Taking aim at DRAM

Liqid and Intel® Optane™ Technology PCIe Add-in-Card (AIC) solid state drive (SSD) solutions combine the unparalleled high throughput, low latency, quality of service (QoS) and endurance of Intel® Optane™ Technology with Liqid’s industry-leading PCIe fabric technology to deliver higher user capacity and application performance. Achieving DRAM memory-like speeds, the Liqid and Intel Optane solution suite is available in capacities of up to 1.50 TB for high-value workloads.

The collaborative design between Liqid and Intel® offers an ultra-thin, standard form factor half-height half-length (HHHL) card that works seamlessly with systems that have existing PCIe slots. A Gen 3.0 x8 PCIe interface enables high-throughput and low-latency transactions. It utilizes the latest NVMe protocol in order to deliver increased performance and efficiency from a single device. The AIC outperforms legacy architectures by delivering 1.6 M IOPS of random performance, over 7 GB/s of throughput and ultra-low transactional latency of <10 µs.

The Liqid solutions also supports Intel® Memory Drive Technology software that extends system memory transparently. Intel® Memory Drive Technology integrates the SSD into the memory subsystem and makes it appear like DRAM to the OS and applications. As a fully transparent memory solution, no changes are required to the OS or applications.

Key Features

- High Performance Intel® Optane™ Technology
- Ultra Fast PCIe 3.0 x8 Interface
- NVMe 1.0 Protocol Supported
- High Capacity Design, up to 1.50TB
- Standard Form Factor SSD
- Low Profile HHHL Card
- Plug-n-Play Compatibility
- UEFI Boot Support
- Enterprise Grade Reliability
- Non-Volatile Storage Media
- Active Thermal Throttling
- Active Power Management
- Advanced ECC and Data Protection
- Advanced Error Recovery
- Active Telemetry Monitoring
- Low Overhead Architecture
- No Host CPU or DRAM Off Load
- RAID on Card Supported
- Intel® Memory Drive Technology Software Support for DRAM Emulation

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### Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Model: Element LQD3900 PCIe AIC SSD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raw Capacity</td>
<td>Up to 1.50 TB</td>
</tr>
<tr>
<td>Media Type</td>
<td>Intel® Optane™ Technology</td>
</tr>
<tr>
<td>Read Bandwidth (GB/s)</td>
<td>~7.0</td>
</tr>
<tr>
<td>Write Bandwidth (GB/s)</td>
<td>~7.0</td>
</tr>
<tr>
<td>Ran. Read IOPS (4k)</td>
<td>~1,600,000</td>
</tr>
<tr>
<td>Ran. Write IOPS (4k)</td>
<td>~1,600,000</td>
</tr>
<tr>
<td>Read Access Latency</td>
<td>~10 μs</td>
</tr>
<tr>
<td>Write Access Latency</td>
<td>~10 μs</td>
</tr>
<tr>
<td>Protocol</td>
<td>NVMe 1.0</td>
</tr>
<tr>
<td>Bus Interface</td>
<td>PCI Express 3.0 x8</td>
</tr>
<tr>
<td>Endurance</td>
<td>Up to 164 PBW*</td>
</tr>
<tr>
<td>Security</td>
<td>256 Bits AES Data Encryption</td>
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<tr>
<td>Weight</td>
<td>6-10 oz</td>
</tr>
<tr>
<td>Warranty</td>
<td>3 years, or maximum endurance used</td>
</tr>
<tr>
<td>Form Factor</td>
<td>Standard Form Factor HHHL Card</td>
</tr>
<tr>
<td>Temperature</td>
<td>Op: 0 to 55 deg C</td>
</tr>
<tr>
<td></td>
<td>Non-Op: -40 to 75 deg C</td>
</tr>
<tr>
<td></td>
<td>Active: ~30 W Typical</td>
</tr>
<tr>
<td>Power</td>
<td>Input: 12 V Only (optional aux power cable)</td>
</tr>
<tr>
<td>Air Flow</td>
<td>Min 400 LFM</td>
</tr>
<tr>
<td>Humidity</td>
<td>5% to 95% (non-condensing)</td>
</tr>
<tr>
<td>Altitude</td>
<td>0 ft to 10,000 ft</td>
</tr>
<tr>
<td>Operating Environments</td>
<td>Windows, Windows Server 2012, 2012 R2</td>
</tr>
<tr>
<td></td>
<td>RHEL; SLES; CentOS, Solaris, SUSE, VMware</td>
</tr>
<tr>
<td>Agency &amp; Safety</td>
<td>UL, CB, CE, CCS, KCC, HF, BSMI, VCCI, FCC Class B and CISPR Class B, JEDEC</td>
</tr>
</tbody>
</table>

### Selections

- **Liqid and Intel® Optane™ SSD:**
  - LQD-E1APNIA04P001T50
    - 1.50TB, Intel® Optane™, NVMe PCIe Gen 3.0 x8 HHHL AIC SSD
  - LQD-E1APNIA04P800T00
    - 800GB, Intel® Optane™, NVMe PCIe Gen 3.0 x8 HHHL AIC SSD

- **Liqid and Intel® Optane™ Persistent Memory:**
  - LQD-E1APNIA04PM001T50
    - 1.50TB, Intel® Optane™ Memory, NVMe PCIe Gen 3.0 x8 HHHL AIC SSD
  - LQD-E1APNIA04PM800G00
    - 800GB, Intel® Optane™ Memory, NVMe PCIe Gen 3.0 x8 HHHL AIC SSD

Please contact your sales rep for more information and to determine which configuration is best for use. Specification subject to change without notice.

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### Contact Information

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### About Liqid

A leader in composable infrastructure, Liqid enables users to configure and manage physical, bare-metal server systems in seconds. Storage, compute, networking and graphics processing devices are interconnected over PCI-Express fabric to deliver dynamically configurable bare-metal servers perfectly sized with the exact physical resources required by the application being deployed.

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Intel® Memory Drive Technology software enables the Liqid and Intel® Optane™ solutions to be fully integrated into the memory subsystem and presented transparently to the OS and applications layer as native DRAM. The technology also supports NVMe storage without DRAM emulation.

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