight – vital considerations for the educators deploying the laptops to their students for use throughout the day.

### **What are some of the challenges associated with laptop batteries?**

As good as modern battery technologies are, heat remains their persistent enemy. Batteries are not only exposed to heat produced by other system components, such as the computer's memory and central processing unit, but also produce heat internally when being charged or while supplying current during portable use. Long-term exposure to high temperatures causes the batteries to degrade, which significantly decreases their lifespan.

### **How does a laptop manage heat?**

To manage the heat stress of the battery, engineers include sophisticated battery management functions into the design of the computers. They can be found in two places: the external charger and internal to the laptop itself.

The external charger converts the alternating current from the wall socket to a lower voltage direct current. Besides charging a laptop's battery, these “bricks” as they're sometimes called, can supply enough electricity to operate a laptop and charge the battery simultaneously.

Deep inside the computer, a dedicated microcircuit continuously monitors and manages the charging current, voltage and temperature of the battery. If the temperature of the battery is too high, the microcircuit will stop charging the battery until the temperature drops to acceptable levels.

### **Why was the brain incorporated into the Bretford carts?**

Laptops have become indispensable tools for business and education. It is not uncommon to see a classroom where each student has their own laptop. The need to safely and efficiently charge and store large numbers of laptops gave birth to the charging cart concept.

Additionally, as part of the cart development, Bretford conducted a survey to find out more about what its educational customers are looking for in a laptop computer cart. Hands down, “charging the computers” ranked as one of the most critical functions.

### **How does the brain work?**

The brain in each Intelligent Laptop Computer cart is responsible for charging the laptop batteries, with no manual switching or timer required. It redistributes power on a regular basis not only to ensure consistent charging, but to keep the laptops cool and prevent overheating. The brain also senses when the laptop batteries are almost charged, then automatically decreases power, which extends battery life and saves energy.

### **How does the brain make charging the equipment user friendly?**

The brain provides a fast, intuitive charge. It has one-touch sequencing that allows for easy navigation to three different modes. All the user has to do is push the button to the necessary mode and wait for the red indicator light to stop blinking. The modes are as follows:

**Round Robin Mode.** Ideal for charging all the laptops, this feature switches between outlet strips every three minutes to give priority to those that require the most amount of power first. Every strip also gets at least a three minute “relaxation cycle” once every six minutes to cool down after extended use or between cycles.

**Turbo Mode.** Designed for quick charging, this mode provides a short cycle recharge that enables users to rapidly charge a block of laptops. In this mode, each power strip will get a minimum of three minutes of charging every nine minutes – so after an hour all the laptops present during that charging period will have at least a useful partial charge.

**Auxiliary Mode.** This mode diverts power by supplying it to additional outlets in the brain so that other technology products, like printers and scanners, can be plugged in for use with the cart as well.

Bretford's Intelligent Laptop Computer Carts build on previous cart-charging success by adding advanced charging management technology to work in tandem with the battery management already built into the laptops. Combined, these features result in reduced heat and efficient recharge time to help maximize laptop battery life and, in turn, increase a school's return on its technology investment.

