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RESX07-1U22R
22" Depth, 1U Rugged Rack Server

Short-depth 1U rugged high-performance GPU and storage server

- Dual Intel® 3rd Gen Xeon® SP CPUs plus 350 W NVIDIA GPU in 1U chassis
- High-density storage server configuration option with 4x removable NVMe 4.0 + 4x SATA SSDs
- Patented ruggedization with MIL-STD qualification testing
- Made in USA for mission-critical HPC/AI/sensor processing with AS9100 aerospace-grade quality

Mercury's 1U22R model in the RES X07 rugged edge server family integrates the highest-performing, data-center class COTS computing technologies in a short-depth chassis for space-constrained applications. With proprietary ruggedization for operation in extreme environments, the 1U22R is one of the densest, most configurable rugged computing platforms ready to tackle challenging artificial intelligence (AI), high performance computing (HPC) and sensor processing workloads at the edge.

Trust Mercury for Modified COTS

For decades, system integrators have relied on us to build the most rugged, COTS-based solutions for mission-critical programs on land, sea and air. Let our talented engineering team optimize the RES X07-1U22R to meet your specific requirements.

Highlights

- Ingest, process, store and move data in SWaP-constrained rack architectures
- Dual Intel 3rd Gen Xeon-SP CPUs (up to 80 cores total) with built-in AI and security workload accelerators, plus low latency PCIe 4.0 throughput
- Support for dual-slot 350 W NVIDIA GPU PCIe 4.0 card, up to five total I/O expansion slots (1URA config) or 4x I/O expansion slots plus 8x removable SSDs (1URC config)
- Advanced capabilities for secure data-at-rest, data-in-transit, and data in use
- Front removable SSDs; rear removable power supply
- OCP 3.0 slot and PCIe Gen 4 slots to support up to 200 Gbps Ethernet/Infiniband
- Ruggedized chassis includes patented/proprietary shock, vibration, thermal management, and serviceability features to ensure reliability

Technical specifications

DATA CENTER-CLASS PROCESSOR ARCHITECTURE

▪ Dual-socket Intel 3rd Gen Xeon Scalable processor CPUs (formerly Ice Lake-SP), x86-64, up 40 cores per CPU (80 cores total)*

▪ Thermally optimized for two 165 W TDP CPUs at extended temps with options up to 270 W per CPU with reduced thermals**

▪ Built-in workload and service accelerator engines for AI/security/vector processing (e.g. Intel Deep Learning Boost, Intel AVX-512, Intel SGX, Intel Cypto Acceleration, etc.)

▪ Intel Virtual RAID on CPU (VROC) key option to enable low-latency NVMe SSD performance

HIGH-DENSITY, HIGH-SPEED MEMORY

▪ Up to 2 TB total DDR4-3200 MHz ECC registered RAM memory, 16x DIMM slots

ADVANCED SECURITY CAPABILITIES

▪ Integrated TPM 2.0 compliant TCG 2.0 secure crypto-processor module

▪ Intel TXT, PFR, SGX, TME, Crypto Accel, QuickAssist for Zero Trust security

▪ Self-encrypting FIPS 140-2/3 Flash storage options

▪ NVIDIA Bluefield Data Processing Unit (DPU) options for security offload

▪ NVIDIA Network controller options to accelerate in-line encryption/decryption

▪ Tamper-resistant storage sleds with key-lock option

MANAGEMENT AND OS SUPPORT

▪ Linux (Ubuntu LTS default; RHEL optional), Windows Server options

▪ VMware ESXi virtual machine (VM) hypervisor compatible

▪ Redfish and IMPI 2.0 management

HIGH-BANDWIDTH ETHERNET/INFINIBAND NETWORKING

▪ OCP 3.0 network controller slot (1/10/25/40/50/100/200 Gbps options)

▪ PCIe Gen 4 slots for network controllers (1/10/25/40/50/100/200 Gbps options)

RESX07-1U22RA Front View

RESX07-1U22RA Rear View

BASELINE INTEGRATED I/O

▪ 2x USB 3.0 ports (rear)

▪ 1x VGA port (rear)

▪ 1x RJ-45 IPMI port (rear)

MODULAR HIGH-SPEED I/O EXPANSION SLOTS

Up to 5x expansion slots:

▪ 1U22RA Configuration (I/O-optimized):

  – Slot A1: PCIe 4.0 x16 dual-width, full-height full-length (FHFL), 12.0" depth w/RIO (compatible with 300W NVIDIA GPU)

  – Slot A2: PCIe 4.0 x16 single-width, half-height half-length (HHHL), 6.7" depth w/RIO

  – Slot A3: PCIe 4.0 x8 single-width, half-height half-length (HHHL), 6.7" depth w/RIO

  – Slot A4: OCP 3.0 gen 4.0 x16 w/RIO

  – Slot A5: PCIe 4.0 x8 single-width, half-height half-length (HHHL), 6.7" depth w/FIO

▪ 1U22RC Configuration (storage-optimized):

  – Slot A1: PCIe 4.0 x16 dual-width, full-height full-length (FHFL), 12.0" depth w/RIO (compatible with 300W NVIDIA GPU)

  – Slot A2: PCIe 4.0 x16 single-width, half-height half-length (HHHL), 6.7" depth w/RIO

  – Slot A3: PCIe 4.0 x8 single-width, half-height half-length (HHHL), 6.7" depth w/RIO

  – Slot A4: OCP 3.0 gen 4.0 x16 w/RIO

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HIGH-SPEED DATA STORAGE

- 1U22RA Configuration (I/O-optimized):
  - No removable SSD support
  - Up to 2x internal NVMe Gen4 x4 M.2 SSD slots
- 1U22RC Configuration (storage-optimized):
  - Up to 4x removable 2.5" form factor 15 mm U.2 NVMe PCIe Gen4 x4 SSDs, front access drive sleds with thumb screws
  - Up to 4x removable 2.5" form factor 7 mm SATA3 6 GBps SSDs, front access drive sleds with thumb screws
  - Up to 2x internal NVMe Gen4 x4 M.2 SSD slot
- Standard enterprise or FIPS 140-2 encryption options; compatible with FIPS 140-3 and NIAP Common Criteria certified SSDs
- RAID redundancy with integrated Intel VROC key option or add-on RAID controller card option
- Patented read-only or R/W-selectable switch for removable SATA SSD sleds (optional)

ROBUST POWER SUPPLY OPTIONS

- Removable single P1H form factor PSU module (rear)
- Input voltage options: 120 V AC, 240 V AC, 28 V DC, 48 V DC, or 240 V DC
- Max combined power output: up to 1000 W @ 120 V AC / 1400 W @ 240 V AC / 800 W @ 28 V DC / 1000 W @ 48 V DC
- Filtered MIL-STD-461 CE102 compliant power supply available with external accessory option: up to 750 W @ 120 V AC

SERVICEABILITY

- Field replaceable units (FRUs), including removable PSU, SSDs, OCP card
- Front-panel system power and drive activity indicators, including power on/off switch

MECHANICAL

- Form Factor: 19" rackmount short-depth 1U chassis
- Height: 1U or 1.75" (44.45 mm)
- Width: 17.36" (440.9 mm), EIA-310/RETMA rack-mountable (rail kits optional)
- Depth: 22" (558.8mm) from front to back, 21" (533.4 mm) from rack ear to back
- Weight (typical)**: estimated at 27 lb. (12.27 kg)
- Hardened Finish: Powder coating over Iridite-treated aluminum and passivated stainless steel
- Designed with materials compliant to RoHS and REACH prohibited substance restrictions

PATENTED OR ADVANCED RUGGEDIZATION

- Patented air baffle channel technology optimizes airflow over high TDP devices
- Proprietary system control module (SCM) for temperature monitoring and adaptive fan control
- High-speed, high-volume fans to ensure maximum airflow over crucial system components
- Shock-hardened PCIe 3-axis board stiffener brackets
- Memory retention clips for DRAM shock-resistance while retaining serviceability
- Lightweight aluminum chassis with stainless steel reinforcement
- Electrical interference input filtering and cable shielding
- Conformal coated power supply default; full conformal coat kit option
- Staking option for connectors or large components for severe environments
- Optional protections for salt-fog/corrosion/fungus/dust ingress

RESX07-1U22RC Front View

RESX07-1U22RC Rear View

Technical specifications (cont.)

ENVIRONMENTAL **

- Baseline qualification testing to Mercury Servers Rugged Level 1 (RL1) enhanced standard for demanding military, aerospace, and industry deployment:

  - Temp: 0 to +50°C operation/-40 to +71°C storage, MIL-STD-810H

  - Shock: 20 G @ 11 ms operation, MIL-STD-810H (optional kit for 30 G @ 20 ms)

  - Vibration (random): 5 Hz - 2000 Hz, non-operating random, MIL-STD-810H (optional extended vibe kit)

  - Vibration (sinusoidal sweep, dwell): 4 Hz - 33 Hz operation, MIL-STD-167-1A

  - Altitude: 12.5 K ft operation/40 K ft storage, MIL-STD-810H

  - Humidity: up to 95% NC, MIL-STD-810G (optional kit for 100% condensing)

  - EMC/Safety: MIL-STD-461G CE102, RE102

  - Safety: MIL-STD-882; CE Mark conformity

  - Airborne Noise: MIL-STD-1474D

- Enhanced Ruggedization Kit Option (sand/dust filter bezel, extended shock/vibe, conformal coating for condensing humidity, salt-fog mitigation)

- Customer-specific configuration compliance will be configuration dependent

- NVIDIA Certification - with integrated A100 GPU

- Optional EMI hardening for expanded MIL-STD-461 compliance

- Optional delta qual testing – expanded MIL-STD-810, MIL-STD-461, or DO-160 testing

OPTIONAL ACCESSORIES

- Rail mount options: fixed mount (front and rear) or slide rails

- Power cords: USA/European

- Dust filter bezel

CONFIGURATION SERVICE OPTIONS

- Environmental Stress Screening (ESS)

- Configuration control services

- Configuration-specific ICD drawings/CAD models

- Configuration-specific MTBF analysis, Letter of Volatility (LoV), EQT test reports

- Lifecycle extension obsolescence management services

- Minor to major mechanical modifications to chassis

REGULATORY/EXPORT COMPLIANCE

- CE Mark conformity declaration, safety certification, RoHS/REACH compliance

- Dual-use EAR export control (configuration dependent)

- Mercury is ITAR registered and compliant to support military program requirements

- Country of Origin/TAA-Compliance: designed and manufactured in USA

- Quality Management: mature ISO 9001 and AS9100 quality manufacturing process

- Modular Open Architecture Approach (MOSA): aligned with standards-based interfaces and interoperable with multi-vendor COTS cards

- AS5553-compliant counterfeit parts prevention program with vetted supply chain

- Product designs and customer information protected by Mercury's DFARS 252.204-7012 and NIST SP 800-171A-compliant IT infrastructure
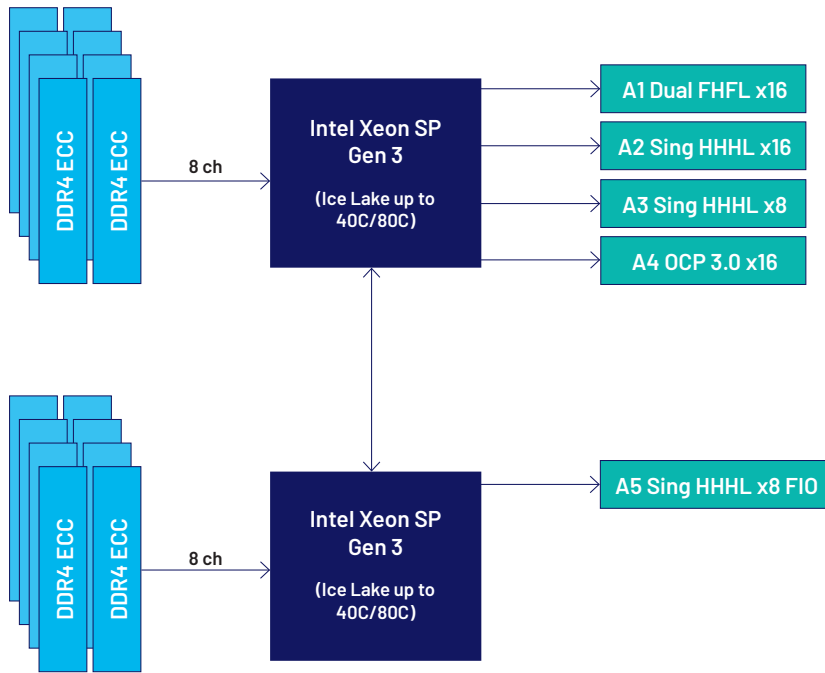
WARRANTY

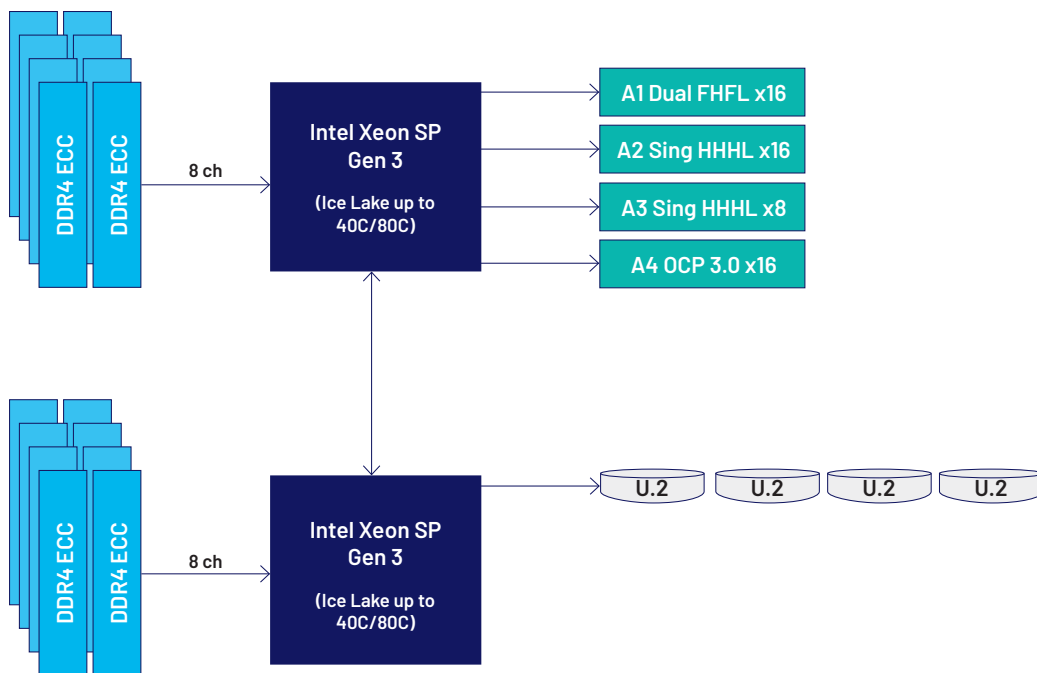- Mercury's limited lifetime warranty

* Roadmapped feature/capability
** Products designed to meet or exceed listed datasheet specifications. Some specifications including I/O, weight, and thermal profiles are configuration dependent. Contact factory for more information.

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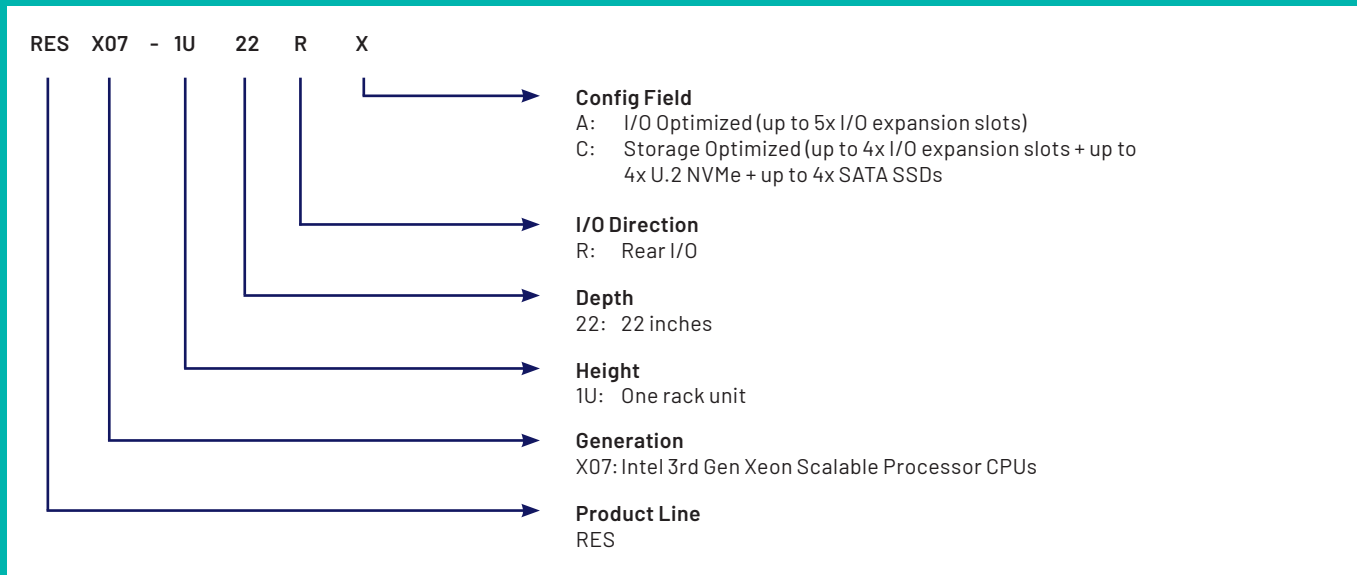# Block diagrams

I/O OPTIMIZED RES X07-1U22RA BLOCK DIAGRAM

STORAGE OPTIMIZED RES X07-1U22RC BLOCK DIAGRAM

APPLICATIONS

High-performance computing (HPC)	Machine learning/deep learning (ML/DL)	Signals intelligence (SIGINT)	5G-based workloads
Sonar/radar signal processing	Virtual reality (VR)/augmented reality (AR)	Industrial automation	Big data analytics
Sensor and image processing	High performance simulation	C5ISR	Electronic warfare (EW)
Artificial intelligence (AI) inferencing		Heterogeneous accelerated copro-cessing (GPUs, FPGAs)	Virtualization

CONFIGURATION MODEL CHART

RES X07 - 1U 22 R X

Config Field
A: I/O Optimized (up to 5x I/O expansion slots)
C: Storage Optimized (up to 4x I/O expansion slots + up to 4x U.2 NVMe + up to 4x SATA SSDs)

I/O Direction
R: Rear I/O

Depth
22:    22 inches

Height
1U: One rack unit

Generation
X07: Intel 3rd Gen Xeon Scalable Processor CPUs

Product Line
RES

Partnering with

intel XEON GOLD

intel partner Titanium IoT Solutions

NVIDIA PREFERRED PARTNER

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