Safe Harbor Notice

Except for the historical information contained herein, the matters addressed in this presentation are forward-looking statements that involve certain risks and uncertainties that could cause actual results to differ materially, including but not limited to weather, impact of competitive products and pricing, industry-wide shifts in the supply and demand for semiconductor products, rapid technology change, semiconductor industry cycle, and general economic conditions.

Except as required by law, Andes undertake no obligation to update any forward-looking statement, whether as a result of new information, future events or otherwise.
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Company Overview

http://www.andestech.com
Founded in March 2005 in Hsinchu Science Park, Taiwan, ROC.
Well-established high technology IPO company
Over 230 people; 80% are engineers.
TSMC OIP Award “Partner of the Year” for New IP (2015)
Founding Premier membership in the RISC-V International Association (RISC-V Foundation) (2020)
AI Global Media Award “Most Outstanding Embedded Processor IP Supplier” (2020)
Hsinchu Science Park Innovation Award - AndesCore™ NX27V (2020)

Andes Highlights

• Innovate performance-efficient processor solution for low-power SoC

Andes Mission

• Smart and Green electronic devices
• Cloud Computing and Internet of Things and Machine Learning

Emerging Opportunities
Business Status Overview

❖ 200+ commercial licensees
  - Geographically distributed in Taiwan, China, Korea, Japan, Europe, and USA
  - 500+ license agreements signed

❖ AndeSight™ IDE:
  - 20,000+ installations

❖ Eco-system:
  - 500+ partners

❖ 8B+ Accumulative SoC Shipped
Operation Results
2Q21 Revenue Analysis

YoY +103.7%
QoQ +37.2%

(NT$ thousands)

2Q20: 101,797
1Q21: 151,126
2Q21: 207,370

250,000
200,000
150,000
100,000
50,000
0
1H21 Top 10 Customers Analysis by Revenue

(NT$ thousands)

Top 10 Customer Contributed 69% Revenue

- A1 (US)
- Touch Panel (TW)
- Wireless/IOT (TW)
- 5G Modem (CN)
- Sensing (TW)
- MCU (US)
- 5G Modem (CN)
- Server (CN)
- WiFi6 (CN)
- OLED TDDI (TW)
2Q21 Royalty Analysis

YoY +63.3%
QoQ -7.5%

(NT$ thousands)

<table>
<thead>
<tr>
<th></th>
<th>2Q20</th>
<th>1Q21</th>
<th>2Q21</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value</td>
<td>30,976</td>
<td>54,667</td>
<td>50,569</td>
</tr>
</tbody>
</table>

2Q20 vs 1Q21: +63.3%
2Q21 vs 1Q21: -7.5%
1H21 Top 10 Royalty Contributors Analysis by Application

Top 10 Royalty Customers Contribution Analysis: 91%
Royalty Analysis

(NT$ thousands)

<table>
<thead>
<tr>
<th>Year</th>
<th>Royalty</th>
<th>Customer numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>445</td>
<td>1</td>
</tr>
<tr>
<td>2012</td>
<td>660</td>
<td>2</td>
</tr>
<tr>
<td>2013</td>
<td>1,285</td>
<td>5</td>
</tr>
<tr>
<td>2014</td>
<td>10,819</td>
<td>9</td>
</tr>
<tr>
<td>2015</td>
<td>12,232</td>
<td>15</td>
</tr>
<tr>
<td>2016</td>
<td>13,320</td>
<td>15</td>
</tr>
<tr>
<td>2017</td>
<td>38,287</td>
<td>25</td>
</tr>
<tr>
<td>2018</td>
<td>74,953</td>
<td>28</td>
</tr>
<tr>
<td>2019</td>
<td>106,716</td>
<td>33</td>
</tr>
<tr>
<td>2020</td>
<td>158,792</td>
<td>41</td>
</tr>
<tr>
<td>2021 H1</td>
<td>105,236</td>
<td></td>
</tr>
</tbody>
</table>
# 2Q21 Consolidated Gross Margin

(NT$ thousands)

<table>
<thead>
<tr>
<th></th>
<th>2Q20</th>
<th>1Q21</th>
<th>2Q21</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross Profit</td>
<td>101,654</td>
<td>150,700</td>
<td>207,160</td>
</tr>
<tr>
<td>Gross Margin</td>
<td>99.86%</td>
<td>99.72%</td>
<td>99.90%</td>
</tr>
</tbody>
</table>
2Q21 Consolidated Operating Expenses

YoY +12.7 %
QoQ +0.5 %

(NT$ thousands)

<table>
<thead>
<tr>
<th></th>
<th>R&amp;D expenses</th>
<th>Administration expenses</th>
<th>Selling expenses</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2Q20</td>
<td>36,881</td>
<td>27,360</td>
<td>58,233</td>
<td>122,474</td>
</tr>
<tr>
<td>1Q21</td>
<td>46,804</td>
<td>19,110</td>
<td>71,529</td>
<td>137,443</td>
</tr>
<tr>
<td>2Q21</td>
<td>50,218</td>
<td>18,761</td>
<td>69,101</td>
<td>138,080</td>
</tr>
</tbody>
</table>
2Q21 Consolidated Operating Income (Loss)

YoY -%
QoQ +421.1%

(NT$ thousands)

<table>
<thead>
<tr>
<th>2Q20</th>
<th>1Q21</th>
<th>2Q21</th>
</tr>
</thead>
<tbody>
<tr>
<td>-(20,820)</td>
<td>13,257</td>
<td>69,080</td>
</tr>
</tbody>
</table>
2Q21 Consolidated Operating Margin

YoY
+53.76 PT

QoQ
+24.54 PT

(%)
2Q21 Consolidated Net Income (Loss)

YoY -%
QoQ +117.3 %

(NT$ thousands)

<table>
<thead>
<tr>
<th>2Q20</th>
<th>1Q21</th>
<th>2Q21</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>60,111</td>
</tr>
<tr>
<td></td>
<td>27,665</td>
<td></td>
</tr>
<tr>
<td>(17,696)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
2Q21 Consolidated Net Profit Margin

YoY +46.37 PT
QoQ +10.68 PT

(%) 40.00% 30.00% 20.00% 10.00% 0.00% -10.00% -20.00%

2Q20 1Q21 2Q21

-17.38% 18.31% 28.99%
2Q21 Consolidated EPS

YoY 1.82 $  QoQ +0.76 $

(NT$ thousands)
1H21 Revenue Analysis by Payment Model

- License Fee: 57%
- Running Royalty: 29%
- Maintenance & Others: 8%
- Custom Computing Service: 6%
1H21 Revenue Analysis by Region

- Taiwan: 38%
- China: 35%
- USA: 6%
- Japan: 3%
- Europe: 1%
- Korea: 1%

ANDES TECHNOLOGY

RISC-V®
1H21 Revenue Analysis by Product
2Q21 Revenue Analysis - RISC-V

- V3
- RISC-V
- Custom Computing

2Q20: 38,554 (V3), 41,894 (RISC-V), 21,349 (Custom Computing)
1Q21: 58,684 (V3), 86,059 (RISC-V), 6,383 (Custom Computing)
2Q21: 116,854 (V3), 56.4% (RISC-V), 7,140 (Custom Computing)
Product Applications

http://www.andestech.com
Andes Updates

- A 16-year-old public CPU IP company
- 2B+ Andes-Embedded SoC annually in 2020

- A founding premier member of the RISC-V International
- An active role in RISC-V International & its extension task groups
  - RISC-V Board Director
  - Vice Chair of Technical Steering Committee
  - RISC-V Ambassador
  - Chair of P-extension (Packed DSP/SIMD) Task Group
  - Co-chair of Fast Interrupt Task Group

- A major open source maintainer/contributor
Andes Embedded in Various Applications

- In leading machine learning computers for datacenter
- In tier-one switch routers for datacenter
- Recent applications: 5G networking, WiFi 6/7, AI processors (using Andes Custom Extension, ACE)

Andes Embedded in Smart Phones

- Sensor Hub
- NFC Controller
- Storage Controller
- WiFi/ BT/ GPS/ FM (combo)
- Touch Screen Controller

Smart Speakers: WiFi IoT

Bike Sharing: GPS Ctrl

X-Trail: ADAS Ctrl

Switch: Game Flash Ctrl
V5 Adoptions: From MCU to Datacenters

- Edge to Cloud
  - ADAS
  - AIoT
  - Blockchain
  - FPGA
  - MCU
  - Multimedia
  - Security
  - Wireless (BT/WiFi)
- 40nm to 5nm
- Many in AI

- Datacenter AI accelerators
- SSD: enterprise (& consumer)
- 5G macro/small cells
Andes RISC-V Cores Adopted in SoC

- Single core
- 2-8 cores
- > 30 cores
- > 100 cores
- > 1000 cores
New Products and Ecosystems

http://www.andestech.com
Andes RISC-V Product Overview

**AndeStar™** Architecture V5

**AndesCore™** Processors
- Highly optimized design with leading PPA

**AndeSight™** Tools
- Professional IDE with high code quality

**AndeShape™** Platforms
- Handy peripheral IPs to speed up SoC construction

**AndeSoft™** Stacks
- Extensive SW stacks from bare metal, RTOS to Linux

Best extensions to RISC-V
# Andes V5 Architecture for All Levels of Computing

## AndesStar™ V5 CPUs
- **N/D-series**
  - N22 N(X)25 D25...
- **A-series**
  - A(X)25 A(X)27 A(X)45 Multicore...
- **Vector**
  - NX27V NX45V...

## Conventional Computing Architecture
- **Leading PPA Embedded Processor**
  - IoT, Sensing, Storage, Audio, GPS
- **High Performance and Power Efficient AP**
  - 5G, AI, Datacenter, Video Surveillance, Networking

## Domain Specific Architecture (DSA)
- **Andes Custom Extension**
- Define custom instruction to handle time critical codes
- Better approach for accelerator /co-processor to do particular jobs
- Automation Tool for the generation of toolchain, ISS, partial RTL and verification
Andes RISC-V Product Roadmap

RV32/RV64

- Cache-Coherent 1-4 Cores
  - A25MP
  - AX25MP

- Linux with FPU/DSP
  - A25
  - AX25

- Fast/Compact with FPU/DSP
  - N25F
  - D25F
  - NX25F

- N22 2-stage (700 MHz)

Vector Ext.

- 27-Series:
  - Vector Ext.
  - MemBoost
  - NX27V
  - A27/AX27
  - A27L2/AX27L2 and more.

- 8-stage (1.1 GHz)

Superscalar

- 45-Series:
  - Dual Issue MemBoost
  - N45/NX45
  - D45/DX45
  - A45/AX45
  - A45MP/AX45MP and more.

- 8-stage (1.2 GHz)

Benefits

- 512-bit SIMD raises MobileNet by 66x (CNN for mobile vision)
- Boost performance by 50%
- Raise bandwidth to 3x; Cut latency by 40%
AndeCore™ 45-Series

32-bit AndesCore™ N45/D45/A45/A45MP
64-bit AndesCore™ NX45/AX45/AX45MP
**AndesCore™ 45-Series Overview**

- **8-stage In-Order Dual-Issue**
- **AndeStar™ V5 ISA:**
  - RV*GCN (S/D FPU): All Series
  - RV*P-ext (DSP/SIMD): D45/A(X)45
  - MMU for Linux Applications: A(X)45
- **MemBoost memory subsystem**
- **Low power dynamic branch prediction**
- **Unaligned data accesses**
- **Fast or small multiplier**
- **StackSafe™** (Andes Ext.)
- **CoDense™** (Andes Ext.)
- **Multi-core support:** A(X)45MP
AndesCore™ 45 vs. 25 Series Performance Enhancement

> 1.5X Coremark & Dhrystone performance enhancement, compared with single-issue 25 series
AX45 Can Do More (vs. 64bit A-series)

- **A53**
  - 8-stage In-Order Dual Issue
  - Widely adopted by industries in many applications

- **AX45**
  - 8-stage In-Order Dual Issue
  - Performance is better!
    - Coremark/MHz: 1.32x
    - Dhrystone/MHz: 1.37x
Target Applications of 27 & 45-Series

- AI/Deep Learning
- AR/VR
- 5G
- Networking
- Storage

- Video Surveillance
- ADAS
- V2X (Vehicle to Everything)
- IVI (In-Vehicle-Infotainment)

... and More!
Andes Processors to Fit Your AI

- Voice trigger
- Voice command
- Always-on
- Face trigger
- Object detection
- Intelligent HMI
- Barge-in
- Beamforming
- Speech to text
- Natural language
- Face unlock
- Bokeh
- Avatar
- SLAM
- Gesture recognition
- High resolution
- > 1 camera
- ADAS, HDR
- > 10 cameras
- > 10 TOPS
- >100 TOPS
- D/A-Series CPUs
- N-Series CPUs
- Vector CPUs
- Smart Camera
- Smart IoT Devices
- Smart Home
- Mobile AR/VR Surveillance
- Automotive
- Data Center

~30 MOPS
~100 MOPS
> 1 GOPS
>1 TOPS
>10 TOPS
>100 TOPS
RISC-V DSP Extension

- Andes contributed market-proven DSP (SIMD) as P-Extension
- Designed to accelerate slow video, audio/voice and low data rate DSP workloads

Real world speedup using P-Extension

- CIFAR10 (Image Classification) 14 times
- PNET (90% of Face Detection) 8.9 times
- ML-KWS (keyword spotting) 5.2 times
- AMR voice codec 3.7 times
- MP3 decode 2 times

❖ Increase power efficiency to your DSP applications
NX27V One Vector for All Implementations

- **Cloud Computing** – Datacenter, HPC, Server
  - *512b*

- **Edge Computing** – 5G, Vision Processing
  - *256b*

- **Endpoint Computing** – Natural Language Processing
  - *128b*

* Configurable compute data width (VLEN)
Andes Custom Extension

- ACE unlocks RISC-V’s Potential of DSA
  - Define ACE instruction to handle time critical codes
  - Another approach to co-processor or accelerators

- All-in-one COPILOT development environment
  - Automation tool and ease of use
  - Extensions are easy to re-use, can be used as a library
Taking RISC-V Cores to Next Level

❖ Andes is the world-leading supplier shipping the commercial RISC-V cores to market with the support of

- **P-Extension**
  - D25, D45, A(X)25(MP), A(X)27(L2), A(X)45(MP)

- **V-Extension**
  - NX27V, NX45V

- **Custom-Extension** (w/ ACE* support)
  - Entire 25, 27, 45 series

*: Andes Custom Extension
Bring Andes Strength to RISC-V Cores

**Performance & Extensibility**
- Leading PPA and code size
- Rich data processing in P, V, and ACE

**Configurability**
- Flexible configurations for rich features

**Maturity**
- Compiler optimizations, and SW stacks
- Comprehensive features in AndeSight IDE
### Aggressive in RISC-V Community

#### Foundation Task Groups (partial list)

<table>
<thead>
<tr>
<th>Bit Manipulation</th>
<th>Compliance</th>
<th>Debug</th>
<th>Memory Model</th>
<th>P-Extension</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMD, BAE Systems, Exar</td>
<td>Codasip, bluetspec, Microsemi</td>
<td>SiFive, Syntacore</td>
<td>IBM, Princeton University, ARM, NVIDIA, Google</td>
<td>ANDES, Greenwaves, Cadence, TSMC</td>
</tr>
<tr>
<td>SiFive, Mips, Tensilica, Mediatek</td>
<td>Exar, Microsemi, NVIDIA</td>
<td>SiFive, Syntacore</td>
<td>ROD Logic, Syntacore, lowRISC, ARM</td>
<td>ANDES, Cadence, TSMC</td>
</tr>
<tr>
<td>Andes</td>
<td>Exar, Microsemi, NVIDIA</td>
<td>SiFive, Syntacore</td>
<td>Draper</td>
<td>ANDES, Greenwaves, Cadence, TSMC</td>
</tr>
</tbody>
</table>

- Contributing hardware architecture extensions
  - Chair of the P-extension (Packed SIMD/DSP) Task Group
  - Co-chair of Fast Interrupts Task Group
  - Closely reviewing activities of other Task Groups
Andes Helps Strengthen RISC-V Ecosystem

- More choices for customers are good
- Andes works closely with partners to grow RISC-V ecosystem
Andes Position in RISC-V

- Complete product portfolio
- Reliable RISC-V core IP vendor
- Extreme low power consumption, high computing efficiency
- World’s leading P-, V- and Custom-Ext. Capable RISC-V cores
- Professional custom computing service
Two Ecosystems: Andes and Knect.me
Knect.me™ Ecosystem

- Built up the community *to* help developing IoT products
  - To knect solutions for silicon IP’s, SW stacks, tools, applications, systems and products
  - Including
    - SoC IP Platforms
    - Software Stack
    - Development Boards
    - Development Tools

- Forms a IoT League
  - To knect chip vendors, partners, application developers, system vendors

- Forms a IoT League
  - To knect chip vendors, partners, application developers, system vendors
FreeStart Program

❖ FreeStart Evaluation Program (FSEP)
  ■ For all RISC-V enthusiasms and educator/researcher
  ■ Fixed-Configuration N22 RTL
  ■ Sign simple evaluation agreement directly on website

❖ FreeStart Mass-production Program (FSMP)
  ■ For industrial and academy mass production
  ■ Full-configuration N22 RTL
  ■ License fee: $0; only running royalty is required when mass production

❖ Support Package (FSSP)
  ■ For all
  ■ $20K for 1st year, including
    • 1 year e-service
    • FreeStart AE250 RTL
    • Corvette F1 FPGA board

For more info., please visit www.andestech.com
Event Promotion

RISC-V CON series
RISC-V Summit, Forum, Workshop & Meetup series
TSMC Symposium & OIP series

RISC-V Summit in San Jose
2020: Diamond Sponsor
Concluding Remarks
Andes Technology

A Trusted Computing Expert

Successfully rolled out new series of RISC-V cores (w/ leading P-, V- and Custom-Ext.), custom computing service and FreeStart program to extend more oppty.

Aggressively involved in RISC-V International new technology development, contributing and leveraging RISC-V eco-system.

Becoming a technology contributor, market promoter, and sales leader in the RISC-V industry.
Thank You

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