Safe Harbor for Forward-Looking Statements

This presentation contains forward-looking statements under the Private Securities Litigation Reform Act of 1995 including those relating to our expectations regarding financial guidance for the fourth quarter of 2018 and beyond, including revenue, operating costs and expenses, earnings per share and estimated, fixed, long-term projected tax rates. Such forward-looking statements are based on current expectations, estimates and projections, management’s beliefs and certain assumptions made by Rambus’ management. Actual results may differ materially. Our business is subject to a number of risks which are described more fully in our periodic reports filed with the Securities and Exchange Commission. Rambus undertakes no obligation to update forward-looking statements to reflect events or circumstances after the date hereof.

Effective January 1, 2018, the Company adopted Accounting Standards Update No. 2014-09, Revenue from Contracts with Customers in ASC 606. The adoption of ASC 606 materially impacted the timing of revenue recognition for the Company's fixed-fee intellectual property licensing arrangements. The adoption of ASC 606 did not have a material impact on the Company's other revenue streams, net cash provided by operating activities, or its underlying financial position.

The Company has provided financial results for the third quarter ended September 30, 2018 and its fourth quarter outlook under ASC 606 and ASC 605 in order to provide additional transparency. The Company believes that providing this additional disclosure in the short term will help its investors and analysts understand the impact of the change in revenue recognition standards, especially given the material difference in the timing of revenue recognition for its fixed-fee licensing arrangements as mentioned above. Note that the presentation under ASC 605 is not a substitute for the ASC 606 revenue recognition rules under current GAAP.

This presentation contains non-GAAP financial measures, including operating costs and expenses, operating margin, operating income (loss), adjusted EBITDA and net income (loss). In computing these non-GAAP financial measures, stock-based compensation expenses, acquisition-related transaction costs and retention bonus expense, amortization expenses, non-cash interest expense and certain other one-time adjustments were considered. The non-GAAP financial measures should not be considered a substitute for, or superior to, financial measures calculated in accordance with GAAP, and the financial results calculated in accordance with GAAP and reconciliations from these results should be carefully evaluated. Management believes the non-GAAP financial measures are appropriate for both its own assessment of, and to show investors, how the Company’s performance compares to other periods. Reconciliation from GAAP to non-GAAP results are made available and more fully described on our website as well as the back of this deck and in the earnings release.
Rambus At-a-Glance

Corporate Facts
- NASDAQ: RMBS, Inc. in 1990; IPO 1997
- Headquartered in Sunnyvale, CA
- Operations throughout North America, Europe & Asia
- Revenue:
  - Q318: $59.8M (ASC 606);
    $99.8M (ASC 605)
  - 2017: $393.1M (ASC 605)
- Cash from Operations:
  - Q318: $31.6M
  - 2017: $117.4M
- ~800 employees
- ~2,500 patents & applications
Our Journey So Far

Key Milestones

- **1990**: Rambus founded
- **Nintendo64 ships with RDRAM®**
- **1990-2000**: Revolutionizing the Memory Market
- **2000**: Sony PLAYSTATION 2 ships
- **2000-2010**: Diversification Focused on Key Markets
- **2010**: Sony PLAYSTATION 3 ships
- **2017**: Acquired Cryptography Research Inc.
- **2017**: Amplified with products from Semtech and Inphi

**Data • Faster • Safer**
Moving Data Faster, Safer, and Smarter
The Data Center

Data • Faster

- **Cores**
  - SerDes PHYs
    - Move data from chip to chip
  - Memory PHYs
    - Move data between chips and memory

- **Chips**
  - Server DIMM Chipsets
    - Enables more capacity at high performance
Growth Through Acquisition for Data Center Needs

- Architecture
  - License
  - Foundational IP
- Cores
  - DDRx PHYs
  - SerDes PHYs
- Chips
  - Buffer chips

Historic Business
High margin; predictable; fuels investment

High growth; differentiated margin
Growing Opportunity in Data Center

MID Revenue SAM ($M)

Source: IHS, Gartner, Semico Research, and Rambus estimates
Moving Data Faster, Safer, and Smarter
The Mobile Edge

Data • Safer

Embedded Security
- Secure Cores
  Embedded device protection
- CryptoManager Platform
  Secure provisioning and key management

Secure Services
- CryptoManager Trusted Services
  IoT Security Service

Secure Software
- Mobile Payments
  Secure payments and trusted transactions
- Smart Ticketing
  Simplified travel with mobile ticketing
Growth in Services at the Mobile Edge

Foundational Embedded Security
- Architectural Licenses, Cryptographic IP Cores
- Historic Business

Secure Device Management
- CryptoManager Core in Customer Chips
- Hardware Root of Trust & Provisioning Infrastructure

Trusted Transactions
Smart Transport
IoT Security
In-field secure services
Growing Opportunity in Mobile Edge

Source: ABI Research, Strategy Analytics, Gartner and Rambus estimates
Trust From Devices to Digital Assets

- Secure Devices
- Tokenization Software
- Secure Digital Assets

- Root-of-trust Cores
- Provisioning Services
- Tokens
- Keys
Security from Chip to Cloud to Crowd

- Trust by Design
- Secure Assets & Clusters
- Device Configurations & Customer Demands
- Applications & Services
- Customer Data & Intelligence

Manufacturing
- Over 9 billion chips/year with DPA license
- CryptoManager Cores and Infrastructure with Qualcomm and others
- Over 1.5 billion chips configured annually

In-field
- 100s of billions of payment and ticketing transactions secured
- Recently announced CryptoManager IoT Security Service

Moving Data Faster & More Securely
CryptoManager Platform Ecosystem

- **CryptoManager Platform**
  - Sell hosted service
  - License software + sell appliances
  - License cores + sell appliances
  - CM Root of Trust and Infrastructure

  - **CM SDK and Infra**
  - **CM Root of Trust and Infrastructure**

  - **OEM**
  - **Chip Maker**

  - **Platform as a Service (PaaS) Provider**

  - **Connected Devices**

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**Data • Faster • Safer**
Growing Revenue Base

Large portion of our revenue is fixed & predictable

<table>
<thead>
<tr>
<th>Quarter</th>
<th>ASC 606</th>
<th>ASC 605</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1'18</td>
<td>46.4</td>
<td>10.0</td>
</tr>
<tr>
<td></td>
<td>34.0</td>
<td>4.0</td>
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<tr>
<td>Q2'18</td>
<td>56.5</td>
<td>21.5</td>
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<td>35.0</td>
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<td>Q3'18</td>
<td>59.8</td>
<td>15.0</td>
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<td>44.7</td>
<td>2.5</td>
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<td>Q3'17</td>
<td>99.1</td>
<td>26.3</td>
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<td></td>
<td>68.8</td>
<td>2.4</td>
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<tr>
<td>Q4'17</td>
<td>101.9</td>
<td>43.2</td>
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<td>73.9</td>
<td>2.5</td>
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<td>Q1'18</td>
<td>100.5</td>
<td>19.9</td>
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<td>78.0</td>
<td>2.5</td>
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<tr>
<td>Q2'18</td>
<td>98.8</td>
<td>25.5</td>
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<td>73.3</td>
<td>2.5</td>
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<tr>
<td>Q3'18</td>
<td>99.8</td>
<td>20.1</td>
</tr>
<tr>
<td></td>
<td>79.8</td>
<td>2.5</td>
</tr>
</tbody>
</table>

- Q3’18 showed year-over-year revenue growth of 5% under ASC 605, excluding impact of Lighting Division
- Continue to leverage our high margin historic businesses to fuel growth in adjacent areas
# Non-GAAP Income Statement

<table>
<thead>
<tr>
<th>In Millions</th>
<th>ASC 606 Q1 2018</th>
<th>ASC 606 Q2 2018</th>
<th>ASC 606 Q3 2018</th>
<th>ASC 605 Q3 2017</th>
<th>ASC 605 Q4 2017</th>
<th>ASC 605 Q1 2018</th>
<th>ASC 605 Q2 2018</th>
<th>ASC 605 Q3 2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revenue</td>
<td>$46.4</td>
<td>$56.5</td>
<td>$59.8</td>
<td>$99.1</td>
<td>$101.9</td>
<td>$100.5</td>
<td>$98.8</td>
<td>$99.8</td>
</tr>
<tr>
<td>Total Operating Cost and Expenses¹</td>
<td>$68.7</td>
<td>$66.8</td>
<td>$67.6</td>
<td>$64.6</td>
<td>$68.4</td>
<td>$68.7</td>
<td>$66.8</td>
<td>$67.6</td>
</tr>
<tr>
<td>Operating Income (Loss)¹</td>
<td>($22.3)</td>
<td>($10.3)</td>
<td>($7.9)</td>
<td>$34.5</td>
<td>$33.5</td>
<td>$31.7</td>
<td>$32.0</td>
<td>$32.2</td>
</tr>
<tr>
<td>Operating Margin¹</td>
<td>-48%</td>
<td>-18%</td>
<td>-13%</td>
<td>35%</td>
<td>33%</td>
<td>32%</td>
<td>32%</td>
<td>32%</td>
</tr>
<tr>
<td>Diluted Earnings (Loss) Per Share¹</td>
<td>($0.10)</td>
<td>($0.03)</td>
<td>($0.01)</td>
<td>$0.19</td>
<td>$0.19</td>
<td>$0.21</td>
<td>$0.21</td>
<td>$0.22</td>
</tr>
</tbody>
</table>

¹Please refer to reconciliations of non-GAAP financial measures included in this presentation and in our earnings release

- Growth from product revenue, royalties and incremental licensing agreements
- Actively manage expenses through effective cost management
- Operating Income consistently in line with expectations
- Operating Margin expansion
- Delivering profitable growth
## Financial Strength

<table>
<thead>
<tr>
<th></th>
<th>Q3 2017</th>
<th>Q4 2017</th>
<th>Q1 2018</th>
<th>Q2 2018</th>
<th>Q3 2018</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total Cash &amp; Marketable Securities</strong></td>
<td>$183.6</td>
<td>$329.4</td>
<td>$291.2</td>
<td>$298.3</td>
<td>$248.2</td>
</tr>
<tr>
<td>Issued $172.5M convert and extinguished $56.8M of debt in Q4 17 and $81.2M of debt in Q3 18</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total Assets</strong></td>
<td>$824.1</td>
<td>$891.1</td>
<td>$1,539.7</td>
<td>$1,525.8</td>
<td>$1,344.0</td>
</tr>
<tr>
<td>Strong balance sheet with limited debt</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Stockholders’ Equity</strong></td>
<td>$589.5</td>
<td>$571.6</td>
<td>$1,119.0</td>
<td>$1,105.5</td>
<td>$1,009.0</td>
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<tr>
<td>$50M of cash used for share repurchases in Q2 17 and Q1 18</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Adjusted EBITDA¹</strong></td>
<td>$37.8</td>
<td>$36.8</td>
<td>$34.7</td>
<td>$34.6</td>
<td>$34.8</td>
</tr>
<tr>
<td>$117.4M Cash from Operations in 2017</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

¹Please refer to reconciliations of non-GAAP financial measures included in this presentation and in our earnings release
Investment Summary

- Focused on key technology areas in the Data Center & Mobile Edge
- Accelerating our growth through strategic acquisitions & execution of key programs
- Large portion of our cash flows are predictable and committed long-term
- Strong balance sheet to support strategic initiatives
Thank You
## Reconciliation of Non-GAAP Financial Measures

### Net Income (Loss) in Millions

<table>
<thead>
<tr>
<th></th>
<th>Q1 2018 (ASC 606)</th>
<th>Q2 2018 (ASC 606)</th>
<th>Q3 2018 (ASC 606)</th>
<th>Q2 2017 (ASC 605)</th>
<th>Q3 2017 (ASC 605)</th>
<th>Q4 2017 (ASC 605)</th>
<th>Q1 2018 (ASC 605)</th>
<th>Q2 2018 (ASC 605)</th>
<th>Q3 2018 (ASC 605)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GAAP Net Income (Loss)</strong></td>
<td>($36)</td>
<td>($15)</td>
<td>($104)</td>
<td>$3</td>
<td>$8</td>
<td>($36)</td>
<td>$6</td>
<td>$14</td>
<td>($71)</td>
</tr>
<tr>
<td><strong>Adjustments:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stock-based compensation</td>
<td>$8</td>
<td>$2</td>
<td>$6</td>
<td>$7</td>
<td>$7</td>
<td>$7</td>
<td>$8</td>
<td>$2</td>
<td>$6</td>
</tr>
<tr>
<td>Acquisition-related transaction costs &amp; retention bonus</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>Amortization</td>
<td>$11</td>
<td>$9</td>
<td>$5</td>
<td>$10</td>
<td>$11</td>
<td>$11</td>
<td>$11</td>
<td>$9</td>
<td>$5</td>
</tr>
<tr>
<td>Restructuring charges</td>
<td>$3</td>
<td>($1)</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$3</td>
<td>($1)</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>Non-cash interest expense / Loss on extinguishment of debt</td>
<td>$3</td>
<td>$3</td>
<td>$2</td>
<td>$2</td>
<td>$3</td>
<td>$3</td>
<td>$3</td>
<td>$2</td>
<td>$2</td>
</tr>
<tr>
<td>Provision for (benefit from) income taxes</td>
<td>($50)</td>
<td>($50)</td>
<td>$89</td>
<td>($6)</td>
<td>($6)</td>
<td>$36</td>
<td>($6)</td>
<td>($3)</td>
<td>$81</td>
</tr>
<tr>
<td><strong>Non-GAAP Net Income (Loss)</strong></td>
<td>($11)</td>
<td>($3)</td>
<td>($1)</td>
<td>$16</td>
<td>$22</td>
<td>$21</td>
<td>$24</td>
<td>$24</td>
<td>$24</td>
</tr>
</tbody>
</table>

### Operating Income (Loss) in Millions

<table>
<thead>
<tr>
<th></th>
<th>Q1 2018 (ASC 606)</th>
<th>Q2 2018 (ASC 606)</th>
<th>Q3 2018 (ASC 606)</th>
<th>Q2 2017 (ASC 605)</th>
<th>Q3 2017 (ASC 605)</th>
<th>Q4 2017 (ASC 605)</th>
<th>Q1 2018 (ASC 605)</th>
<th>Q2 2018 (ASC 605)</th>
<th>Q3 2018 (ASC 605)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GAAP Operating Income (Loss)</strong></td>
<td>($44)</td>
<td>($20)</td>
<td>($19)</td>
<td>$8</td>
<td>$17</td>
<td>$16</td>
<td>$11</td>
<td>$22</td>
<td>$21</td>
</tr>
<tr>
<td><strong>Adjustments:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stock-based compensation</td>
<td>$8</td>
<td>$2</td>
<td>$6</td>
<td>$7</td>
<td>$7</td>
<td>$7</td>
<td>$8</td>
<td>$2</td>
<td>$6</td>
</tr>
<tr>
<td>Acquisition-related transaction costs &amp; retention bonus</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>Amortization</td>
<td>$11</td>
<td>$9</td>
<td>$5</td>
<td>$10</td>
<td>$11</td>
<td>$11</td>
<td>$11</td>
<td>$9</td>
<td>$5</td>
</tr>
<tr>
<td>Restructuring charges</td>
<td>$3</td>
<td>($1)</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$3</td>
<td>($1)</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td><strong>Non-GAAP Operating Income (Loss)</strong></td>
<td>($22)</td>
<td>($10)</td>
<td>($8)</td>
<td>$25</td>
<td>$35</td>
<td>$34</td>
<td>$32</td>
<td>$32</td>
<td>$32</td>
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<tr>
<td>Depreciation</td>
<td>$3</td>
<td>$3</td>
<td>$3</td>
<td>$3</td>
<td>$3</td>
<td>$3</td>
<td>$3</td>
<td>$3</td>
<td>$3</td>
</tr>
<tr>
<td><strong>Adjusted EBITDA</strong></td>
<td>($19)</td>
<td>($7)</td>
<td>($5)</td>
<td>$29</td>
<td>$38</td>
<td>$37</td>
<td>$35</td>
<td>$35</td>
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</tr>
</tbody>
</table>

Certain amounts may be off $1M due to rounding.
## GAAP & Non-GAAP P&L

### ASC 606

<table>
<thead>
<tr>
<th>In $ Millions</th>
<th>GAAP Actual</th>
<th>Pro Forma Actual</th>
<th>Delta to GAAP</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Revenue</strong></td>
<td>59.8</td>
<td>59.8</td>
<td>0.0</td>
</tr>
<tr>
<td><strong>Cost of revenue</strong></td>
<td>11.3</td>
<td>7.3</td>
<td>(4.0)</td>
</tr>
<tr>
<td><strong>Research and development</strong></td>
<td>43.1</td>
<td>40.0</td>
<td>(3.2)</td>
</tr>
<tr>
<td><strong>Sales, general and administrative</strong></td>
<td>24.5</td>
<td>20.3</td>
<td>(4.1)</td>
</tr>
<tr>
<td><strong>Total operating costs and expenses</strong></td>
<td>78.9</td>
<td>67.6</td>
<td>(11.3)</td>
</tr>
<tr>
<td><strong>Operating loss</strong></td>
<td>(19.2)</td>
<td>(7.9)</td>
<td>11.3</td>
</tr>
<tr>
<td><strong>Interest and other income (expense), net</strong></td>
<td>4.0</td>
<td>6.2</td>
<td>2.2</td>
</tr>
<tr>
<td><strong>Loss before income taxes</strong></td>
<td>(15.1)</td>
<td>(1.6)</td>
<td>13.5</td>
</tr>
<tr>
<td><strong>Provision for (benefit from) income taxes</strong></td>
<td>89.1</td>
<td>(0.4)</td>
<td>(89.5)</td>
</tr>
<tr>
<td><strong>Net loss</strong></td>
<td>(104.2)</td>
<td>(1.3)</td>
<td>103.0</td>
</tr>
</tbody>
</table>

### ASC 605

<table>
<thead>
<tr>
<th>In $ Millions</th>
<th>GAAP Actual</th>
<th>Pro Forma Actual</th>
<th>Delta to GAAP</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Revenue</strong></td>
<td>99.8</td>
<td>99.8</td>
<td>0.0</td>
</tr>
<tr>
<td><strong>Cost of revenue</strong></td>
<td>11.3</td>
<td>7.3</td>
<td>(4.0)</td>
</tr>
<tr>
<td><strong>Research and development</strong></td>
<td>43.1</td>
<td>40.0</td>
<td>(3.2)</td>
</tr>
<tr>
<td><strong>Sales, general and administrative</strong></td>
<td>24.5</td>
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<td>(4.1)</td>
</tr>
<tr>
<td><strong>Total operating costs and expenses</strong></td>
<td>78.9</td>
<td>67.6</td>
<td>(11.3)</td>
</tr>
<tr>
<td><strong>Operating income</strong></td>
<td>20.8</td>
<td>32.2</td>
<td>11.3</td>
</tr>
<tr>
<td><strong>Interest and other income (expense), net</strong></td>
<td>(2.5)</td>
<td>(0.3)</td>
<td>2.2</td>
</tr>
<tr>
<td><strong>Income before income taxes</strong></td>
<td>18.3</td>
<td>31.9</td>
<td>13.5</td>
</tr>
<tr>
<td><strong>Provision for income taxes</strong></td>
<td>89.1</td>
<td>7.7</td>
<td>(81.4)</td>
</tr>
<tr>
<td><strong>Net income (loss)</strong></td>
<td>(70.7)</td>
<td>24.3</td>
<td>95.0</td>
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</tbody>
</table>

Certain amounts may be off $0.1M due to rounding.
Non-GAAP Provision for (Benefit from) Income Taxes

<table>
<thead>
<tr>
<th>ASC 606</th>
<th>Actual Q3'18</th>
<th>Actual Q2'18</th>
<th>Variance QoQ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provision for (benefit from) income taxes (GAAP)</td>
<td>89.1</td>
<td>(1.0)</td>
<td></td>
</tr>
<tr>
<td>Adjustment to GAAP provision for (benefit from) income taxes</td>
<td>(89.5)</td>
<td>0.1</td>
<td></td>
</tr>
<tr>
<td>Non-GAAP benefit from income taxes</td>
<td>(0.4)</td>
<td>(1.0)</td>
<td>0.6</td>
</tr>
</tbody>
</table>

Supplemental Reconciliation of GAAP to Non-GAAP Effective Tax Rate (1)

<table>
<thead>
<tr>
<th></th>
<th>Actual Q3'18</th>
<th>Actual Q2'18</th>
<th>Variance QoQ</th>
</tr>
</thead>
<tbody>
<tr>
<td>GAAP effective tax rate</td>
<td>(589)%</td>
<td>6%</td>
<td></td>
</tr>
<tr>
<td>Adjustment to GAAP effective tax rate</td>
<td>613%</td>
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<tr>
<td>Non-GAAP effective tax rate</td>
<td>24%</td>
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</table>

<table>
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<tr>
<th>ASC 605</th>
<th>Actual Q3'18</th>
<th>Actual Q2'18</th>
<th>Variance QoQ</th>
<th>Actual Q3'17</th>
<th>Variance YoY</th>
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<tr>
<td>Provision for income taxes</td>
<td>89.1</td>
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<td>Adjustment to provision for (benefit from) income taxes</td>
<td>(81.4)</td>
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<td>Non-GAAP provision for (benefit from) income taxes</td>
<td>7.7</td>
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<td>0.1</td>
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<td>(4.0)</td>
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</table>

Supplemental Reconciliation of GAAP to Non-GAAP Effective Tax Rate (1)

<table>
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<tr>
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<th>Actual Q3'18</th>
<th>Actual Q2'18</th>
<th>Variance QoQ</th>
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<tr>
<td>GAAP effective tax rate</td>
<td>484%</td>
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<tr>
<td>Adjustment to GAAP effective tax rate</td>
<td>(460)%</td>
<td>(1)%</td>
<td></td>
<td>(10)%</td>
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<tr>
<td>Non-GAAP effective tax rate</td>
<td>24%</td>
<td>24%</td>
<td>0%</td>
<td>35%</td>
<td>(11)%</td>
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</table>

(1) For purposes of internal forecasting, planning and analyzing future periods that assume net income from operations, the Company estimates a fixed, long-term projected tax rate of approximately 35 percent for 2017 and 24 percent for 2018, which consists of estimated U.S. federal and state tax rates, and excludes tax rates associated with certain items such as withholding tax, tax credits, deferred tax asset valuation allowance and the release of any deferred tax asset valuation allowance. Accordingly, the Company has applied these tax rates to its non-GAAP financial results for all periods in the relevant year to assist the Company’s planning. Certain amounts may be off by $0.1M due to rounding.
## Revenue Breakdown

In Millions

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<td>Q4'17</td>
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Certain amounts may be off $1M due to rounding.
## Revenue and Licensing Billings

**In Thousands**

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<th>ASC 605</th>
<th>ASC 605</th>
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<tr>
<td></td>
<td>Q1'18</td>
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<td>Q3'18</td>
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<tr>
<td>Royalty Revenue</td>
<td>$21,374</td>
<td>$30,049</td>
<td>$33,599</td>
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<td>Product Revenue</td>
<td>$7,313</td>
<td>$8,087</td>
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<td>Contract and Other Revenue</td>
<td>$17,739</td>
<td>$18,322</td>
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<td><strong>Total</strong></td>
<td>$46,426</td>
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<tr>
<td></td>
<td>Q1'18</td>
<td>Q2'18</td>
<td>Q3'18</td>
</tr>
<tr>
<td>Royalty Revenue</td>
<td>$21,374</td>
<td>$30,049</td>
<td>$33,599</td>
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<td>$75,924</td>
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<td><strong>Total</strong></td>
<td>$54,550</td>
<td>$43,161</td>
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1 Licensing billings is an operational metric that reflects amounts invoiced to our patent and technology licensing customers during the period, as adjusted for certain differences.
Product Overview
The Data Center
Data • Faster

- **Cores**
  - SerDes PHYs
  - Move data from chip to chip

- **Memory PHYs**
  - Move data between chips and memory

- **Chips**
  - Server DIMM Chipsets
  - Enables more capacity at high performance
Optimized for power and area, our line-up of SerDes Interface solutions deliver maximum performance and flexibility for today’s most challenging systems.

Fully Standards-Compatible
• Compliant with the latest industry-standard specifications
• Support for multi-modal functionality

Enhanced Design Flexibility
• Support for multiple packaging options
• Enhanced margin and yield

Reduced Power
• Improved power efficiency
• Lower signaling and stand-by power

Improved Performance
• Increased data rates
• Improved bandwidth
• Higher capacity
# Rambus High-Speed SerDes PHY Solutions

## Complete Solutions: SerDes PMA+ PCS, MAC (Partners)

<table>
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<tr>
<th>SerDes Rate</th>
<th>16G</th>
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<th>112G</th>
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<td>28nm &amp; 14nm</td>
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<td>14nm</td>
<td>10nm</td>
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</table>

- PCle 4/3/2
- CEI 11/6
- XFI/XAUI
- SATA
- SAS

- CEI-28/25/11/6
- 100/50/25GbE
- 10G-KR
- FC28
- XFI/XAUI

- CEI-56G MR
- CEI-56G LR
- CEI-28/25/11
- 400GbE
- PAM-4/NRZ

**LEAD CUSTOMERS**

## Integrated tools for easy bring-up and characterization

- Easy-to-use PC Interface
- Interface to 3rd party software
- Pre-defined test scripts
- PHY control settings
- External instrument control
- System characteristics and analysis

**LabStation Platform**

## Validated solutions with partners

- [PLDA](#)
- [avery design systems](#)
- [CoMIRA SOLUTIONS](#)
With their reduced power consumption and industry-leading data rates, our line-up of enhanced memory interface solutions support a broad range of industry standards with improved margin and flexibility.

**Fully Standards-Compatible**
- Compliant with the latest JEDEC and industry-standard specifications
- Support for multi-modal functionality

**Enhanced Design Flexibility**
- Support for multitude packaging options
- Enhanced margin and yield

**Reduced Power**
- Improved power efficiency
- Lower signaling and stand-by power

**Improved Performance**
- Increased data rates
- Improved bandwidth
- Higher capacity
Rambus Memory PHY Solutions

Memory PHY Solutions for Networking and Data Center

**DDR4/3**
- 28nm & 14nm
- 3200Mbps
- x16 – x72-bits
- 1-4 Ranks
- DFI 4.0

**HBM2**
- 14nm
- 2000Mbps
- 1024-bit
- 2.5D design architecture

**GDDR6**
- 12-16 Gbps
- 2x 16-bit channels

**DDR5 & HBM3**
- **ROADMAP**
- LabStation Platform

**Integrated tools for easy bring-up and characterization**
- Easy-to-use PC Interface
- Interface to 3rd party software
- Pre-defined test scripts
- PHY control settings
- External instrument control
- System characteristics and analysis

**Validated solutions with partners**

**Si**

*Data • Faster • Safer*
Built for speed, power efficiency and reliability, the DDRn chipsets for RDIMM, LRDIMM and NVDIMM server modules delivers the top-of-the-line performance and capacity needed to meet the growing demands on enterprise and data center systems.

**Industry-leading Performance**
- Fully-compliant with the latest JEDEC standards
- Operational speeds up to 3200 Mbps

**Enhanced Margin**
- Wide margin I/O design with advanced programmability
- Exceed JEDEC reliability standards for ESD and EOS

**Optimized Power**
- Advanced power management
- Frequency-based, low-power optimization

**Superior Debug and Serviceability**
- Integrated tools for bring-up and debug
- Works out-of-the-box with no BIOS changes required
Introducing DDR5 Server DIMM Chips

Rambus Announces Industry’s First Functional Silicon of Server DIMM Buffer Chipset Targeted for Next-generation DDR5 Memory Technology

Provides data center architects early path to next-generation memory speeds

SUNNYVALE, Calif. – Sept. 20, 2017 – Rambus Inc. (NASDAQ: RMBS) today announced functional silicon of a double data rate (DDR) server DIMM (dual inline memory module) buffer chip prototype for the next generation DDR5 memory technology. This represents a key milestone for Rambus and the industry’s first silicon-proven memory buffer chip prototype capable of achieving the speeds required for the upcoming DDR5 standard.
Rambus Server DIMM Chipset Solutions

Server DIMM Chipsets: enabling performance and capacity

**DDR3**
- JEDEC Compliant
- Speeds up to 2133
- Multiple OEM qualifications

**DDR4**
- JEDEC Compliant
- Speeds up to 3200
- Multiple OEM qualifications

**NV**
- JEDEC Compliant
- Speeds up to 3200
- Ongoing qualifications

**DDR5**
- Consistent with JEDEC direction

Smart tools for easy integration and reduced time to market

LabStation Platform and Buffer BIOS Integration Tool

Validated solutions with partners

Samsung
SK hynix
Micron
The Mobile Edge

Data • Safer

**Embedded Security**
- Secure Cores
  - Embedded device protection
- CryptoManager Platform
  - Secure provisioning and key management

**Secure Services**
- CryptoManager Trusted Services
  - IoT Security Service

**Secure Software**
- Mobile Payments
  - Secure payments and trusted transactions
- Smart Ticketing
  - Simplified travel with mobile ticketing
Embedded Security Cores

DPA Resistance

DPA Resistant Cores

- Cores and services
- Accelerate integration & TTM

Anti-Counterfeiting

CryptoFirewall Cores

- Consumable authentication
- Major printer OEMs

Content Protection

CryptoMedia Cores

- Integrated into Set top boxes
- Broadcast and OTT

---

**DPA Resistance**

**DPA Resistant Cores**

- Cores and services
- Accelerate integration & TTM

**Anti-Counterfeiting**

**CryptoFirewall Cores**

- Consumable authentication
- Major printer OEMs

**Content Protection**

**CryptoMedia Cores**

- Integrated into Set top boxes
- Broadcast and OTT
From security cores to high-performance secure device provisioning, the CryptoManager Security platform is a family of hardware security cores and provisioning infrastructure that creates a trusted path from the SoC manufacturing supply chain to downstream service providers with a complete silicon-to-cloud security solution.

**Improved Profitability**
- Improved time-to-market and reduced inventory waste
- Dynamic SKU and feature management lowers inventory costs
- Reduced operating costs through unified manufacturing and provisioning systems

**Superior Security**
- Provide a robust hardware root-of-trust
- Secure valuable secret keys, identity credentials, intellectual property, and other sensitive data
- Protect against cloning, counterfeiting, and reverse engineering

**Control the Value Chain**
- Actively monitor production status, availability, and inventory levels
- Validate process information through secure logs
- Proven in today’s high-volume manufacturing facilities
Security First: Implementing Trust by Design in Silicon

**Design Freedom**
- Root of trust designed from the bottom up for security
- Control all implementation starting with open RISC-V Instruction Set Architecture

**Siloed**
- Separate general and secure processing
- Optimize independently for performance and security

**Layered Security**
- Strongest security enforced in hardware at inner layer
- Outer layers are more flexible, but less trusted
CryptoManager Root of Trust

Secure Functionality:
- Secure Boot
- Remote Attestation
- Authentication
- Runtime Integrity

Custom RISC-V CPU
Secure Memory
Crypto Accelerators (AES, SHA, others…)

General Processing
Secure Processing
CryptoManager Embedded Security Infrastructure

**Offline Root Server**
System Root-of-Trust, manages high value keys, kept in secure facility, authorizes all provisioning activity

**CryptoManager Service**
Control center used for monitoring and managing all provisioning activity, typically located in chip maker data center

**CryptoManager Appliances**
Tamper proof HSM-enabled devices that connect directly to testers in the manufacturing facility

Diagram:
- Offline Root Server
- CryptoManager Service
- CryptoManager Appliances
- CryptoManager Control Center
- Admin Console
- CryptoManager Appliance Cluster
Flexible cloud-to-silicon secure provisioning platform to host, operate and manage on device security services, lifecycle management and applications services for OEMs, service providers and operators.

Device Lifecycle Management
- Cloud-to-silicon security ecosystem
- Secure provisioning, authentication, and device protection

Seamless Secure Connectivity
- Proven platform used to provision billions of chipsets
- Establish independent trust between devices and services

Flexible Platform Integration
- Provisioning infrastructure offered both as a cloud service and as a standalone product
- Secure services implemented via a hardware or software root-of-trust
CryptoManager IoT Security Services Ecosystem

- **CryptoManager Trusted Services**
  - Sell Security-as-a-Service
    - IoT Security Service

- **Platform as a Service (PaaS) Provider**
  - Provide software
    - IoT Security Service SDK

- **OEM**
  - Chip Maker

- **Connected Devices**
Leveraging a Rambus or 3rd-party root of trust, our IoT Security Service enables seamless secure connectivity and security lifecycle management of IoT devices.
Certified and award-winning management software to enable secure integration with mobile OEM pay and independent mobile wallets for banks and retailers.

**Improved Time-to-market**
- Reduce implementation time with a unified platform to connect to payment schemes and OEM Pay
- Compatible with existing EMV schemes and contactless infrastructure

**Enhanced User Experience**
- Retain branding and drive digital engagement with mobile wallet
- Support loyalty programs, gift cards and more for a unified purchasing experience

**Superior Security**
- Maintain user privacy without sharing data with schemes
- Utilizes HCE with tokenization to minimize unauthorized use of cardholder data

**Reduced Cost**
- Eliminate tokenization fees from payment schemes
- Save on transaction fees as the issuing and acquiring bank
Enabling Mobile Payments for NFC Devices

Token Service Provider

- Leverages Host Card Emulation (HCE) and tokenization to enable secure mobile payments
- Single interface to connect with multiple schemes and OEM Pay platforms
- Maintained up-to-date with latest TSP specifications
### New Account
- Create account with retailer
- Load CC info

### In-Aisle Purchase
- Chose an item, photo/scan to add to virtual cart
- Place item in cart or collect on check-out

### In-store Advertising
- Receive in-store coupons and recommendations based on cart items or geo-beacons
- Order-ahead goods or services

### Mobile Check Out
- Check out on mobile device and skip the lines
- Automatically accrue loyalty points

### Complete Shopping
- Print or show mobile receipt
- Collect items
- Go home happy

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**Consumer**

- Enable account-based retail
- Create integrated online-to-in store experience

**Retailer**

- Gather customer purchasing data, shopping trends
- Increase upsell and cross-sell opportunities
- Reduce CC transaction fees with integrated retail CC payments
- Reduce staff requirements for check-out lines
- Free up more in-store sq. footage for product

**Data • Faster • Safer**
Vaultify Trade

A Tokenization platform for the secure transaction and storage of digital assets on blockchain

• Combines multi-signature with bank-grade tokenization to enhance security, confidentiality and privacy of private keys

• First solution to enable banks, exchanges and investment companies to leverage tokens to securely buy, sell, trade and store crypto assets

• Integrates with existing mobile banking, trading and wallet apps for easy access to crypto assets
Improving Security of the Blockchain

1. Encrypted tokens are stored on end-user devices, while private keys to crypt assets remain safely stored in secure “warm” online vault.

2. Banks support fraud prevention rules.

3. Warm online vault signs transactions, while recovery keys remain safe in “cold” storage even if exchange is hacked.

4. Tokenization mitigates fraud risk to protect crypto assets.
Suitable for multi-modal transport solutions including rail, bus, ferry and taxi, our end-to-end smart ticketing solutions can be implemented in any transport scenario.

**Ease of Integration**
- Comprehensive solutions from back office, to mobile device, to smart card
- Compatible with existing smart systems and suppliers

**Improved Profitability**
- Enhanced business intelligence through account-based ticketing and data analytics
- Easy management of transaction data to ensure correct reimbursements

**Superior Security**
- Reduced risk of fraud with smart technology versus paper tickets
Comprehensive Smart Ticketing Solutions

- End-to-end smart ticketing solutions from back-office processing and traveler analytics, to online purchasing and remote download of tickets
- Leverages secure NFC and mobile technology to replace paper tickets
- Integrated systems for operators to manage passenger journey transactions and analytics to optimize transport systems
First to bring Smart Mobile Ticketing to Rail in UK

Enabling passengers on Scotland’s national railway to use their smartphone to purchase tickets and simply tap to travel.
Emerging Solutions
Data • Smarter

From concept to reality
Innovation • Research • Development
Advanced Research
Exploring avenues to surpass the slowing of Moore's Law and meet the needs of next-generation data centers through cryogenic and hybrid memory research.
Expanding to Prototypes with Microsoft Research

- Cryogenic Research Partner
- DRAM Partner
- FAB Partner
- Development
- Modeling

Rambus Cryogenic Research Station
Thank you