Innodisk Server Solutions

Reliable and High-performance Flash Storage, Memory, and Embedded Peripherals Optimized for Servers

innodisk

Introduction

Requirements

- Sustained performance
- Quality assurance
- Scalability
- Energy Efficiency
- Product longevity and support
- Customizability and adaptability
- Interconnectivity and system compatibility

No matter the application, server components need to meet the same basic requirements: speed, scalability, longevity, and energy efficiency. With Innodisk's comprehensive lineup of flash storage devices and DRAM modules optimized for server use, these requirements are easily fulfilled.

Packing optimal performance in compact and innovative form factors, Innodisk's flash storage and memory solutions are perfect for server applications.

Innodisk's cable-less power technology allows server boot up to be handled in a highly efficient way that simultaneously frees up more space for storage. Leveraging Innodisk's low-profile and high-performance DRAM modules, server operations always run smoothly while also enabling optimal server airflow.

Using Innodisk's embedded peripherals, system operators can also equip their servers with additional features without sacrificing system reliability or low thermal and energy footprints.

Combining a broad and server-optimized product portfolio with the industry's best customer service and smart software solutions, Innodisk can deliver unmatched solutions for any server application.

The Innodisk Solution

Innodisk delivers hardware, firmware, and software solutions optimized for demanding server applications and ready to take on any challenge. Innodisk's DRAM modules, flash storage, and embedded peripherals are designed with the highest workloads and most strenuous server applications in mind to provide unwavering performance and unparalleled longevity.

Innodisk's DRAM modules offer exceptional performance and exclusive technologies in a wide variety of server-optimized form factors – ensuring the highest possible performance with the lowest energy consumption and thermal footprint. Available in form factors and configurations for any server requirements, Innodisk's DRAM modules are always the right choice for all your server applications.

Flash storage solutions from Innodisk deliver industry-leading performance and innovative features in form factors ideal for server applications. By leveraging Innodisk's exclusive firmware technologies and state-of-the-art engineering, these server flash storage solutions guarantee the highest level of security and system stability. This, combined with form factors and technologies such as cable-less power and high-capacity SATADOM drives, enable Innodisk's flash storage solutions to take any server application to the next level.

Leveraging Innodisk's embedded peripherals, system operators can equip their servers with additional capabilities to make them useful in even more applications.

Certifications

Innodisk's DRAM products are CMTL-certified, ensuring compatibility with leading manufacturers' motherboards.

Innodisk's Server Boot Up drives have all passed the Windows Server 2016 WHCK/WHQL test, and are supported in the Hyper-V environment.

Innodisk's DRAM solutions are fully compliant with the JEDEC memory standards.

Innodisk products are compliant with the European Union's Restriction of Hazardous Substances Directive (RoHS).

Our Advantages

Exclusive Firmware Technology and Solutions

Innodisk's flash storage devices run on in-house developed firmware optimized for providing unparalleled performance and reliability in demanding industrial applications. Innodisk also provides custom firmware solutions, tailoring controller firmware according to clients' specific needs and unique challenges. With Innodisk's firmware technology, flash storage devices reach their full potential in any application – bringing critical benefits such as performance enhancement, endurance extension, and data retention improvement.

Innovation and Design

Solving new challenges with innovation and intelligent design is central to Innodisk's mission and a key benefit provided to clients. Innovations such as Innodisk's patented SATADOM Pin 7 cable-less power deliver expertly engineered solutions that empower customers' applications with smart new ways that solve persistent engineering challenges

Always in It for the Long Haul

When working with clients and suppliers, Innodisk always takes a long-term approach to the partnership to ensure the best results – from the first contact to after-sales service and beyond. This commitment to long-time support of clients also extends to Innodisk's products and services, with Innodisk's products designed to not only stand testing operating environments but also stand the test of time.

Superior Memory with Original IC

Integrated circuits used in DRAM modules come in different grades depending on their quality and manufacturer guarantees. Innodisk exclusively uses the highest grade, original IC, which is thoroughly tested by the IC manufacturer and identified as the top-of-the-line ICs. With original IC, the customer also enjoys superior warranties and after-sales support unavailable with lower IC grades.

Leveraging the in-house developed and world-exclusive iRAM testing software, Innodisk can seamlessly identify any underperforming components in DRAM modules. iRAM simulates demanding real-world computing scenarios to make sure that DRAM components are fully up to the task. Combined with Innodisk's other stringent DRAM testing procedures, iRAM guarantees flawless modules fully prepared for the hard work in store for them.

Guaranteeing Only the Best with iRAM

Anti-sulfuration for Advanced Environmental Protection

Sulfide gas is a common challenge in many applications and poses a real threat to DRAM modules by DRAM resistors or DRAM materials, which lowers conductivity, and eventually causes the module to fail. Innodisk's anti-sulfuration technology fully addresses this challenge by covering resistors with a sulfur-resistant material – ensuring that modules are fully protected against environmental threats. Better yet, anti-sulfuration is included for free with all Innodisk's DDR4 DRAM modules.

For applications in extreme temperature environments, Innodisk's wide temperature series of DRAM modules provide excellent and stable performance in temperatures from -40 °C to 85 °C. Designed from the ground up to operate in extreme temperatures, these DRAM modules do not only tolerate wide temperature environments – they are crafted to excel there.

Memory That Excels in Wide Temperatures

Powerful RAID Expansion

Innodisk's RAID expansion cards provide a simple and straightforward way to introduce data redundancy and capacity aggregation support in any system. With a range of form factors and input interfaces, these RAID expansion modules are ideal for making any system more powerful. Innodisk's RAID expansion cards support iRAID, an intelligent software tool for RAID management and device monitoring.

With Innodisk's embedded display cards, users can easily add graphical capabilities to their systems with little impact on power consumption and system temperatures. With an advanced 2D graphics engine and support for up to 4K resolutions across many different outputs, these display cards bring impressive capabilities in space-saving and rugged designs.

Smarter Display Cards

Innodisk's industrial-grade server solutions equip servers to take on any challenge – present and future.

Boot Up-certified and Server-ready Flash Storage Solutions

Innodisk's server-optimized SATADOM and M.2 drives provide excellent IOPS to boost system performance and deliver high endurance for long-term use. Leveraging Innodisk's long industry track record and industry-leading firmware expertise, these flash storage devices and their firmware have been optimized to maximize performance in server applications – providing unparalleled customer value.

Features

iSLC
Innodisk's exclusive iSLC technology offers a cost-effective way to achieve both high capacity and high performance. iSLC is engineered to deliver high reliability for continuous operation alongside the endurance needed for frequent random read/write operations – making it ideal for server boot up drives.

iRetention
Innodisk's exclusive iRetention firmware feature maintains data retention even when up against aging NAND flash and extreme temperature variations. As a result, iRetention significantly extends the SSD retention time compared to standard NAND flash specifications.

iPower Guard
Innodisk's Power-on Protection is a circuit protection feature designed to allow uninterrupted SSD functionality in an inconsistent power supply situation, as well as provide accelerated boot-up for emergency startups or system shutdowns.

AES Hardware Encryption
AES hardware encryption provides exceptional data security without sacrificing any performance. With AES hardware encryption, the encryption engine is located in the SSD controller, avoiding any impact on CPU performance while enabling the complete destruction of all data within less than a second.

TCG Opal 2.0
TCG Opal 2.0 is a set of security specifications published by the Trusted Computing Group that ensure exceptional security in self-encrypted data storage devices. TCG Opal-compliant flash storage devices provide operators with excellent tools that guarantee a high level of data security without sacrificing usability and control.

Flash Storage

SATADOM®

Innodisk's Serial ATA Disk on Module (SATADOM®) is the world's smallest form factor with exclusive built-in Pin 7 and Pin 8 VCC, which simplifies motherboard design. Since it has no external cables, it is more robust and enhances the disk functions of various industrial and enterprise applications. Innodisk's SATADOM® also supports the SATA II and SATA III interfaces with faster data transfer rates and is available in capacities ranging from 512 MB up to 256 GB.

Multiple Power Sources

For even easier integration, Innodisk's proprietary cable-less power design enables VCC power through a dedicated pin. The additional pin makes the connection more robust while simultaneously allowing for a completely cable-less integration. SATADOM® also allows for a multitude of external power cable solutions.

1 External power cable

2 VCC through the extra pins on each side of connector

3 SATA Pin 7 power VCC
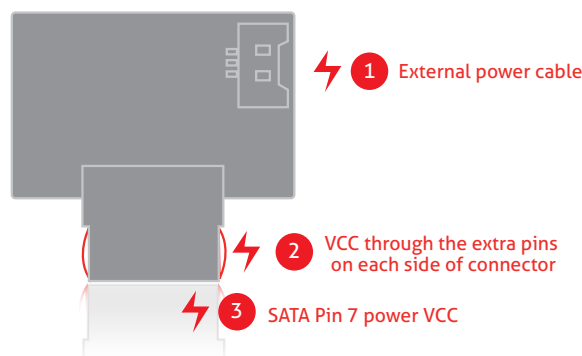
Small Form Factor

The SATADOM® form factor is designed for 1U racks, allowing it to fit seamlessly into any server setup. Since SATADOM® has made a name for itself in the market, many of the major server board providers already offer products designed with independent SATADOM® connectors for server boot up applications.

Model Name	SATADOM-SL 3IS4	SATADOM-ML 3IS4	SATADOM-ML 3IS2-P
	1. Industrial-grade firmware with iSLC technology 2. Advanced LDPC ECC engine 3. Internal RAID technology 4. Designed to fit 1U server chassis 5. Pin 7/Pin 8 power supply 6. Power loss protection with iData Guard	1. Industrial-grade firmware with iSLC technology 2. Advanced LDPC ECC engine 3. Internal RAID technology 4. Designed to fit 1U server chassis 5. Pin 7/Pin 8 power supply 6. Power loss protection with iData Guard	1. Industrial-grade firmware with iSLC technology 2. Advanced LDPC ECC engine 3. Internal RAID technology 4. Designed to fit 1U server chassis 5. Pin 7/Pin 8 power supply 6. Power loss protection with iData Guard
Interface	SATA III 6Gb/s		
Flash Type	iSLC		
Capacity	16GB~64GB	32GB~128GB	16GB~128GB
Max. Channel	2	2	2
Sequential R/W (MB/sec, max.)	530/350	540/400	560/350
Random 4K R/W (IOPS, max)	31K/30K	31K/31K	75K/81K
Max. Power consumption (Operation)	1.02W(5V x 204mA)	0.815W (5V x 163mA)	1.98W(5V x 396mA)
Thermal Sensor	Y	Y	Y
External DRAM Buffer	N	N	N
iData Guard	Y	Y	Y
AES 256bit	N	N	N
TRIM	Y	Y	Y
ATA Security	Y	N	Y
S.M.A.R.T	Y	Y	Y
Dimension (WxLxH/mm)	33.06 x 29.6 x 10.5	33.06 x 29.6 x 10.5	37.17 x 31.5 x 10.2
Environment	Vibration: 20G@7~2000Hz Shock: 1500G@0.5ms Storage Temperature: -55°C ~ +95°C MTBF: >3 million hours		
Standard Temp. OP (0°C~+70°C)	DSSSL-XXXM413C***#	DSSML-XXXM413C***#	DSSML-XXXD813C***#
Wide Temp. OP (-40°C~+85°C)	DSSSL-XXXM413W***#	DSSML-XXXM413W***#	DSSML-XXXD813W***#
Notes	xxx = density (04GB=04G, 08GB=08G, 16GB=16G, 32GB=32G, 64GB=64G, 128GB=A28, 256GB=B56) ***= flash configuration (internal control code) #=power supply method(A=pin 8+ external power cable / B=Pin 7+ Pin 8 / F=Pin 7)		

SATADOM® Advantages

Independent OS

- Independent OS storage that doesn't occupy any additional storage bays.
- Makes more space available for hot-swappable drives and backup solutions.

OS Redundancy

Since the SATADOM® device contains the OS and critical software applications, a secondary device can automatically be reconfigured as a boot drive in the event of the first device failing.
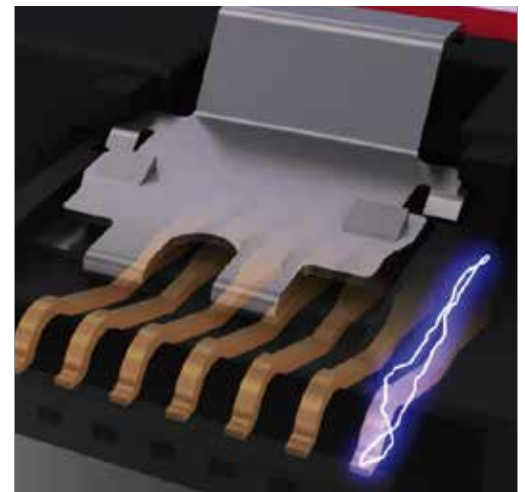
Cable-less SATA Power

Cable-less power supply with Innodisk's patented Pin 7/Pin 8 design.

Small Form Factor

Lower than 1U (44.5mm), designed for 1U server space.

M.2-SATA(NGFF)

The M.2-SATA form factor, previously known as the Next Generation Form Factor (NGFF), is comprised of several interfaces with a 67-pin edge card connector. Innodisk M.2-SATA flash storage devices come in capacities from 8 GB to 512 GB.

Features

- Uses SATA 6 Gb/s interface, compliant with M.2 type 2280 (B + M-key)
- Excellent data transfer speed in a small form factor
- iCell technology for power loss protection (optional)
- Supports iSMART disk health monitoring
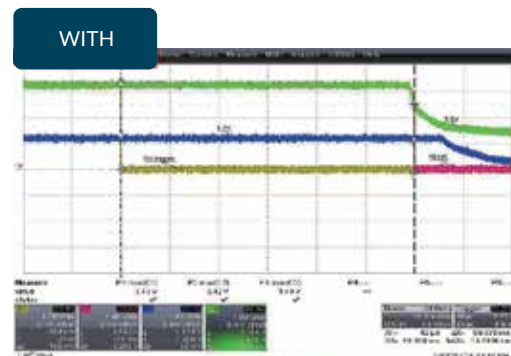
iCell's tantalum capacitors.

iCell - Power Loss Protection and Health Monitoring

Innodisk's iCell is a smart data protection technology that is designed into the M.2 storage device with several tantalum capacitors. These capacitors deliver an instantaneous discharge when low voltage is detected, allowing iCell to provide extended power to complete any command in progress and transferring all data stored in the DRAM buffer to the NAND flash – ensuring complete data integrity in the event of a power failure. By combining iCell with Innodisk's iSMART, the user can periodically check the health status of iCell capacitors and determine if further action is needed or if the drive needs to be replaced.
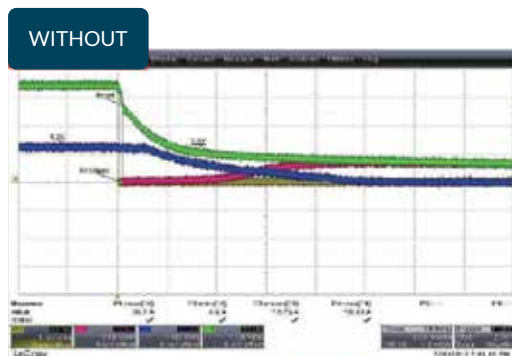
WITHOUT

WITH

Sudden power outage without iCell.

Sudden power outage with iCell.

Model Name	M.2 (S80) 3IS4	M.2 (S80) 3IS2-P	M.2 (S80) 3IE6-P
Interface	SATA III 6.0Gb/s		
Flash Type	iSLC		
Capacity	8GB~128GB	16GB~512GB	32GB~512GB
Max. Channel	2	4	4
Sequential R/W (MB/sec, max.)	530/360	530/460	560/510
IOPS(4K random read/write)	31K/31K	51K/47K	
Max. Power consumption (operation)	1.2W (3.3V x 370 mA)	1.4W (3.3V x 435mA)	2.64W(3.3Vx800mA)
Thermal Sensor	Y	Y	Y
External DRAM Buffer	N	Y	Y
iCell	Y	Y	Y
iData Guard	N	N	N
TRIM	Y	Y	Y
ATA Security	Y	Y	Y
S.M.A.R.T	Y	Y	Y
Dimension (WxLxH/mm)	22.0 X 80.0 X 3.2	22.0 x 80.0 x 3.5	22.0 x 80.0 x 3.5
Environment	Shock: 1500G@0.5ms/Storage Temperature: -55℃ ~ +95℃/MTBF: >3 million hours		
Standard Temp. OP (0℃~+70℃)	DSM28-XXXM413C***	DSM28-XXXD813C***	DSM28-XXXM71EC***
Wide Temp. OP (-40℃~+85℃)	DSM28-XXXM413W***	DSM28-XXXD813W***	DSM28-XXXM71EW***
Note	XXX = density (08GB=08G, 16GB=16G, 32GB=32G, 64GB=64G, 128GB=A28, 256GB=B56, 512GB=C12) ***= flash configuration (internal control code)		

DRAM Modules

Server DIMM

With ever-increasing data loads, it is crucial that the integrated server memory can deliver the needed performance. Innodisk's server DIMM modules boast the high speeds and the high performance required for server operations to run smoothly.
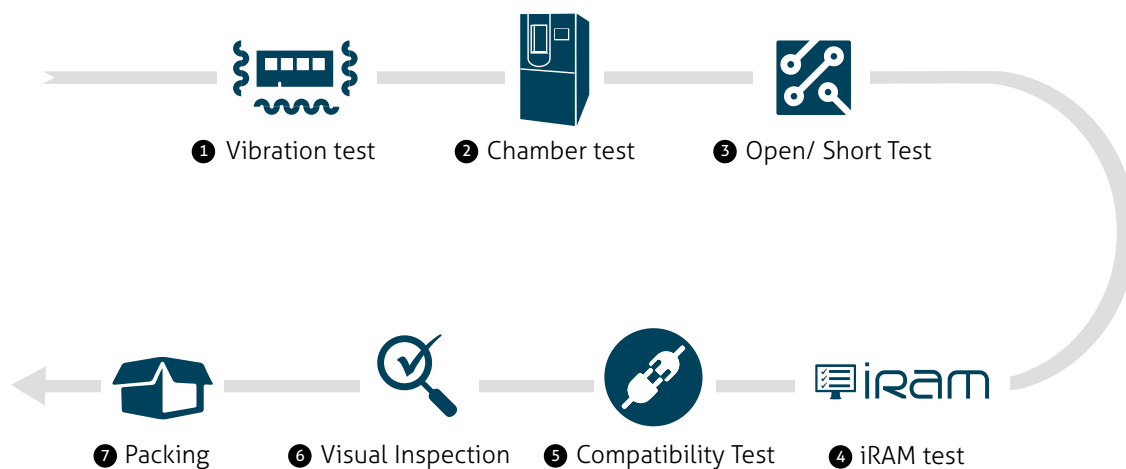
Advantages

- Functionality: reduced server workload and a small footprint to allow for a fan-less integration
- Reliability: all products use original IC with lifetime warranty
- Performance: DDR4 DIMM has significantly higher performance and lower power consumption than DDR3
- Comprehensive product lineup: Innodisk offers all form factors and features needed in server applications, e.g., RDIMM, ECC DIMM, Very Low-Profile and Mini DIMM

iRAM

Innodisk's exclusive testing software

iRAM is made up by numerous stringent testing procedures to guarantee that all modules delivered to customers meet the highest quality requirements. All Innodisk's ECC and RDIMM products are tested with iRAM before delivery.

❶ Vibration test　　❷ Chamber test　　❸ Open/ Short Test

❼ Packing　　❻ Visual Inspection　　❺ Compatibility Test　　❹ iRAM test

iRAM Advantages

- Stringent testing: ensures DRAM module quality
- Able to pinpoint individual defective IC : Innodisk is the only module house that can monitor ECC IC status
- Web-based diagnostic tool: high-precision testing by simulating the customer's user environment
- Multi-core 64-bit test mode: increased efficiency

DRAM Modules

Registered DIMM

Module Type	DDR4 RDIMM	DDR4 RDIMM VLP	DDR3 RDIMM	DDR3 RDIMM VLP
Data Rate	2133MT/s, 2400 MT/s, 2666MT/s, 3200MT/s	2133 MT/s, 2400 MT/s, 2666 MT/s, 3200MT/s	1333 MT/s, 1600 MT/s, 1866 MT/s	1333 MT/s, 1600 MT/s, 1866 MT/s
Capacity	4GB/8GB/16GB/32GB	4GB/8GB/16GB/32GB	2GB/4GB/8GB	4GB/8GB
Function	Registered Memory with ECC			
Pin Number	288pin	288pin	240pin	240pin
Width	72Bits	72Bits	72Bits	72Bits
Voltage	1.2V	1.2V	1.5V/1.35V	1.5V/1.35V
PCB Height	1.23 Inches	0.738 Inches	1.18 Inches	0.738 Inches
Operating Temperature	0 ~ 85 ℃			0~85℃
Golden Finger 30μ"	√			
Anti-sulfuration	√		-	
Valued-Added Service (Optional)	Conformal Coating, Side Fill			

ECC DIMM

Module Type	DDR4 ECC UDIMM	DDR4 ECC SODIMM	DDR4 ECC UDIMM VLP	DDR4 ECC SODIMM VLP
Data Rate	2133 MT/s, 2400 MT/s. 2666MT/s, 3200MT/s	2133 MT/s, 2400 MT/s, 2666 MT/s, 3200MT/s	2133 MT/s, 2400 MT/s. 2666MT/s	2133 MT/s, 2400 MT/s. 2666MT/s
Capacity	4GB/8GB/16GB/32GB	4GB/8GB/16GB/32GB	4GB/8GB/16GB	4GB/8GB
Function	ECC Unbuffered Memory			
Pin Number	288pin	260pin	288pin	260pin
Width	72Bits	72Bits	72Bits	72Bits
Voltage	1.2V	1.2V	1.2V	1.2V
PCB Height	1.23 Inches	1.18 Inches	0.738 Inches	0.7 Inches
Operating Temperature	0 ~ 85 ℃			
Golden Finger 30μ"	√			
Anti-sulfuration	√			
Valued-Added Service (Optional)	Conformal Coating, Side Fill			

Module Type	DDR3 ECC UDIMM	DDR3 ECC SODIMM	DDR3 ECC UDIMM VLP	DDR3 ECC SODIMM ULP	DDR2 ECC UDIMM
Data Rate	1066 MT/s, 1333 MT/s, 1600 MT/s, 1866 MT/s	1066 MT/s, 1333 MT/s, 1600 MT/s, 1866 MT/s	1333 MT/s, 1600 MT/s, 1866 MT/s	1333 MT/s, 1600 MT/s	667 MT/s, 800 MT/s
Capacity	2GB/4GB/8GB	2GB/4GB/8GB	2GB/4GB/8GB	2GB/4GB	1GB/2GB
Function	ECC Unbuffered Memory				
Pin Number	240pin	204pin	240pin	204pin	240pin
Width	72Bits	72Bits	72Bits	72Bits	72Bits
Voltage	1.5V/1.35V	1.5V/1.35V	1.5V/1.35V	1.5V/1.35V	1.8V
PCB Height	1.18 Inches	1.18 Inches	0.738 Inches	0.709 Inches	1.18 Inches
Operating Temperature	0 ~ 85 ℃				
Golden Finger 30μ"	√				
Anti-sulfuration	-				
Valued-Added Service (Optional)	Conformal Coating, Side Fill				

Wide Temperature Registered DIMM

Module Type	DDR4 WT RDIMM	DDR4 WT RDIMM VLP
Data Rate	2133MT/s, 2400 MT/s, 2666MT/s, 3200MT/s	2133 MT/s, 2400 MT/s, 2666 MT/s, 3200MT/s
Capacity	4GB/8GB/16GB/32GB	4GB/8GB/16GB/32GB (4GB* is only for 2133MT/s and 2400MT/s)
Function	Registered Memory with ECC	
Pin Number	288pin	288pin
Width	72Bits	72Bits
Voltage	1.2V	1.2V
PCB Height	1.23 Inches	0.738 Inches
Operating Temperature	-40 ~ 85℃	
Golden Finger 30μ"	√	
Anti-sulfuration	√	
Valued-Added Service (Optional)	Conformal Coating, Side Fill	

Wide Temperature ECC Unbuffered DIMM

Module Type	DDR4 WT ECC UDIMM	DDR4 WT ECC SODIMM	DDR3 WT ECC UDIMM	DDR3 WT ECC SODIMM
Data Rate	2133 MT/s, 2400 MT/s, 2666 MT/s, 3200MT/s	2133 MT/s, 2400 MT/s, 2666 MT/s, 3200MT/s	1066 MT/s, 1333 MT/s, 1600 MT/s, 1866 MT/s	1066 MT/s, 1333 MT/s, 1600 MT/s, 1866 MT/s
Capacity	4GB/8GB/16GB/32GB	4GB/8GB/16GB/32GB	2GB/4GB/8GB	2GB/4GB/8GB
Function	ECC Unbuffered Memory			
Pin Number	288pin	260pin	240pin	204pin
Width	72Bits	72Bits	72Bits	72Bits
Voltage	1.2V	1.2V	1.5V/1.35V	1.5V/1.35V
PCB Height	1.23 Inches	1.18 Inches	1.18 Inches	1.18 Inches
Operating Temperature	-40 ~ 85℃			
Golden Finger 30μ"	√			
Anti-sulfuration	√		-	
Valued-Added Service (Optional)	Conformal Coating, Side Fill			

Mini DIMM

Module Type	DDR4 Mini ECC VLP	DDR4 Mini RDIMM VLP	DDR3 Mini ECC ULP	DDR3 Mini RDIMM	DDR3 Mini RDIMM VLP
Data Rate	2133MT/s, 2400 MT/s	2133MT/s, 2400 MT/s	1066 MT/s, 1333 MT/s, 1600 MT/s	1066 MT/s, 1333 MT/s, 1600 MT/s	1066 MT/s, 1333 MT/s, 1600 MT/s
Capacity	4GB/8GB/16GB	4GB/8GB	2GB/4GB	8GB	2GB/4GB
Function	ECC Unbuffered Memory	Registered Memory with ECC	ECC Unbuffered Memory	Registered Memory with ECC	Registered Memory with ECC
Pin Number	288pin	288pin	244pin	244pin	244pin
Width	72Bits	72Bits	72Bits	72Bits	72Bits
Voltage	1.2V	1.2V	1.5V/1.35V	1.5V/1.35V	1.5V/1.35V
PCB Height	0.738 Inches	0.738 Inches	0.7 Inches	1.18 Inches	0.738 Inches
Operating Temperature	0 ~ 85 ℃				
Golden Finger 30μ"	√				
Anti-sulfuration	√		-		
Valued-Added Service (Optional)	Conformal Coating, Side Fill				

Embedded Peripherals

Disk Array

Model Name	E2SS-32R1	E2SS-32R2	EMPS-32R1
Module Type	2.5" SSD to dual mSATA RAID module	2.5" SSD to dual M.2 RAID module	mPCIe to dual SATA III RAID module
Key Features	1. 2.5" SSD to dual mSATA slots 2. Supports SATA III to SATA III port multiplier 3. Supports H/W RAID 0/1 over SATA 4. Excellent data transfer speed	1. 2.5" SSD to dual M.2 slots. 2. Supports M.2 Key-B 2242/2260/2280 3. Supports SATA III to SATA III port multiplier 4. Supports H/W RAID 0/1 over SATA 5. Excellent data transfer speed	1. PCIe to dual SATA III ports 2. Supports AHCI, port multiplier 3. Supports hardware RAID 0, RAID1
Form-Factor	2.5" SSD	2.5" SSD	mPCIe
Input I/F	SATA III	SATA III	PCI Express 2.0
Input Connector	SATA 7 + 15-pin	SATA 7 + 15-pin	mPCIe
Output I/F	SATA III	SATA III	SATA III
Output Connector	mSATA x 2	M.2 Key-B x 2	SATA 7-pin x 2
Dimension (WxLxH/mm)	69.85 x 100.1 x 11.0	69.85 x 100.1 x 11.0	30.0 x 50.9 x 10.7
Operating Temperature	STD temp : 0°~70°C	STD temp : 0°~70°C	STD temp : 0°~70°C
Order Infomation	E2SS-32R1-C1	E2SS-32R2-C1	EMPS-32R1-C1

Display Card

| Model Name	EMPV-1201	EMPV-1202	EGPV-1101
Module Type	mPCIe to dual VGA & HDMI (DVI) module	mPCIe to VGA & 18/24 bit LVDS module	M.2 to to HDMI or DVI & single/dual-channel LVDS module
Key Features	1. mPCIe to dual VGA & HDMI display card 2. VGA output: 1920x1080, up to 75Hz vertical rate. 3. HDMI/DVI up to 1080p, ultra-low power consumption 4. Optional VGA/HDMI/DVI cable 5. 90°, 180°, and 270° rotation of on-screen images	1. VGA output up to 1920x1080, up to 75Hz vertical rate 2. LVDS resolution supports up to 1600 x 1200 3. EMPV-1202-C1 supports 18/24 bit JEIDA LVDS 4. EMPV-1202-C2 supports 24 bit VESA LVDS 5. Allows for 90°, 180°, and 270° rotation of on-screen images	1. Supports display output of HDMI 1.4 or DVI-D, single/dual 24bit LVDS channel 2. Single HDMI/DVI-D display resolution up to 4K UHD (3840x2160@30p) 3. Dual LVDS display resolution up to FHD (1920x1080@60p) 4. Built-in 256MB DDR3 memory
Form-Factor	mPCIe	mPCIe	M.2 2280
Input I/F	PCI Express 1.0	PCI Express 1.0	PCI Express 2.0 x 2
Input Connector	mPCIe	mPCIe	M.2 B-M
Output I/F	VGA x 2, HDMI x 1 (optional DVI x 1)	VGA, 18/24 bit LVDS	HDMI or DVI-D x 1 , single & dual LVDS
Output Connector	40-pin 1.25mm x 2 (40DP-1.25)	40-pin 1.25mm x 1(40DP-1.25)	20-pin x 1(HDMI), 20-pin x 2 (LVDS)
Dimensions(WxLxH/mm)	31.5 x 50.9 x 8.2	30.0 x 50.9 x 8.2	30.0 x 50.9 x 8.2
Operating Temperature	STD temp : 0°~70°C	STD temp : 0°~70°C	STD temp : 0°~70°C Wide temp : -40 ~ 85 °C
Order Infomation	EMPV-1201-C1	EMPV-1202-C1, EMPV-1202-C2	EGPV-1101-C1, EGPV-1101-W1, EGPV-1101-C2/W2

Innodisk Administration Platform

iCAP

iCAP™ is a browser-accessed management and maintenance platform that allows you to manage solid-state drives (SSDs), memory, and other components in edge devices. With iCAP, accessing device data and controlling devices is possible from anywhere, for example from your internet-connected cell phone, tablet, or laptop. Moreover, iCAP fully supports in-band and out-of-band management, making it easy to restore severely malfunctioning edge devices in no time.

Data Security in Sensitive Applications and Industries

Data falling into the wrong hands can have devastating consequences. Devices located in sensitive equipment, such as unmanned vehicles and remote installations, are often located far away from their operators. Once a device failure occurs, devices and their data can be exceedingly hard to retrieve. In such instances, expedient data erasure is imperative to maintain security. iCAP allows the operator to execute drive erasure commands that guarantee the complete erasure of any sensitive data stored on devices.
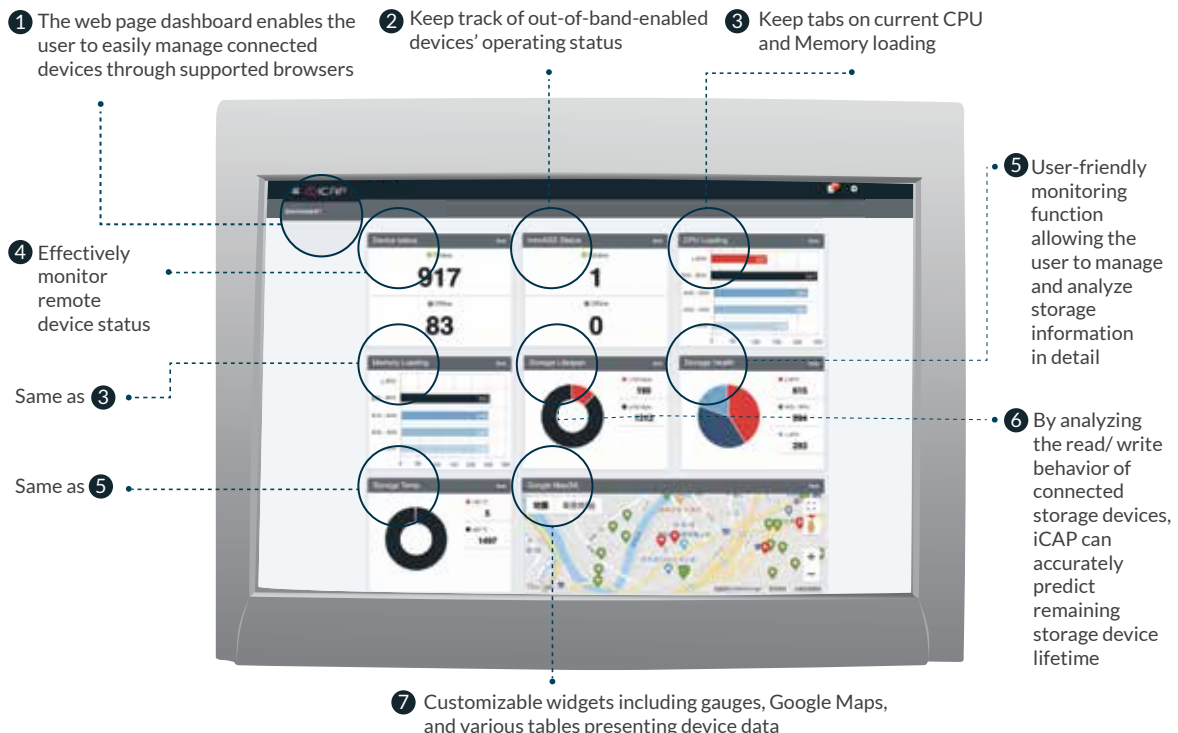
Data Erase Functions

- Quick Erase – Erases all data within seconds
- Secure Erase – High-grade data erasure protocol
- Destroy – Erases all data, as well as the firmware, rendering the storage device unusable
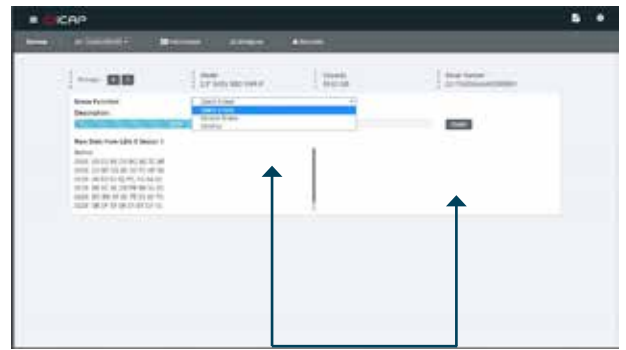
Simply select your preferred erasure feature and press 'Start' to initiate the data erasure process.

Efficient Storage Prediction

SSDs have finite life expectancies. As iCAP monitors all SSD activity, it also continuously tracks the SSD's health status. When the end of the SSD lifecycle approaches, iCAP alerts the operator so that they can carry out maintenance in a timely manner.

① The web page dashboard enables the user to easily manage connected devices through supported browsers

② Keep track of out-of-band-enabled devices' operating status

③ Keep tabs on current CPU and Memory loading

⑤ User-friendly monitoring function allowing the user to manage and analyze storage information in detail

④ Effectively monitor remote device status

Same as **③**

Same as **⑤**

⑥ By analyzing the read/ write behavior of connected storage devices, iCAP can accurately predict remaining storage device lifetime

⑦ Customizable widgets including gauges, Google Maps, and various tables presenting device data

iOpal

TCG Opal-compliant Software

The TCG-defined standard for self-encrypting drives (SEDs) emphasizes data security and ease of use. Innodisk's software conforms to this standard and can provide a simple and intuitive way to handle SED management. The software allows the user to easily define different ranges for different users—allowing for a system where data is shared on a strictly need-to-know basis.

Limits permissions toward self-encrypting drives, need correspondence to the relevant credentials or passwords for the different levels of functions

Set locking range allows setting up divided locking ranges for different authorizations

Device locking setting information

Pre-boot Authentication (PBA) is a process used to add a shadow Master Boot Record (MBR) region and implement the boot-up authorization procedure by entering the correct password

The revert function can be divided into two levels, which are representative of different reverting contents

Advantages

User-friendly
Provides an intuitive user interface for SED management that meets the TCG Opal 2.0 specifications and supports up to five devices simultaneously.

Multi-function
iOpal's data storage management features are designed to enhance data security and communication with the host system.

Wide compatibility:
iOpal is available in both Windows and Linux versions, ensuring wide compatibility.

Form Factor	
3MG2-P with AES	2.5" SSD, M.2 (S42, S80), mSATA, SATA Slim
3SE2-P with AES	2.5" SSD, 1.8" SSD
3TG6-P with AES	2.5" SSD, 1.8" SSD, M.2 (S42,S80), mSATA, SATA Slim

Supported OS List

Windows 7 / Windows 10 / Linux Ubuntu / Linux Fedora

iSMART

Easy-to-use tool to access S.M.A.R.T. information.
The iSMART tool monitors the health and lifespan of Innodisk's SSDs and DRAM modules while also providing details on usage patterns. Alerts are easily configured to issue warnings before any critical errors can occur. With iSMART, the user is able to properly integrate Innodisk's SSDs and DRAM modules into their solutions by carefully monitoring behavior and lifespan during development, integration, and mass production.

S.M.A.R.T. Dashboard

The Dashboard's home provides a quick snapshot of each installed device in the system. This page offers accurate data information regarding Temperature, Health, Capacity, Lifespan, iAnalyzer, and Notifications. Further device information such as S/N, firmware version, interface, etc. is also available.

DRAM Information

iSMART eliminates the need to physically access the DRAM module to ascertain device info. The DRAM will provide all information to iSMART, making it easily available to the user. The DRAM information section will show P/N, data transfer rate, capacity, data code, etc.

iAnalyzer

When activated, the iAnalyzer tab displays the read/write behaviors of the SSD in real time. This allows the user to understand their application usage of the SSD. Sequential and Random I/Os are easily broken down into percentages making them easy to read.

Alert

The Alert tab helps the user set trigger points with Temperature, Health Percentage, Remaining Capacity or Life Remaining. If these trigger points exceed their boundaries, the iSMART utility can send a warning and email to the user, notifying them that something is at risk of failing.

PCIe NVMe Support

iSMART supports logging for PCIe NVMe devices. The user can easily check the PCIe storage devices' health status.

iSMART for Linux
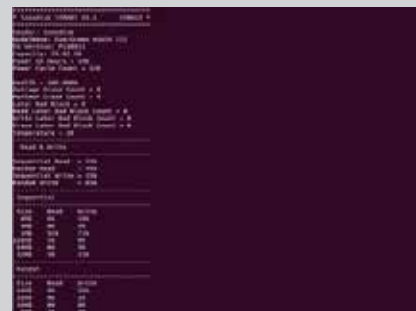
The iSMART Linux version provides every storage device's S.M.A.R.T. values by vendor command, and also fully supports the iAnalyzer function.

Successful Story

Hyper-intelligent Server Boot Up Storage Solution

The Situation

Hyper-converged infrastructure (HCI) is an IT megatrend that brings higher efficiency, modularity, and cost efficiency to data centers. By integrating the server, networking, and storage layers of traditional data center infrastructure and combining this with virtualization, HCI reduces complexity as all resources are jointly managed by the hypervisor. The result is a highly compelling computing solution for enterprises of all sizes.

However, enabling the benefits of HCI requires highly capable flash storage devices that provide high performance and longevity while leaving small physical and thermal footprints.

Challenges

1. **High capacity:** the application required high-capacity expansion with a small footprint.
2. **Smart and flexible expansion:** limited expansion slot availability and the need to allow excellent airflow and low power consumption called for smart solutions.
3. **Demanding workloads:** frequent data transactions and real-time management of storage traffic meant that the solution needed to constantly deliver high performance and endurance.

Solutions

1. **High capacity, high endurance:** Innodisk's SATADOM-SL 3IS4 provided industrial-grade iSLC, delivering both excellent capacity and steadfast endurance.
2. **Cable-less and expansion-friendly:** with Innodisk's patented VCC Pin 8 design, no cables were necessary, leaving more space expansion.
3. **Smart device management:** Innodisk's iSMART software and its iAnalyzer function allowed remote real-time status monitoring of the flash storage devices.

Our Roadmap to Success

SATADOM-SL 3IS4 with iSLC

- Patented cable-less design
- High-performance SATA III 6.0 Gb/s interface
- 16 GB – 64 GB storage capacity
- Low 1.02 W power consumption
- Long-lasting and reliable performance with Innodisk's exclusive iSLC technology

iSMART

- SSD and DRAM health monitoring
- Real-time SSD read-write behavior monitoring
- Automatic alerts for user-defined thresholds

Result

With Innodisk's SATADOM-SL 3IS4, the client could expand their HCI servers with reliable and high-performing boot up storage featuring enhanced firmware architecture. Thanks to the SATADOM-SL 3IS4 unique design and advanced technologies, the boot up storage solution had little impact on power consumption and server airflow and did not occupy any additional server slots or bays. The result was an optimal integration that made the client's HCI servers an even more attractive solution to their customers.

Successful Story

Unwavering High-performance DRAM for Critical Data Center Servers

The Situation

As part of a drive to unify its enterprise computing infrastructure, a leading telecommunications organization focused on cloud management solutions decided to upgrade its data center hardware. Therefore, company staff was tasked with procuring highly reliable and high-performing DRAM modules suited for critical telecommunications infrastructure. Due to the critical nature of the application, any solutions must be able to operate at a high level day in and day out without encountering any errors. To address these needs and to ensure that its upgraded data center meets the current and future needs of its customers, the telecommunications industry company reached out to Innodisk to find a suitable solution.

Challenges

1. **High capacity and high availability:** continuous data analysis requires high-capacity modules with uninterrupted uptime.
2. **No room for error:** the client cannot risk costly downtime caused by memory errors.
3. **Top performance:** the client's application requires data transmissions to maintain high and stable performance under heavy and constant load.

Solutions

1. **Truly industrial-grade DRAM:** stringently tested DRAM modules with original IC, guaranteeing that all quality requirements are met in full.
2. **Server-optimized stability:** registered memory modules with error-code correction.
3. **High-performing high-capacity server memory:** with exceptional bandwidth and memory performance along with generous capacities, Innodisk's DRAM provided ample performance headroom for future demands.

Our Roadmap to Success

Server-ready 16 GB DDR4-2133 RDIMM

- Extensively tested with Innodisk's state-of-the-art iRAM testing to ensure the highest-quality modules
- Original IC for the highest-quality ICs
- Registered memory with error-correcting code for maximum reliability
- Exceptional 360-degree customer service that supports the client at each stage of the customer journey

Result

With Innodisk's 16 GB DDR4-2133 RDIMM modules, the telecommunications company found a solution that met their requirements and exceeded their expectations for memory-intensive server use in their upgraded data center. Moreover, with Innodisk's DRAM modules' original IC and stringent in-house testing with iRAM, the client expects to continue using the modules for years to come before requiring replacement or upgrade. Finally, owing to Innodisk's best-in-class service quality, the client is confident in tackling any potential unexpected challenges that may come their way in the future.

ABOUT US

Innodisk is a service-driven provider of flash memory, DRAM modules, embedded peripherals, and software solutions for industrial and enterprise applications. With satisfied customers across the embedded, server, in-vehicle, cloud storage markets, and more, we have set ourselves apart from the competition with a commitment to dependable products and unparalleled service quality. The result is solutions designed to supplement existing industrial solutions and high IOPS flash arrays for industrial and enterprise applications. The expanded business lines lead our next steps as a comprehensive solutions and service provider in the industrial storage industry.

Founded in 2005 and headquartered in Taipei, Taiwan, Innodisk services clients globally with engineering experts and sales teams in China, Europe, Japan, and the United States. With abundant experience and unrivaled knowledge of the memory industry, Innodisk develops products with excellent quality, remarkable performance, and the highest reliability.

For more information about Innodisk, please visit https://www.innodisk.com.

Our Advantages

Technical Aptitude by Design

Our advantage lies in our portfolio of hardware, software, and firmware technology and how we arrange these basic building blocks into new works of innovation.

Deeply Rooted in the Market

Our awareness of the pitfalls and opportunities in vertical markets allows us to see the full picture when crafting the optimal solution.

We Are in It Together

To reach the optimal solution, working together with our partner from day one is paramount. The best possible outcome is always managed by developing solutions jointly.

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