Using Universal Backplane Management (SFF-TA-1005) to Enable Tri-Mode Backplanes

Session : SSDS-102-1: Enterprise SSDs

Jeff Plank

Abstract

UBM is a recently released standard from SNIA SFF for the management of SAS, SATA and NVMe backplanes by storage controllers, chipsets and switches. UBM provides a single industry standard design mechanism for backplanes to interoperate with the storage ecosystem in a single self-describing standard way reducing costs and development time within storage partner ecosystems.

Learning Objectives:

1. Evangelize the SFF-TA-1005 specification
2. Discuss example backplane applications
3. Showcase how the UBM controller supports a range of host-based interfaces

Universal Backplane Management

System Simplification and Cost Savings

- System versatility
  - ✓ Standards based
  - ✓ Interchangeability of backplanes
  - ✓ Interchangeability of NVMe, SAS and SATA drives if desired

- Cost savings
  - ✓ System versatility with interchangeable backplanes
    - Mainboard/controller configuration-less operation and/or SKU reduction
  - ✓ Tri-mode operation
    - System, controller and backplane SKU reduction
  - ✓ Standard connector definition between NVMe, SAS, SATA
    - Cable SKU reduction
  - ✓ Connector pin reduction

- Decreased risk and effort through automation
  - ✓ Reduce misconfiguration related downtime

Endorsed by Top Server OEMs and Solution Providers

SFF-TA-1005 UBM Specification

- UBM enables the controller to know precisely what the backplane is capable of and sensing drive type and presence:
  - Defining backplane capabilities and configuration:
    - PCIe Reference Clock expectations, PCIe Reset expectations, PwrDIS signal support
    - Dual Port support
    - High speed lane port routing assignments to Host Facing Connectors
    - Number of Drive Facing Connectors supported by the backplane
- UBM provides configurability and ease-of-maintenance through:
  - Status and Control over Drive Facing Connector I/O and LED States
  - Customer-specific backplane LED patterns
  - Backplane UBM FRU and Controller programmable code updates
  - Host to backplane cable installation order independence

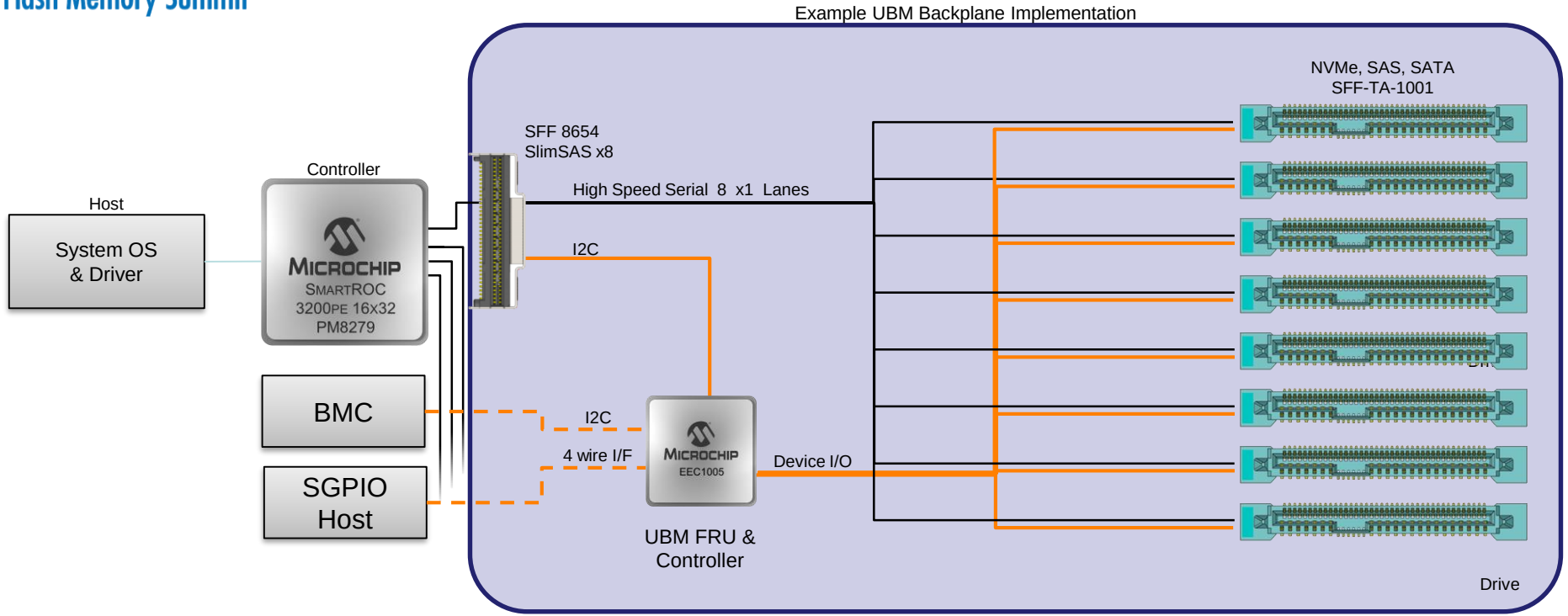
UBM Building Blocks

- UBM FRU
  a) Responsible for reporting static backplane information
  b) Accessed via 2Wire with a fixed address (0xAE)
  c) Defines protocols supported, max rates, and link widths
- UBM Controller
  a) There may be multiple UBM Controllers per backplane
  b) Accessed via 2Wire, the address is defined in the UBM FRU
  c) The UBM Controller manages
    a) the Host Facing Connector sideband I/O signaling
    b) the Drive Facing Connector I/O signaling, and
    c) the LED states for the DFC
  d) Reports backplane type and number, along with capabilities of the drives attached

Vendors are combining UBM FRU & Controller in a single device!

x8 > x1 Universal Backplane

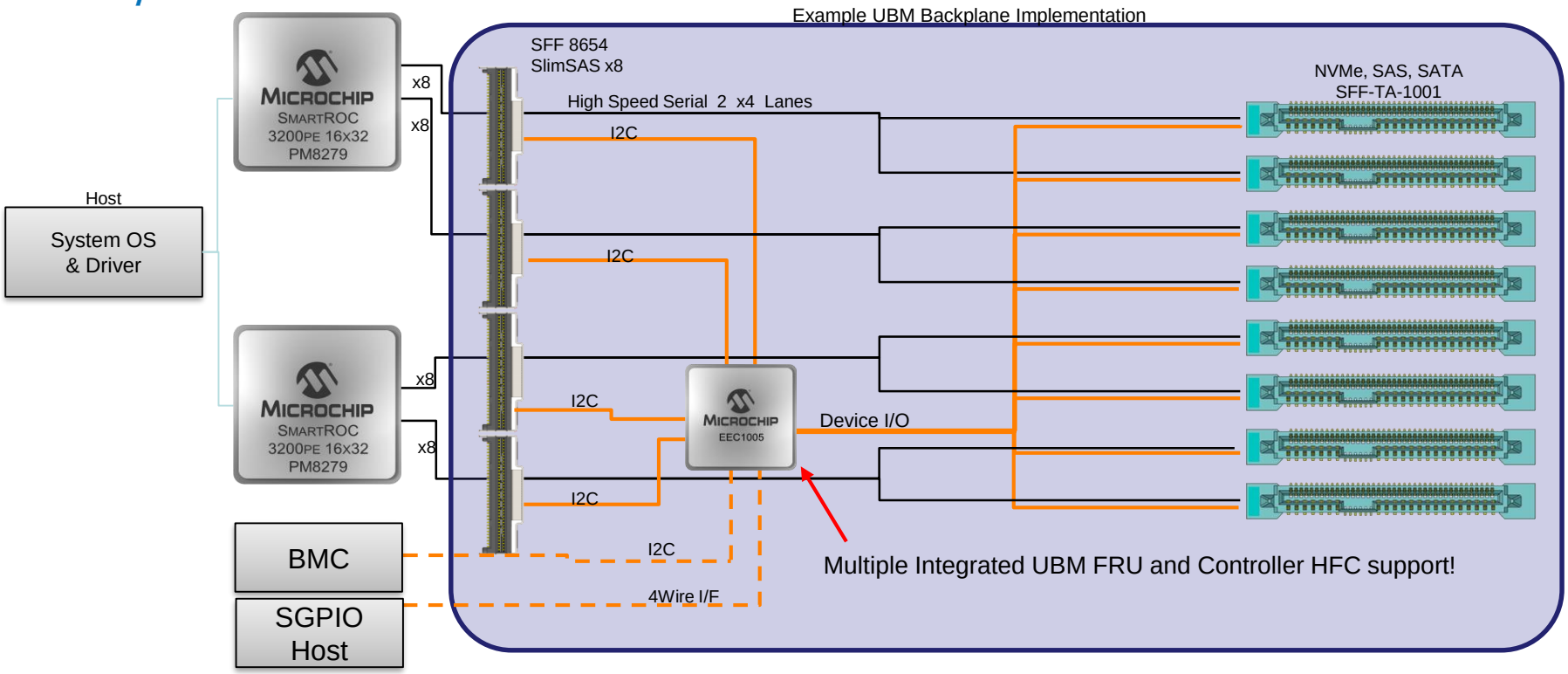
SFF-TA-1005 w/ Microchip Universal Backplane Management Controller



Microchip's Truly Universal Backplane Management Controller comprises complete for install, reset, type detection and LED management along with support for many host interfaces.

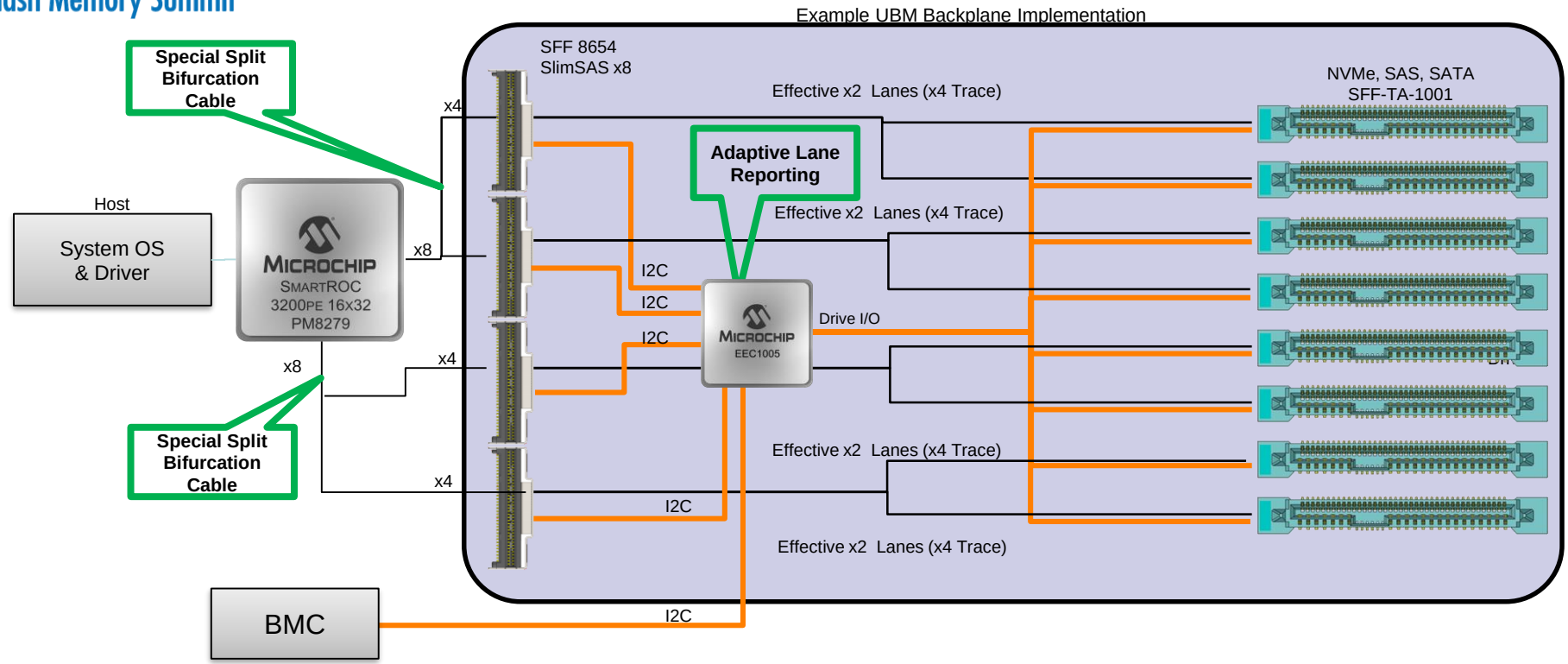
x8 > x4 Universal Backplane

SFF-TA-1005 w/ Microchip Universal Backplane Management Controller



x8 > x2 Universal Backplane Bifurcation

SFF-TA-1005 w/ Microchip Universal Backplane Management Controller



Summary

- UBM based backplanes allow for ubiquitous support of all drive types and controllers.
- UBM Based backplanes allow for multiple use cases with a single design, ie x2 / x4 by example
- UBM based backplanes ensure trouble free configuration and cabling for adapters and backplanes (discoverable)

Detailed Microchip based documents for UBM support may be found at https://info.microsemi.com/ubm.

Flash Memory Summit

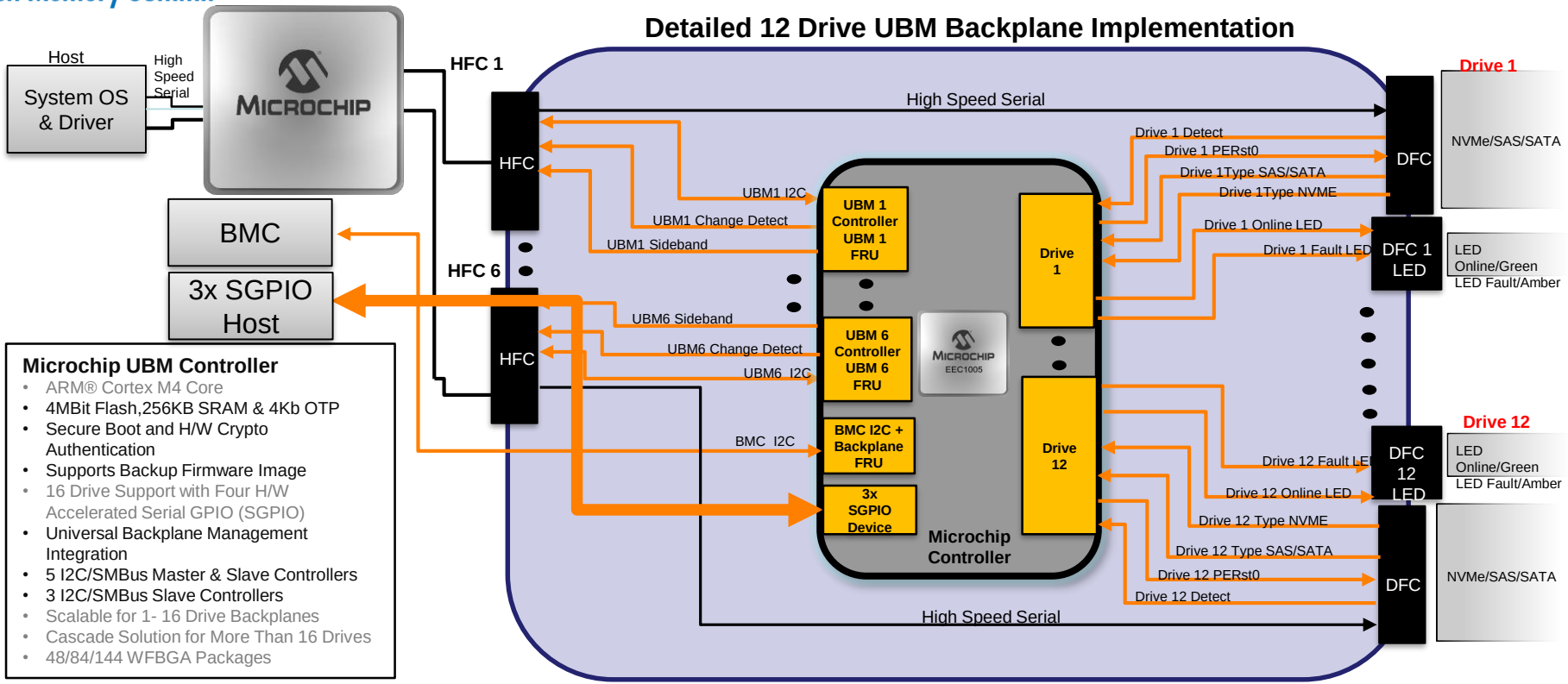
Gen 4/SAS4 Tri-Mode Development Platform

- Development platforms along with their associated reference designs are being made available from Microchip
  - Development systems are standalone units with drive cages and power supplies
- Two tri-mode backplanes options are available and utilize the Microchip EEC1005 UBM controller:
  - 8 drive U.2 x4 NVMe/SAS/SATA
  - 8 drive U.3 x4 NVMe/SAS/SATA

Contact Microchip to access development systems, reference designs and design collateral

Universal Backplane Specification

SFF-TA-1005 –Host Adapter to Microchip Universal Backplane Management Controller



Microchip UBM Controller

- ARM® Cortex M4 Core
- 4MBit Flash,256KB SRAM & 4Kb OTP
- Secure Boot and H/W Crypto Authentication
- Supports Backup Firmware Image
- 16 Drive Support with Four H/W Accelerated Serial GPIO (SGPIO)
- Universal Backplane Management Integration
- 5 I2C/SMBus Master & Slave Controllers
- 3 I2C/SMBus Slave Controllers
- Scalable for 1- 16 Drive Backplanes
- Cascade Solution for More Than 16 Drives
- 48/84/144 WFBGA Packages

Thank You