

Rugged Controller

Model Number: THRSLMCC1001

Overview

The **Rugged Controller** is a military-grade computing platform designed for **ground, avionics, and naval applications** where reliability is critical. Built to withstand **extreme temperatures, humidity, shock, vibration, and dust**, it provides robust computing capability in mission-critical environments.

Equipped with Intel Xeon processing power, modular GPU support, and extensive I/O options, the Rugged Controller combines **high performance, scalability, and MIL-STD compliance**. The system has been **successfully supplied to DRDO Hyderabad, the Indian Air Force, and BrahMos programs**, proving its reliability in operational defense deployments.

Technical Specifications

Parameter	Specifications
Processor	Intel Xeon W-1290E
Integrated Graphics	Intel UHD Graphics 630
GPU Upgrade (Option)	NVIDIA T1000 MXM 3.1 (4 GB GPU memory)
RAM	DDR4, up to 64 GB
Storage	1 TB M.2 NVMe SSD + removable SATA III SSD
Video Outputs	2 × DVI (primary & secondary)
Networking	2 × Gigabit Ethernet
USB Ports	4 × USB 2.0
Serial Interfaces	4 × RS232/RS422/RS485
CAN Interfaces	2 × CAN (CAN 2.0B compliant)

Audio	HD audio in/out (AC97)
Expansion Slots	1 × MXM GPU slot, 2 × XMC (or 1 × XMC + 4 × mini PCIe), 1 × vehicle I/O extension
I/O Extension Board	16 × digital inputs, 4 × digital outputs (300 mA low side), 4 × digital outputs (2 A high side), 4 × analog inputs (2 × 0–5V, 2 × 0–36V)
Power Supply	28 VDC, MIL-STD-1275D compliant, IES hold-up compliant
Power Consumption	80 W typical, 100 W max
Cooling	Passive
Dimensions	310 × 220 × 82 mm (W × D × H)
Weight	5–6 kg
Operating Temperature	–40°C to +65°C (up to +71°C with limitations, MIL-STD-810G)
Storage Temperature	–40°C to +85°C
Humidity	95% @ 60°C (MIL-STD-810G)
Altitude	Operating: 30,000 ft, Non-operating: 40,000 ft
Ingress Protection	IPX7 (IEC 60529)
Vibration	Random vibration – wheeled vehicles (MIL-STD-810G), heavy tracked vehicles (AECTP 400)
Shock	40 g, 23 ms (6 shocks/axis, MIL-STD-810G)

Key Features

- Ruggedized military-grade housing with **IPX7 enclosure**
- Intel Xeon CPU and optional NVIDIA GPU for high-performance computing
- Modular and customizable I/O extension boards
- Extensive communication interfaces: **Ethernet, USB, RS232/422/485, CAN**

- MIL-STD qualified for **shock, vibration, altitude, temperature, and humidity**
- Passive cooling design for noise-free operation
- Designed for **long life cycle** support and reduced cost of ownership
- Supplied to **DRDO Hyderabad, Indian Air Force, and BrahMos programs**

I/O Connector Details

Connector	Type	Function
J1	2 × DVI	Primary and secondary video output
J2	2 × RJ-45	Gigabit Ethernet ports
J3	4 × USB 2.0	Peripheral connectivity
J4	4 × Serial (DB9 / MIL connector)	Configurable as RS232 / RS422 / RS485
J5	2 × CAN (DB9 / MIL connector)	CAN 2.0B compliant
J6	Audio (3.5mm / MIL connector)	HD audio in/out (AC97)
J7	MXM Slot	GPU upgrade (NVIDIA T1000 option)
J8	XMC / mini PCIe slots	Modular expansion (networking, storage, etc.)
J9	Vehicle I/O connector	16 × digital inputs, 8 × digital outputs, 4 × analog inputs
J10	Power Input	28 VDC, MIL-STD-1275D compliant

Applications

- Mission-critical defense computing (ground, naval, avionics)
- Autonomous robotic and unmanned vehicle platforms
- Command and control stations
- Industrial rugged computing applications
- Supplied to **DRDO Hyderabad, Indian Air Force, and BrahMos programs**

Compliance

Environmental Qualification (MIL-STD-810G / AECTP 400)

- Temperature: -40°C to +65°C operating, -40°C to +85°C storage
- Vibration: Random vibration (wheeled & tracked vehicles)
- Shock: 40 g, 23 ms (6 shocks/axis)
- Humidity: 95% @ 60°C
- Altitude: 30,000 ft operating, 40,000 ft non-operating
- Salt / Fog: 48 hrs, 5% concentration
- Sand & Dust: Blowing dust compliance
- Drip Proof: MIL-STD-810F, Method 506.4 Proc III

EMI/EMC Compliance (MIL-STD-461F)

- Ground Army standards for emissions and susceptibility



Note

The **Rugged Controller** is part of **THRSL's standard technology suite**, designed for **plug-and-play deployment** across industries. It has been **successfully supplied to DRDO Hyderabad, Indian Air Force, and BrahMos programs**, proving its dependability in mission-critical defense operations.

Custom configurations are available with alternate GPUs, I/O extensions, or specialized environmental compliance certifications.