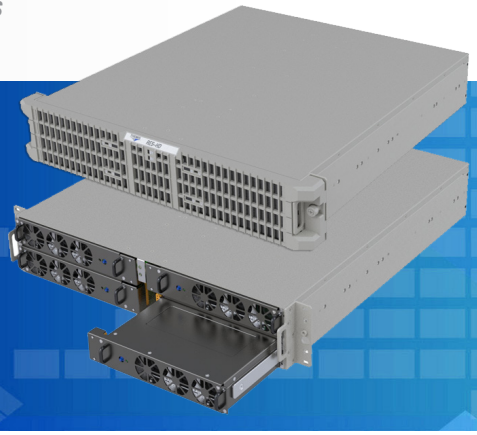
DATA SHEET

Themis RES High Density Rack Mountable Systems

Enhanced Reliability and Scalability for High-Density Computing Environments



- **Backward, current, and future module compatibility**
- **Mix and match over six configurable "plug and pull" modules**
- **Eliminate the need to rip and replace, cut logistical costs**
- **Intel Xeon E5-2600 v3/v4 series processors**

Designed for virtualization, ISR, Big Data Analytics, radar processing, image processing, and large Hadoop cluster applications, Mercury RES HD systems can be used in a multitude of applications that require high-compute density and low latency access to large-data storage.

Modular, Scalable, Extensible

RES HD chassis are built to support the following RES HD modules:

- XR5 RES HD Compute (HDC)
- XR5 RES HD Storage (HDS)
- XR5 RES HD Storage 8 drive (HDS8)
- RES HD Storage Expansion (HDSE)
- RES HD Networking (HDN) Switches
- RED HD Resource Management (HDRM)

Customers combine modules to meet their specific computing and storage requirements. Designed with enhanced reliability features for military, industrial, or rugged commercial use, Themis RES-HD servers can be mounted in standard commercial racks or mobile rugged transit cases, and incorporate thermal and kinetic management design capabilities for shock, vibration, and extended temperature.

Mercury Value

Mercury provides systems integrators and end-users with the best-of-breed computing resources available, and works closely with them to optimize computing solutions that are easy to integrate, yet inexpensive to own and operate.

RES HD Chassis and System

Offered in 2U (four slot) or 3U (six slot) chassis options, Themis RES-HD chassis are built with enhanced reliablity features and house multiple stand-alone, hot-pluggable, compute, storage, switch, and system management modules. Customers can combine these "plug and pull" modules to meet their specific computing and storage requirements.

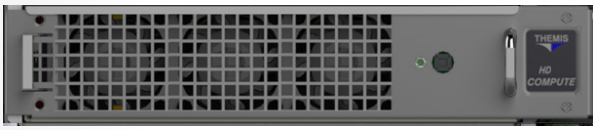
Themis RES-HD Chassis Specifications

Dimensions Height	2U or 3.5 inches (88.9 mm) four chassis slot, 3U or 5.25 inches (133.35 mm) six chassis slot		
Width	17.06 inches (433.3 mm)		
Depth	20 inches (508 mm)		
		Non-Operating	Operating
Temperature range		-40°C – 70°C	0°C – 55°C
Humidity (non-condensing)		5% to 95%	8% to 90%
Shock	3 axis, 35G, 25ms		
Vibration	(10-2000Hz) 4.76 Grms, 5Hz to 2000Hz (SSD)		
Safety	EN60000		
RFI/EMI	EN55022/24		
Compliance	CE Mark		
Military standard:	MIL-STD-810F		

XR5 RES High Density Compute (HDC)

The RES HDC module occupies one chassis slot with two processor sockets, eight DIMMs (8, 16, or 32 GB), and up to three high-bandwidth I/O ports.

The HD Compute module contains two Intel Xeon E5-2600 v3/v4 series processors with up to twenty cores per socket



XR5 RES HDC Module Specifications

Processor	Two Intel Xeon E5-2600 v3/v4 series with up to twenty cores per socket
Memory	Up to 64 GB memory modules for a total of 512 GB DDR4 ECC
Ethernet support	56 Gb/s Infiniband, 40 Gb/s Ethernet, 10 Gb/s Ethernet (option)
Interface	Copper or Fiber
Remote management	BMC, IPMI 2.0
Boot options	PXE or DOM (front panel)

XR5 RES HD Processor Rear I/O Panel

	Per Module
RJ-45 Gigabit Ethernet LAN ports	2
RJ-45 Dedicated IPMI LAN Port	1
Fast UART 16550 Port	1
USB 2.0 Ports	2
Serial port	1
QSFP (quad small form-factor pluggable) Controller	1
Expansion slot	One PCIe 3.0 x16
VGA Port	1

XR5 RES High Density Storage (HDS)

The RES HDS module occupies two chassis slots with two processor sockets, eight DIMMs (8, 16, or 32 GB), up to three highbandwidth I/O ports, and four 3.5 inch disk slots. The HDS module includes a companion RES-XR5-HDC processor module.

XR5 RES HDS Module Specifications

Processor	Two Intel Xeon E5-2600 v3/v4 series with up to twenty cores per socket
Memory	Up to 64 GB memory modules for a total of 512 GB DDR4 ECC
Ethernet support	Gigabit Ethernet, QDR, or FDR
Interface	Copper or Fiber
Remote management	BMC
Boot options	PXE or storage cansister
Expansion slot	One PCIe 3.0 x16
SATA Drives	Four 3.5 inch SATA drives in a single removable storage canister.

Each HDS module includes a companion XR5 RES HDC module.

XR5 RES HDS8 Module Specifications

Processor	Two Intel Xeon E5-2600 v3/v4 series with up to twenty cores per socket
Memory	Up to 64 GB memory modules for a total of 512 GB DDR4 ECC
Ethernet support	Gigabit Ethernet, QDR, or FDR
Interface	Copper or Fiber
Remote management	BMC, IPMI 2.0
Boot options	PXE storage cansister, front accessible DOM
Expansion slot	One PCIe 3.0 x16
SATA Drives	Eight 2.5 inch SATA3/SAS3 SSDs/HDDs in a removable module.
RAID Controller	LSI00200

Each HDS8 module includes a companion XR5 RES HDC module.

RES HD Storage Expansion (HDSE) Module

RES HDSE modules occupy one chassis slot and require a base HDS8 Storage module (with companion processor). Each storage expansion module supports eight 2.5 inch HDD or SDD drives. Maximum storage configuration for the 3RU HD chassis would be one HDS8 module plus four HDS8 Storage Expansion modules for a total of 40 drives (including 8 drives in HDS8 Storage module).

RES HD Networking (HDN) Switch Module

The RES HDN1 module occupies one chassis slot with a 12-port, managed 56 Gb/s Infiniband VPI SDN/40GBe switch system that delivers up to 1.3Tb/s of non-blocking bandwidth and 200ns port-to-port latency. The Switch module enables data centers to scale out with Fourteen Data Rate (FDR) Infiniband. Mellanox switching technology provides industry-leading performance, power, and density. The HD hosted switch also interoperates with existing networks, supports Software Defined Networks (SDN), and provides fabric management for cluster and converged I/O applications. Additionally, with a break out cable, each QSFP port can support four ports of 10GbE for a total of 48 10GbE ports.

Functionality

- 12 QSFP non blocking ports with aggregate data throughput up to 1.344 Tb/s (FDR)
- QSFP controller supports 56Gb IB / 40GbE / 10GbE VPI ConnectX3
- Port-to-port latency 200ns
- Compliant with IBTA 1.21 and 1.3
- 9 virtual lanes: 8 data + 1 management
- 256 to 4Kbyte MTU
- 4x48K entry linear forwarding data base

Fabric Management

- On-board SM for fabrics up to 648 nodes
- Unified Fabric Manager™ (UFM™) Agent

Device Management

- CLI or SNMP

Management Ports

- 100/1000 Ethernet port
- RS232 port over DB9
- Mini USB

Connectors and Cables

- QSFP connectors
- Passive copper or active fiber cables
- Fiber media adapters
- QSFP to SFPT adaptors
- Indicators
- Per port status LED Link, Activity
- System status LEDs: System, fans, power supplies
- Port Error LED
- Unit ID LED

10GbE, 40GbE, 56GbE, and 100GbE switch modules (HDN40, HDN56, HDN100) are also available.

RES HD Resource Management (HDRM) Module

The RES HDRM module provides remote independent initialization, administration, and monitoring of the health and environment of one or more modules or servers and related computing infrastructure equipment, including fault data history, analytics and prognostics. The Resource Manager provides a single user interface for easy access to managed systems' service processors, displaying information obtained from these processors in a converged dashboard view. Mercury's i7 based Resource Manager leverages open standards such as Open Stack Dashboard (Horizon) and Zabbix, a highly efficient, enterprise-class open source distributed monitoring solution for networks and applications.

Functionality

- Number of ports: fourteen ports
- Performance switching capacity: 48 Gbps
- Maximum forwarding rate: 35.71 Mpps
- MAC address table size: 8K entries
- Packet buffer: 3.5 Mbits
- Forwarding mode: store and forward
- IEEE 802.3 compliant
- IEEE 802.3u compliant
- IEEE 802.3ab compliant
- Supports half/full-duplex operation at 10/100Mbps
- Supports full-duplex operation at 1000Mbps
- Supports auto-negotiation for each port
- Auto MDI/MDIX
- IEEE 802.3x flow control support
- IEEE 802.3az compliant

For additional module options, please reference XR6 RES HD datasheet or contact a sales representative.

2X Compute Density

6 Module Types

½ the Rack Space

100% Scalable & Flexible

RES HD servers double the compute density by taking half the rack space and reducing total system weight by 50% when compared to standard density systems.

Reduced Total Cost of Ownership

compared to standard commercial hardware

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