

Re: usb question

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- *From:* "Ian D" <taurus@xxxxxxxxxxxx>
 - *Date:* Mon, 27 Oct 2008 13:22:00 -0400
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"Twayne" <nobody@xxxxxxxxxxxxxxxxxxxx> wrote in message
[news:e%23\\$ano9NJHA.2912@xxxxxxxxxxxxxxxxxxxxxxxx](news:e%23$ano9NJHA.2912@xxxxxxxxxxxxxxxxxxxxxxxx)

"Twayne" <nobody@xxxxxxxxxxxxxxxxxxxx> wrote:

Since the specs are a total of 500 mA,

The USB low power bus mode specifies a maximum of 100 ma per port.

However, if you have two hard drives that want to suck 250 mA...

USB powered drives stay within the 100 ma per port requirement. If they draw more than the 100 ma limit they supply a two port cable and suck power from 2 ports.

EVER device has a power requirement of xxx mA at xx volts. Exceed those specs, and the device will no longer receive power, along with any others attached to the same controller.

A correctly designed computer will be able to supply 100 ma to each USB port. A correctly designed USB powered drive will draw no more than 100 ma from each USB port. No problems no matter how many ports involved. Not a hard concept to understand.

It's not even close to rocket science,

I would agree.

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You boys can have the last word...

OK, here you go, since you're too lazy to look for yourself. It's simple if you can just bother to READ and comprehend, not just the parts you like, but ALL of the specs.

...

A USB device specifies its power consumption expressed in 2mA units in the configuration descriptor which we will examine in detail later. A device cannot increase its power consumption, greater than what it specifies during enumeration, even if it loses external power. There are three classes of USB functions,

- a.. *Low-power* bus powered functions aka 100 mA
- b.. *High-power* bus powered functions aka 500 mA
- c.. *Self-powered* functions

Low power bus powered functions draw all its power from the VBUS and *cannot draw any more than one unit load.* The USB specification defines *a unit load as 100mA. Low power* bus powered functions must also be designed to work down to a VBUS voltage of 4.40V and up to a maximum voltage of 5.25V measured at the upstream plug of the device. For many 3.3V devices, LDO regulators are mandatory.

High power bus powered functions will draw *all* its power from *the bus* and cannot draw more than one unit load *until it has been configured*, after which *it can then drain 5 unit loads (500mA Max)* provided it asked for this in its descriptor. High power bus functions *must* be able to be detected and enumerated at a minimum 4.40V. When operating at a full unit load, a minimum VBUS of 4.75 V is specified with a maximum of 5.25V. Once again, these measurements are taken at the upstream plug.

Self power functions may draw up to 1 unit load from the bus and derive the rest of its power from an external source. Should this external source fail, it must have provisions in place to draw no more than 1 unit load from the bus. Self powered functions are easier to design to specification as there is not so much of an issue with power consumption. The 1 unit bus powered load allows the detection and enumeration of devices without mains/secondary power applied.

No USB device, whether bus powered or self powered can drive the VBUS on its upstream facing port. If VBUS is lost, the device has a lengthy 10 seconds to remove power from the D+/D- pull-up resistors used for speed identification.

Other VBUS considerations are the Inrush current which must be limited. This is outlined in the USB specification paragraph 7.2.4.1 and is commonly overlooked. Inrush current is contributed to the amount of

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capacitance on your device between VBUS and ground. The spec therefore specifies that the maximum decoupling capacitance you can have on your device is 10uF. When you disconnect the device after current is flowing through the inductive USB cable, a large flyback voltage can occur on the open end of the cable. To prevent this, a 1uF minimum VBUS decoupling capacitance is specified.

For the typical bus powered device, *it can not drain any more than 500mA* which is *not* unreasonable. So what is the complication you ask? Perhaps Suspend Mode?

...

What about laptops? My HP laptop will provide up to at least 1000 mA from it's own internal power. I did some measurements. Up to 500 mA the USB hub provides the power according to Device Manager. Go over 500 mA, and the USB hub current drops to a residual 10 mA, and the USB port still provides the power, obviously on a switch over to power directly from the laptop 5V bus.

I have a 2.5" HD in a Vantec external case, which came with an extra USB power connector on the USB cable. On my laptop, I don't need the extra connector. If I connect it, it draws no current from that USB hub. On the other hand, if I connect the USB HD to the front ports of my Antec case, that are connected to an Asus P5B Dlx MB, with the single connection, the drive won't power up until I plug in the extra USB connector. Then it powers up and runs normally, so between the two case front USB ports over 500 mA is available.

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