MIPI ALLIANCE CURRENT ACTIVE WORKING GROUP OVERVIEW

MIPI® Alliance is a global, collaborative organization comprised of companies that span the mobile ecosystem and are committed to defining and promoting interface specifications for mobile and mobile-influenced devices. MIPI Alliance is led by a Board of Directors, comprised of founding and rotating Promoter member companies. Specifications are developed in topic-focused Working Groups (WGs). These groups are launched after the Board has formed an Investigation Group (IG) and determined a need for the specification. Read more about the MIPI Alliance Working Groups:

The **Analog Control Interface Working Group** is chartered to develop control interface specifications which impact analog chip-to-chip connections. Within the WG, an Envelope Tracking Subgroup has been formed to specifically address the interface between the transmitter and Envelope Tracking power supply.

The **Battery Interface Working Group** defines a robust, cost-efficient communication interface specification for smart, green and low cost batteries. The fundamental requirement for a battery interface is to provide a method to communicate enough information to ensure safe and efficient charging in any environmental conditions. While a low cost battery interface supports battery chemistry and capacity detection for basic safety, a smart battery interface with security features can offer strong protection against use of counterfeit batteries, providing a safer solution for mobile terminal end users.

The **Camera Working Group** enables industry convergence onto a robust, scalable, power efficient serial interface for imaging peripherals and host processors. Currently, the group focuses on interfaces between host processors, image processors, and imaging peripherals using both UniPro® and M-PHY®. The group maintains existing high performance interface specifications and develops next generation specifications to address emerging requirements in the industry to aid system integration and achieve even higher levels of performance.

The **Debug Working Group** develops specifications and recommendations ranging from dedicated debug interfaces and connector recommendations, to protocols supporting a system-wide debug approach. The current focus of the group is to enable debug via functional interfaces that are available in fielded systems. The NIDnT family of specifications defines how to re-map functional interfaces for debug and trace (pin re-use). Gigabit Trace and the SneakPeek Protocol are network independent specifications for enabling high performance trace and debug over functional networks. Gigabit Debug for USB is the realization of Gigabit Trace and the SneakPeek Protocol over USB 2.0 and 3.0 networks.

The **DigRF^{SM} Working Group** develops specifications for wireless mobile Baseband IC (BBIC) to Radio Frequency IC (RFIC) interfaces in various mobile devices. Designing one common high-speed interface that can be re-used for multiple applications is intended to help reduce design resource requirements and improve time-to-market. In addition to releasing the DigRF 3G Dual Mode 2.5G/3G Baseband/RFIC Interface Specification, the Working Group developed the DigRF v4 Specification for mobile terminals that support next generation mobile broadband technologies such as Long Term Evolution (LTE) while supporting existing 3GPP standards such as 2.5G and 3.5G (EGPRS, UMTS, HSPA, etc.). The DigRF WG has also collaborated extensively with MIPI's PHY WG to allow the use of a common M-PHY physical layer for DigRF v4.

The **Display Working Group** develops open industry-standard interfaces between processors and display panels in handheld systems and maximizes commonality across multiple high-speed interfaces without compromising display-to-interface objectives. The group focuses on enabling the evolution of displays and display interfaces as well as accommodating a variety of architectures and system partitioning, while maintaining an older generation of parallel interfaces to mobile terminal displays where legacy interfaces are needed. Further work continues to support emerging advancements using both UniPro and M-PHY in high resolution mobile terminal displays, as well as a specialized specification to support 3D display applications.

The **Low Latency Interface Working Group** defines a point-to-point interconnect between the application processor and the modem/baseband processor with sufficient performance to allow sharing of DRAM memory between two chips for data and program. A primary motivation is EBoM cost reduction, in addition to the capability of connecting a companion chip to an APE and exchange transactions without software intervention, thus enabling remote configuration and memory mapped transfers as if the two chips were a single chip. The WG has developed the MIPI Alliance Specification for Low Latency Interface (LLI) v1.0 and v2.0, both which use the common MIPI M-PHY physical layer.

The **Low Speed Multipoint Link Working Group** supports audio, data and control applications requiring relatively low bandwidth on an interface designed to save power and simply overall system design. The efforts of many audio codec, application processor, baseband, and other companies produced the first Serial Low-power Interchip Media Bus (SLIMbus®) Specification in 2007. SLIMbus uses a two-wire, low voltage CMOS physical layer with a time division multiplexed link layer as a foundation for a set of bus management and control messages and data transmission channels. It allows system integrators to lower overall system cost and offer more flexible system designs by consolidating several diverse functions. These functions, which are usually implemented on separate legacy interfaces, which can be merged onto one dynamically reconfigurable multidrop bus offering peer-to-peer communication through a rich standardized message set. SLIMbus supports many high quality audio channels with different concurrent sample rates, using digital audio or system/RF clocks.

The **Marketing Working Group** provides both strategic and tactical guidance to the MIPI Board of Directors, Technical Steering Committee, and Working Groups to foster the growth and adoption of current MIPI specifications as well as the development of the next generation of mobile interfaces. In addition the MWG promoted the MIPI specifications worldwide and serves the member companies through numerous value-add opportunities focusing on brand management, event marketing, public relations, marketing communications, social media, co-marketing and alliance growth.

The **PHY Working Group** is chartered to specify high-speed physical layer designs to support multiple application requirements. The first specification developed by the PHY WG addressed requirements of camera and display applications. The resulting standard, D-PHY, is a low-power, differential signaling solution with a dedicated clock lane and one or more data lanes to address scalable bandwidth requirements. In addition to supporting MIPI CSI-2 and DSI standards, M-PHY also supports MIPI's emerging UniPro specification. To support longer term requirements for more advanced applications, the PHY WG has released and continues to develop a higher speed, embedded clock design called M-PHY, which enjoys widespread success as the foundation for multiple MIPI specifications as well as key industry specifications from partner organizations such as JEDEC, USB Promoters Forum, and PCI SIG.

The **RF Front-End Working Group** defines control interface solutions for RF front-end components and modules. The RFFE WG has worked to develop a highly efficient, flexible, and extensible interface, accommodating many variations in the overlying system design, while providing interoperability at the interface level between compliant RFICs and front-end modules. Described as the 'backbone' of the RF solution, the *MIPI Alliance Specification for RF Front-End Control Interface (RFFE) v1.10* covers numerous front-end devices including power amplifiers, low-noise amplifiers, filters, switches, power management modules, antenna tuners and sensors. The ability to design one common control interface that can be reused for multiple modules is intended to reduce front-end complexity and improve the time-to-market for terminals.

The **Sensor Birds of a Feather Group** is tasked to investigate requirements related to integrating sensors of all varieties into mobile systems. Sensors are experiencing rapid growth in mobile devices – reaching a critical milestone of 10+ sensors and 20+ signals per device. To compound matters, the digital interface landscape is fragmented and current standard architectures do not scale to reach future demands. The Sensor Birds of a Feather Group is open to non-MIPI member companies, insuring the group receives input from the broad sensor and wireless device ecosystem.

The **Technical Steering Group** (TSG) serves as the steward and guiding influence for specification work within the MIPI Alliance, with the participation of representatives from Board (Founder and Promoter companies) and select Contributor companies. The group operates independently of the Working Groups, investigating issues of strategic importance to MIPI and evaluating new specification opportunities, and reports to the Board of Directors. The Board can also direct the group to discuss specific topics or consider engagement with external organizations. Supported primarily by consensus decisions reached through open and active discussion among the assembled participants, the TSG provides recommendations regarding the direction, activities and roadmaps of the WGs to the Board and defines and maintains the MIPI Technology Roadmap.

The **Test Working Group** provides a forum to discuss and correlate test issues and efforts across all MIPI Working Groups. In addition, the group will provide guidance and resources to the Working Groups to develop test-related materials, advise the Board of Directors on test-related issues, provide a clearinghouse for test information, and encourage interoperability events.

The **UniPro Working Group** is the MIPI Alliance Standard for UniPro (Unified Protocol) defines an application-agnostic scalable layered protocol for interconnecting devices and components within mobile systems such as cellular telephones, handheld computers, digital cameras, etc. UniPro allows these devices and components to exchange data at high data rates, with low pin count and at low energy per transferred bit.