



**PDHonline Course E330 (1 PDH)**

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**PoweredUSB, Make the USB Cable  
Robust & Include 12 & 24 Vdc**

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## **PoweredUSB, Make the USB Cable Robust & Include 12 & 24 Vdc**

**Clifford T Johnson, PE, CSE**

### **Introduction**

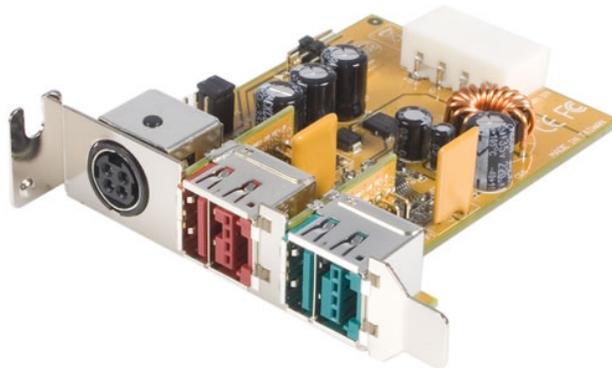
*PoweredUSB* is an extension to the Universal Serial Bus connectivity standard that addresses the two key shortcomings of conventional USB:

- Power USB 1.X and 2.0 only support devices at 5 Volts and up to 0.5 Amps. While this is more than sufficient for low-power devices like keyboards, mice and flash drives, peripherals with greater power requirements – including external hard drives, printers and scanners – require external power supplies.
- Robustness Conventional USB connectors are not positively locked into their corresponding plugs, making them relatively easy to jar loose.

### **Why use PoweredUSB**

In typical use, the limitations to the USB 1.x & 2 have not been much of a hindrance. Billions of USB-based devices have been sold, and the standard is extremely successful and entrenched. In point-of-sale retail environments, however, the requirement for a second connection for power as well as an external adapter brick could be an obstacle. In the high-traffic, rough-and-tumble world of the in-store checkout kiosk, there simply isn't room for adapter bricks and extra cables on the floor – and little tolerance for cables disconnecting every time a device is moved or bumped.

*PoweredUSB* addresses these shortcomings by incorporating power and data connectivity in a single-cable design, by supporting the kind of higher-draw devices – like receipt printers and bar code scanners – typically seen in retail, and by incorporating a locking mechanism in the connector to keep everything properly secured. It is also often referred to as Retail USB, USB Plus Power or USB + Power.



Shown above: [StarTech 2 Port Low Profile 12V 24V PoweredUSB Adapter Card](#)



Shown above: [StarTech 10 ft 24V 2x4 PoweredUSB Cable](#)

## Features & Benefits

### Features

*PoweredUSB* extends the USB standard by adding a second connector for power on top of the already-familiar data connector. The connectors are stacked one on top of the other in a single plastic housing that is noticeably larger than those used for basic USB. Three versions of *PoweredUSB* are available to support three unique power requirements. They are often – but not necessarily – differentiated by color as follows:

Color	Volts	Watts
Beige or Ivory	5	30
Teal	12	72
Red	24	144

All three flavors of *PoweredUSB* can function at up to 6 A per connector, compared to traditional USB which operates at 5 V and 0.5 A. Each *PoweredUSB* receptacle uses a unique polarizing key to prevent users from accidentally plugging a device into the wrong receptacle.

Data throughput matches that of the well entrenched USB 2.0 standard – namely 480 Mbps and, like USB 2.0, is downward-compatible with the earlier 12 Mbps USB 1.X spec. At this time, *PoweredUSB* does not support the more recent SuperSpeed USB 3.0 standard because the products that currently use *PoweredUSB* would not typically gain any benefit from the increased sustained throughput that USB 3.0 allows. Largely because of this, participating vendors have not yet indicated their plans for eventually upgrading *PoweredUSB* to incorporate USB 3.0-compliant data rates (4.8 Gbps) and devices.

Like USB 1.X, 2.X and 3.X, *PoweredUSB* devices and supporting connectors are hot pluggable, and support Plug-and-Play features built into virtually all-modern operating systems. While host-

side (male) connectors and (female) receptacles are well defined, peripheral-side connectivity standards are not universal, and different vendors may have somewhat unique connectors and receptacles.



Shown above: *PoweredUSB* host side receptacles - [StarTech 2 Port 12V 1 Port 24V Dual Profile PCI Powered USB Card](#)

### Benefits

By combining both data connectivity and power into a single-cable, single-connector solution, *PoweredUSB* allows retailers to minimize the amount of clutter at a POS location. The payoff isn't limited to simple neatness, as the cleaner environment also presents fewer points of failure, resulting in greater reliability and less downtime.

*PoweredUSB* host receptacles are also backward compatible with USB 1.X and 2.X devices, so the data-only connectors can easily plug into the data side of a spare *PoweredUSB* receptacle – which is good news for retail or similar environments challenged with juggling multiple devices and supporting older peripherals.

This industry-accepted solution is a significant improvement over the proprietary hardware and connectivity solutions that were once the norm. Before *PoweredUSB*, buyers typically had to acquire all their equipment from a single vendor, and had to commit to that vendor's vision over the complete product lifecycle. Lock-in can be an expensive, limiting prospect for any business, especially retailers looking for cost-effective, industry-supported POS solutions. *PoweredUSB* has been a catalyst in the transition away from vendor-specific technologies.

This cost-saving advantage extends to retailers with limited budgets, as it allows them to upgrade their personal computer to a POS-compatible computer to connect newer peripherals without buying a brand new computer. This budget-friendly means of upgrading even a low-end PC into a full-blown POS machine by adding inexpensive *PoweredUSB* adapters makes this a compelling option for retailers hoping to break away from expensive, vendor-specific solutions.

### Availability

It is important to note that *PoweredUSB* has not been ratified by the [USB Implementers Forum](#) (USB-IF). It is also extremely unlikely that the Forum will ever consider approving *PoweredUSB* as a standard. The [Association for Retail Technology Standards](#) (ARTS) has, however, approved *PoweredUSB* as part of its broader [UnifiedPOS](#) standard for the retail industry. Similarly, the [Electronic Industries Alliance](#) (EIA) has approved the USB PlusPower connector as an industry standard.

Despite the incomplete approval landscape, *PoweredUSB* technology has nonetheless been accepted by major POS manufacturers, including Dell, Epson, Fujitsu, HP, IBM, NCR, Star Micronics and Wincor, and is currently incorporated into virtually all of their mainstream retail offerings. When specifying new POS solutions for Requests for Proposal (RFP), retailers almost always require *PoweredUSB* capability as a condition of eligibility.

IBM originally developed the technology in partnership with NCR and FCI/Berg and now charges product manufacturers a licensing fee. The company holds three patents on enhanced USB technology that incorporates data and power connectivity in a common, stacked connector. The first of these patents was submitted in 1997 and approved in 2000. At the time, IBM's goal in pursuing this technology was to support a particular retail POS solution, but its subsequent decision to allow third party vendors to produce *PoweredUSB*-capable devices under license has helped define and expand the market.

#### ***PoweredUSB* adapters:**

- [3 Port \(2 Port 12V & 1 Port 24V\) Dual Profile PCI Powered USB Card](#),
- [3 Port Low Profile PCI 12V PoweredUSB Adapter Card](#),
- [2 Port 12V 24V PoweredUSB Adapter Card](#),
- [3 Port PCI Express 12V PoweredUSB Adapter Card](#)

#### ***PoweredUSB* Cables**

- [3 ft 24V to 1x8 PoweredUSB Cable](#),
- [6 ft 24V to 2x4 PoweredUSB Cable](#),
- [10 ft 24V to Hosiden+USB B PoweredUSB Cable](#)

To see full range of *PoweredUSB* Adapters and Cables, [please click here](#).

#### **Future**

As an unratified connectivity standard, *PoweredUSB* does not have a well-defined product evolution roadmap. Because it is, however, well entrenched in retail markets thanks to its broad vendor support; it will remain a mainstay for POS solutions for some time to come. A number of leading vendors of retail POS equipment, including Dell, Fujitsu, HP, IBM, NCR, Star Micronics and Wincor have incorporated *PoweredUSB* into all of their product lines and will continue to do so for the foreseeable future.

Industrial markets are also drawn to *PoweredUSB* because many of the same environmental issues that help guide retail implementations are also evident in factories and related industrial environments. *PoweredUSB* technology is useful in embedded devices and shop floor machines, and is already being adopted by vendors in a growing array of compelling industrial solutions and applications.

Against this backdrop of broad-based industry support, it is commonly accepted that IBM will continue to actively support the *PoweredUSB* market that it helped create as it works with its industry partners to extend the uses of this unique and value-added technology.