THEMIS

RACK MOUNTABLE SERVERS DATA SHEET

# RES-NT1-1U

## NVIDIA® TESLA™ M-CLASS HIGH PERFORMANCE COMPUTER

## FEATURES

### NVIDIA® TESLA™ M-CLASS GPU COMPUTING MODULES

- M2050, M2070, M2090

### INTEL® XEON® PROCESSORS

- Intel 5500 or 5600, four or six core Xeon processors

### MECHANICAL INTEGRITY

- Dimensions
  - Height: 1RU or 1.75 inches (44.45 mm)
  - Width: 17.06 inches (433.3 mm)
  - Depth: 20 inches (508 mm)
- Weight*: 22 pounds (9.98 kg)
- Designed for reliability in harsh operating environments
- Corrosion resistant aluminum
- Stainless steel reinforcement for strength and stiffness
- Modular design for easy upgrade and service
- Optional rack-mount slides
- Front-to-rear airflow direction

### MANAGEMENT AND OPERATING SYSTEM

- Windows® and Linux® application support
- IPMI v2.0 support

### ENVIRONMENTAL RESILIENCY

- Operating shock: 3 axis, 30G, 25ms
- Operating vibration: 2.0 Grms, 8 Hz to 2000 Hz
- Operating temperature: 0°C – Up to 50°C
- Operating Humidity: 8% to 90% non-condensing

### MODULAR MAINTAINABILITY

- Power supply options
  - Single or redundant 110/220 VAC
  - 18-36 VDC, 32 Amp
  - 36-72 VDC, 18 Amp

### MILSPEC

- MIL-STD-810G (Shock and Vibration)

* Themis designs all products to meet or exceed listed data sheet specifications. Some specifications are configuration dependant. Please contact Themis for information specific to your desired configuration requirements.

## OVERVIEW

The Themis RES-NT1 High-Performance Computer (HPC) combines the GPU Computing performance of NVIDIA® Tesla™ M-Class computing modules, up to two Intel 5500 or 5600, four or six core Xeon processors with up to 192 GB of memory, and Themis robust thermal and kinetic design management in a 1U form factor to meet the demanding requirements of rugged environments.

NVIDIA Tesla M-class computing modules are the world's fastest parallel computing processors for high performance computing (HPC). Based on the Fermi architecture, M-class computing modules feature up to 665 gigaflops of double precision performance and one teraflop of single precision performance. M-class module are the first GPUs to have ECC memory that provides data reliability required in demanding environments. The M-Class high performance to power ratio in the RES-NT1 HPC brings new levels of computing power to applications outside the datacenter.

The RES-NT1 HPC brings NVIDIA M-Class high-performance computing to environments constrained by space, weight, and power (SWAP).The RES-NT1-1U HPC has a twenty inch (508 mm) depth that enables it to fit in tight spaces. The system's aluminum chassis is about half the weight of a standard steel chassis and operates reliably in hot or cold environments to save power.

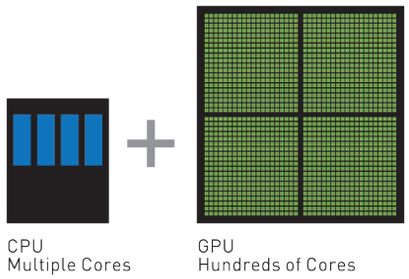


*Figure 1: RES-NT1 HPCs Feature Intel Xeon Processors and NVIDEA Tesla M-Class GPUs*

## WHY GPU COMPUTING?

With the ever-increasing demand for more computing performance, the HPC industry is moving toward a hybrid computing model, where GPUs and CPUs work together to perform general purpose computing tasks. As parallel processors, GPUs excel at tackling large amounts of similar data because the problem can be split into hundreds or thousands of pieces and calculated simultaneously. As sequential processors, CPUs are not designed for this type of computation, but they are adept at more serial-based tasks such as running operating systems and organizing data. NVIDIA's GPU solutions outpace others as they apply the most relevant processor to the specific task in hand.

## CUDA PARALLEL COMPUTING ARCHITECTURE

CUDA™ is NVIDIA's parallel computing architecture. Applications that leverage the CUDA architecture can be developed in a variety of languages and APIs, including C, C++, Fortran, OpenCL, and DirectCompute.

The CUDA architecture contains hundreds of cores capable of running many thousands of parallel threads, while the CUDA programming model lets programmers focus on parallelizing their algorithms and not the mechanics of the language. The latest generation CUDA architecture, codenamed "Fermi," is the most advanced GPU computing architecture ever built. With over three billion transistors, Fermi is making GPU and CPU co-processing pervasive by addressing the full spectrum of computing applications. With support for C++, GPUs based on the Fermi architecture make parallel processing easier and accelerate performance on a wider array of applications than ever before. Just a few applications that can experience significant performance benefits include ray tracing, finite element analysis, high-precision scientific computing, sparse linear algebra, sorting, and search algorithms.

## TECHNICAL SPECIFICATIONS

### *GPU, Processor, and Memory*

| PARAMETER | DESCRIPTION |
|---|---|
| GPU | M2050, M2070, or M2090 NVIDIA M-Class |
| Processor | One or two 5500 or 5600 Series Intel Xeon |
| Memory | Up to 192 GB DDR3 ECC |

### *On-Board Expansion*

| PARAMETER | DESCRIPTION |
|---|---|
| Expansion slot | 1 PCIe 2.0 x4 in a x16 slot |

### *Front Panel and Rear Panel Access I/O* [Note 1]

| I/O | QUANTITY | ACCESS |
|---|---|---|
| Status LEDs | 2 | Front panel |
| Gigabit Ethernet ports (RJ45) | 2 | Front panel |
| USB 2.0 ports | 2 | Front panel |
| RS-232 serial ports (DB9) | 1 | Rear panel |
| Power connector | 1 or 2 | Rear panel |
| Power switch | 1 standard | Rear panel |
| PS2 keyboard and mouse ports | 1 | Rear panel |

### *Environmental*

| PARAMETER | NON-OPERATING | OPERATING |
|---|---|---|
| Temperature range | -40°C to 70°C | 0°C to 50°C [Note 2] |
| Humidity (non-condensing) | 5% to 95% non-condensing | 8% to 90% non-condensing |
| Shock | 3 axis, 35G at 25 ms | 3 axis, 35G at 25 ms |
| Vibration (10-2000Hz) | 3.0 Grms, 8 Hz to 2000 Hz | 3.0 Grms, 8 Hz to 2000 Hz |

### *Modular Maintainability*

| PARAMETER | DESCRIPTION |
|---|---|
| Power supply options | Single or redundant 110/220 VAC, 750 Watt (50/60Hz, 400Hz)<br>18-36 VDC, 32 Amp<br>36-72 VDC, 18 Amp |

### *Mechanical*

| PARAMETER | NON-OPERATING |
|---|---|
| Dimensions | Height: 1RU or 1.75 inches (44.45 mm)<br>Width: 17.06 inches (433.3 mm)<br>Depth: 20 inches (508 mm) |
| Weight [Note 3] | 22 pounds (9.98 kg) |
| Chassis features | Coated aluminum for light weight and corrosion resistance<br>Stainless steel in selected areas to add strength and stiffness<br>Modular design for easy upgrade and service<br>Optional rack-mount slides and shock pins<br>Front to rear airflow |

### Notes

1. I/O options are configuration dependent.
2. Environmental specifications are configuration dependent. Higher operating temperatures are available in specially configures systems. Contact your Themis sales representatives for more information.
3. Weights are provided for typical configurations. Weight may vary depending on configuration. Contact your Themis sales representatives for more information.

## THE RES HIGH PERFORMANCE COMPUTING (HPC) FAMILY

The Themis RES-NT1 HPC features NVIDIA Tesla M-class computing modules are the world's fastest parallel computing processors for high performance computing (HPC), the latest Intel® four- and six-core Xeon® processors,  and Themis thermal and kinetic design management expertise to provide reliability and superior high-performance computing performance in the most demanding environments.

The Themis RES server design keeps mission-critical applications available, improves life-cycle management, at a substantially lower total cost of ownership. When the environment is tough and your data is critical, rely on Themis to protect it and keep it available.

## THEMIS VALUE

Themis provides systems manufacturers and end-users with the most modern, best-of-breed computing resources available. Package and performance scale from small form factor embedded servers to bladed servers.

Themis listens, understands, and works closely with our customers to optimize computing solutions that are easy to integrate, yet inexpensive to own and operate. Our solutions achieve the right balance between standard commercial technology and requirements for rugged environments, optimizing space, weight, and performance. For more information on Themis products, visit www.themis.com.

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