Greenliant®

G-CARD®

Product Description

G-card® NVMe flash cards are designed to provide high reliability, high performance and large capacity for demanding enterprise and Internet datacenter applications. They combine Greenliant's advanced controller and an array of NANDrive™ solid state drives organized in RAID groups, in a standard PCIe add-in card form factor. G-card's advanced architecture supports Concurrent Read / Write operations with sustainable low latency, giving users a consistent performance experience. Dedicated power failure detection with backup power circuitry is built in to prevent data integrity issues due to sudden power interruptions.

Using 2-bits-per-cell (MLC) NAND flash equipped with the hardware RAID and intelligent error management algorithms that substantially improve the system-level endurance far beyond that of the NAND component, G-card offers modern datacenters a cost-effective and highly reliable tier-one primary storage solution.

Key Features

Industry Standard PCIe Interface / Form Factor
- PCI Express 2.0 x4 flash card
- Compatible NVMe 1.0d
- Full height, Half length
- Fits into x4, x8, x16 non-graphics card slots

Large Storage Capacity
- G7101: 900 GB (1.37 TB Raw)
- G7102: 1.8 TB (2.75 TB Raw)

High Endurance
- 10 Drive Writes Per Day (DWPD) for 5 years

Boot Support
- Bootable with major operating systems

Energy Efficient
- Active Mode: 25W (typical)
- Idle Mode: 12W (typical)

Dedicated Power Interrupt Data Protection
- Prevents data corruption when power is lost

DataCore Ready
- Compatible with SANsymphony-V10

Fast Read/Write Performance
- Concurrent Sequential Read/Write: 900 MB/s (typical)
- Sequential Read: 875 MB/s (typical)
- Sequential Write: 850 MB/s (typical)
- Random Read (4KB): 130K IOPS (typical)
- Random Write (4KB): 60K IOPS (typical)
- Supports TRIM command

Ultra Low Read/Write Latency
- Delivers sustainable, low latency for optimized performance
- Sequential Read/Write: 80µs/20µs (typical)
- Random Read/Write: 130µs/22µs (typical)

Built-in Hardware RAID
- Protects against uncorrectable errors
- Unrecoverable Bit Error Rate (UBER): 1 sector per 10^{28} bits read

VMware Ready
- vSphere ESXi 5.5, 5.5 U1/U2, 6.0 certified

Software Tools
- Uses Greenliant's G-command software for advanced PCIe card management
- Enables SMART command-based alerts indicating the remaining useful product life
- Allows users to update firmware and securely erase data
- Configures capacity based upon specific application usage models

Supported Operating Systems
- MS Windows Server 2008 R2 64-bit
- MS Windows Server 2012 R2 64-bit
- CentOS 5.5/ 5.8/ 5.10 64-bit
- CentOS 6.3/ 6.4/ 6.5/ 7.0 64-bit
- RHEL 6.0/ 6.1/ 6.2/ 6.3/ 6.4/ 6.5 64-bit
- RHEL 7.0 64-bit
- Oracle Linux Server 6.5 64-bit

Operating Temperature
- 0°C to +55°C with 200 Linear Feet per Minute (LFM) airflow

Multiple Cards for Primary Storage

With multiple cards installed inside a server for primary storage applications, G-card shows excellent scalability and outperforms other primary solutions in bandwidth, IOPS, latency, power consumption, footprint, initial cost and total cost of ownership.

| RAID0	Raw Capacity (TB) G7101 / G7102	Sequential Read** (typical)		Sequential Write** (typical)		Concurrent* Read / Write (typical)	4KB Random** Read (typical)		4KB Random** Write (typical)		Power (typical)
		Bandwidth (GB/s)	Latency (µsec)	Bandwidth (GB/s)	Latency (µsec)	Bandwidth (GB/s)	IOPS (k)	Latency (µsec)	IOPS (k)	Latency (µsec)	
2 cards	2.7 / 5.5	1.75	80	1.70	24	1.80	250	130	120	30	50 W
4 cards	5.5 / 11	3.50	80	3.40	24	3.60	500	130	240	30	100 W
8 cards	11 / 22	7.00	80	6.80	24	7.20	1000	130	480	30	200 W

* Concurrent with 90% Read and 10% Write   ** Performance measured with Queue Depth 256 per G-card and aggregated across all G-cards. Measurements performed on 80% logical block addressing (LBA) span of G-card storage to demonstrate the typical application usage model.

Applications

— *Cloud Computing*
— *Enterprise Datacenter*
— *Online Transaction Processing (OLTP)*

— *Web / Applications Hosting*
— *Content Delivery Network (CDN)*
— *Computer Aided Design (CAD)*

— *High-Performance Database*
— *Virtual Desktop Infrastructure (VDI)*
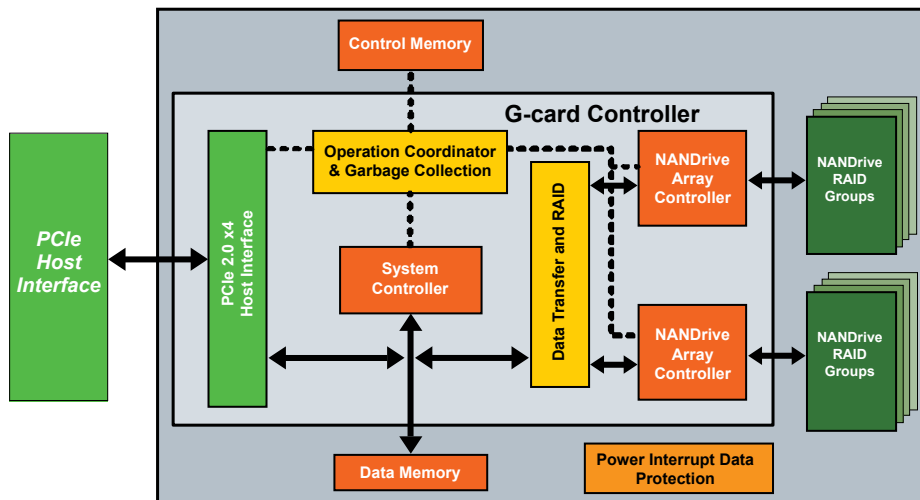— *Big Data Analytics*

G-card Board Diagram

111.15mm x 167.65mm x 18.42mm
PCI Express 2.0 x4 (Full Height, Half Length)
RoHS compliant

64,13±0,25
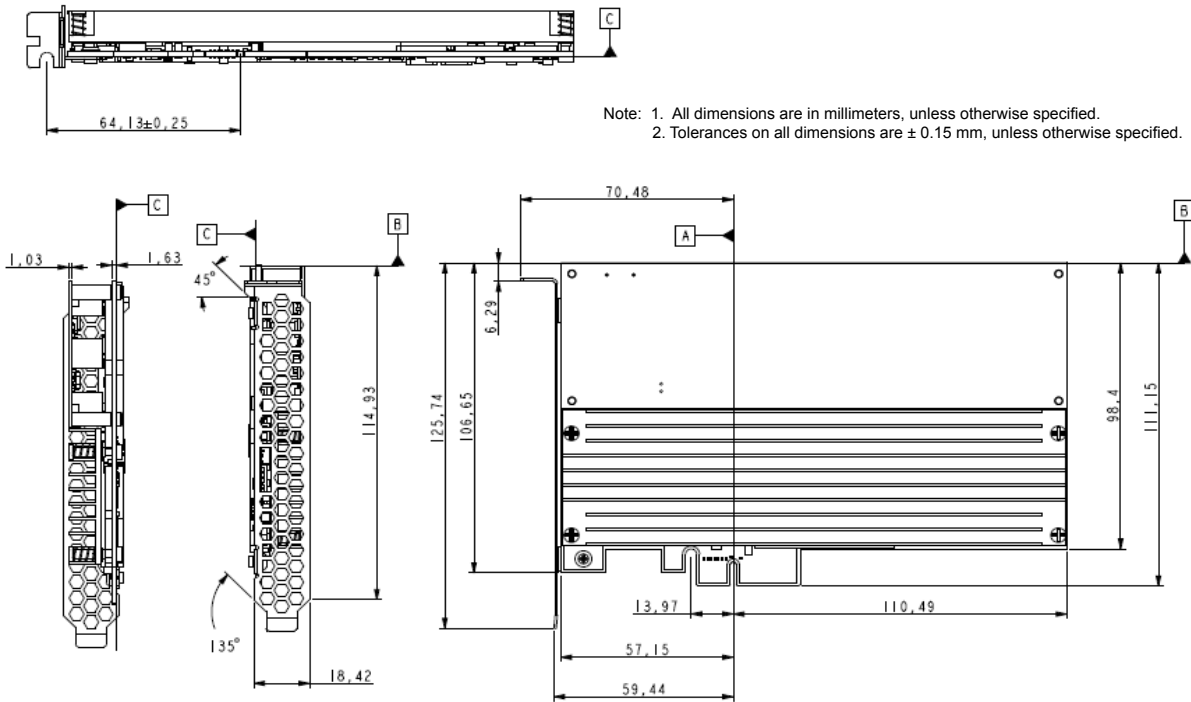
Note: 1. All dimensions are in millimeters, unless otherwise specified.
2. Tolerances on all dimensions are ± 0.15 mm, unless otherwise specified.

1,03   1,63   45°   70,48   A

114,93   6,29   125,74   106,65   98,4   111,15

135°   18,42   13,97   110,49

57,15   59,44

G-card Block Diagram

Control Memory

G-card Controller

Operation Coordinator & Garbage Collection

PCIe Host Interface

PCIe 2.0 x4 Host Interface

System Controller

Data Transfer and RAID

NANDrive Array Controller

NANDrive RAID Groups

NANDrive Array Controller

NANDrive RAID Groups

Data Memory

Power Interrupt Data Protection

For more information please contact your local Greenliant Sales Representative.
See the "Sales" page of www.Greenliant.com for complete listings.