Intel® Core™ Ultra Series 3 Mobile Reference Design (Panther Island)

Product Brief

March 2026

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Revision History

Date	Revision	Description
March 2026	1.0	Initial release.

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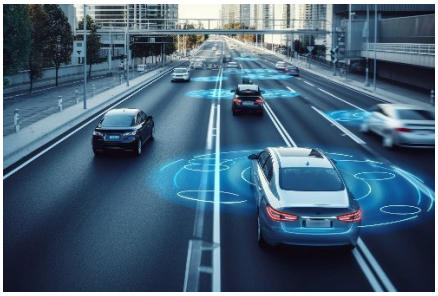
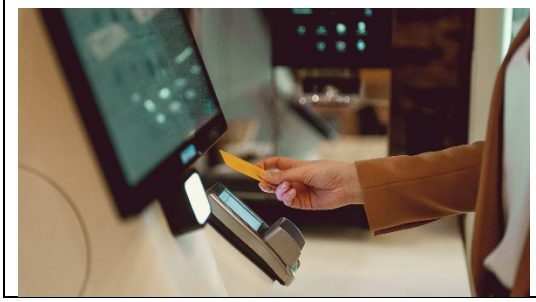
1.0 Introduction

The Panther Island Reference Design is an Intel-developed, small-form-factor platform built on the Intel® Core™ Ultra Mobile Processor to accelerate edge, embedded, and next-generation computing designs. It provides a ready-to-use hardware baseline with high-performance LPDDR5X memory, advanced I/O, and rich display and connectivity options to help customers shorten development cycles and reduce design risk.

1.1 Panther Island Use-Cases

	**Advanced Vision & Capture for Robotics and 360 Imaging Applications** • **8x GMSL2 (MAX96724) Camera Support:** Enabled via **GMSL AIC**, allowing for 360-degree situational awareness in AMRs. Verified compatibility with **D3 ISX031** used in automotive • **HDMI Capture via Dual MIPI C-PHY:** Enables professional-grade **HDMI video and audio capture**, effectively turning the board into an AI-powered NVR or a pro-AV processing hu

	**Deterministic Robotics & Secure Remote Management** • **Precision Control (TSN):** The **Intel® i226 controller** supports **Time-Sensitive Networking (TSN)**, which, combined with the **Panther Lake SoC's TCC**, ensures robotic motor control and network packets are synchronized to the microsecond. • **Active Management Technology (AMT)**, enabling "lights-out" remote management, hardware-level KVM, and out-of-band troubleshooting—critical for robots deployed in hard-to-reach industrial areas.
	**Deliver Innovative and Stunning Computing Experiences with Virtualization Technology** • **Visual Wall Performance:** Supports **4x 4K60** or **2x 8K60** concurrent displays through 4x HDMI ports, ideal for high-end digital signage. • **Virtual Machines with Real IOs and Display:** with advanced virtualization technology, developers can attach real display and USB as peripherals to virtual machines.

	**IO Expansion Options for Vertical with Legacy Peripheral Dependencies** **Examples of device categories:** Digital Signage, Self-Checkout Kiosk, POS, Gaming, Virtual Labs, Interactive Flat Panel Display, Healthcare and Life Sciences Devices

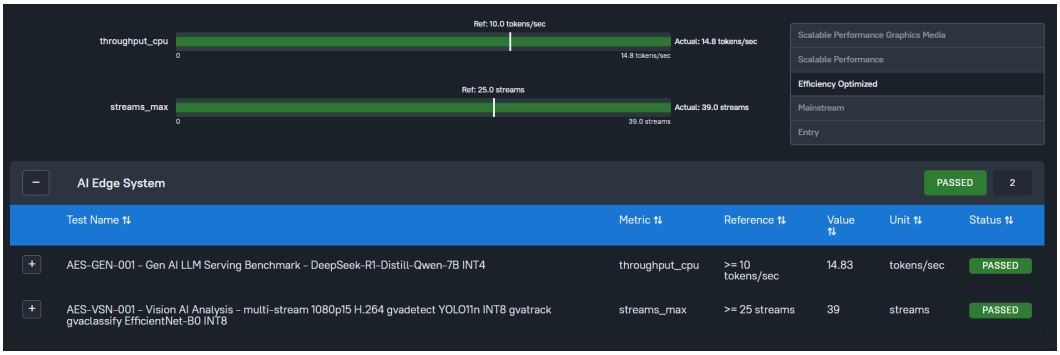
These features make the Panther Island Reference Design a versatile and powerful platform for developers working on cutting-edge AI and edge computing solutions.

1.2 Generative AI and Vision AI

The Panther Island reference board demonstrates strong and well-balanced AI edge performance, exceeding qualification benchmarks across both Generative AI and Vision AI workloads within the Efficiency Optimized category.

For Generative AI inference, the system achieves 14.8 tokens per second when serving a 7-billion-parameter (7B) large language model—specifically a DeepSeek-R1-Distill-Qwen-7B INT4 configuration—comfortably surpassing the reference threshold of 10 tokens per second. This result indicates that the Panther Island platform can reliably support mid-scale LLM inference at the edge with meaningful performance headroom.

In parallel, the platform sustains 39 concurrent 1080p H.264 vision streams, significantly exceeding the 25-stream reference requirement. This highlights the system's ability to handle compute-intensive, multi-stream Vision AI workloads alongside GenAI tasks without compromise.



Taken together, these results underscore the Panther Island board's balanced architecture and system-level optimization, enabling efficient execution of both 7B parameter language models and high-density vision analytics. The performance margin achieved in both tests reinforces Panther Island's suitability for

production-grade edge deployments where efficiency, scalability, and mixed AI workloads are critical.

1.3 Terminology

Table 1. Terminology

Term	Description
HDMI	High-Definition Multimedia Interface
TSN	Time-Sensitive Networking
MIPI CSI	Mobile Industry Processor Interface Camera Serial Interface
LSPCON	Level Shifter and Protocol Converter
SIO	Super Input Output
eSPI	Enhanced Serial Peripheral Interface
DP	Display Port
eDP LVDS	Embedded Display Port with Low-Voltage Differential Signaling

1.4 Reference Documents

Log in to the Resource and Documentation Center (rdc.intel.com) to search for and download the document numbers listed in the following table. Contact your Intel field representative for access.

Note: NDA Customers can access Arrow Island Design Collaterals after obtaining a Design Licensing Agreement from Intel.

Table 2. Panther Island Reference Documents

Document	Document No./Location
Panther Island Gold Deck	850937
Panther Island Hardware Spec	TBD
Schematics PDF	850939
Schematic Cadence Format	850940

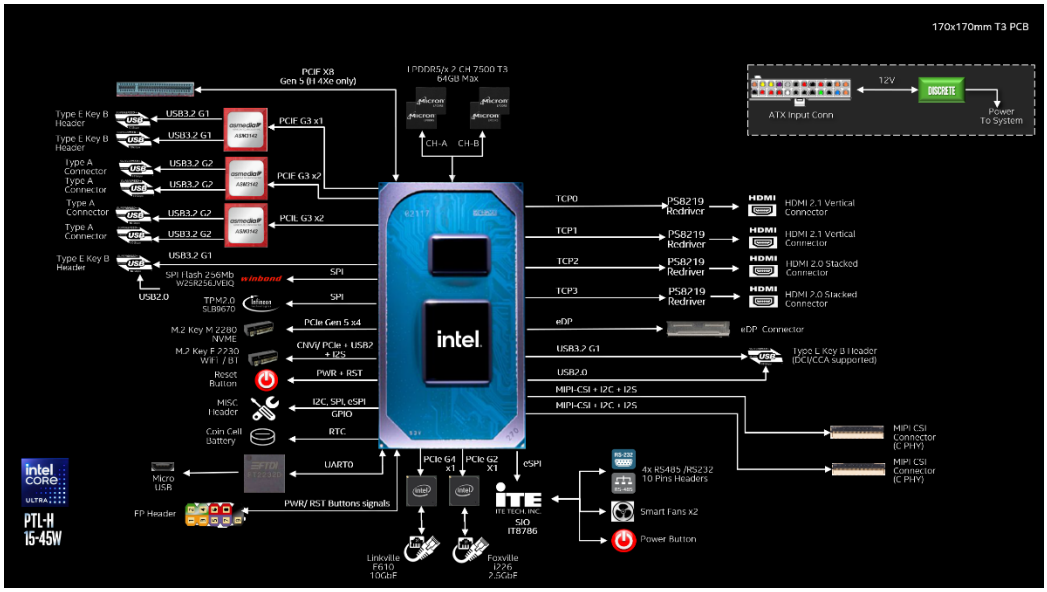
Document	Document No./Location
Schematic OrCAD Format	850941
Schematic Zuken Format	850942
Schematic Mentor Format	850943
Board Layout Files	850944
Bill of Materials (BOM)	850945
Tape Out Manufacturing Files	850946
User Guide	TBD
Thermal Mechanical Design Guide (TMDG)	TBD

2.0 Panther Island Reference Design Specifications

The Panther Island Reference Design is a compact, high-performance Mini-ITX platform powered by the Intel® Core™ Ultra Mobile Processor (Series 2), designed to unlock AI-ready and next-generation edge computing.

The following section describes the high-level details and specifications of this cutting-edge platform.

Figure 1. Panther Island Reference Design Landing Zone



2.1 Panther Island Technical Specifications Summary

Table 3. Technical Specification Summary

Specification	Details
SoC	PTL-U/H 15W-45W Silicon (Solder Down)
Form Factor	SBC: 170mm x170mm; Type 3 PCB 12 Layer
Memory	LPDDR5x MD Dual Channels (7500MT/s, NON ECC, 64GB)
Display	Display Outputs (Support Maximum 4x 4k60Hz or 2x 8k60Hz) 2x HDMI 2.1 Standard Connectors 2x HDMI 2.0 Standard Connectors 1x eDP Connector

Storage	1x M.2 Key M 2280 [PCIe x4 Gen5] 256Mb SPI Chip [W25R256JWEIQ]
USB	2x USB 3.2 Gen 1 Type E Key-B Header (PCH with redriver) 4x USB 3.2 Gen 2 Type A Connector (through PCIE Bridge) 2x USB 3.2 Gen 1 Type E Key-B Header (through PCIE Bridge) 1x USB to UART Debug Port (FTDI)
Connectivity	1x Foxville i226 2.5Gb Ethernet (Support Vpro and TSN) 1x Linkville E610 10Gb Ethernet 1x M.2 Key E 2230 for WIFI/BT [CNVI/PCIe+USB]
Super IO	eSPI Super IO [IT8786]
Expansion Slots	1x PCIE Gen 5 X8
MISC Header	SPI Dediprog eSPI Header 2x Fan Headers 1x Front Panel Header 4x RS232/RS485 Header (from SIO) GPIO, I2C, GSPI Header RTC Battery Connector
MIPI-CSI	2x Samtec 60-pins Connectors (C-PHY with 12V)
Indicator	Power button, Reset button, 6x LEDs
Security	TPM SLB9670XQ2.0
Power	ATX Power Connector 24 pins + PCIE 8 pins
Chassis	Open Board
Thermal	Active Solution with Fan
Temperature	Operating: 0 ~ 60 °C
OS	Windows
UEFI BIOS	Pre-Alpha Release Only

3.0 Call to Action

To obtain Panther Island design documents from Intel, an NDA (Non-Disclosure Agreement) and Design Licensing Agreement must be signed. This ensures compliance with legal and corporate policies while facilitating seamless collaboration between your company and Intel.

Approach dedicated FAE to obtain the required design files.

For our existing customers, please refer to EDS/PDG for the platform design guidelines. Panther Island is provided as a customer focused small form factor hardware design reference

If you are new to Intel, please contact us at https://builders.intel.com/contact-us.