

## *Bus Powering 3.5 inch Hard Drives -- FAQs*

### A White Paper

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As of this writing, there is only one vendor of bus powered 3.5 inch FireWire hard drives in the United States: WiebeTech LLC. The purpose of this white paper is to explain the use and operation of bus powered, high capacity FireWire storage devices.

#### 1. What bus powered 3.5 inch FireWire products are available?

WiebeTech markets two products which fall into this category: The Super DriveDock+™, and the UltraGB+™. The Super DriveDock+ (hereafter SDD+) is a docking product, allowing the attachment of a variety of 3.5 inch hard drives through a FireWire and power bridge to a host computer; while the UltraGB+ (hereafter UGB+) is portable or desktop storage enclosure, with fixed capacities.

#### 2. Why does FireWire support 3.5 inch bus powered drives while USB will not?

Bus powered 3.5 inch drives require at least 8 watts of power in order to operate. USB ports are universally rated to supply no more than 2.5 watts. It just isn't enough power to operate the drive. FireWire ports are usually rated to provide between 6 and 15 watts of power. (Although some variations of FireWire, such as iLink, provide absolutely no bus power and will not work.) As a result, it is possible (albeit very difficult) to engineer a bus powered 3.5 inch drive which will operate with a typical FireWire port.

#### 3. Will SDD+ work with any drive or any host?

No, it will not. The power requirements of many IDE drives vary greatly. As a result, we can not guarantee that SDD+ will operate your individual drive successfully. Also, SDD+ will not operate successfully with all hosts, because not all hosts provide enough power.

#### 4. So where will SDD+ work?

It will work fine when run off the FireWire port of any computer rated to provide 15W of power. This includes all desktop Macs and all PCI FireWire host cards (when the host card is attached to the internal +12V supply of the host using the power connector on the host card). It also includes all CardBus adapters where FireWire power is injected via WiebeTech's AC adapter (part # is PWR-4, \$39.95, providing 36 Watts (!) of power).

#### 5. Will SDD+ work off my notebook computer?

It is not recommended, but it might work. It depends on what drive you use (and what notebook computer you attach to.)

6. Are there any drives which are likely to work better with SDD+ (or not work at all?)

Yes, there are. While almost all drives will work with SDD+ when attached to a desktop computer, some are very marginal in other situations. These include Western Digital, which consume prodigious amounts of power at spin up time, and perhaps Maxtors. Seagate and Hitachi (IBM) drives usually work very well.

7. Will UGB+ work with any drive or any host?

No, but it comes very close. It works with any desktop computer, any PCI based FireWire host card, any Cardbus adapter where FireWire power is injected via WiebeTech's AC adapter (part # PWR-4), and many different notebook computers. We've tested it on four different types of notebook computers with good results: iBook G4, iBook with FireWire port, 15 inch Powerbook (new model), and 15 inch PowerBook (old model: TiBook). It did not work well with the TiBook, but worked well everywhere else. The failure mode on the TiBook was excessive current load, causing the internal circuit breaker of the TiBook to turn off the backlight on the screen (nothing else seems to happen, but the screen is virtually impossible to read with the backlight completely off. The resolution is to remove the UGB+ and reboot the computer.)

8. What configurations are UGB+ available in?

120GB and 160GB at release time. It is not available in an unconfigured, 'empty' version. From our prior experience selling this type of product, we believe that we can control 90% of our technical support by preconfiguring the product in this manner.

9. Is Apple's 'sleep' mode supported by either SDD+ or UGB+?

No. Computers which sleep while attached to a bus powered 3.5 inch drive may not properly wake up. We recommend disabling 'sleep' when using these products.

10. Who is the target user of the SDD+?

The target user is someone who swaps a lot of drives on and off their computer, and principally uses a desktop computer for this function. This is often a video or audio developer, a service technician or IT personnel, or someone who has a need to randomly access different drives.

11. Who is the target user of the UGB+?

This is typically someone similar to #10, above, with the added component of having an enclosure which is completely mobile and also shock mounted.

12. How are the bottom electronics of the drive protected when attached to SDD+?

We include a machined aluminum plate and rubber bumpers. Additional plates are available for \$11.95 each.

13. Are AC adapters included with these products? If so, why?

Yes, they are. AC adapters must be used in conjunction with USB, and both products have USB ports. Also, AC adapters provide a power backup solution for all situations where the FireWire host is nonpowered (such as iLink, prevalent on Sony computers) or underpowered (as in the case of our TiBook example.)

14. How does the user select between bus power and AC power?

The SDD+ has a 3 position switch: Bus Power – OFF – AC Power. It will work in the position the user selects. It will not cross power – if Bus Power and AC Power are both available and attached, the source of power will be determined by the position of the switch. The UGB+ has only an On/Off switch. If AC power is attached, it will automatically override any bus power which may be available.

15. How do these products handle the large current loads presented at the time the drive is spinning up?

The UGB+ contains a proprietary technology which stores energy and releases it at spinup time. It is similar to a small battery, but uses other technology. The SDD+ also includes an external SpinBoost™ dongle which accomplishes the same thing.

16. Do either of these products contain protective current load circuitry?

SDD+ is designed to electronically turn itself off in the event of an overload. This causes a warning LED to flash. It then automatically recycles and attempts to restart. UGB+ controls current loads through WiebeTech's selection and integration of an appropriate lower power 3.5 inch hard drive. Apple's notebook computers also contain fusing logic which automatically resets in the event of a power overload on the FireWire port. In our experience, this fusing logic appears to work by turning off the backlight to the screen. If you have information which could help us understand this, we'd enjoy hearing from you.

17. What is the capacity limit of UGB+?

Currently, 160GB. (January, 2005). Check website for product updates.

18. How is the FireWire bus power converted into usable drive / enclosure power?

We designed a proprietary circuit called PowerBridge™ which does a marvelous job of this. It is remarkably efficient and is capable of handling input FireWire host voltages

between 9 volts and 30 volts. It converts these voltages to the exact values required by the enclosure and the hard drives.