Theory and Practice of the Low-Power SATA Spec DevSleep

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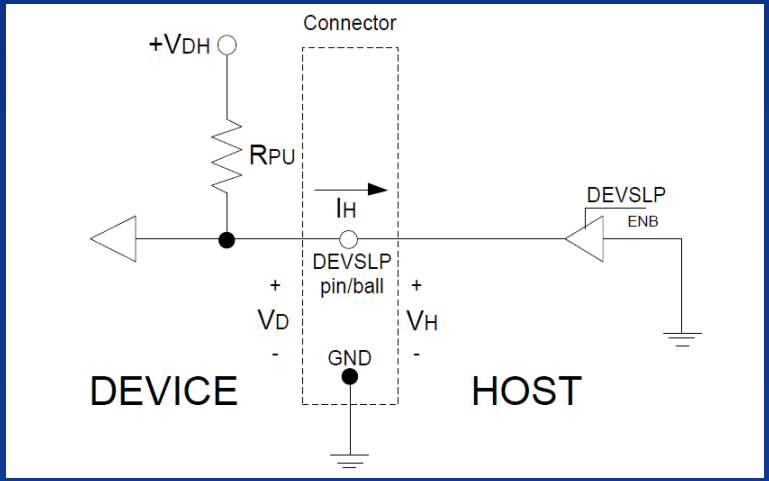
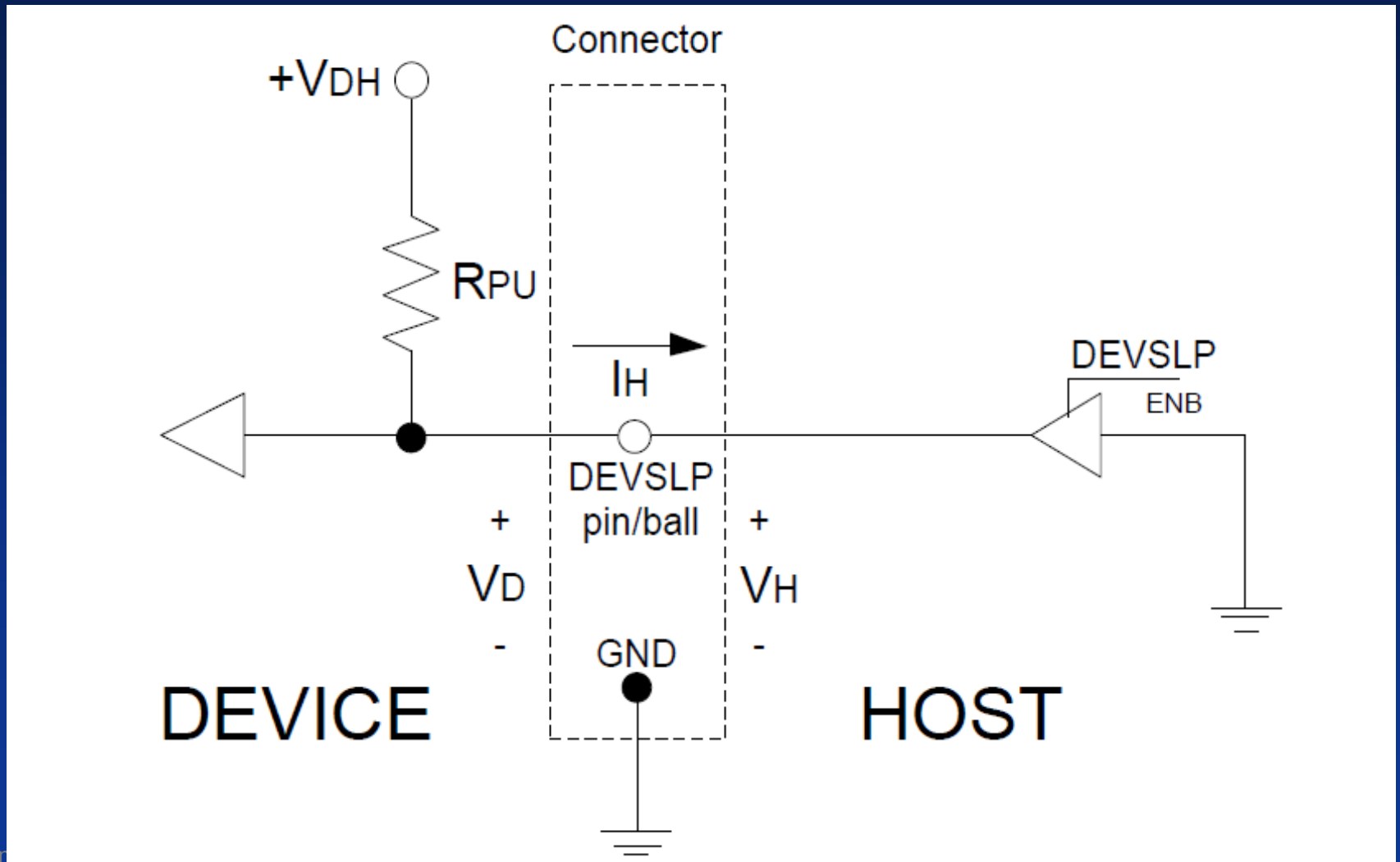
- Background
  - “Device Sleep” or “DevSleep” allows a lower device power state through a digital sideband signal
  - By predicating DEVSLP with SATA Slumber, the Slumber exit protocol utilizing COMWAKE can be used vs COMINIT. COMINIT triggers induces additional latency associated with Asynchronous Signal Recovery (ASR).

- DEVSLEP incorporated into SATA 3.2
  - Technical Proposal TP_038_SATA31_TPR_C108_DEVSLP_V1.0a
  - Technical Proposal TPR_C111v01 for 2.5” P3 Assignment

- Workload Storage Targets
  - BAPCo MobileMark 2007* <140mW
  - Microsoft* Windows* 8.1 Connected Standby < 5mW



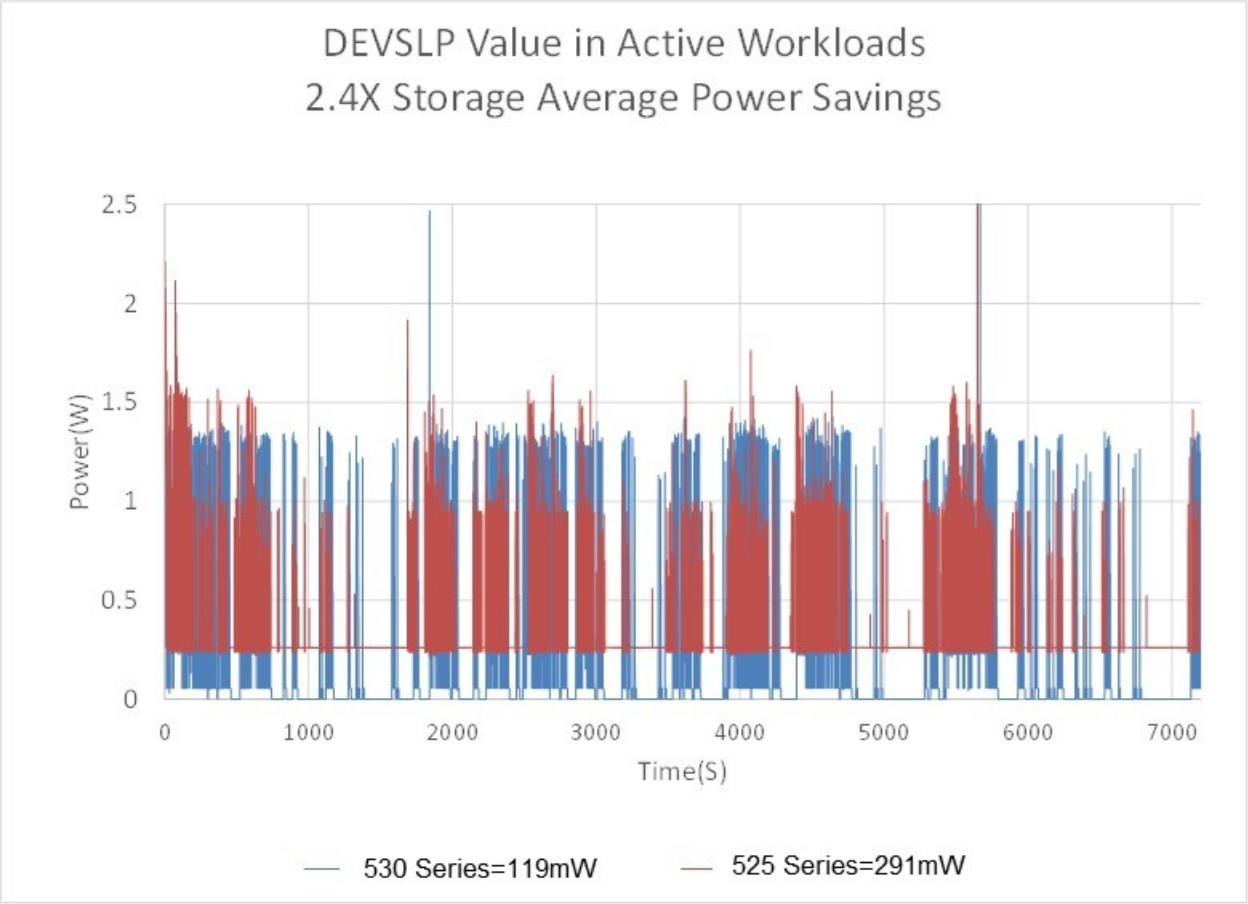

Connector
+VDH
RPU
IH
DEVSLP
ENB
DEVSLP
pin/ball
+
VD
-
+
VH
-
GND
DEVICE
HOST

Measurement Methodology

Power measurement of workload requires external measurement equipment.

Use power system which allows measurement of average power between samples vs instantaneous power between samples

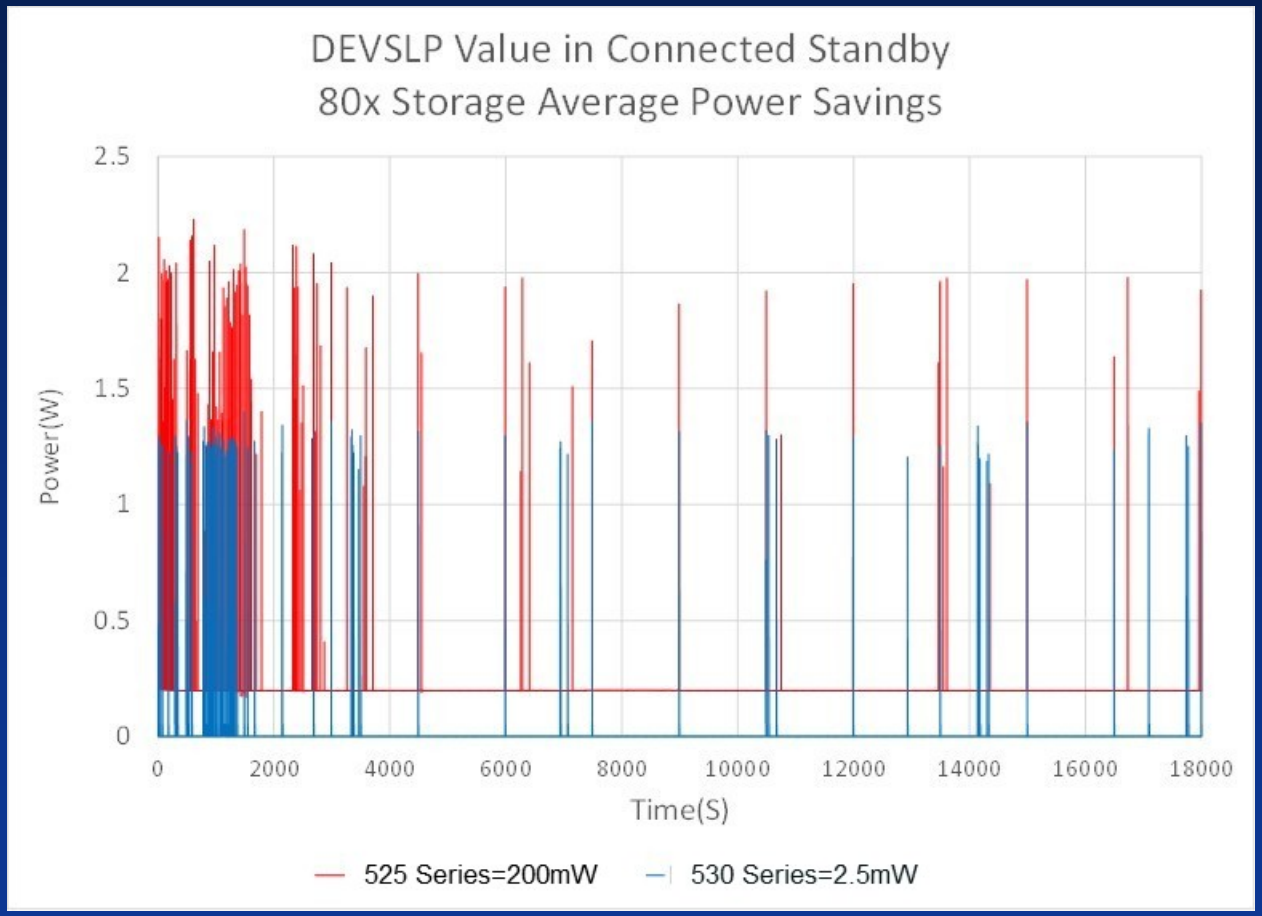
Active Workload Savings With DEVSLP



- DEVSLP enabled Intel® 530 Series SSD provided ~170mW storage power savings vs Intel® 525 Series SSD. This maps to ~5% increase in platform battery life in a 50wH system.

Measurements are made using internal validation platform with Windows* 8.0 and reflect the approximate capability of the technology as measured by those tests. Any difference in system hardware or software design or configuration may affect actual results.

DEVSLP Enables Windows* 8.1 Connected Standby



- DEVSLP Enabled Intel 530 Series SSD offers nearly 2 order of magnitude of storage power savings in Connected Standby vs 525 Series SSD.

Measurements are made using internal validation platform with Windows* 8.0 and reflect the approximate capability of the technology as measured by those tests. Any difference in system hardware or software design or configuration may affect actual results.

Summary and Looking Forward

- DevSleep enabled SATA SSDs are a critical platform ingredient for low power mobile PCs
- Looking forward to PCIe, SSDs incorporating an AHCI or NVMe controller are expecting to have new power saving capabilities
  - More details in Thursday's session on PCIe SSDs in Client Systems