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.

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4 Keys to Interoperability

1. The Standard

2. Knowledge Center

3. Technical Testing

4. Interoperability Metric

- Implement the keys, solve the problem

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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.

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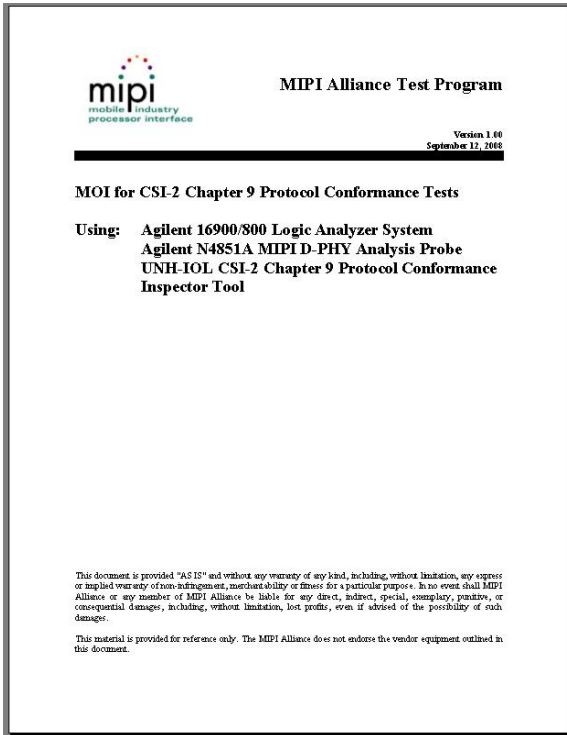mobile industry
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Test Suite Documents
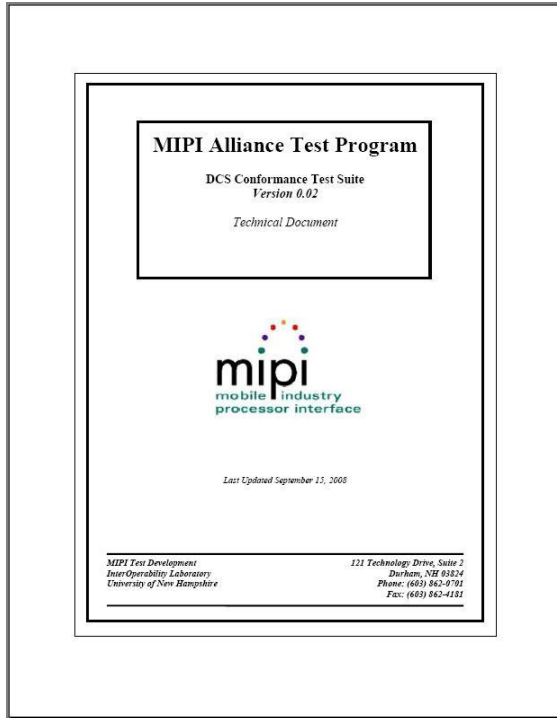
- Defines what in a given standard needs to be tested.
  - Typically one or more test descriptions for each normative requirement in a standard.

- 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

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MOI Documents

MIPI Alliance Test Program

Version 1.00
September 12, 2008

MOI for CSI-2 Chapter 9 Protocol Conformance Tests

Using: Agilent 16900/800 Logic Analyzer System
Agilent N4851A MIPI D-PHY Analysis Probe
UNH-IOL CSI-2 Chapter 9 Protocol Conformance
Inspector Tool

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This material is provided for reference only. The MIPI Alliance does not endorse the vendor equipment outlined in this document.

- 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.
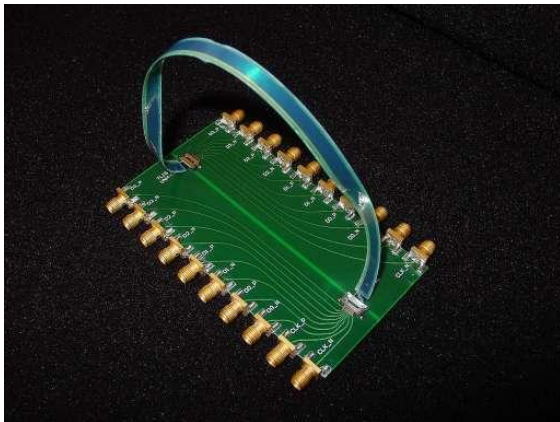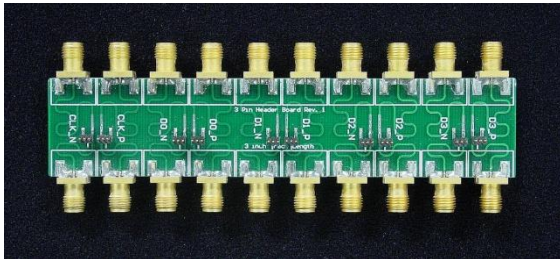
Test Software

- 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

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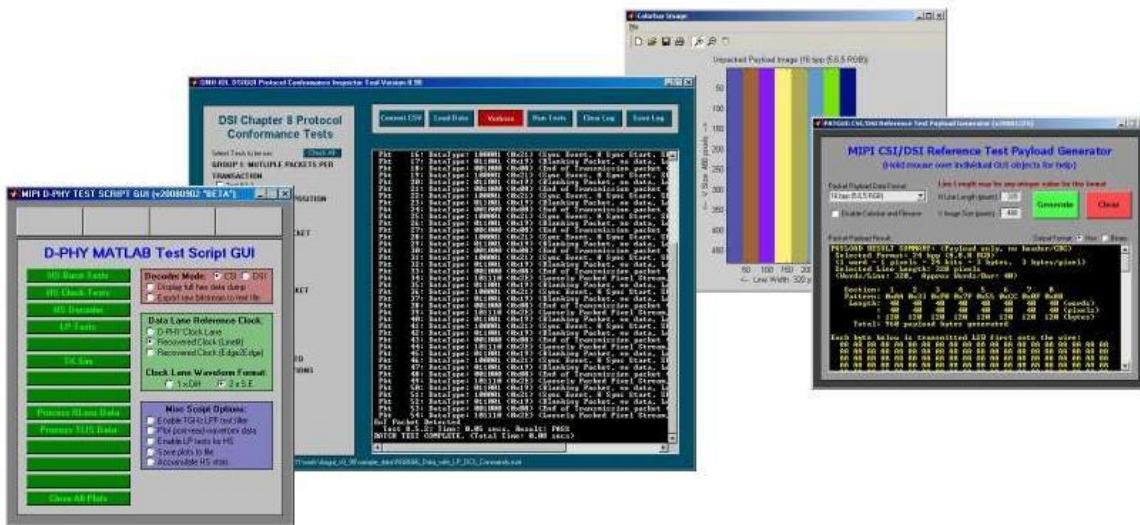
Test Fixtures

- **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.

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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?