Your Laptop's Midlife Crisis
How to Help It Cope

Part 3 - Adding USB3

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What is the Lifespan of a Laptop?

- Hardware is "current" for about 2 years
- Expect to avoid repair problems for about 4 years
- Could likely run for 10 years without problems if cared for
- "Useful" life is typically 5 years
- Varies with initial cost and capabilities
- Probably good for the useful life of the installed operating system

Example: My two Fujitsu Laptops

- Lifebook AH531 - $380 new in Sept. 2011
  - 15.6" display, Intel i3 processor
- Lifebook LH531 - $400 new in June 2012
  - 14" display, Intel i5 processor
- Both have:
  - 500 GB hard drive, 2 GB RAM
  - USB 2.0, HDMI, 10/100/1000 LAN, 802.11N
  - Dual-layer DVD-RW, 1.3 Mpixel camera
  - Windows 7

Useful Life Trade-offs

- What they have going for them
  - Still fairly fast
  - Have most current interfaces
  - Good operating system
  - Appear to be reliable
- What they lack
  - More RAM
  - Larger hard drive and/or solid state drive
  - USB3
  - Blu-ray drive

Most Popular Laptop Upgrades

- More memory
- Larger hard drive
- Solid-state drive
- Faster interfaces (USB3, Gigabit Ethernet, 802.11N wireless)
- HDMI output
- Blu-ray drive
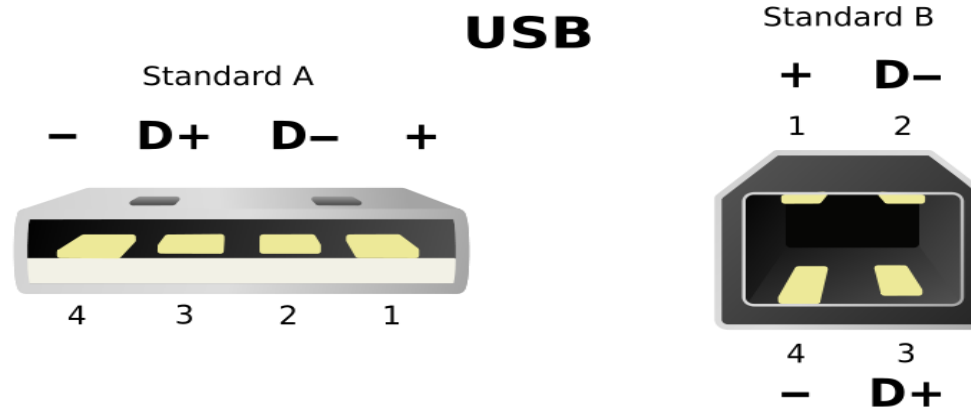- New battery*

Why Add USB3 to a Laptop?

- Faster transfer rate
  - 5.0 Gbit/s (USB2.0 is 480 Mbit/s)
  - Full-duplex (USB2.0 is half-duplex)
- Higher current
  - Up to 900 mA @ 5V (500 mA for USB2.0)
- Many USB3 devices are available (and are now the norm)
  - USB3 Flash drives
  - USB3 external hard drives
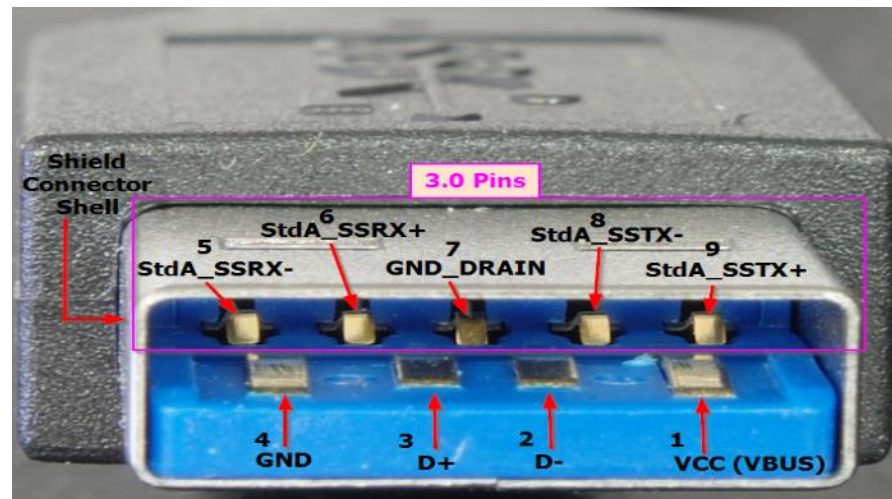
USB3 is Backwards Compatible

- These versions all interoperate with each other
  - USB3.0 (SuperSpeed) - 5 Gbit/s, 900 mA
  - USB2.0 (Hi-Speed) - 480 Mbit/s, 500 mA
  - USB1.1 - 12 Mbit/s (Full Speed), 1.5 Mbit/s (Low Speed), 500 mA
- Main connectors are compatible
- Through handshaking, link operates at capability of lowest link version

USB Connectors

- These connectors mate with each other
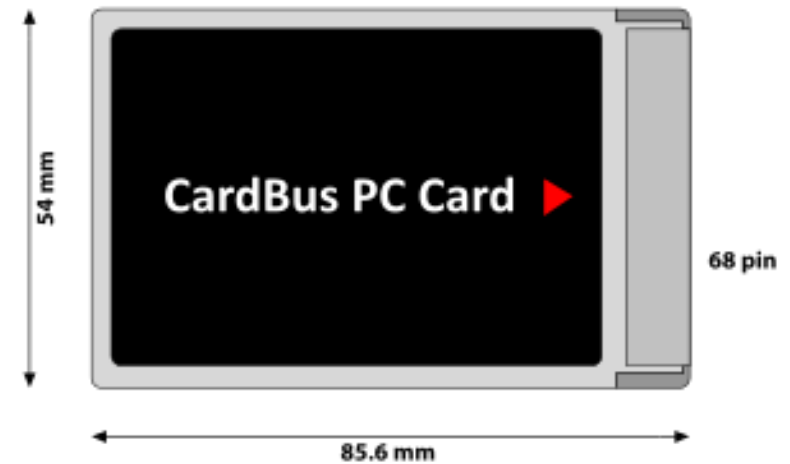- USB1.1 / 2.0
  – 4-pin

- USB3.0
  – 9-pin

ExpressCard

- Peripheral device interface available on some laptops
- Standard developed by PCMCIA
  - Personal Computer Memory Card International Association
- Slot built into computer accepts expansion cards
- Two form factors
  - ExpressCard/34 (34 mm wide)
  - Expresscard/54 (54 mm wide, in an L shape)

ExpressCard Formats

ExpressCard Expansion Cards

- USB (2.0 and 3.0)
- Ethernet ports
- Solid State Drives
- Wireless NIC cards
- TV tuner cards
- Sound Cards
- eSATA
- $9 to $200

ExpressCard Connection

- Plugs into slot - is hot-pluggable

Installing an ExpressCard

- Card plugs in with a push-in, push out action (like an SD memory card)

  – Push in maximum amount to eject card

- Drivers and possibly software are required, depending on the card

  – USB3 cards require specific drivers

- Problem: card can get pulled out or ejected by external connections made to the card

Example: My Fujitsu Laptops

- Lifebook AH531 (15.6" display) has an ExpressCard/54 slot
  - A USB3 interface can be added
- Lifebook LH531 (14" display) has no ExpressCard slot
  - No way to add USB3

What Kind to Get?

- Amazon has 9 different cards
  - $12 to $42
- Five types available
  - Dual port 34 mm flush mount
  - Dual port 54 mm flush mount
  - Single port 34 mm flush mount
  - Dual port 34 mm non-flush
  - Quad port 34 mm non-flush

My Upgrade - AH531

- Initial Purchase
  - Low cost ($10) no-name dual port 54 mm flush
  - Came with aux power cable, driver CD but no manual, instructions or web URL
  - Finally got drivers to load successfully after reading reviews and experimenting
  - Gave an error when transfering large files

My Upgrade - AH531

- Second Purchase
  - StarTech 2-port 54 mm flush mount ($33)
  - Came with aux power cable, driver CD, manual, support web URL
  - Installed easily and worked fine

The Upgrade Process (StarTech)

- Remove ExpressCard cover plug
- Install ExpressCard
- Ignore any system messages
- Insert CD and run .exe for appropriate product to install drivers
- Verify functionality by inserting a USB drive and check transfer speed

StarTech 2-Port USB3 Features

- Two USB3 flush ports
- Optional power cable to provide additional power to USB3 ports
  - Plugs into another USB port or power adapter

Enclosed USB power cord for extra power

ExpressCard USB3 Issues

- Inserting USB devices too far can eject ExpressCard
- Removing USB devices can accidentally remove ExpressCard
- ExpressCard draws power when not being used
  - Hot plug in/out to save power
- Speed increase seems small

Data Transfer Tests

- Verifty operation and transfer speed by measuring the time to copy a file
  - Use a large file (1 GB or larger - backup image file) to make timing more accurate
- Transfer to and from internal hard drive and
  - Western Digital My Passport 500 GB USB3 external hard drive
  - Patriot Blitz 128 GB USB3 Flash drive
  - Emprex PD330 8 GB USB2 Flash drive
  - Using USB3 ExpressCard and USB2 port

Data Transfer Test Devices

Data Transfer Test Results

External Drive	Port Used	Transfer Direction	Transfer Time (min:sec)
Emprex USB2	ExpressCard USB3	PC to Flash drive	3:53
Emprex USB2	ExpressCard USB3	Flash drive to PC	0:52
Emprex USB2	Laptop USB2	PC to Flash drive	4:00
Emprex USB2	Laptop USB2	Flash drive to PC	1:11
Patriot USB3	ExpressCard USB3	PC to Flash drive	1:13
Patriot USB3	ExpressCard USB3	Flash drive to PC	0:56
Patriot USB3	Laptop USB2	PC to Flash drive	1:15
Patriot USB3	Laptop USB2	Flash drive to PC	0:58
WD HD USB3	ExpressCard USB3	PC to Ext HD drive	0:22
WD HD USB3	ExpressCard USB3	Ext HD drive to PC	0:22
WD HD USB3	Laptop USB2	PC to Ext HD drive	0:55
WD HD USB3	Laptop USB2	Ext HD drive to PC	0:47

Tests performed using a 1.39 GB True Image backup image file

Once the new USB3 port is installed and verified, your laptop will feel better about itself!

References

- Wikipedia.com (USB, USB3, ExpressCard)
- Amtron Technology - Amtron.com
- Bixnet.com
- Startech.com
- Google Images

Questions?

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Part 3 – Adding USB3

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An International
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