



THOR22-H6

RADAR SIGNAL PROCESSING SERVER



REDHAWK



- RFSoc and GPU-based Processing Architecture
- Intel® Xeon® 6 Granite Rapids D Processor 6556P-B, 36 Cores 2.3/3.5 GHz, 215W
- DDR5 6400MT/s 64GB RDIMM up to 512GB
- 2TB M.2 NVMe SSD Storage
- NVIDIA RTX 6000 Ada 18176 CUDA Cores, 210.6 TFLOPS RT Cores, 48GB GDD6 ECC
- iWave iG-G42P UltraScale+™ ZU49 RFSoc 16 ADC/ 16 DAC PCIe card
- 2 x 100GbE QSFP28 , 1 x VGA, 1 x IPMI LAN, 2 x USB3.0
- 100~264 VAC 1500W Redundancy PSU
- MIL-STD 810 for Thermal, Anti-Vibration and Shock
- Support RedHawk™ Linux RTOS

INTRODUCTION

In next-generation radar systems, the traditional boundaries between subsystems are increasingly indistinct. Compute, signal processing, and RF front-end functions are converging into tightly integrated platforms. Within this context, an “RFSoc GPU Server” becomes a foundational element of modern radar architecture.

System Architecture Overview:

The subsystem THOR22-H6 is built on a high-performance heterogeneous computing architecture, utilizing the following hardware components:

CPU: Intel® Xeon® 6 Granite Rapids D Processor 6556P-B

Function: Manages system control, data flow, real-time scheduling, and backend processing.

GPU: NVIDIA RTX 6000 Ada

Function: Accelerates large-scale parallel processing, including beamforming, Doppler processing, and AI-enhanced radar algorithms.

FPGA / RFSoc: AMD UltraScale+™ ZU49 RFSoc with 16 ADCs / 16 DACs

Function: Serves as the digital front end—directly digitizing RF inputs, performing digital down-conversion, and managing high-speed signal streaming with low latency.



Key Processing Workflow:

- **RF Signal Ingestion:** Raw RF data from antenna elements are digitized by the ZU49 RFSoc.
- **Real-Time Front-End Processing:** FPGA fabric performs initial filtering, channelization, and data aggregation.
- **Massively Parallel Computation:** Aggregated data streams are offloaded to the NVIDIA RTX 6000 Ada for high-throughput beamforming, target detection, and Doppler analysis.
- **System Orchestration:** The Intel Xeon CPU coordinates tasks, manages I/O, interfaces with tracking/display systems, and supports real-time operating systems or hypervisors.

Performance Benefits:

- **High Throughput:** Direct RF sampling via ZU49 eliminates analog mixer stages, reducing size and signal degradation.
- **Low Latency: FPGA** preprocessing ensures deterministic, real-time signal conditioning.
- **Scalable Compute:** GPU acceleration enables complex algorithms and AI/ML-based radar enhancements.
- **System Flexibility:** Software-defined architecture supports multi-mode radar operation (e.g., surveillance, tracking, imaging) and future waveform upgrades.

Potential Applications:

- Software-defined phased array radar
- EW and SIGINT
- Multifunction radar systems (MFR)

Powered by the latest **Intel® Xeon® 6 Granite Rapids-D processor**, the THOR22-H6 is a 2U high-performance rackmount server engineered for modern radar signal processing and 5G network deployments. Equipped with an **NVIDIA RTX 6000 Ada GPU** featuring 18,176 CUDA® cores and up to 210.6 TFLOPS of RT core performance, the platform delivers exceptional compute density for AI acceleration, real-time analytics, and advanced inference workloads.



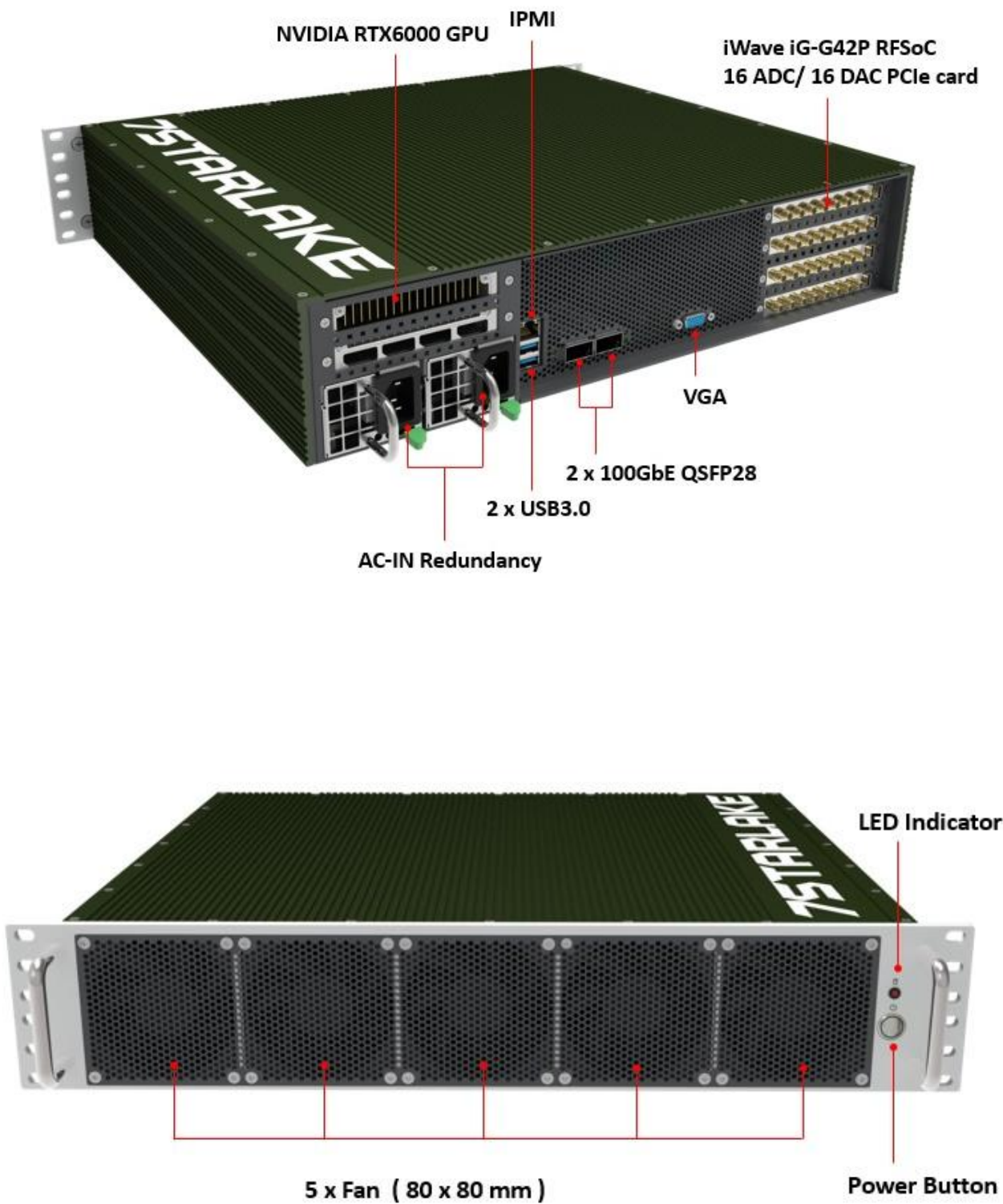
Optimized for time-sensitive operations, the THOR22-H6 supports **real-time operating systems such as RedHawk™ Linux**, enabling deterministic execution and precise timing control. The system also integrates support for the **iWave iG-G42P UltraScale+™ ZU49 RFSoc PCIe card**, unlocking advanced capabilities for software-defined radio (SDR), phased-array radar, and electronic warfare (EW) applications. With 16 ADC and 16 DAC SMA connectors, the server can interface with complex RF front ends, supporting high-bandwidth signal acquisition, real-time processing, and transmission for radar and jamming.



The platform supports up to **512GB of high-speed DDR5** memory and up to **2TB of SSD storage** within a space-efficient 2U form factor, enabling low-latency data access and sustained high-throughput transfers. Its lightweight chassis and wide operating temperature range ensure reliable operation in harsh, space-constrained, or edge-deployed environments.

Whether deployed at telecom edge nodes for high-speed data processing or at remote military sites for AI inferencing, the THOR22-H6 adapts seamlessly to mission-critical demands. **Dual 100GbE QSFP28** ports and a **redundant 1500W power supply** provide reliable connectivity and resilience, making the system an ideal solution for 5G core networks, real-time video analytics, and compact data centers where performance, reliability, and density must coexist.

Appearance



SPECIFICATION

SYSTEM

CPU	Intel® Xeon® 6 SoC 6556P-B, 36 Cores, CPU TDP 215W eTEMP support
Memory Type	Up to 512GB RDIMM, 4CH DDR5 4800/6400 MHz in 4 Slots
Chipset	SoC
IPMI	ASPEED AST2600

GPU

GPU	RTX 6000 Ada 18176 CUDA Cores, 210.6 TFLOPS RT Cores, 48GB GDD6 ECC
-----	---

STORAGE

HDD/SSD	2TB M.2 NVMe SSD
---------	------------------

ETHERNET

Ethernet	2 x 100GbE QSFP28 (SoC) + IPMI shared LAN 1x GbE RJ45
----------	---

RFSOC

RFSoc (FPGA)	iWave iG-G42P UltraScale+™ ZU49 RFSoc 16 ADC/ 16DAC PCIe card
--------------	---

OS

OS Support List	Windows 11, RHEL 9.4 64bit, RHEL 9.5 64bit, Oracle 9.4 64bit, Oracle 9.5 64bit, Rocky Linux 9.4 64bit, Rocky Linux 9.5 64bit, SLES 15 SP6 64bit, Ubuntu 24.04.1 64bit Server, VMWare ESXi 8.0U2
RTOS	RedHawk™ Linux, VxWorks support

POWER

Power Requirement	100~264 VAC 1500W Redundancy PSU
Dimensions	440 x 400 x 88 mm (W x D x H) final size is dependent on specific configuration
Weight	≤ 12 kg final size dependent on specific configuration

FRONT I/O

Switch	1 x Power On Switch
IPMI	1 x IPMI shared LAN 1x GbE RJ45
USB	2 x USB 3.0
LAN1-2	2 x 100GbE QSFP28
Display	1 x VGA
ADC Channels (x16)	1 x Right Angle SMA connector on Front Panel with Balun (BW 10MHz To 3GHz) 3 x Right Angle SMA connectors on Front Panel with Balun (BW 3.1GHz To 5.8GHz)

	3 x Straight SMA connectors with Balun (BW 10MHz To 3GHz)
	9 x Straight SMA connectors with Balun (BW 3.1GHz To 5.8GHz)
DAC Channels (x16)	1 x Right Angle SMA connector on Front Panel with Balun (BW 10MHz To 3GHz)
	3 x Right Angle SMA connectors on Front Panel with Balun (BW 3.1GHz To 5.8GHz)
	3 x Straight SMA connectors with Balun (BW 10MHz To 3GHz)
	9 x Straight SMA connectors with Balun (BW 3.1GHz To 5.8GHz)

ENVIRONMENT

Operating Temp.	0°C to 55°C
Storage Temp.	-40°C to 75°C
Relative Humidity	5% to 95%, non-condensing

MIL-STD-810 ENVIRONMENT TESTING STANDARDS

Method 501, Operational Temperature, high:	Procedure II: +55°C, two-hour dwell, four cycles
Method 501, Storage Temperature, high:	Procedure I: +75°C, two-hour dwell, four cycles
Method 502, Operational Temperature, low:	Procedure II: 0°C, two-hour dwell, four cycles
Method 502, Storage Temperature, low:	Procedure I: -40°C, two-hour dwell, four cycles
Method 514, Vibration:	Category 24/Non-Operating (Category 20 & 24, Vibration)
Method 514, Vibration:	Category 20/Operating (Category 20 & 24, Vibration)
Method 516, Shock:	Procedure V Non-Operating (Mechanical Shock)
Method 516, Shock:	Procedure I Operating (Mechanical Shock)
Method 507, Humidity:	Procedure II: exposure to 10 cycles of 95% relative humidity at temperatures of 30 °C to 60 °C with conformal coating (optional)
Method 509, Salt fog:	Each cycle consists of 24 hours in salt-fog conditions of 5%NaCl, 95% relative humidity and 35 °C followed by 24 hours of drying in an environment with less than 50% relative humidity (optional)
Method 500, Altitude (Low Pressure):	15,000 feet transport, -200÷2500[m] ground operation and exposed to +55°C and -20°C operation (optional)
Method 510, Sand-Dust:	Procedure I: Blasting dust, 12 hours (optional)
Method 508, Fungus:	28 days, mixed spore, 30°C 95% RH (optional)

This datasheet is for marketing purposes only and does not constitute a warranty. All specifications, dimensions, and data are subject to change without notice. For the latest specifications and updates, please contact your 7STARLAKE representatives.