mercury

RESX08-2U18R
18" Depth, 2U Rugged Rack Server

2U short-depth rugged edge server with max configurability

- Dual Intel® 4th/5th gen Xeon® SP CPUs plus dual NVIDIA 350 W GPUs w/ NVLink
- High density/highly configurable PCIe Gen5 I/O and storage: up to 6x PCIe slots and 8x removable NVMe/12x 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 2U18R model in the RES X08 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 that enables operation in extreme environments, the 2U18R is one of the densest, most configurable computing platforms on the planet ready to tackle challenging artificial intelligence (AI), high performance computing (HPC) and sensor processing workloads at the edge.
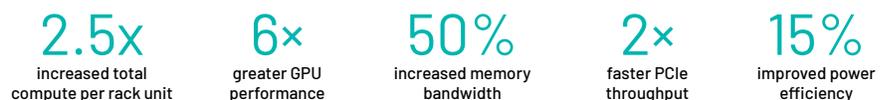
Trust Mercury for Modified COTS

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 X08-2U18R to meet your specific requirements.

Highlights

- Ingest, process, store and move data at never-before accomplished speeds for real-time decision-making and data inferencing in SWaP-constrained rack architectures
- Dual Intel 4th/5th Gen Xeon-SP CPUs plus PCIe 5.0 fabric for maximum throughput
- Up to two 350 W GPU cards connected via NVLink (e.g. NVIDIA H100)
- Advanced capabilities for secure data-at-rest, data-in-transit, and data in use
- Front removable CMOS battery and SSDs; rear removable power supply
- OCP 3.0 slot and PCIe Gen 5 slots to support up to 400 Gbps Ethernet/Infiniband
- Ruggedized chassis includes patented/proprietary shock, vibration, thermal management, and serviceability features to ensure reliability

RES X08 PERFORMANCE

2.5x	6×	50%	2×	15%
increased total compute per rack unit	greater GPU performance	increased memory bandwidth	faster PCIe throughput	improved power efficiency

*compared to previous generation servers

Technical Specifications

DATA CENTER-CLASS PROCESSOR ARCHITECTURE

- Dual-socket Intel 4th Gen Xeon Scalable processor CPUs (formerly Sapphire Rapids), x86-64, up 52 cores per CPU (128 cores total)*

- Dual-Socket Intel 5th Gen Xeon Scalable processor CPUs (formerly Emerald Rapids)*

- Thermally optimized for two 225 W TDP CPUs at extended temps with options up to 300 W per CPU with reduced thermals**

- Built-in data accelerator engines for demanding workflows, including artificial intelligence (AI), networking, storage, security and high performance computing (HPC)

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

HIGH-DENSITY, HIGH-SPEED MEMORY

- Up to 8 TB total DDR5-4800 MHz ECC registered RAM memory, 16x DIMM slots

- CXL 1.1 cache-coherent interconnect for memory expansion option

ADVANCED SECURITY CAPABILITIES

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

- Intel TXT, PFR, SGX, TME, TDX, QAT for Zero Trust security against cyber-attacks

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

- NVIDIA Confidential Computing options for GPU security*

- 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

HIGH-BANDWIDTH ETHERNET/INFINIBAND NETWORKING

- OCP 3.0 network controller slot (2x 200 Gbps/1x 400 Gbps port options)

- PCIe Gen 5 slots for network controllers (1/10/25/40/50/100/200 and 400 Gbps options)

- Integrated motherboard NICs: 2x 10GBaseT ports

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

BASELINE INTEGRATED I/O

- 4x USB 3.0 ports (2x rear, 2x front)

- 1x VGA port (rear)

- 1x RS232 serial port (rear)

- 2x 10GBase-T LAN ports (rear)

- 1x RJ-45 IPMI LAN port (rear)

- Fan CFM control switch (front)

- Remote battery (front)

MODULAR HIGH-SPEED I/O EXPANSION SLOTS

- Slot 1: PCIe 5.0 x16 dual-width, full-height, full-length (FHFL), 10.5" depth w/RIO (compatible with 350 W NVIDIA GPU, i.e. H100/L40S/other GPU), NVLink support available

- Slot 2: PCIe 5.0 x16 dual-width, full-height, full-length (FHFL), 10.5" depth w/RIO (compatible with 350 W NVIDIA GPU, i.e. H100/L40S/other GPU), NVLink support available

- Slot 3: PCIe 5.0 x4 low profile, 6.7" depth w/RIO

- Slot 4: PCIe 5.0 x8 low profile, 6.7" depth w/RIO

- Slot 5: OCP 3.0 gen 5.0 x16 w/RIO

- Slot 6: PCIe 5.0 x16 full- height, 6.7" depth w/RIO

- Slot 7 (optional): PCIe 5.0 x8 single-width full-height full length (FHFL), 10.5" depth with RIO, assumes Slot 2 is bifurcated to x8 PCIe single-width FHFL
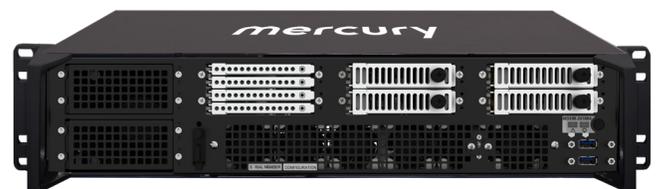
RESX08-2U18R Front View

HIGH-SPEED DATA STORAGE

- Up to 8x removable 2.5" form factor 15 mm U.2 NVMe PCIe Gen5 x4 SSDs, front access drive sleds with thumb screws

- Up to 12x removable 2.5" form factor 7 mm SATA3 6 GBps SSDs, front access drive sleds with thumb screws

- Combination of removable SATA and NVMe SSDs (i.e. 4x SATA + 4x NVMe)

- Up to 2x internal NVMe Gen5 x4 M.2 SSD slots

- Standard enterprise or FIPS 140-2 encryption options; compatible with FIPS 140-3 and NIAP Common Criteria certified SSDs

- Optical disk drive option for CD/DVD/Blue-Ray (front); note: reduces capacity for storage

- RAID redundancy with integrated Intel VROC option or add-on RAID controller card options

- Patented read-only or R/W-selectable switch for removable SATA SSD sleds (optional)

- Optional key-lockable drive trays to prevent unauthorized access

ROBUST POWER SUPPLY OPTIONS

- Removable single or dual/redundant CRPS form factor PSU module (rear)

- Input voltage options: 110/220 V AC, 28 V DC, 48 V DC, or 270 V DC

- Max combined power output: up to 2800 W @ 110 V AC/ 2000 W @ 28 V DC/4800 W @ 220 V AC or 270 V DC

- Filtered MIL-STD-461 CE102 compliant PSU option for 110/220 V AC, filter extends chassis depth 40 mm (roadmapped DC voltage option)

MECHANICAL

- Form Factor: 19" rackmount short-depth 2U chassis

- Height: 2U or 3.5" (88.9 mm)

- Width: 17" (432.0 mm), EIA-310/RETMA rack-mountable (rail kits optional)

- Depth: 18" (457.2 mm)**

- Weight (typical)**: 23 lb.

- 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 cdevices

- Proprietary system control module (SCM) for temperature monitoring and adaptive fan control

- High-speed, high-volume fans (9x total) to ensure maximum airflow over crucial system components

- Front-panel CFM control switch for lab/high-performance modes with lock-out

- Shock-hardened PCIe card cage and 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

RESX08-2U18R Rear View

Technical specifications (cont.)

SERVICEABILITY

- Removable remote CMOS battery on front panel to avoid downtime and quickly replace battery in field while system is running

- Field replaceable units (FRUs), including removable PSU, SSDs, OCP card, CMOS battery

- Front-panel system power and drive activity indicators, including power on/off switch

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: 30G@20ms operation/40 G@11ms storage, MIL-STD-810H; Designed for MIL-S-901, Grade B

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

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

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

  - Humidity: up to 95% NC, MIL-STD-810G

  - EMC/Safety: MIL-STD-461G CE102, RE102; MIL-STD-464 Ground Bond Continuity

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

  - Airborne Noise: MIL-STD-1474D

- Customer-specific configuration compliance will be configuration dependent

- NVIDIA Certification (pending)

- Optional conformal coating kit for condensing humidity

- 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

- Spare field replacement units (PSUs, SSD drive trays)

- 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
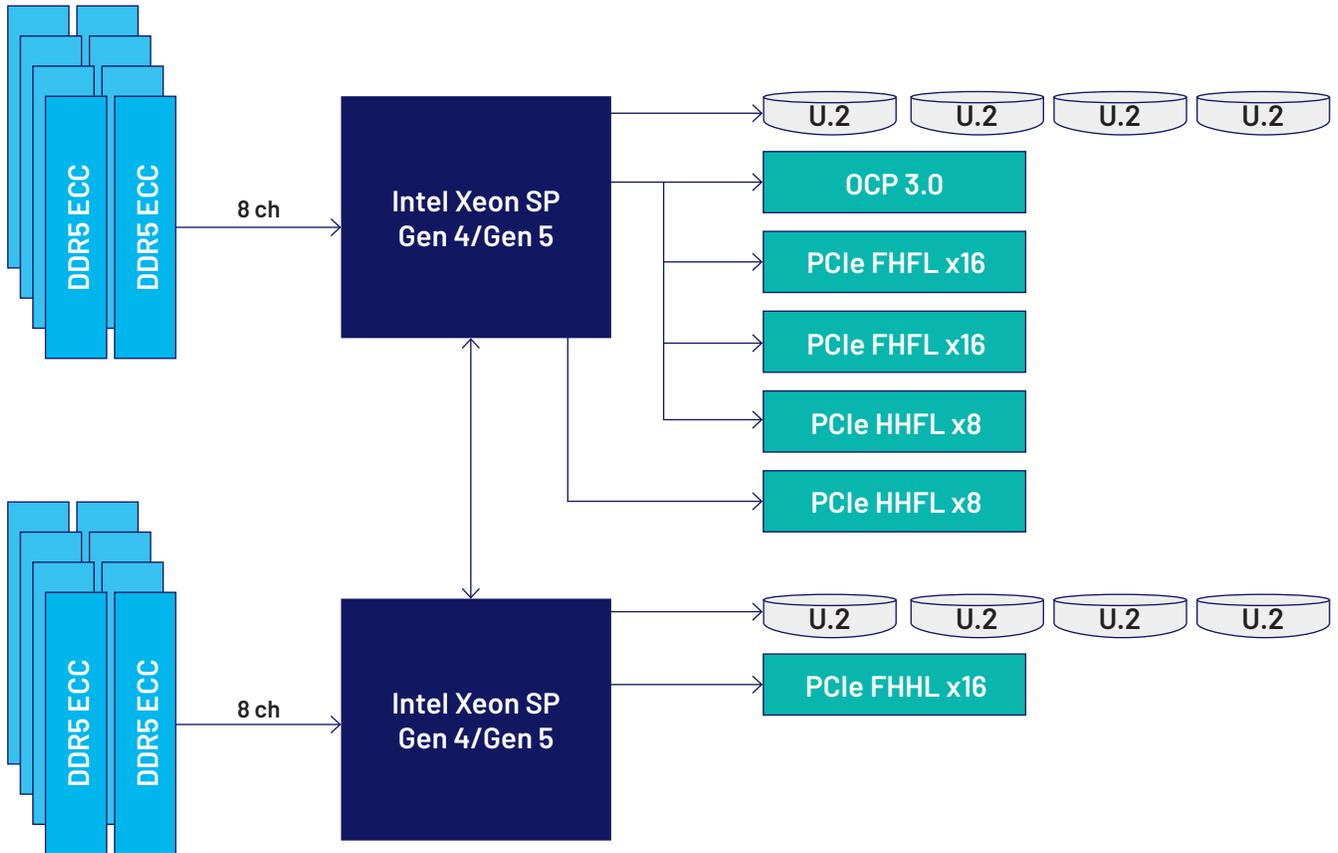
WARRANTY

- Mercury's 3-year warranty; extended warranty available

* 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.
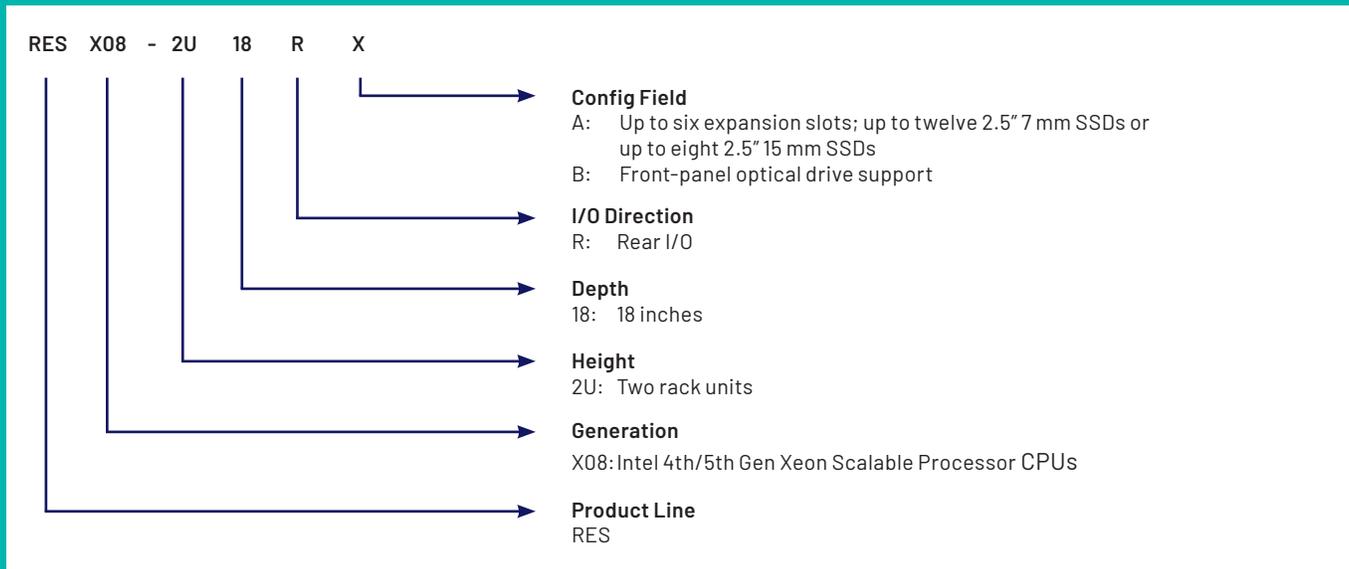
Block diagram

APPLICATIONS

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

CONFIGURATION MODEL CHART

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RES   X08  -  2U   18    R    X
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Config Field
A: Up to six expansion slots; up to twelve 2.5" 7 mm SSDs or up to eight 2.5" 15 mm SSDs
B: Front-panel optical drive support

I/O Direction
R: Rear I/O

Depth
18:   18 inches

Height
2U: Two rack units

Generation
X08: Intel 4th/5th 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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