Agenda

• Introduction - Why USI?
• Scope & Features
• Demonstrations
• Technical Highlights
• Status & Milestones
• Stylus Forecast & Future Work
• USI Member Statements
• How To Join
• Q&A
Why USI?

Today
No active stylus standardization.
existing solutions are -
• proprietary
• expensive
• deliver an inconsistent experience
End User Desire:
A stylus that’s **personal**
customizable attributes that travel with the stylus
• color
• weight
• stroke
End User Desire:
A **predictable** stylus experience

- consistent, best-in-class performance
- expansive feature-set
End User Desire:
A truly **interoperable** stylus.

• one stylus that works on every device
Why USI?

Industry Desire
Broad penetration of stylus.

• increased market opportunity
• drive scale for cost reduction
Why USI?

Goal
Deliver an industry standard for active stylus.
Founding Members

Growing Membership

As of May 30, 2016. See the USI website for a current list of members.
Scope & Features
Scope

Areas to Standardize

• stylus discovery mechanism
• packet formats to communicate key information (such as pressure, button info)
• facilitate low-cost as well as high-end, premium implementations
• mechanism for vendor extensions
Scope

- **Applications / UI**
- **Operating System and Drivers**
- **Kernels and Algorithms**
- **SoC + Firmware**

- **Touch Controller + Firmware**
- **Touch Sensor**
- **Active Stylus**

- **addressed by OS and software vendors**
- **addressed by touch controller vendors**
- **addressed by SoC vendors**
Scope

Applications / UI

Operating System and Drivers

Kernels and Algorithms

SoC + Firmware

- addressed by OS and software vendors
- addressed by touch controller vendors
- addressed by SoC vendors

Touch Controller + Firmware

In Scope
- frequency
- modulation
- etc.

Out of Scope
- firmware implementation
- register definition

Touch Sensor

In Scope
- constraints on electrical charge transfer

Out of Scope
- type/material
- patterning

Active Stylus

In Scope
- frequency
- modulation
- etc.

Out of Scope
- firmware implementation
- register definition
- physical/industrial design
Scope

**Not specified by USI**

- stylus industrial design / look and feel
- hardware/firmware implementation in touch controller or stylus IC
- touch sensor technology
- software APIs for Stylus data access
Basic Concept

• ‘USI System’ comprises of a USI-compatible touch controller and stylus
• USI defines the communication between an active stylus and a touch controller
• two-way communication
• Physical Layer defines the frequency selection, modulation, timing, etc.
• Link Layer defines the communication protocol and information exchange

Efficient Communication - No Side-band Channel Required!
**High-Level Features**

**Use Cases**
- Single Stylus, Single Device
- Single Stylus, Multiple Devices
- Multiple Styluses, Single Device
- Simultaneous Touch and Stylus
- Dual-Mode Support for Co-Existence with Legacy/Proprietary Protocols

**Features**
- Low Latency
- High Resolution
- Force/Pressure Sensing
- Tilt, Twist & Erase Functions
- Low Power/Long Battery Life
- Strong Noise Immunity

Support for Vendor-Defined Extensions Allows for Differentiation!
USI Stylus Inking Demonstration

Hanvon, Sharp, Waltop

https://www.youtube.com/watch?v=7SSoZvvBdso
Technical Highlights
Key Technical Highlights

1. Robust, Two-Way Protocol
2. Multiple, Simultaneous Stylus Support
3. Rich Features and Extensibility
1. Robust, Two-way Protocol

- Two-way protocol is fundamental building block for dynamic discovery and interoperability
  - Stylus can tune to device capability instantly
  - No need for Bluetooth or other sideband communication
- Allows the device to tell stylus to transmit at the ‘right’ frequency at the ‘right’ time
  - Provides best noise avoidance techniques
  - Supports all types of sensor technology from OGS to metal mesh
  - Supports hybrid In-cell and full In-cell panels
- Supports legacy co-existence
2. Multiple Simultaneous Stylus Support

- Multiple styluses can transmit at different timeslots.
- Multiple styluses can transmit at different frequencies.
- The device detects multiple styluses and configures each one in the first frame of communication with that stylus.
- Up to 6 simultaneous styluses can be supported.
3. Rich Features and Extensibility

• Improved capabilities over existing stylus being used with Windows
  • Improved ink accuracy & writing recognition with >2x report rate
  • Supports simultaneous pen + touch OS commands

• Extends the inking experience with advanced features
  • Goes beyond standard pressure, buttons and eraser capabilities
  • Tilt and twist, 9-axis motion sensor (Accel, Gyro, Mag) data
  • Airbrush functionality
  • Personalized ink settings maintained across apps and across devices

• Additional vendor extensibility
Technical Highlights - Recap

1. Robust, Two-Way Protocol
2. Multiple, Simultaneous Stylus Support
3. Rich Features and Extensibility
Status & Milestones
# USI Major Milestones

<table>
<thead>
<tr>
<th>Milestone</th>
<th>Date</th>
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<tbody>
<tr>
<td>USI kick-off</td>
<td>Q4 2014</td>
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<tr>
<td>Operations and founding members established</td>
<td>March 2015</td>
</tr>
<tr>
<td>Working Group scope and requirements complete</td>
<td>March 2015</td>
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<tr>
<td>Public Launch &amp; Open to New Members</td>
<td>April 2015</td>
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<tr>
<td>First USI Plugfest</td>
<td>December 2015</td>
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<tr>
<td>Second USI Plugfest</td>
<td>March 2016</td>
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<tr>
<td>USI 0.9 Specification Draft Release</td>
<td>March 2016</td>
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<tr>
<td>USI 1.0 Specification Release</td>
<td>June 2016</td>
</tr>
<tr>
<td>Initial Certification Program Established</td>
<td>Q4 2016</td>
</tr>
<tr>
<td>Expected First USI Product Release</td>
<td>Q4 2016</td>
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Stylus Forecast & Future Work
Active Stylus Module Market Forecast

**Stylus market ramp underway**
- many OEMs offering stylus and writing app solutions as a standard feature

**Improvements in stylus capability driving growth**
- apps seeing significant reductions in ink latency and algorithm performance to provide a better user experience

Source: Touch Display Research
Forecast active pen writing module (includes pen sensor and controller IC) revenue
Future Plans

• Certification & Compliance Program
• USI 2.0 (new features)
• Development and promotion of other ink & stylus related initiatives
• Developing a new touch interface standard
  • collaboration with MIPI Alliance
Join USI
## Membership Benefits

<table>
<thead>
<tr>
<th>Benefit</th>
<th>Promoter $15k/year</th>
<th>Contributor $8k/year</th>
<th>Adopter $4k/year</th>
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<tbody>
<tr>
<td>Eligible for Board of Directors seat (Board seats are not guaranteed)</td>
<td>✓</td>
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<tr>
<td>Eligible for Working Group Chair position</td>
<td>✓</td>
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<tr>
<td>Approval of Final Specifications (Board of Directors only)</td>
<td>✓</td>
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<tr>
<td>May propose new work streams</td>
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<tr>
<td>Voting Rights within Working Groups</td>
<td>✓</td>
<td>✓</td>
<td></td>
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<tr>
<td>May participate in technical, communications and certification Working Groups</td>
<td>✓</td>
<td>✓</td>
<td></td>
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<tr>
<td>Access to specs and test specs (Adopters will be provided access to V0.7 and later)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>May apply for Certification (when available)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>May attend special all member meetings</td>
<td>✓</td>
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<tr>
<td>May publicly promote company’s involvement in Universal Stylus Initiative</td>
<td>✓</td>
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<td>✓</td>
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How To Join

• Request and review the membership materials
  • USI Membership Levels and Benefits
  • USI Bylaws
  • USI IPR Policy
  • USI Certificate of Incorporation
  • USI Participation Agreement

• Email your executed Participation Agreement to: usi-membership@workspace.universalstylus.org.

• Active member when fully executed Participation Agreement and dues received by USI.

More Information Available At www.universalstylus.org
Thank You!