



SPECIFICATION BRIEF

MIPI[®] UniProSM Specification Brief

Specification Overview

The MIPI[®] Alliance Unified Protocol (UniPro) specification defines a layered protocol for interconnecting devices and components within mobile device systems. MIPI UniPro is used in a wide range of component types including application processors, co-processors and peripheral devices, as it allows usage of different application layers.

MIPI UniPro specification supports different types of data traffic including control messages, bulk data transfer and packetized streaming. Implementing the MIPI UniPro specification reduces time-to-market and design costs by simplifying the interconnection of peripherals. In addition, the re-useable, extensible nature of the specification simplifies new feature implementation.

MIPI UniPro leverages the MIPI Alliance M-PHY[®] specification as its physical layer interface. UniPro with M-PHY is referenced as UniPort-M and enables a reliable chip-to-chip connectivity.

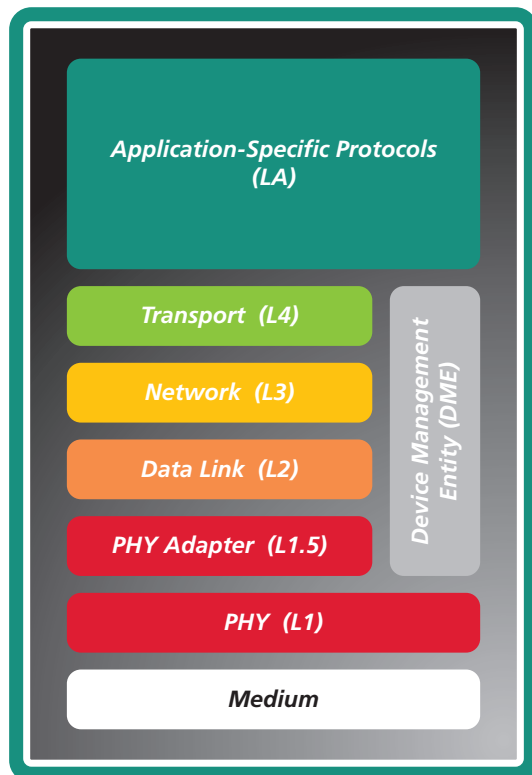


Figure 1: MIPI UniPro layers over MIPI M-PHY

FEATURES

Target Applications

- Wireless handsets
- Tablets and Laptops
- Multimedia devices
- Digital cameras

Key Features

- MIPI M-PHY v3.0 support
- Supports several Applications: JEDEC UFS, MIPI CSI-3, chip-to-chip connectivity
- Scalable bandwidth of 23.2Gbps in each direction
- PA Configuration Protocol for peer configuration
- Attribute-based connection setup
- End-to-End Flow Control and CPort Safety Valve
- Stack hibernation

Key Benefits

- High Performance
- Flexible and Scalable
- Low Power
- High Bandwidth

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MIPI UniPro Layering High Level Overview

MIPI UniPro is structured as a stack of protocol layers, similar to an OSI Reference Model for networking applications. The protocol stack operates as a processing pipeline for data units.

Layer 1/1.5

Includes the MIPI M-PHY (Layer 1) and the MIPI M-PHY Adapter (Layer 1.5). Supports between 1 and 4 Lanes, a fully automatic Link initialization as well as an embedded MIPI M-PHY Adapter-level control protocol. M-PHY test features for multi-lane.

Layer 2

Encompasses the reliable Data Link layer. Offers error detection, automatic retransmission, windowed acknowledgement, credit based flow control, multiple traffic classes, preemption capability, and high bandwidth efficiency.

Layer 3

Forward compatible to the network-of-chips. It includes device ID-based switching.

Layer 4

Addresses the Transport layer interface to the Application. Layer 4 provides unlimited size message passing capability, connection-oriented communication for high bandwidth efficiency, independent communication channels enabling multiple concurrent connections, and flow control per connection for simplified protocol design. MIPI UniPro stack test feature.

FEATURES

MIPI UniPro Layering Features

Layer 1: MIPI M-PHY

- Scalable speed-cost implementation choices
- Low power
- Scalable bandwidth
- Optical support

Layer 1.5: PHY Adapter

- No need for side band signaling
- Multiple Lane management
- Scalable bandwidth
- No need for propagation of a side band clock
- Lane discovery and remapping
- M-PHY power states management

Layer 2: Data Link

- Two priority classes TC0 and TC1 with fast TC1 pre-emption
- Guaranteed link reliability

Layer 3: Network

- Ready for extension to network of up to 127 DeviceID's

Layer 4: Transport

- Large number of virtual channels (up to 2047 CPorts)
- End-to-End Flow Control option
- CPort Safety Valve option
- Controlled Segment Dropping

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Device Management Entity Overview

The Device Management Entity controls the layers in the MIPI UniPro stack. It provides access to control and status parameters in all layers, manages the power mode transitions of the Link and handles the boot-up, hibernate and reset of the stack.

Application Specific Protocols

Different Application specific protocols can be used to connect with the MIPI UniPro Layers. These application specific applications include: JEDEC UFS and MIPI CSI-3.

MIPI UniPro Work Group Overview

The MIPI UniPro Work Group was chartered in 2004 to develop a high-speed interface technology for interconnecting integrated circuits in mobile devices. The Work Group coordinates requests from different application groups such as JEDEC UFS Work Group, MIPI Camera Work Group, and MIPI PHY work group to align latest development with protocol demand.

MIPI Alliance Overview

MIPI Alliance (MIPI) develops interface specifications for mobile and mobile-influenced industries. Founded in 2003, the organization has more than 250 member companies worldwide, more than a dozen active working groups, and has delivered more than 45 specifications within the mobile ecosystem in the last decade. Members of the organization include handset manufacturers, device OEMs, software providers, semiconductor companies, application processor developers, IP tool providers, test and test equipment companies, as well as camera, tablet and laptop manufacturers. For more information, please visit www.mipi.org.

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