Windows Ink

David Abzarian
Principal Program Manager
Input Platform Team

Touch, Pen, Touchpad, Text Input, Keyboards, Mice...

All input across all form factors and SKUs of Windows
Writing instruments of the past...
Paper still matters....

Microsoft Puget Sound Paper consumption vs. US High Tech Orgs Paper consumption vs. US Orgs Paper consumption

1,450 pages a year\(^1\) vs. 5,964 pages a year\(^2\) vs. 10,000 pages a year\(^3\)

Sources:
1. MSIT Printing Habits of Redmond Campus, 2012;
2. Xerox tracking the printing habits for US High Tech Org with similar managed print programs to Microsoft, 2012;
Pen still matters...
of people use pen 1 hour or more daily
Pen still matters...

of people use pen 3 hours or more daily
CY2017: ~20 Million Windows Tablets & 2:1 systems projected
(IDC, June 2015)
- Pen devices doubled in 2015.
- Over 50% of all Pen enabled devices are running Win10!

Pen-attached devices generally have higher satisfaction rating vs non-Pen devices

The opportunity....
More sockets for apps

Richer platform

More demand for pen devices

Compelling experiences to make you pick up the pen, and continue using the pen

More Pen applications and plugins

High quality pen devices at all price points

More Pen applications and plugins
Compelling Experiences Out-of-the-box!

Edge (Windows 10)
Ink Workspace

- Intelligent Sticky Notes
- Sketchpad
- Screen Sketch

- Most Recently Used Apps
- Discover the best applications for your pen!
Windows Ink Workspace Demo
Fueling great ink applications

DirectInk powers Windows Ink

Low Latency, beautiful ink rendering

Easy to integrate, flexibility to build powerful ink applications
Low Latency Video
XAML Ink Canvas

Drop in canvas enabling beautiful built-in brushes
- Pen
- Pencil
- Highlighter

Just 1 line of markup!

```xml
<InkCanvas x:Name="m_inkCanvas"/>
```
XAML Ink Toolbar

Drop in control of brush selection, color and brush width

Just 1 line of markup!

<InkToolbar TargetInkCanvas="{x:Bind m_inkCanvas}" />

And you get the ruler for free!
Let’s see some great ink applications!

- OneNote
- Office

- So many more on the Windows app store!
Tencent QQ / WeChat Messaging app

Whiteboard

Photo annotation
Siemens JT2Go 3D CAD app

Annotation
Annotation
DocuSign Document signing app

DRAW YOUR SIGNATURE

Signature

By tapping Confirm, I agree that the signature and initials will be the electronic representation of my signature and initials for all purposes when I (or my agent) use them on documents including legally binding contracts - just the same as pen-and-paper signature and initial.
TechSmith Coach’s Eye Video analysis app

Video annotation
Simultaneous Pen & Touch

“In humans most skilled manual activities involve **two hands** playing **different roles**.”

- Yves Guiard

“... a division of labor between pen and touch: the pen writes, touch manipulates, and the **combination of pen + touch yields new tools**.”

– Ken Hinckley et al., Microsoft Research
Simultaneous Pen & Touch

Low Level APIs
Windows Pointer Input APIs support Pen + Touch Simultaneous Input, **on by default**!

Pen building blocks
Use `CoreWetStrokeUpdateSource` to change inking behavior

Touch building blocks
Use WinRT `GestureRecognizer` to detect touch gestures
Perfect Circles Demo
Adobe Simultaneous Pen & Touch Video
Microsoft Research
Simultaneous Pen & Touch Video
Palm Rejection

- Fundamental to the experience
- Needs to be effective for a broad set of users
- Windows supplements device palm rejection
Settings Walkthrough
BREAK
Richer platform

More sockets for apps

Compelling experiences to make you pick up the pen, and continue using the pen

More demand for pen devices

High quality pen devices at all price points

More Pen applications and plugins

The Economist

FluidMath

More sockets for apps
Great experiences need great hardware!

- Beautiful and natural inking
  - Highest accuracy
  - Lowest latency
  - Best jitter performance
  - Realistic pressure
  - Reliable palm rejection
  - Built-in eraser support

*Microsoft Pen* provides the easiest path to a Windows 10 compatible pen solution!

“… writing music annotations or solving math equations with an active pen could provide a unique digital experience not possible by other tools”. – Microsoft Research
Pen Design

- Pressure Sensing Tip
- Primary Barrel Button
- Tail-End Eraser
- Bluetooth Button (ClickNote)
- Primary Barrel Button
- Eraser Button
- Pressure Sensing Tip
Windows Ink Compatibility

- Windows 10 HLK for Pen
- Windows 10 HLK for Touch
- Sim. Pen and Touch Compatibility
Input Driver Model

- **RIM.sys**
  - **HIDClass.sys**
    - **HIDUSB.sys**
    - **HIDBTH.sys**
    - **HIDI2C.sys**

- **Precision Touchpad**
  - **Touchpad**
  - **Touch**
  - **Pen**

- **Mouse**
  - **Keyboard**

**Planned Inbox Convergence Point**
- **Existing Inbox Component**
- **IHV Provided**
- **SiV Provided**

**HID Compliant Input Devices**
Pen Validation
Microsoft Pen Program

• Turnkey solution for Windows Ink compatibility

• High quality, power efficient and affordable pens

• All devices and pens that speak the Microsoft Pen protocol work together!
Great Supply Chain = Great Choices!

Microsoft Pen Suppliers

- Wacom
  - Dual-Protocol Pen

Microsoft Pen Compatible Touch Controllers

- Elan
- Goodix
- Synaptics
- SiS
- Atmel

SUNWODA
APS Technologies
Magic of Microsoft Pen Demo
ELAN - Microsoft Pen Controllers
Joe Yeh
Executive Vice President
ELAN’s Smart-Touchscreen™ & Active Pen Solution is World’s 1st with Microsoft Pen Certification

For the Best Pen
Microsoft Pen

Best Touch
ELAN Touch Solution

Best Experience
Win10 HLK and Beyond

Windows hardware certification report: Approved

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<td>Qualification level:</td>
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ELAN with MSFT for the Ultimate E2E Experience!

*: outside of MSFT Surface Pro
Elan Microelectronics Corp.

Windows 10

Active Stylus
Microsoft Pen
Wacom Dual-Pen

Touch Controller
ELAN 5500 Series One Chip Solution

<table>
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<tr>
<th>IC Part #</th>
<th>Pkg</th>
<th>Tx</th>
<th>Rx</th>
<th>Size (finger only) (Pitch 5mm)</th>
<th>Size (Active pen) (Pitch 4.2mm)</th>
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Screen Size
Support up to 15.6”

Stack Up
Pen Support with 4.2mm sensor pitch (Refer to ELAN sensor design guide)

Adaptor
Refer to adaptor selecting guide, examples: Delta, Lite-on, Chicony
Elan Microelectronics Corp.

**Screen Size**
Support up to 15.6”

**Touch Controller**
ELAN 5300 Series One Chip Solution

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**Active Stylus**
Microsoft Pen
Wacom Dual-Pen
Wacom AES

**Stack Up**
Pen Support with 4.2mm sensor pitch (Refer to ELAN sensor design guide)

**LCM**

Noise Level Judgement

- **OK**
- **NG**
ELAN, the Market Leader in Touch + Pen

**Screen Size**

10.1” 12” 12.5” 13.3” 15.6” 17.3”

**Resolution**

HD  FHD  WXGA  QHD  4K*2K

**Brands**

acer  DELL  hp  lenovo  Microsoft

Active Pen Projects

2014  2015  2016

*ELAN is the Key Bridge between Pen and Windows OS!*
Wacom - Microsoft Pen and Sim. Pen & Touch
Nobutaka Ide
Sr. Vice President – Technology Solutions BU
Long Term Strategic Partnership

Microsoft × wacom = The Best Inking Experience

Windows 10
Value Proposition G11 / G12

• The best class natural writing feel
• High precision, less latency
• 2048 level pen pressure
• Variety of Pen industrial design
• Pen ID number for ink application
• Up to 15.6” size
• “Pen & Touch simultaneous function”

by F/W update
Innovation for next Gen. G13

• High performance Pen & Touch simultaneous 240Hz Pen, 120Hz Touch
• Super rich pen pressure curve 4096 level
• Tilt detection
• Multi Pen protocol supporting pen
• Supporting Variety of Touch Panel
• 2016 Q4
“Dual Protocol Pen” in Wacom vision

◆ Universal Pen Framework “UPF”

◆ Digital Stationery Consortium “DSC”
Windows Ink Everywhere!

Best!

Bundled Microsoft Pen with Bluetooth
(with Simultaneous Pen & Touch support)

Better

Bundled Windows 10 HLK Compliant Pen

Good

Active Pen Capable (w/Microsoft Pen Protocol support)
Windows Precision Touchpad (PTP)
The best touchpads are Precision Touchpads

- Maintain stability, reliability, and performance across OS updates and changes

- Deliver exceptional precision and efficiency with certified hardware coupled with high quality software

- Integrate tightly with the Operating System to deliver the best interactions and multi-finger gestures
Improving quality and reducing support costs

Compared to Legacy, Devices with Precision Touchpads Had:

- 95% reduction in rollbacks for Windows 10 with the touchpad cited as a reason
- 38% reduction in users who would not recommend the system with the touchpad cited as a reason
- 30% reduction in users sending negative feedback about a touchpad problem
Ensuring touchpads are reliable

365 Legacy touchpad bugs requiring driver update from partner, including:
- Kernel Crashes
- Broken Gestures
- Missing Settings
- Nonfunctional Hardware

2 PTP bugs caused by Legacy drivers

3 PTP bus driver bugs
1 PTP customization driver bug
Continuous investment in Precision Touchpad

Precision Touchpads just keep getting better!!

With Windows 10 Anniversary Update:

- Enhanced pointer stability during button presses and lifts
- Decreased time and distance boundaries to drive the mouse cursor for fine movements
- Expanded tuning parameters for palm rejection to better scale across device sizes
- Additional hardware palm rejection support from increased Confidence bit capabilities
There is even more!

New gesture capabilities for RS1

- Four finger swipes to switch desktops
- Gesture detection works even with resting contacts or palms
- Improved scroll performance for widely used Win32k apps such as Chrome, Firefox, and Adobe apps
- Smoother, quicker detection for multifinger gestures
Precision Touchpad Demo
Call to Action

Join WinHEC LINE Community @winhec

Online Survey Form
http://aka.ms/winhecfeedback

Download WinHEC presentations here:
https://channel9.msdn.com/Blogs/WinHEC

* Gifts are limited. They will be offered at “a first come, first serve” basis.
Thank You!

Please provide feedback on this session:

http://aka.ms/winhecfeedback