



LAND



SEA



AIR

# i11D-Q5000

**Rugged QUADRO MXM GPU Server  
with Intel Xeon D Processor**



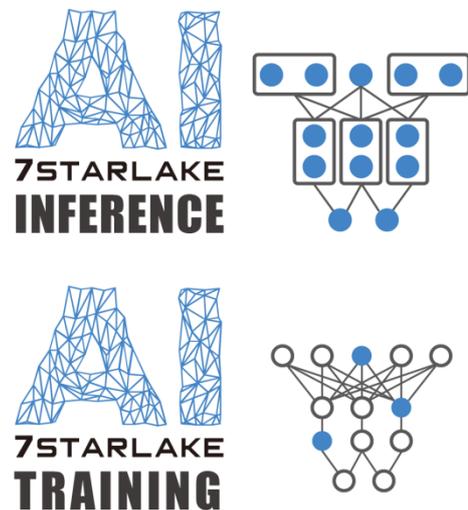
## AI Accelerated GPU Server

- CPU: Intel XEON D-1587 (16xC)
- GPU: NVIDIA QUADRO MXM RTX5000
- DDR4 2133MHz RDIMM up to 128GB
- 9V~36V DC-DC 300W
- 2 x SATA 3.0 SSD Internal Storage
- MIL-STD Anti Vibration, Shock
- Extreme Temperature -20~+55°C

# 1. Features

## 1-1 Introduction

Deep neural network and AI in machine learning can be categorized as parallel process which means parallel super computing solutions can speed up 90%. Artificial Intelligence AI and machine learning play a vital role in continuing competitive advantage and delivering fantastic user experience. GPU accelerates the tensor processing necessary for deep learning applications; these deep learning approaches have shown impressive performances in resembling humans in various fields.



GPUs have attracted a lot of attention as the optimal vehicle to run AI workloads. Most of the cutting-edge research seems to rely on the ability of GPUs and newer AI chips to run many deep learning workloads in parallel. However, GPUs are not necessarily better than CPUs when it comes to AI. The trusty CPU still has an important role in AI. CPUs have long held the advantage for certain kinds of AI algorithms involving logic or intensive memory requirements. How to run more efficient AI algorithms on CPUs and GPUs which having a more efficient algorithm and reduces power requirements, makes more practical for applications will drastically expand the market for the application of AI.

In order to having more powerful handling of database workloads, 7Starlake offers an extensive range of CPUGPU servers with multiple GPUCPU combinations dedicated servers like 1CPU+1GPU, 2CPU+4 GPU, custom-built for massive parallel computing environments and today's most demanding HPC and hyperscale data center workloads for any high performance demanding tasks.

7Starlake's CPUGPU platforms range from 1 to 2 CPU inside traditional rackmount chassis or workstations. We also offer GPU expansion options capable of delivering up to 4 GPUs in

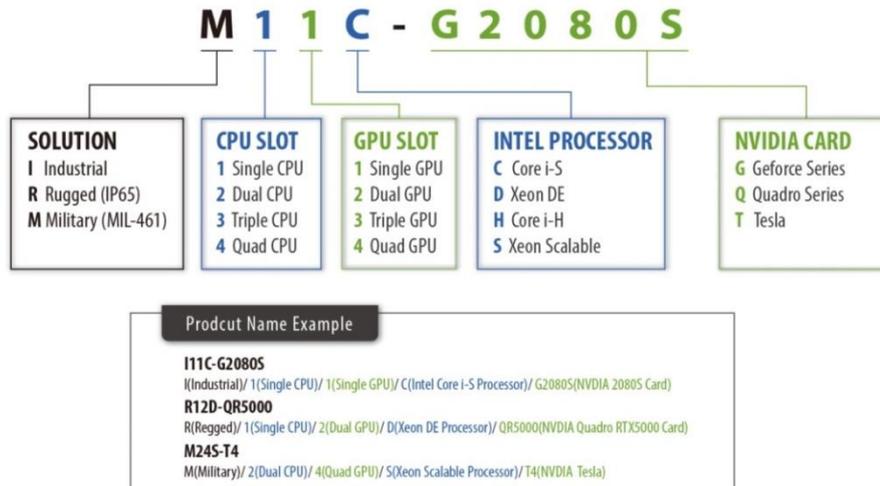
rack space. You get the benefit of higher performance and reduced power consumption compared to traditional CPU-centric platforms—and all the supercomputing power you need for even your most advanced applications.



## 1-2 Naming Rule

### Product Naming Rule

AI GPU Accelerated Server



Each computer is named after several factors—along with solution, number of CPU slots and GPU slots, brand of Intel processor, and series of NVIDIA card system configurations—to be considered when deciding the right computer for clients' needs. The above illustration demonstrates the naming rule and the pattern of a product name.

#### Solution

**M** The 7Starlake naming scheme starts with the computer's solution which corresponds to different application. There are 3 solutions: *I*, *R*, and *M*. *I* represents industrial purpose. *R* stands for rugged computers that all meet IP65 standard while *M* indicates military used computers that are MIL-STD 461 certified for reliability purpose.

#### CPU Slot

**1** The number followed by the solution indicates the CPU quantity of each computer. The number of CPU that 7Starlake may employ is from 1 CPU to 4 CPU.

#### GPU Slot

**1** The number followed by the solution indicates the GPU quantity of each computer. The number of GPU that 7Starlake may employ is from 1 GPU to 4 GPU.

#### Intel Processor

**C** After the quantity of CPU and GPU comes the Intel processor brand that is applied in the computer. *C* symbolizes Core i-S while *D* means Xeon DE. The other two indicators are *H* and *S* which respectively indicate Core i-H and Xeon Scalable series.

#### NVIDIA Card

**G 2 0 8 0 S** The GPU suffix placed after the hyphen represents the NVIDIA GPU used in the model. For example, 2080S indicates that the

system is equipped with NVIDIA GeForce 2080S. On the other hand, Q and T independently signify Quadro series and Tesla series applied in the computer.

## 2-1 NVIDIA Quadro RTX5000

Shatter the boundaries of what's possible with NVIDIA® Quadro RTX™ 5000. Powered by

NVIDIA RTX 5000	
NVIDIA Architecture	Turing
CUDA® Cores	3072
Boost Clock	1.8 GHz
Base Clock	1.6 GHz
Memory Type	16 GB GDDR6
Memory Clock	1750 MHz
TGP	265 W

graphics memory and rendering, AI, and VirtualLink® provides high-resolution VR compelling virtual professional visual



the NVIDIA Turing™ architecture and the NVIDIA RTX™ platform, it fuses ray tracing, deep learning, and advanced shading to supercharge next-generation workflows. Creative and technical professionals can make more informed decisions faster and tackle demanding design and visualization workloads with ease. Combined with NVIDIA NVLink™ technology, RTX 5000 scales performance to drive the most demanding visual computing workloads. And the all-new connectivity to next-generation, HMDs to let you view your work in the most environments. Welcome to the future of computing.

## 2-2 Intel Xeon D1587

Intel® Xeon® Processor D-1500 Product Family Broadwell DE:



The Intel® Xeon® processor D-1500 product family is Intel's third-generation 64-bit system on a chip (SOC) and the first Intel® Xeon® SoC based on Intel® 14 nm

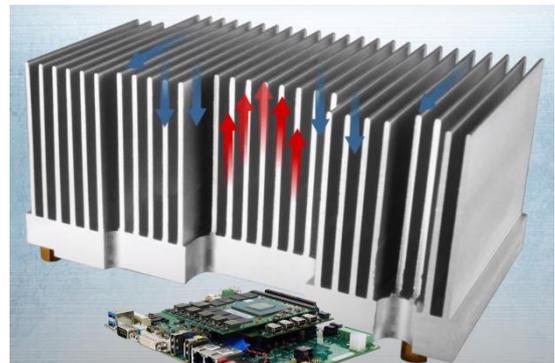
silicon technology. This lineup offers hardware and software scalability from two up to sixteen cores, making it the perfect choice for a broad range of high-performing, low-power solutions that will bring intelligence and Intel® Xeon® reliability, availability, and serviceability (RAS) to the edge.

Intel Xeon D-1587 Specification	
Code Name	Broadwell
CPU Cores	16
CPU Threads	32
Frequency	1.70GHz
Max Turbo Frequency	2.30GHz
TDP	65W
Max Memory Size	128GB
Memory Types	DDR4, DDR3
Maximum Memory Speed	2133 MHz

For applications where space is a premium, an integrated Platform Controller Hub (PCH) technology and Intel® Ethernet in a ball grid array (BGA) package offer an inspiring level of design simplicity. The Intel® Xeon® processor D-1500 product family is offered with a seven-year extended supply life and 10-year reliability for Internet of Things designs.

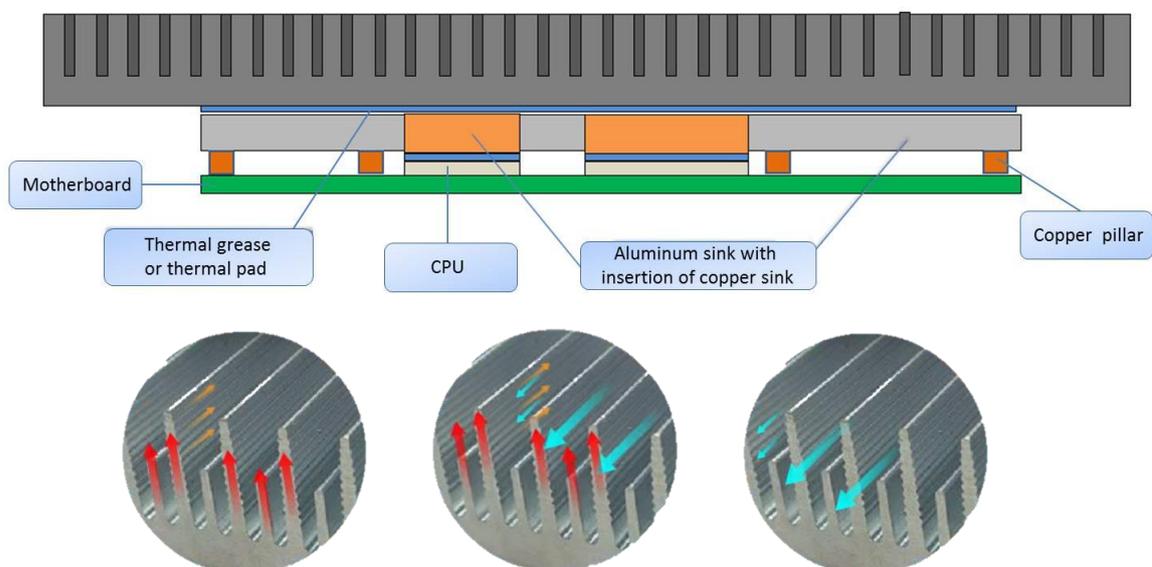
### 3 Thermal Solution: Conduction cooling

Aluminum heatsink are an ideal solution for rapidly and evenly distributing high density heat loads. The heat sink is often used to increase heat distribution to additional cold plate surface which directedly contact with the heats and improves the overall thermal performance of the system. In addition, 7starlake's unique high thermal conductivity aluminum enclosure is designed with high and low fin plus wave line, creating adequate airflow and increasing the surface area and heat dissipation to reduce thermal resistance in contact with the cooling medium up to 30-40%.



7Starlake ensures that the computer systems we develop remain stable even in high temperature environments. We design to use efficient thermal solutions which can typically keep CPU and GPU module full loading with highly performance during high temperature.

The conduction cooling passive solutions don't require moving components, meaning high reliability, less wear and tear, and low maintenance. It guarantees that our products are made in accordance with your requirements on wide temperature range, compact design, durability, high performance and extended lifecycle. We implement a design principle that uses wide temperature grade components, optimal power circuits, constructed cooling & thermal design, and wideband extended temperature testing.



## 2. Specifications

### System

CPU	Intel® Xeon® Processor D-1587 (Frequency 1.7GHz, Turbo Boost up to 2.3GHz), 16-Core, 32 Thread Support, 24MB Smart Cache. Build-in Turbo Boost Technology 2.0, VPro and Hyper-Threading
Memory type	4 x ECC RDIMM DDR4 2133MHz up to 128GB
Chipset	SoC, integrated with CPU
GPU	NVIDIA QUADRO MXM RTX5000

### Display

Display Port	Resolution up to 1920x1200@60Hz 32bp
--------------	--------------------------------------

### Storage

Storage 1	1 x SATA3.0
Storage 2	2 x SATA3.0

### Ethernet

LAN	1 x Intel I350-AM2 Gigabit LAN Interfaces ( 10/100/1000Mbps )
10GbE	2 x 10GbE supported

### Front I/O

USB	2 x USB 3.1 Ports
HDMI	1 x VGA
Ethernet	2 x 10/100/1000 Gigabit Ethernet 2 x 10GBase-T Ethernet 1 x IPMI
SSD/HDD Tray	1 x Dual 2.5" HDD/SSD Easy Swap Tray

### Power Requirement

Power Input	9V~36V DC-DC 300W 100V~240V AC-DC (optional)
-------------	---

### Applications, Operating System

Applications	Military Platform requiring compliance to MIL-STD 810 embedded computing where harsh temperature, vibration, shock and EMI conditions.
--------------	--

OS	Windows 10 64Bit Ubuntu13.04, Ubuntu13.10, Ubuntu14.04, Fedora 20
----	---

### Physical

Dimension	365 x 301 x 90 mm (W x D x H)
Weight	5.5 KGS
Chassis	SECC
Heatsink	Aluminum Alloy, Corrosion Resistant
Finish	Anodic aluminum oxide

### Environmental

Compliance	MIL-STD-810
Operating Temp.	-20 to +55°C
Storage Temp.	-40 to 85°C
Relative Humidity	5% to 95%, non-condensing

### MIL-STD-810 Specifications (Operating )

Method 502.5 Procedure 2	Low Temperature	-20°C, 4 hours, ±3°C
Method 501.5 Procedure 2	High Temperature	+55°C, 4 hours, ±3°C
Method 507.5	Humidity	85%-95% RH without condensation, 24 hours/cycle, conduct 10 cycles.
Method 514.6	Vibration	5-500Hz, Vertical 2.20Grms, 40mins x 3axis.
Method 516.6	Shock	6 Grms, 11ms, 3 axes.

### MIL-STD-810 Specifications (None-Operating)

Method 502.5	Low Temperature Storage	-20°C, 4 hours, ±3°C
Method 501.5 Procedure 1	High Temperature Storage	+71°C, 4 hours, change rate: ≤20°C/ Hour +63°C, 240 hours (By request)
Method 514.6	Vibration	5-500Hz, Vertical 2.20Grms, 40mins x 3axis.

### 3. Ordering Information

Model series	Model Name	CPU	GPU MXM	GPU PCIEX16	10GbE	IP65	DC IN	AC-IN
I11D	i11D-Q3000	D-1541, 8C	RTX3000	N/A	2	N/A	9V~36V 300W	N/A
	I11D-QP5000	D-1587, 16C	P5000	N/A	2	N/A	9V~36V 300W	N/A
	i11D-Q5000	D-1587, 16C	RTX5000	N/A	2	N/A	16V~33V 500W	N/A

### 4. Dimension

