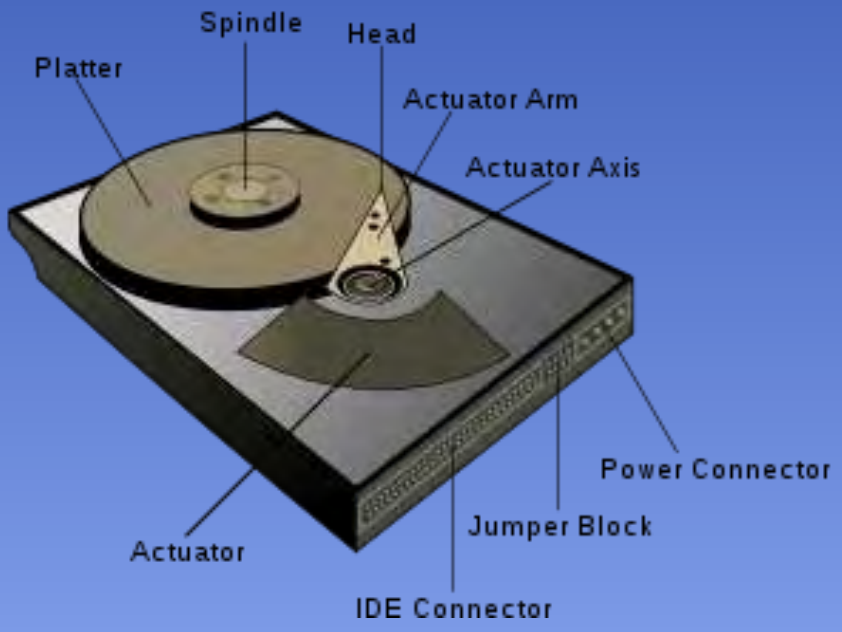
Are Tin Cans The Future of SSD's?

Mark Ayers
CTO
Soligen Corporation

HDD Form Factor Considerations

- *Circuit integration has always played second fiddle to mechanical component considerations.*
- *As technology evolved the footprint became smaller however the mechanical design would largely keep non-volatile memory solutions deployed as peripherals.*
- *Metal cans were used to protect delicate mechanical components from the environment.*
- *Environmental factors acceptable to solid state components were wholly incompatible with exposed HDD parts.*



Our Old Friends

-The 2.5” FF dominates the SSD market as a good fit for Flash controllers managing predominately 16 or so Nand Flash packaged component locations. Often deployed in 3.5” drive bays via adapters.

-The 1.8” FF SSD is making strong in-roads into portables and some embedded solutions. 8 locations of Nand flash are predominate however up to 16 Nand packaged components have been utilized. Small volumetric space limits flexibility.

-The 3.5” FF SSD has been slow to adoption as the 2.5” FF remains prevalent. Significant quantities of Nand components can fit in this large can. Internal Raided SSD solutions are an interesting option.

The reuse of Hard Drive Form Factors allowed for adoption of SSD technology quickly. This integration has grown as capacity and performance has closed the gap with mechanical drives.

SSD Advantages

- Immediate advantages
  - Performance improvement
  - Power Consumption reduction
  - Reliability-
    - MTBF
    - More rugged/no moving parts
- Immediate Disadvantages
  - Higher cost per GB
  - Lower capacity
  - New to the market, perception of risk

Are there other advantages the market has not realized?

Other SSD Form Factor Examples

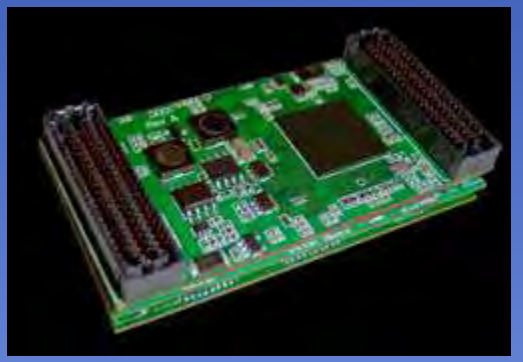
Low Capacity

- Jedec 64.8

- Mini- PCI express

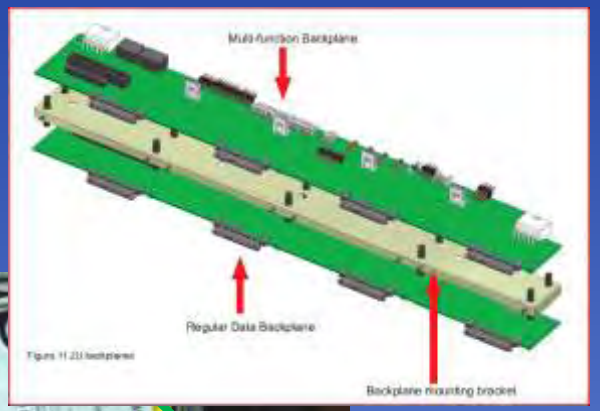
High Capacity

- Flashbridge



- PCI Express

Hardware Removal



Advantages OEM

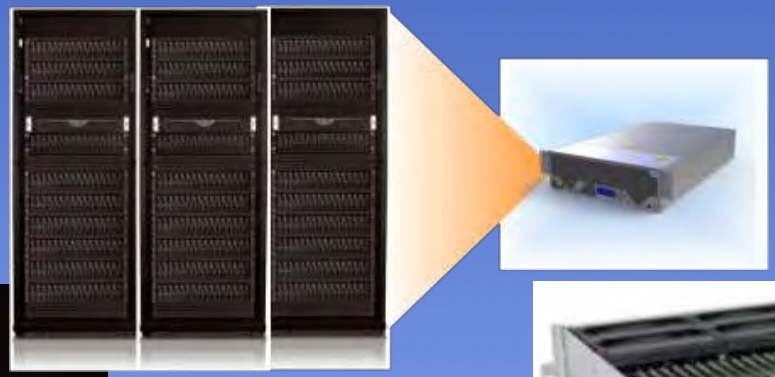
- Engineering
  - Integrate SSD solution as a simple function of layout rather than mechanical design.
  - Common footprint allows for several protocols
  - Signal integrity control over PCB path, reduction in transitions
  - Increased test coverage and module access
  - Reduced cooling/power requirements
- Supply Management/Quality
  - Reduction in BOM and tooling costs
  - Reduction in labor and assembly cycles
  - Backplane, rack, final assembly cost reduction

System Integration Advantages

- Mechanical
  - Rack count reduction
  - Weight/Space reduction
- Electrical
  - Power reduction
    - Fewer Fans
    - Less Cabling
  - Memory Density
  - Signal Integrity

Examples of Progressive Designs

- Violin 3200 Flash Memory Array
  - 500GB-20TB 3U rack configuration
  - 84 SSD Full Capacity Dimm modules



Examples of Progressive Designs

- Fusion-IO