MIPI Interoperability and Conformance Testing

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The Interop Problem

• If Interoperability is Unproven:
  • Customers wary of purchasing products due to skepticism regarding interoperability with current design.
  • Development cost/time goes up to solve bugs that could have been found earlier.

• If Interoperability is Proven
  • Cost/Speed of integration goes down
  • Customers can purchase with confidence
  • Speed of adoption increases
  • More companies able to make successful products.
4 Keys to Interoperability

1. The Standard
2. Knowledge Center
3. Technical Testing
4. Interoperability Metric

• Implement the keys, solve the problem
UNH-IOL MIPI Mission – Implement the Keys

- Reviews and comment on Specs with respect to test and interop, develop open industry-standard Test Suite Document.
  - (Key #1, The Standard)

- Develop open industry-standard Test Suite and Method of Implementation Documents. Provide software tools and reference test fixtures to MIPI Community.
  - (Key #2, Knowledge Center)

- Provide Test Services, neutral third party test reports
  - (Key #3 Technical Testing, #4 Interop Metric)

- Coordinate Interop Events
  - (Key #4, Interop Metric)

- UNH-IOL currently implementing these keys for test efforts in Display, Camera, SLIMbus, D-PHY, M-PHY.
Test Suite Documents

- Defines what in a given standard needs to be tested.
  - Typically one or more test descriptions for each normative requirement in a standard.

- Defines high level algorithm to perform that test
  - Defines what packets need to be sent, what order they need to be sent in, what bits must be set in the packet.

- Creates a common set of tests
  - An industry resource that allows all members to test the same items

- Abstract
  - Not tied to any type of equipment or device feature set
MOI Documents

- Defines how to perform the tests in a given Test Suite
  - Step by step to configure Device and Test Equipment
- Tied to a particular set of equipment
  - Describes testing using a given make/model of Scope/Logic Analyzer etc…
- Designed to be duplicated
  - An industry resource that allows you to duplicate UNH-IOL test setup in your own lab.
Test Software

- Software tools to perform D-PHY TX and Protocol tests, create test patterns, decode scope waveforms.
- Freely available on MIPI Testing Site.
- Used in conjunction with other test equipment.
- Excellent industry resource for correlating data across multiple platforms/sites/test equipment.
Test Fixtures

- **D-PHY Reference Termination Board**
  - Reference termination test fixture used for performing MIPI D-PHY transmitter physical layer signaling measurements.

- **MIPI D-PHY/CSI/DSI Probing Board**
  - Allows convenient connectivity for an Oscilloscope or Logic Analyzer system in order to monitor an active D-PHY based link. This can be used to monitor an interoperability test setup between two devices, or for performing protocol conformance tests.

- **D-PHY TLIS Board**
  - A reference test channel designed to match the Transmission Line Interconnect Structure defined in the MIPI D-PHY specification. It can be used as a worst-case test channel during MIPI interop testing.
Test Services and Reporting

- UNH-IOL currently offering test services and reporting for Display and Camera products using D-PHY, and SLIMbus.

- IOL Test Reports
  - Reports become yours, use them as you like.
  - Use reports to prove to customers and partners that a part is interoperable and conformant.
Interop Events

- UNH-IOL has coordinated interop events for Displays (May 2009, Feb 2010), Cameras (June 2009), and SLIMbus (Sept 2009).
  - Interop Events prove that the community is serious about interoperability

- Plans for future events underway
  - Fall 2010 for Displays, Cameras, and SLIMbus
  - Provide opportunity to test against many new devices in a short period of time.
  - Excellent opportunity to network and connect with other engineers.

- Events help determine the Interop Metric
  - Provides a cross section view of the industry to gauge health and define interop metrics
  - What behavior reasonably defines interoperability?