Synaptics Advanced Touch Solutions and Roadmap for Wearables

Jason Yang, Synaptic Touch Expert
Apr 2015
Agenda

- Synaptics Intro
- Wearables Market and Technical Requirement
- Synaptics Wearables Touch Solutions
Synaptics
Introduction
Customers Smart Phones based on Synaptics Touch Solution

<table>
<thead>
<tr>
<th>OPPO N3</th>
<th>OPPO R5</th>
<th>Oppo R3</th>
<th>Huawei Mate7</th>
<th>Lenovo Vibe X2</th>
<th>Vivo X5</th>
<th>Vivo xplayer 3s</th>
<th>Meizu MX4</th>
<th>Gionee Elife S5.1</th>
<th>IUNI U3</th>
<th>ZTE Nubia Z7 Max</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ClearPad High-end Family For Flagship Smartphones</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ZTE 小星星</th>
<th>ZTE 清漾2S</th>
<th>Coolpad Y1</th>
<th>Huawei Honor6</th>
<th>Huawei C199</th>
<th>Huawei Honor 4x</th>
<th>Huawei Ascend</th>
<th>Huawei Honor 3X</th>
<th>Vivo Y22</th>
<th>Xiaomi Pad</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ClearPad for Mid- and Low-end Smartphones and Tablet</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Showcase in Wearables Market

- Alctel Onetouch Watch
- HTC Smart Band
- Coolpad CW001 Watch
- LG G Watch
- Sony Smart Watch
Who We Are Today

At-a-Glance

- Founded in 1986
- IPO in 2002 (NASDAQ: SYNA)
- Headquarters: San Jose, California
- Revenue: FY14: $948M; FY15 Q2: $463M
- ~1650 Employees
  - 70% in engineering; 60% located in Asia
- 20 Locations Worldwide
- 1400+ Patents Issued or Pending

Market leadership

- #1 In TouchPads
- #1 In TouchScreens
- #1 In Fingerprint Sensors for SmartPhones & Tablets
- #1 In Fingerprint Sensors for Notebooks
Core Markets

Display Drivers
Touchscreen Controllers
ClearPad® Series

TouchPads
TouchPad™, ClickPad™, ForcePad™, SecurePad™

Biometrics
Natural ID™

Smartphone
Tablet
Notebook PC
Auto
Wearables
Competitive Advantages

Existing Advantages to Leverage and Grow

- Usability Expertise
- System Solution Experience
- Product Innovation
- Existing IP Portfolio
- Silicon Development & Operations
- System Cost Competitiveness
- Scale

New Advantages to Create

- System Solution Expertise in New Product Areas
- New IP in New Product Areas
- Ecosystem of Strategic Partners Around our Platform
Wearable Devices
Market and Touch Requirement
Wearables Were Everywhere at CES 2015
ID and UX are More Critical to Wearables
Technical Requirements for Touch Solutions

- **Basic Touch Functions**
- **Low Power Consumption**
- **Narrow Boarder**
- **Premium Touch Functions**
- **Multi-Touch, Glove, Wet Finger**
- **90% time dozing, very low stand-by current required**
- **Boarderless ID**
- **Edge Sensing/Force Touch**
State-of-the-art Wearables Touch Solution
## Current Wearables Roadmap

<table>
<thead>
<tr>
<th></th>
<th>CY2014</th>
<th></th>
<th>CY2015</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Q2</td>
<td>Q3</td>
<td>Q4</td>
<td>Q1</td>
</tr>
<tr>
<td><strong>Single Layer Oncell</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2326 (5x5 QFN)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• 48ch, 150um pitch</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• – phase out for 1312</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Multilayer Discrete / OGS / OLED</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2232 (5x5 QFN)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• 48ch, 150um pitch</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• – phase out for 1222</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S2200</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S3506</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1222 (2.7x2.8 CSP)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• 18ch, high yield 400um pitch</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• True 2F glove, WUG, Moisture robustness</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Next-Gen**
- 2nd gen ASIC specifically targeted at low power and small footprint
Low Power Wake Up Gestures

- Touch controller detects and reports specific gestures to host
  - Swipe
  - Tap-Tap
  - Characters: <, >, v, ^, Δ, O, M, W, e and C
- Enables phone wakeup and specific action based on gesture input
Moisture Performance

- Touch controllers tested to perform under presence of moisture
- Various moisture scenarios tested for
  - Water mists, drops, on startup and operation
  - Wet finger tracking
  - Operation after water removal
Underwater Detection

- Submersion of sensor saturates delta-capacitance levels
  - Complete saturation of sensor indicates phone is underwater
  - Controller notifies host of underwater mode
- Host can configure device for underwater input if desired
  - Accelerometer to detect taps
  - Mechanical buttons (e.g. volume, power keys)
Glove Operation

- **Detect Thick Glove**
  - Ski, Wool, Leather glove supported
  - 2 glove finger touch
- **Auto-switching to allow for seamless transition from Glove to Finger and vice-versa**
- **Up to 120Hz refresh rate typical allows for minimal latency**
Summary

- Continuing investment in resources and channels leading to support China customers
- Broadest portfolio of solutions and local engineering will enable China customers to compete globally
- China customers are leading the display integration technology transformation with Synaptics
- Continuing investment in technology and new market in China
Thank You