



# NVDIMM: Persistent Memory

## Netlist NVDIMM DDR4 JEDEC Standard Module Combines DRAM Capacity/Performance with NAND Persistence

Non-volatile dual in-line memory module (NVDIMM) is persistent memory that combines DRAM and storage in a 288pin DIMM socket. The NVDIMM operates as a standard registered DIMM (RDIMM) and drops into the DDR4 memory channel. The device has a DDR4 protocol that is JEDEC compliant and has DRAM latency and bandwidth. A non-volatile persistent memory solution that provides performance and persistence for a broad range of enterprise server and storage applications.

### Applications:

- Logging
- Journaling
- RAID Cache
- In-memory database
- Big data analytics

### Advantages & Benefits:

- JEDEC NVDIMM compliant
- Fast backup times – 5s/GB
- High energy ultrathin supercap at 55°C
- High performance 2DPC configuration
- Virtual zero erase time
- Integrated into x86 BIOS
- 30x greater IOPs vs. NVMe SSD\*
- 1000x lower latency vs. NVMe SSD
- 15x greater write bandwidth vs. NVMe SSD

### NVDIMM Operation

The Netlist NVvault NVDIMM-N implements the JEDEC compliant DDR4 RDIMM and NVDIMM-N and logic subsystem that preserves the contents of the DRAM during system power losses. The NVDIMM consists of NAND components to store the DRAM data, isolation components to decouple the DIMM from the system during power failure, a backup power circuit to provide power to the DIMM during power failure, and a logic device to control the operations. NVvault backups to and restores from NAND allowing data to be preserved through a power loss. During this operation, the DRAM is completely isolated from the normal system memory bus and cannot be accessed by the system. The system controls the configuration and operation of NVvault via a register set accessible through the SMBus.

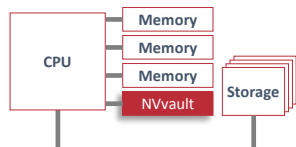
### NVDIMM Configuration

8GB DDR4 NVDIMM 2400/2666 – Available Now  
 16GB DDR4 NVDIMM 2400/2666 – Available Now  
 LARGER CAPACITIES COMING SOON

### 8/16GB NVDIMM DDR4 Performance

1DPC 2666MTs  
 2DPC 2666MTs

### Memory Architecture NVDIMM in Memory Channel



#### Ultracapacitor Backup

- Provides power to move vital data contents from DRAM to flash during a system or power failure event
- Eliminates battery
- Multiple options: Ultrathin Pack/PCIe Card/2.5 Drive Bay"

- Facilitates backup/restore functionality
- Register access for temp monitoring, ultracapacitor and flash statistics
- Legacy and JEDEC



Netlist NVDIMM  
Controller



x86  
Compatibility



uPMU™  
Technology



High  
Performance

## Technical Specifications: NVDIMM

Platform support	Supported on Intel x86-based servers with DDR4 RDIMM slots
Operating Temperature	0°C to 70°C
DIMM type	NVDIMM-N, Hybrid DIMM
DIMM capacity	8/16GB
Native speed (MT/s)	2666, 2400, 2133
Non-volatile media	NAND flash
Non-volatile media capacity	2X over provision
NVDIMM Latency	JEDEC
Operating system	Linux 4.5+ kernel; Windows Server 2016
JEDEC Memory Interface	Registered
Dimension (W x D x H)	JEDEC Compliant to MO-309

## Why Netlist

- Inventor of NVDIMM
- Inventor of LRDIMM
- Strategic Partnership with Samsung®
- Ultrathin Supercapacitor, NVDIMM-N and SCM Roadmap
- Full kit (DIMM & Supercap) solution from one supplier

## Supported Platforms and Operating Systems

It is supported by a wide range of leading servers and operating systems including:

- x86 servers that support DDR4 NVDIMM slots
- Linux 4.5+ kernel versions
- Windows Server 2016

## Resources

To learn more go to <http://www.netlist.com/products/vault-memory-storage/vault-memory-storage-overview/>

## Application use cases

<http://www.netlist.com/use-cases/application-use-cases/default.aspx>

## Part Numbers

8GB DDR4 NVDIMM P/N: NV4884SDT21-211NLx001 (JEDEC, 2666MTs, Supercap option)  
 16GB DDR4 NVDIMM P/N: NV4A84SBT21-211NLx001 (JEDEC, 2666MTs, Supercap option)  
 8GB DDR4 NVDIMM P/N: NV4874SDT20-133NLx001 (Legacy, 2400MTs, Supercap option)  
 16GB DDR4 NVDIMM P/N: NV4A74SBT20-133NLx001 (Legacy, 2400MTs, Supercap option)  
 340F x 1 uPMU P/N: UC190-8-6  
 340F x 2 uPMU P/N: UD190-0-6  
 340F x 2 uPMU 2.5in Drive Bracket P/N: UG220-B-6  
 340F x 4 uPMU 2.5in Drive Bracket P/N: UG220-A-6  
 340F x 1 uPMU HHHL PCIe Card P/N: UH190-8-6  
 340F x 2 uPMU HHHL PCIe Card P/N: UH190-0-6