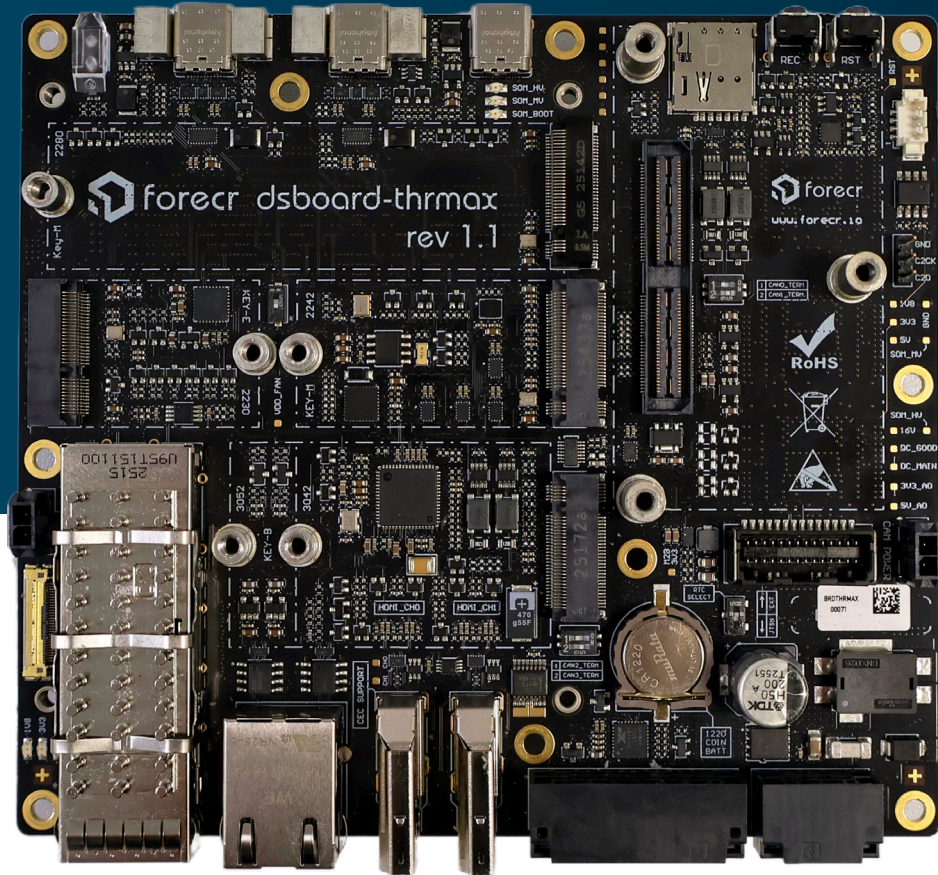




DSBOARD-THRMAX USER MANUAL

UM-DSBDTHRMAX-01

Document Revision: 1.3

12/08/2026



Forecr
<https://www.forecr.io>
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Preface

Disclaimer

Forecr emphasizes that the information contained in this user manual is continuously updated in line with the technical modifications and enhancements made by Forecr to its carrier board. Therefore, this manual only represents the technical status of Forecr carrier board at the time of publishing.

Forecr shall not be held responsible for any damages that may occur directly or indirectly as a result of any technical or typographical errors or omissions found in this document or for any discrepancies between the product and the user's manual.

Customer Support

In case you encounter any challenges after reading the user manual and/or using the carrier board, please reach out to the Forecr reseller from which you purchased the carrier board.

See the contact information section below for more information on how to contact us directly.

Contact Information

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Symbols

	ElectroStatic Discharge (ESD) Sensitive Device! Electronic boards and their components are sensitive to static electricity. When handling any circuit board assemblies, it is recommended that ESD safety precautions be observed. ESD safe best practices include, but are not limited to: • Do not handle the carrier board out of its antistatic packaging while it is not used for operational purposes unless it is otherwise protected. • Whenever possible, unpack or pack this product only at ESD safe work stations. • Where a safe work station is not guaranteed, it is important for the user to be electrically discharged before touching the product with his/her hands or tools. • Try to handle the board by the edges, avoiding contact with components.
	HOT Surface! Do not touch. Contact may cause burns. Allow to cool before servicing.
	Waste Electrical and Electronic Equipment (WEEE)! The carrier board should not be discarded as unsorted waste but must be sent to separate collection facilities for recovery and recycling.
	Restriction of Hazardous Substances (RoHS)! The carrier board complies with the regulations and restrictions established by the ROHS Directive and does not contain hazardous substances in concentrations that may be harmful to health or the environment.

Limited Product Warranty

Forecr provides a 1-year Warranty for the carrier board. This warranty period is valid from the original purchase date of the carrier board. In order to maintain warranty, the carrier board must not be altered or modified in any way. Changes or modifications to the board, that are not explicitly approved by Forecr and described in this user manual or received from Forecr Support as a special handling instruction, will void your warranty.

To receive warranty service, the carrier board must be delivered to Forecr within the warranty period together with the original invoice or proof of purchase.

Revision History

Revision No	Revision Date	Revision Description
1.0	22.08.2025	Preliminary Release
1.1	05.01.2026	Added Accessory Section.
1.2	24.02.2026	Updated the board revision and the system block diagram.
1.3	12.08.2026	Added Power Consumption and MTBF Prediction details. Updated the board revision to DSBOARD-THRMAX Rev. 1.1, along with associated sections. Updated the GPIO list and Accessories section. Added new sections for Software Information, Industrial I/O Interface, Expansions and Add-On Boards, as well as new connectors and switches (Micro-Coax DP Connector, Expansion Power Connector, Power Mode Switch, and RTC Switch).

1. Introduction

The DSBOARD-THRMAX is FORECR's most advanced carrier board, purpose-built for the groundbreaking NVIDIA® Jetson AGX Thor™ platform (supporting the T4000 and T5000 modules). Featuring a powerful 64GB/128GB LPDDR5X memory interface, high-speed PCIe Gen5 storage, and a comprehensive array of I/O options (including dual HDMI 2.1, USB 3.2, QSFP28, and robust serial connectivity), this compact 140 x 125 mm form factor is engineered to support the most demanding edge AI workloads.

This industrial board delivers exceptional performance for applications requiring high-speed data transfer, real-time communication, and uninterrupted reliability. Whether deployed in machine vision, robotics, or industrial automation, the platform provides the computational capacity and versatility required to execute complex edge tasks.

Built for seamless deployment in mission-critical environments, the device integrates industrial-grade features, including an operating temperature range of -40°C to +85°C, ruggedized digital I/Os, CAN bus interfaces, and real-time sensor monitoring (such as IMU and onboard temperature sensors). Additionally, its flexible expansion ecosystem supports Wi-Fi, Bluetooth, LTE/5G modules, and high-bandwidth camera connectivity, while full compatibility with NVIDIA JetPack™ 7.x and Ubuntu Linux 24.04 ensures a seamless software integration and development environment.

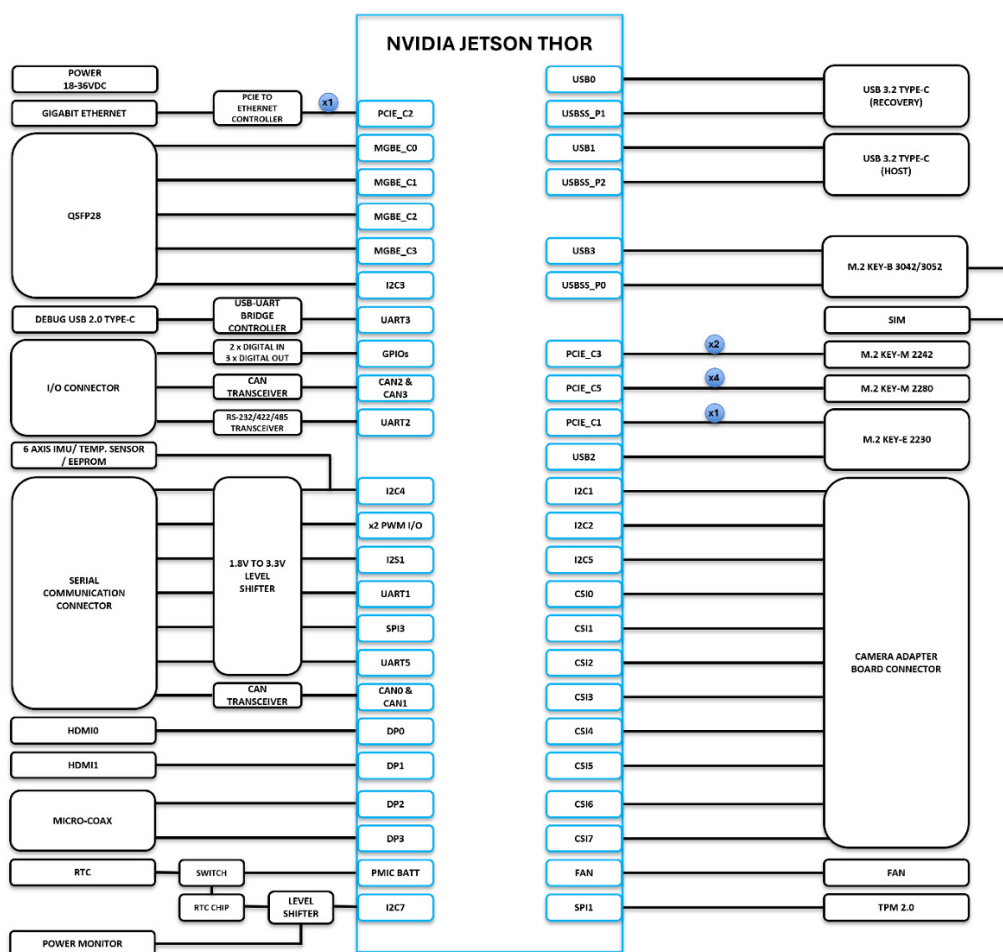
The latest revision of this user manual, datasheet, and 3D model can be downloaded from the [Forecr](#) website.

2. Product Specification

2.1 Technical Specification

Supported Modules	NVIDIA Jetson T4000 / NVIDIA Jetson T5000
Memory	64 GB 256-bit LPDDR5X 273 GB/s 128 GB 256-bit LPDDR5X 273 GB/s
Graphics Interfaces	2x HDMI 2.1
Interfaces	1x Gigabit Ethernet (RJ45) 2x USB 3.2 Type-C (Screw-Lock) 1x USB 2.0 Type-C (Debug) 1x QSFP28 (4x 25GbE for T5000, 3x 25GbE for T4000) 1x RS-232/422/485 (Software Configurable) 4x CAN-FD (8Mbps) (T5000 only) 2x Digital Input (12-60V compatible) 3x Digital Output (12-60V compatible)
Other Features	TPM 2.0 Chipset for Enhanced Security EEPROM, 6-axis IMU, Temperature Sensor RTC (Onboard external RTC chip for 10+ years battery life)
Wireless Communication	WiFi/Bluetooth/LTE/5G Connectivity by extension sockets
Power Supply	18-36V DC
Extension Sockets	1x M.2 Key-B 3042/3052 (USB3.2, USB2.0) 1x M.2 Key-E 2230 (PCIe x1, USB2.0) 1x Camera Expansion Connector (6x 2-Lane or 4x 4-Lane) 1x Serial Communication Connector (I2C, I2S, SPI, UART, PWM, CAN) FAN Connector (12V)
Mass Storage	1x M.2 Key-M 2280 (PCIe Gen5 x4) 1x M.2 Key-M 2242 (PCIe Gen5 x2)
Ambient Conditions	-40°C ... +85°C
Form Factor / Dimensions	140 mm x 125 mm , 169.5 gr
Operating Systems	Ubuntu Linux 24.04
JetPack Support	JetPack 7.x

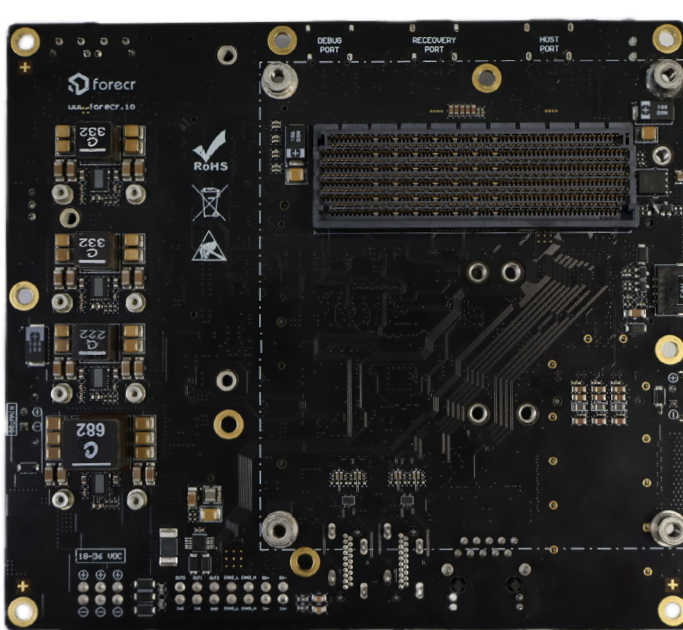
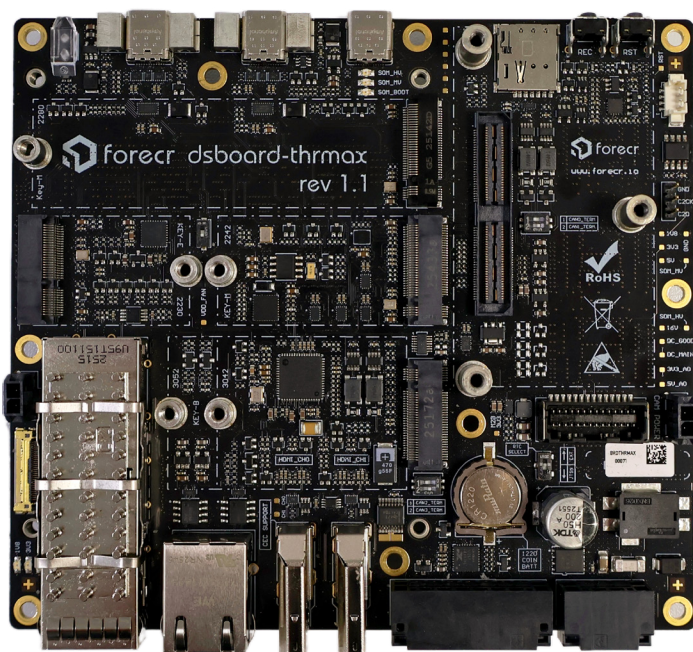
2.2 Block Diagram



2.3 Board Visuals

Front Side

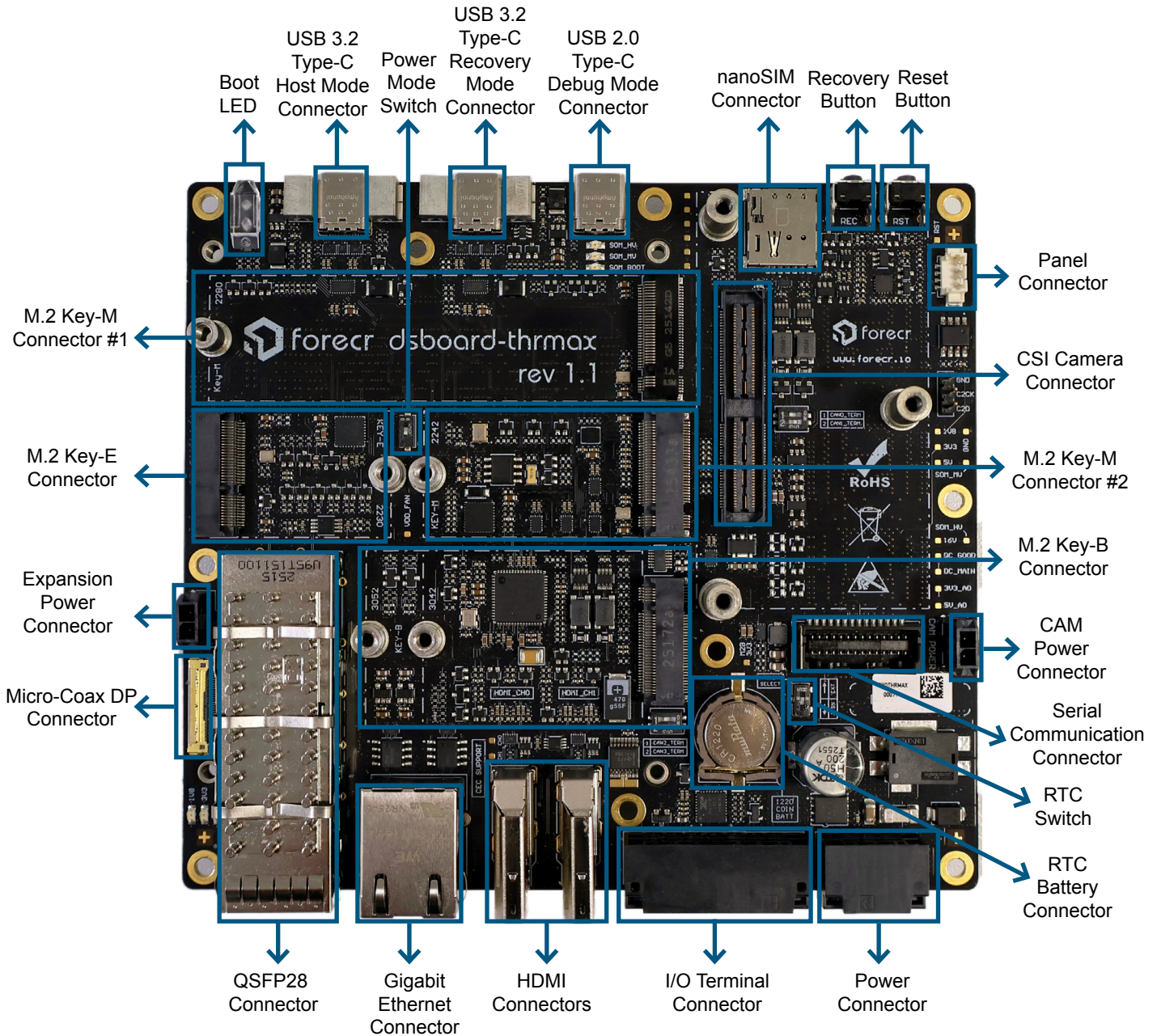
Rear Side



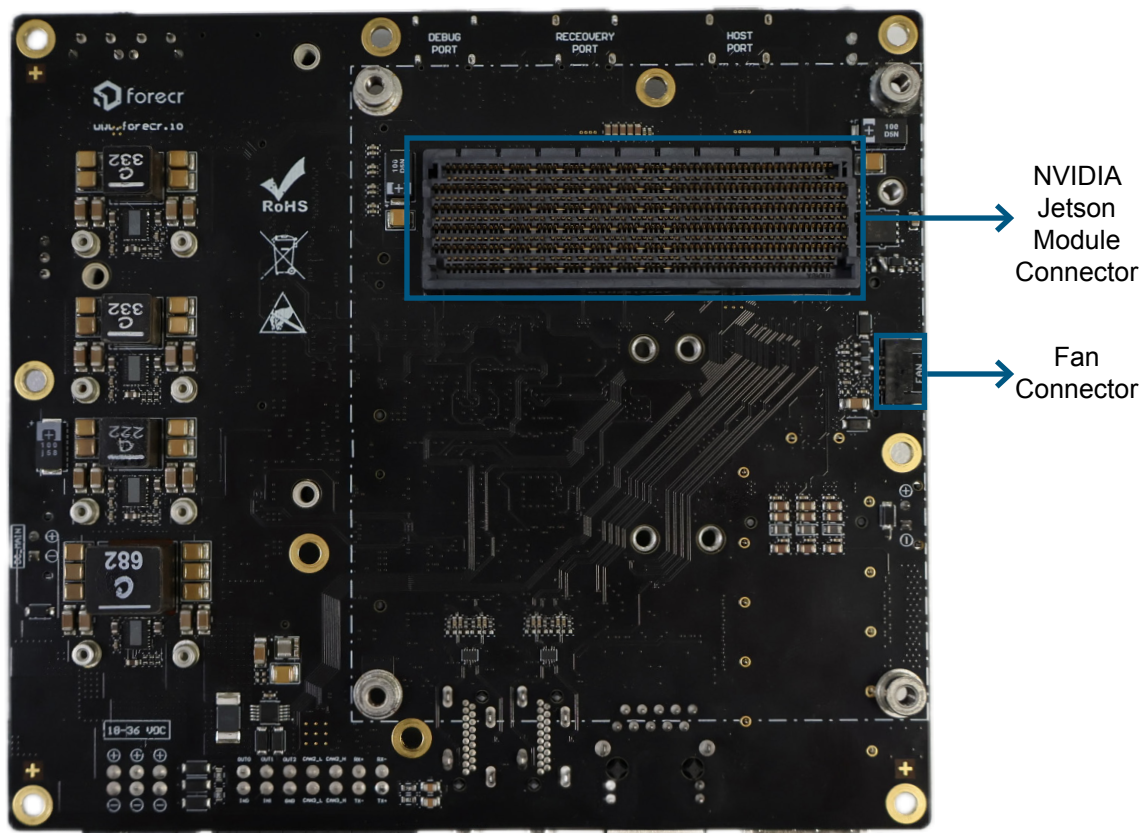
3. Hardware Information

3.1 Connector, Button and Switch Location

3.1.1 Front Side



3.1.2 Rear Side



3.2 List of Connectors, Buttons, and Switches

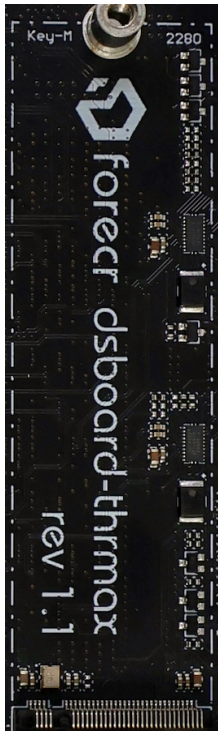
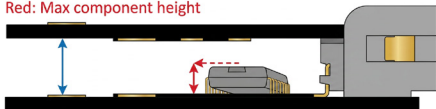
Connectors
DSBOARD-THRMAX Power Connector
DSBOARD-THRMAX M.2 Key-M Connector #1
DSBOARD-THRMAX M.2 Key-M Connector #2
DSBOARD-THRMAX M.2 Key-B Connector
DSBOARD-THRMAX M.2 Key-E Connector
DSBOARD-THRMAX CSI Camera Connector
DSBOARD-THRMAX I/O Terminal Connector
DSBOARD-THRMAX Serial Communication Connector
DSBOARD-THRMAX nanoSIM Connector
DSBOARD-THRMAX Panel Connector
DSBOARD-THRMAX RTC Battery Connector
DSBOARD-THRMAX HDMI Connectors
DSBOARD-THRMAX QSFP28 Connector
DSBOARD-THRMAX Gigabit Ethernet Connector
DSBOARD-THRMAX Fan Connector
DSBOARD-THRMAX USB 3.2 Type-C Recovery Mode Connector
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DSBOARD-THRMAX USB 3.2 Type-C Host Mode Connector
DSBOARD-THRMAX CAM Power Connector
DSBOARD-THRMAX Micro-Coax DP Connector
DSBOARD-THRMAX Expansion Power Connector
Buttons and Switches
DSBOARD-THRMAX Recovery Pushbutton
DSBOARD-THRMAX Reset Pushbutton
DSBOARD-THRMAX Power Mode Switch
DSBOARD-THRMAX RTC Switch

3.3 Definition of Each Connector

3.3.1 Power Connector

	Function		Description	
	Connector Type		1787027	
	Mating Connector		1790302	
	Minimum Input Voltage		+18V	
	Maximum Input Voltage		+36V	
	Pinout		Pin	Description
			1	Positive
			2	Negative
			3	Positive
			4	Negative
			5	Positive
			6	Negative

3.3.2 M.2 Key-M Connector #1

	Description					
	Pinout	Pin	Description	Pin	Description	Pin
		1	DGND	24	NC	47
		2	VDD_3V3	25	PCIE_C5.TX2_P	48
		3	DGND	26	NC	49
		4	VDD_3V3	27	DGND	50
		5	PCIE_C5.RX3_N	28	NC	51
		6	NC	29	PCIE_C5.RX1_N	52
		7	PCIE_C5.RX3_P	30	NC	53
		8	NC	31	PCIE_C5.RX1_P	54
		9	DGND	32	NC	55
		10	NC	33	DGND	56
		11	PCIE_C5.TX3_N	34	NC	57
		12	VDD_3V3	35	PCIE_C5.TX1_N	58
		13	PCIE_C5.TX3_P	36	NC	67
		14	VDD_3V3	37	PCIE_C5.TX1_P	68
		15	DGND	38	NC	69
		16	VDD_3V3	39	DGND	70
		17	PCIE_C5.RX2_N	40	NC	71
		18	VDD_3V3	41	PCIE_C5.RX0_N	72
		19	PCIE_C5.RX2_P	42	NC	73
		20	NC	43	PCIE_C5.RX0_P	74
		21	DGND	44	NC	75
		22	NC	45	DGND	
		23	PCIE_C5.TX2_N	46	NC	
	Board to board spacing=6.6 mm Max component height=1.2 mm Blue: Board-to-Board spacing Red: Max component height					
						

3.3.3 M.2 Key-M Connector #2

Description

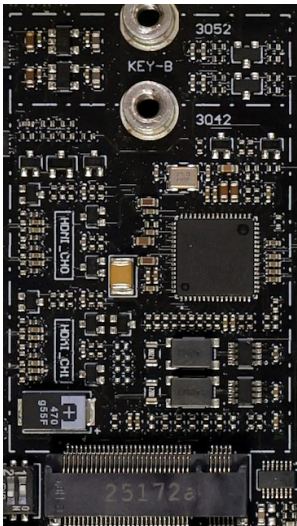
Pinout	Pin	Description	Pin	Description	Pin	Description
	1	DGND	24	NC	47	PCIE_C3.TX0_N
	2	VDD_3V3	25	NC	48	NC
	3	DGND	26	NC	49	PCIE_C3.TX0_P
	4	VDD_3V3	27	DGND	50	PCIE_C3.RST_N
	5	NC	28	NC	51	DGND
	6	NC	29	PCIE_C3.RX1_N	52	PCIE_C3.CLKREQ_N
	7	NC	30	NC	53	PCIE_C3.CLK_N
	8	NC	31	PCIE_C3.RX1_P	54	PCIE_WAKE_N
	9	DGND	32	NC	55	PCIE_C3.CLK_P
	10	NC	33	DGND	56	NC
	11	NC	34	NC	57	DGND
	12	VDD_3V3	35	PCIE_C3.TX1_N	58	NC
	13	NC	36	NC	67	NC
	14	VDD_3V3	37	PCIE_C3.TX1_P	68	32KHZ_CLK
	15	DGND	38	NC	69	NC
	16	VDD_3V3	39	DGND	70	VDD_3V3
	17	NC	40	NC	71	DGND
	18	VDD_3V3	41	PCIE_C3.RX0_N	72	VDD_3V3
	19	NC	42	NC	73	DGND
	20	NC	43	PCIE_C3.RX0_P	74	VDD_3V3
	21	DGND	44	NC	75	DGND
	22	NC	45	DGND		
	23	NC	46	NC		

Board to board spacing=4.15 mm
Max component height=1.75 mm

Blue: Board-to-Board spacing
Red: Max component height

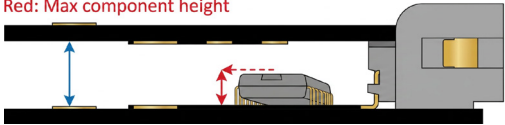
3.3.4 M.2 Key-B Connector

Description				
Pinout	Pin	Description	Pin	Description
	1	NC	43	NC
	2	VDD_3V8	44	NC
	3	DGND	45	DGND
	4	VDD_3V8	46	NC
	5	DGND	47	NC
	6	M2B_FULLCARD_PWOFF#	48	NC
	7	USB3.D_P	49	NC
	8	M2B_W_DISABLE1#	50	NC
	9	USB3.D_N	51	DGND
	10	NC	52	NC
	11	DGND	53	NC
	20	NC	54	NC
	21	NC	55	NC
	22	NC	56	NC
	23	NC	57	DGND
	24	NC	58	NC
	25	NC	59	NC
	26	M2B_W_DISABLE2#	60	NC
	27	DGND	61	NC
	28	NC	62	NC
	29	USBSS_P0_RX_N	63	NC
	30	M2_USIM_RST	64	NC
	31	USBSS_P0_RX_P	65	NC
	32	M2_USIM_CLK	66	NC
	33	DGND	67	M2B_RESET
	34	M2_USIM_DAT	68	NC
	35	USBSS_P0_TX_N	69	NC
	36	M2_USIM_VDD	70	VDD_3V8
	37	USBSS_P0_TX_P	71	DGND
	38	NC	72	VDD_3V8
	39	DGND	73	DGND
	40	NC	74	VDD_3V8
	41	NC	75	NC
	42	NC		



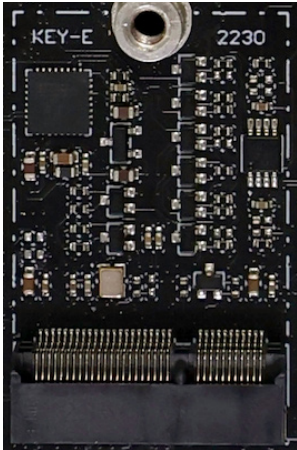
Board to board spacing=4.15 mm
Max component height=2.8 mm

Blue: Board-to-Board spacing
Red: Max component height



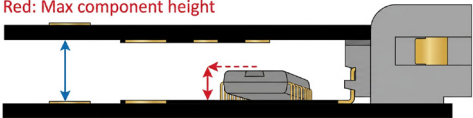
3.3.5 M.2 Key-E Connector

Description				
Pinout	Pin	Description	Pin	Description
	1	DGND	44	NC
	2	VDD_3V3	45	DGND
	3	USB_2.D_P	46	NC
	4	VDD_3V3	47	PCIE_C1.CLK_P
	5	USB2.D_N	48	NC
	6	NC	49	PCIE_C1.CLK_P
	7	DGND	50	M2E_32KHZ
	8	NC	51	DGND
	9	NC	52	NC
	10	NC	53	PCIE_C1.CLKREQ_N
	11	NC	54	M2E_WDISABLE2_N
	12	NC	55	PCIE_WAKE_N
	13	NC	56	M2E_WDISABLE1_N
	14	NC	57	DGND
	15	NC	58	NC
	16	NC	59	NC
	17	NC	60	NC
	18	DGND	61	NC
	19	NC	62	NC
	20	M2E_BT_WAKE_N	63	DGND
	21	NC	64	NC
	22	NC	65	NC
	23	NC	66	NC
	32	NC	67	NC
	33	DGND	68	NC
	34	NC	69	DGND
	35	PCIE_C1.TX0_P	70	NC
	36	NC	71	NC
	37	PCIE_C1.TX0_P	72	VDD_3V3
	38	NC	73	NC
	39	DGND	74	VDD_3V3
	40	NC	75	DGND
	41	PCIE_C1.RX0_P		
	42	NC		
	43	PCIE_C1.RX0_N		

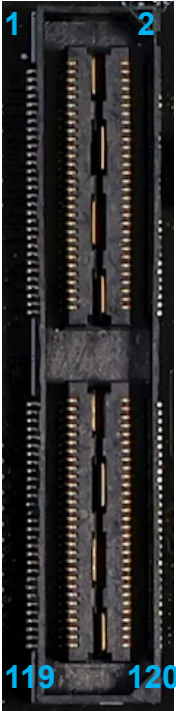


Board to board spacing=4.15 mm
Max component height=1.1 mm

Blue: Board-to-Board spacing
Red: Max component height



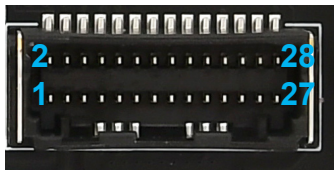
3.3.6 CSI Camera Connector

	Function	Description							
	Connector Type	QSH-060-01-L-D-A-K-TR							
	Pinout	Pin	Description	Pin	Description	Pin	Description	Pin	Description
		1	CSI0.D0_P	37	CSI4.D0_P	73	CSI5.D1_N	109	NC
		2	CSI1.D0_P	38	CSI6.D0_P	74	CSI7.D1_N	110	VDD_3V3
		3	CSI0.D0_N	39	CSI4.D0_N	75	CAM_I2C.SCL	111	NC
		4	CSI1.D0_N	40	CSI6.D0_N	76	NC	112	NC
		5	GND	41	GND	77	CAM_I2C.SDA	113	NC
		6	GND	42	GND	78	NC	114	NC
		7	CSI0.CLK_P	43	CSI4.CLK_P	79	GND	115	GND
		8	CSI1.CLK_P	44	CSI6.CLK_P	80	GND	116	GND
		9	CSI0.CLK_N	45	CSI4.CLK_N	81	NC	117	CAM_INT1
		10	CSI1.CLK_N	46	CSI6.CLK_N	82	NC	118	VDD_3V3
		11	GND	47	GND	83	NC	119	NC
		12	GND	48	GND	84	NC	120	VDD_3V3
		13	CSI0.D1_P	49	CSI4.D1_P	85	CAM_FRSYNC1		
		14	CSI1.D1_P	50	CSI6.D1_P	86	NC		
		15	CSI0.D1_N	51	CSI4.D1_N	87	I2C2.SCL		
		16	CSI1.D1_N	52	CSI6.D1_N	88	CAM1.MCLK		
		17	GND	53	GND	89	I2C2.SDA		
		18	GND	54	GND	90	CAM1.PWDN		
		19	CSI2.D0_P	55	NC	91	CAM0.MCLK		
		20	CSI3.D0_P	56	NC	92	CAM1.RST		
		21	CSI2.D0_N	57	NC	93	CAM0.PWDN		
		22	CSI3.D0_N	58	NC	94	CAM2.MCLK		
		23	GND	59	CSI5.D0_P	95	CAM0.RST		
		24	GND	60	CSI7.D0_P	96	NC		
		25	CSI2.CLK_P	61	CSI5.D0_N	97	NC		
		26	CSI3.CLK_P	62	CSI7.D0_N	98	NC		
		27	CSI2.CLK_N	63	GND	99	GND		
		28	CSI3.CLK_N	64	GND	100	GND		
		29	GND	65	CSI5.CLK_P	101	NC		
		30	GND	66	CSI7.CLK_P	102	VDD_1V8		
		31	CSI2.D1_P	67	CSI5.CLK_N	103	CAM_INT3		
		32	CSI3.D1_P	68	CSI7.CLK_N	104	NC		
		33	CSI2.D1_N	69	GND	105	I2C5.SCL		
		34	CSI3.D1_N	70	GND	106	NC		
		35	GND	71	CSI5.D1_P	107	I2C5.SDA		
		36	GND	72	CSI7.D1_P	108	VDD_3V3		

3.3.7 I/O Terminal Connector

	Function	Description		
	Connector Type	1787069		
	Mating connector	1790344		
		Pin	Description	I/O Type
		1	SERIAL_CONN.RX_N	I/O
		2	SERIAL_CONN.TX_P	I/O
		3	SERIAL_CONN.RX_P	I/O
		4	SERIAL_CONN.TX_N	I/O
		5	CAN2.CONN_P	I/O
		6	CAN3.CONN_P	I/O
		7	CAN2.CONN_N	I/O
		8	CAN3.CONN_N	I/O
		9	DIGITAL_OUT2	I/O
		10	DGND	Power
		11	DIGITAL_OUT1	I/O
		12	DIGITAL_IN1	I/O
		13	DIGITAL_OUT0	I/O
		14	DIGITAL_IN0	I/O

3.3.8 Serial Communication Connector

	Function	Description			
	Connector Type	505433-2881			
	Mating connector	5054322801			
	Pinout	Pin	Description	Pin	Description
		1	VDD_5V (1A max, 0.5A nominal)	15	SPI3_3V3.CS0
		2	VDD_3V3 (1A max, 0.5A nominal)	16	SPI3_3V3.CLK
		3	VDD_1V8 (50mA max)	17	SPI3_3V3.MISO
		4	NC	18	SPI3_3V3.MOSI
		5	NC	19	DGND
		6	I2S1_3V3.CLK	20	DGND
		7	I2S1_3V3.FS	21	PWM_GPIO27_3V3
		8	I2S1_3V3.SDOUT	22	I2C4_3V3.SDA
		9	I2S1_3V3.SDIN	23	PWM_GPIO36_3V3
		10	AUD_3V3.MCLK	24	I2C4_3V3.SCL
		11	CAN0.CONN_P	25	UART5_3V3.TX
		12	CAN1.CONN_P	26	UART5_3V3.RX
		13	CAN0.CONN_N	27	UART1_3V3.TX
		14	CAN1.CONN_N	28	UART1_3V3.RX

3.3.9 nanoSIM Connector

	The DSBOARD-THRMAX provides a nanoSIM connector.
---	---

3.3.10 Panel Connector

	Function	Description	
	Connector Type	53398-0471	
	Mating Connector	0510210400 from Molex	
	Pinout	Pin	Description
		1	FORCE_RECOVERY (1.8V Level)
		2	BUTTON_POWER_ON_N (3.3V Level)
		3	SYS_RST_IN (1.8V Level)
		4	GND

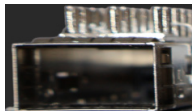
3.3.11 RTC Battery Connector

	The DSBOARD-THRMAX includes an RTC battery holder suitable for CR1220 batteries.
--	---

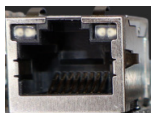
3.3.12 HDMI Connectors

	The NVIDIA® Jetson Thor modules outputs video via the DSBOARD-THRMAX vertical HDMI connectors that are HDMI 2.1 capable.
---	---

3.3.13 QSFP28 Connector

	The DSBOARD-THRMAX features a high-speed Ethernet connection in QSFP28 form-factor that supports up to 100G (4x25G for T5000, 3x25G for T4000).
---	--

3.3.14 Gigabit Ethernet Connector

	The DSBOARD-THRMAX integrates an RJ-45 Ethernet connector for network communication. This port supports 10/100/1000 Mbps operation and PTP feature.
---	--

3.3.15 Fan Connector

	Function		Description	
	Connector Type		5040500491	
	Mating Connector		5040510401	
	Pinout	Pin	Description	
		1	GND	
		2	VDD_FAN (12V)	
		3	TACH	
		4	PWM	

3.3.16 USB 3.2 Type-C Recovery Mode Connector

	The DSBOARD-THRMAX provides a USB 3.2 Type-C recovery mode connector to allow installing or upgrading the operating system. This port can be used in host mode when recovery mode functionality is not needed. It has 10Gbps bandwidth, shared with USB3.2 connection to M.2 Key-B connector.
---	---

3.3.17 USB 2.0 Type-C Debug Mode Connector

	The DSBOARD-THRMAX includes a USB 2.0 Type-C debug mode connector to access the module by using serial connection.
---	--

3.3.18 USB 3.2 Type-C Host Connector

	The DSBOARD-THRMAX incorporates USB 3.2 Type-C connector. This port has 10Gbps bandwidth.
---	---

3.3.19 CAM Power Connector

	Function		Description	
	Connector Type		43650-0215	
	Mating Connector		43645-0200	
	Pinout	Pin	Description	
		1	DGND	
		2	VDD_DC_MAIN	
Note: CAM Power connector enables user to conveniently power up the camera expansion boards when needed. 3A maximum current draw supported.				

3.3.20 Micro-Coax DP Connector

	Function	Description			
	Connector Type	20525-030E-02			
	Mating Cable	81423-100B-02-D			
	Pinout	Pin	Description	Pin	Description
		1	VDD_3V3	16	DGND
		2	DP3.D1_P	17	DP2.D2_P
		3	DP3.D1_N	18	DP2.D2_N
		4	DP3.D2_N	19	DP2.D0_P
		5	DP3.D2_P	20	DP2.D0_N
		6	DGND	21	DGND
		7	DP3.D0_P	22	DP2.AUX_P
		8	DP3.D0_N	23	DP2.AUX_N
		9	DP3.D3_N	24	DP2.D3_P
		10	DP3.D3_P	25	DP2.D3_N
		11	DGND	26	DGND
		12	DP3.AUX_P	27	DP2_3V3_EN
		13	DP3.AUX_N	28	DP2.HPD
		14	DP2.D1_P	29	DP3_3V3_EN
		15	DP2.D1_N	30	DP3.HPD

3.3.21 Expansion Power Connector

	Function	Description	
	Connector Type	43650-0215	
	Mating Connector	43645-0200	
	Pinout	Pin	Description
		1	DGND
		2	VDD_DC_MAIN
Note: Expansion Power Connector enables user to conveniently power up the M.2 expansion boards when needed. 3A maximum current draw supported.			

3.4 Definition of Each Button and Switch

3.4.1 Recovery Pushbutton

	The DSBOARD-THRMAL features a recovery pushbutton. The recovery pushbutton should be pressed with the reset pushbutton at the same time. After releasing the reset pushbutton, the recovery pushbutton should be held down for a minimum of 250 ms.
---	--

3.4.2 Reset Pushbutton

	The DSBOARD-THRMAL includes a reset pushbutton.
---	--

3.4.3 Power Mode Switch

	Power Mode Switch Configuration: ON: Enables Manual Power Mode (System powers on by triggering the BUTTON_POWER_ON_N signal on the panel connector). OFF: Enables Auto-Power Mode (System automatically turns on when power is applied).
---	--

3.4.4 RTC Switch

	RTC Mode Switch Configuration: JTSN: Uses the integrated Jetson Native RTC circuit. Provides a backup duration of 1 to 4 months. EXT: Uses external RTC circuitry. Extends the RTC battery life to 10+ years.
---	---

4. Software Information

4.1 Installation

The JetPack-7.x installation guide can be found [here](#).

5. Connectivity

5.1 General Purpose Input/Output (GPIO)

MODULE PIN NUMBER	I/O NAME	MODULE PIN NAME	TYPE	DESCRIPTION
C4	CAM0_PWDN	GPIO47	OUTPUT	Camera 0 power down (1.8V Level)
F10	CAM1_PWDN	GPIO15	OUTPUT	Camera 1 power down (1.8V Level)
L5	CAM0_RST	UART4_TX	OUTPUT	Camera 0 reset. (1.8V Level)
F9	CAM1_RST	GPIO16	OUTPUT	Camera 1 reset. (1.8V Level)
J54	CAM0_MCLK	MCLK02	OUTPUT	Camera 0 reference clock (1.8V Level)
H53	CAM1_MCLK	MCLK03	OUTPUT	Camera 1 reference clock (1.8V Level)
H55	CAM2_MCLK	MCLK04	OUTPUT	Camera 2 reference clock (1.8V Level)
E61	CAM_INT1	SPI2_CLK	INPUT	Camera 1 interrupt.
F60	CAM_INT3	SPI2_MOSI	INPUT	Camera 3 interrupt.
G7	I2C_GP3_PEX_EN_N	GPIO13	OUTPUT	Enable signal for QSFP+ connector I2C voltage level translator.
A7	PWRMON_ALERT_N	GPIO29	INPUT	Hardware alert signal from the INA228 power monitor.
C18	DP1.HPD	HPD1	INPUT	Display Port 1: Hot Plug Detect
A19	DP2.HPD	HPD2	INPUT	Display Port 2: Hot Plug Detect
C19	DP3.HPD	HPD3	INPUT	Display Port 3: Hot Plug Detect
G4	TPM_SPI_PIRQ_N	I2S2_CLK/ BOOT_CHAIN_1	INPUT	TPM chip interrupt signal.
F5	TPM_SPI_RST_N	I2S2_DOUT	OUTPUT	TPM chip reset signal.
F6	TPM_GPIO_LP	I2S2_DIN	OUTPUT	TPM chip low power/standby mode signal.

E4	TPM_GPIO_PP	I2S2_FS	OUTPUT	TPM chip physical presence signal.
G58	IMU_INT0	UART2_RTS	INPUT	IMU sensor interrupt signal.
E56	IMU_INT1	SPI2_CS1_N	INPUT	IMU sensor interrupt signal.
L49	GPIO179_5V0_HDMI_I_EN	I2S7_LRCK	OUTPUT	HDMI2 enable signal.
L50	GPIO35_5V0_HDMI_EN	I2S7_SCLK	OUTPUT	HDMI1 enable signal.
B54	M2B_W_DISABLE1 #	GPIO45	OUTPUT	LTE/5G module airplane mode control. Drive low to enable airplane mode. Drive high for normal operation.
A54	M2B_W_DISABLE2 #	GPIO46	OUTPUT	GNSS disable control. Drive low to disable GNSS. Drive high for normal operation.
J55	M2B_RESET	I2C9_DAT	OUTPUT	LTE/5G module reset control input. Drive high to trigger reset. Drive low for normal operation.
B59	M2B_FULLCARD_P_WROFF#	GPIO04	OUTPUT	LTE/5G module power on/off control. Drive low to power off the module. Drive high for normal operation.
A59	M2B_PWR_ON#	GPIO05	OUTPUT	LTE/5G module 3.3V power supply LDO enable control. Drive low to disable LDO. Drive high for normal operation.
C60	M2E_WDISABLE1_N	I2S3_FS	OUTPUT	WiFi/BT module full powerdown control for the WiFi/BT radio. Drive low to disable WiFi/BT. Drive high for normal operation
C59	M2E_WDISABLE2_N	I2S3_SCLK	OUTPUT	Reset for Bluetooth. Active low by default.
B58	M2E_BT_WAKE_N	GPIO21	INPUT	Wake up signal for Bluetooth radio.
B55	PWRLED_R	GPIO30/IST_DONE_N	OUTPUT	Drive high to turn on the Red LED.
C54	PWRLED_G	GPIO33/XFI1_MDIO	OUTPUT	Drive high to turn on the Green LED.
H60	PWRLED_B	GPIO31/IST_REQ_N	OUTPUT	Drive high to turn on the Blue LED.
E54	FAN_TACH	FAN_TACH	INPUT	Fan Tachometer signal
K62	FAN_PWM	FAN_PWM	OUTPUT	Fan Pulse Width Modulation signal.
F54	GPIO22_USB_VBUS_EN0	GPIO22	OUTPUT	Connect to enable and overcurrent pins of load switch.
G55	GPIO23_USB_VBUS_EN0	GPIO23	OUTPUT	Connect to enable and overcurrent pins of load switch.
B56	SERIAL.485/232\	SPI1_CS1_N	OUTPUT	Serial communication control for SP330EEY-L transceiver. Drive low to enable RS-232. Drive high to enable RS-485.
A47	SERIAL.HALF/FULL	I2C10_CLK	OUTPUT	Half duplex or full duplex control for RS-485 communication protocol. Drive low for full duplex communication. Drive high for half duplex communication.
D54	SERIAL.DE	GPIO03/XFI2_MDC	OUTPUT	Driver control for RS485 communication. Drive high for enable receiver.
J51	SERIAL_RE	GPIO24/XFI2_MDIO	OUTPUT	Receiver control for RS485 communication. Drive low for enable receiver.
K58	GPIO08_DATA_IN0	GPIO8	OUTPUT	Control signal for DIGITAL_IN0 in I/O connector.

H57	GPIO09_DATA_IN1	GPIO9	OUTPUT	Control signal for DIGITAL_IN1 in I/O Connector.
J59	DP2_3V3_EN	I2S3_DIN	OUTPUT	Enable signal for Display Port 2.
K59	DP3_3V3_EN	I2S3_DOUT	OUTPUT	Enable signal for Display Port 3.
A62	CAM_FRSYNC1	GPIO17	OUTPUT	Camera frame synchronization signal for multi-camera timing alignment.
K56	GPIO19_DATA_OUT0	GPIO19/ XFI0_MDC	OUTPUT	Control signal for GPIO19_DATA_OUT0 in I/O connector.
K49	GPIO25_DATA_OUT1	GPIO25/ XFI0_MDIO	OUTPUT	Control signal for GPIO25_DATA_OUT1 I/O connector.
H51	GPIO26_DATA_OUT2	GPIO26/ XFI0_MDC	OUTPUT	Control signal for GPIO26_DATA_OUT2 in I/O connector.
H52	PWM_GPIO27	GPIO27	OUTPUT	Control signal for PWM_GPIO27 in I/O connector.
F56	PWM_GPIO36	GPIO36	OUTPUT	Control signal for PWM_GPIO36 in I/O connector.
H17	SOC_QSFP_PRSENT_N	GPIO62	INPUT	QSFP present signal.
G18	SOC_QSFP_LP_N	GPIO57	OUTPUT	QSFP low power signal.
J53	SOC_QSFP_INT	I2C0_DAT	INPUT	QSFP interrupt signal.
J52	SOC_QSFP_RESET	I2C0_CLK	OUTPUT	QSFP reset signal.

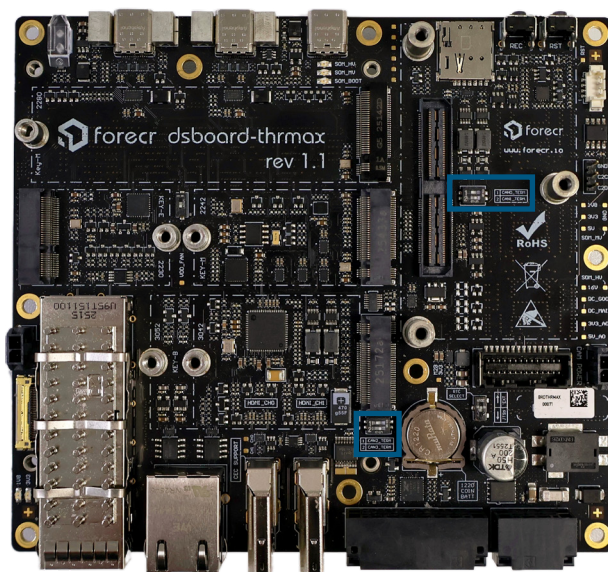
5.2 I/O Connector

On the 14 pin IO connector, there are 4 Serial Communication, 1 Ground, 4 CANBus, 2 Digital Input and 3 Digital Output pins.

5.2.1 CANBus Interface

There are four CAN Bus interfaces on the DSBOARD-THRMAX. A TCAN3414DDFR transceiver with FD support is utilized between native CAN pins of the Jetson and the connector. Integrated DIP switches allow configuration of the 120R termination resistors across the CAN_H and CAN_L lines. The termination resistors can be enabled by setting the respective DIP switch to ON position.

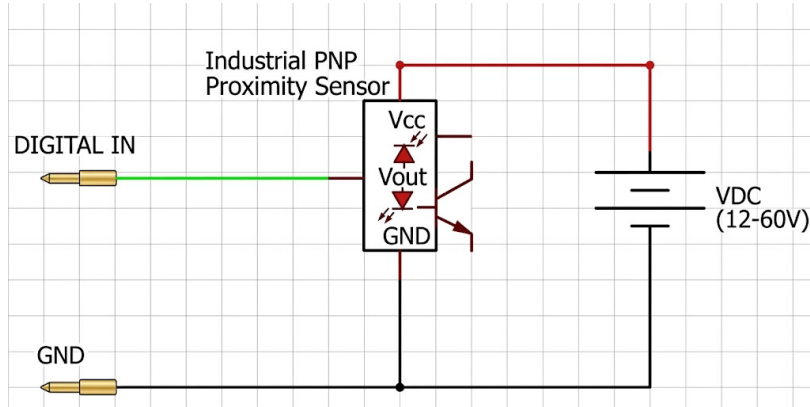
CANBus Termination Switch



5.2.2 Industrial Input Output Interface

5.2.2.1 Setting and Reading Input Pin

Digital input side accepts signals between 12-60V with current limiting feature. In our application, we used [Heschen M12 Inductive Proximity Sensor \(PNP & Normally Open\(NO\)\)](#) with 24V voltage source.



Find sysfs equivalent of the connected output pin from the table below. For this setup, it is DIGITAL_IN0. After proper hardware connection with industrial LED, we can continue with the software side.

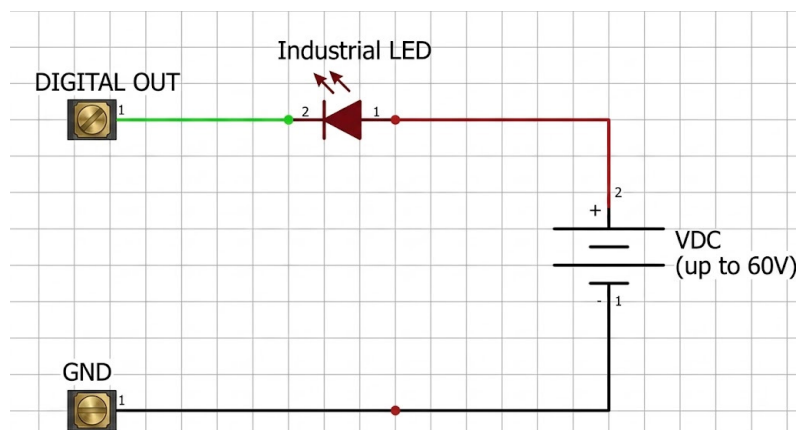
Pin Name	Sysfs Name
DIGITAL_IN0	gpio-640 (PJ.05)
DIGITAL_IN1	gpio-641 (PJ.06)
GROUND	GND

Set DIGITAL_IN0 as input and read sensor value. To do this, you should use the commands below.

```
sudo sh -c "echo 640 > /sys/class/gpio/export"
sudo sh -c "echo in > /sys/class/gpio/PJ.05/direction"
sudo sh -c "cat /sys/class/gpio/PJ.05/value"
```

5.2.2.2 Setting Digital Output as High and Low

Digital output side can drive loads up to 60V and has a current limit of 1A. They work as low side switches, open-close between them and GND. So, you should have a circuitry as in the schematic below. In our application, we used [GASH-ER 24V Indicator Light](#) with 24V voltage source.



Find sysfs equivalent of the connected output pin from the table below. For this setup, it is DIGITAL_OUT0. After proper hardware connection with industrial LED, we can continue with the software side.

Pin Name	Sysfs Name
DIGITAL_OUT0	gpio-568 (PE.01)
DIGITAL_OUT1	gpio-563 (PD.04)
DIGITAL_OUT2	gpio-564 (PD.05)
GROUND	GND

Then, set DIGITAL_OUT0 as output and control light state. To do this, you should use the commands below.

```
sudo sh -c "echo 568 > /sys/class/gpio/export"
sudo sh -c "echo out > /sys/class/gpio/PE.01/direction"
```

To short output:

```
sudo sh -c "echo 1 > /sys/class/gpio/PE.01/value"
```

To open output:

```
sudo sh -c "echo 0 > /sys/class/gpio/PE.01/value"
```

5.2.3 Serial Communication Interface

For RS422 communication protocol, SERIAL.485/232 GPIO from Jetson should be driven high. To use half-duplex mode, SERIAL.HALF/FULL GPIO should be driven high. To use full-duplex mode, SERIAL.HALF/FULL GPIO should be driven low. In half-duplex mode, SERIAL_RE and SERIAL_DE GPIOs must be used to switch between driver or receiver mode. To enable receiver mode, both SERIAL_RE and SERIAL_DE GPIOs should be driven low. To enable driver mode, both SERIAL_DE and SERIAL/RE GPIOs should be driven high.

For RS232 communication protocol SERIAL.485/232 GPIO should be driven low. SERIAL.HALF/FULL, SERIAL_DE and SERIAL_RE GPIOs are not used in this mode.

Top View Dimensions:

- Overall Width: 140,00
- Overall Height: 125,00
- Left Edge: 112,59
- Bottom Edge: 20,59
- Bottom Width: 56,40
- Bottom Width (with holes): 135,40
- Hole specification: (Ø3,25 THRU ALL) X 4

Bottom View Dimensions:

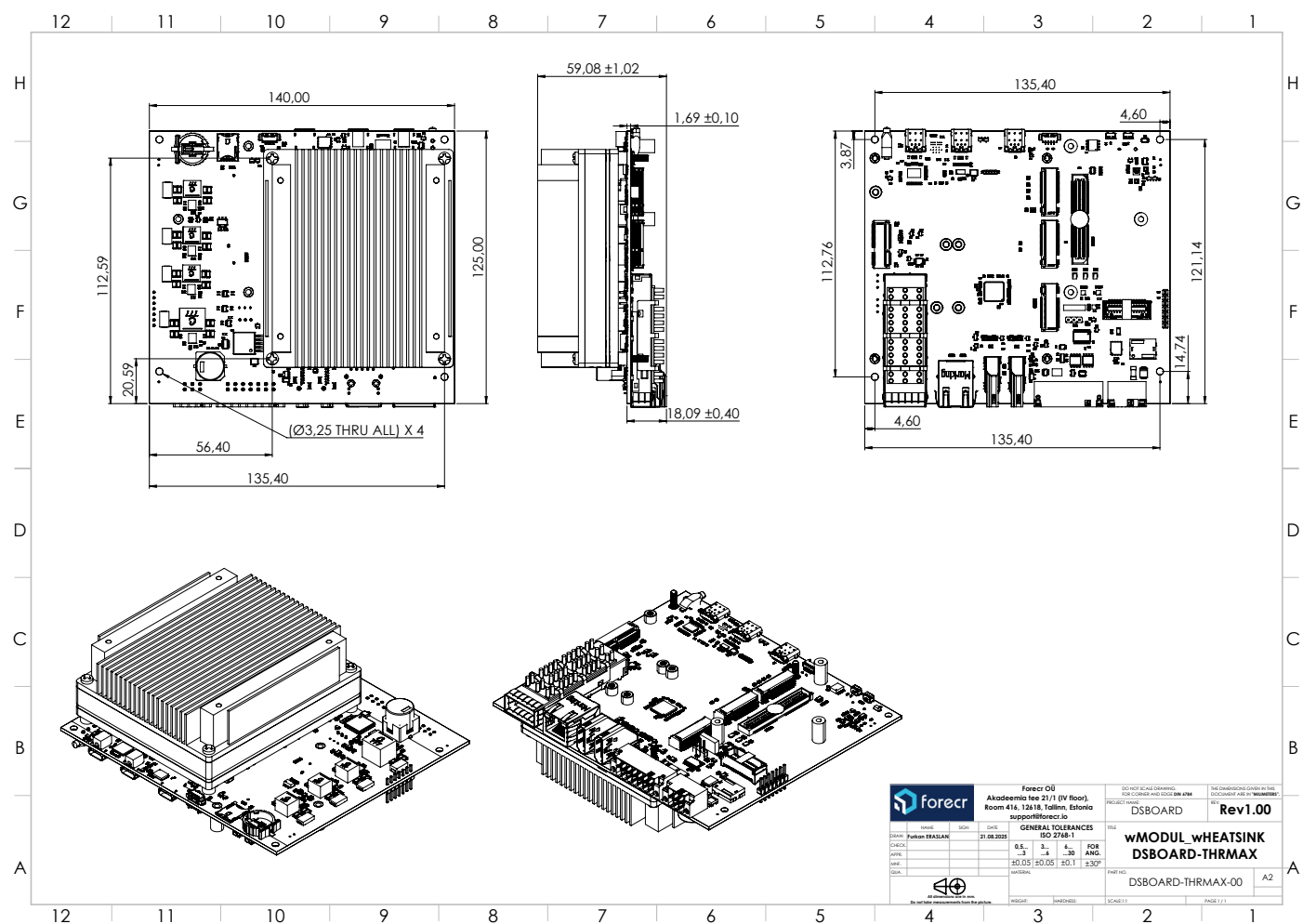
- Top Edge: 37,38 ±0,92
- Top Edge: 1,69 ±0,10
- Right Edge: 18,09 ±0,40

Isometric View Dimensions:

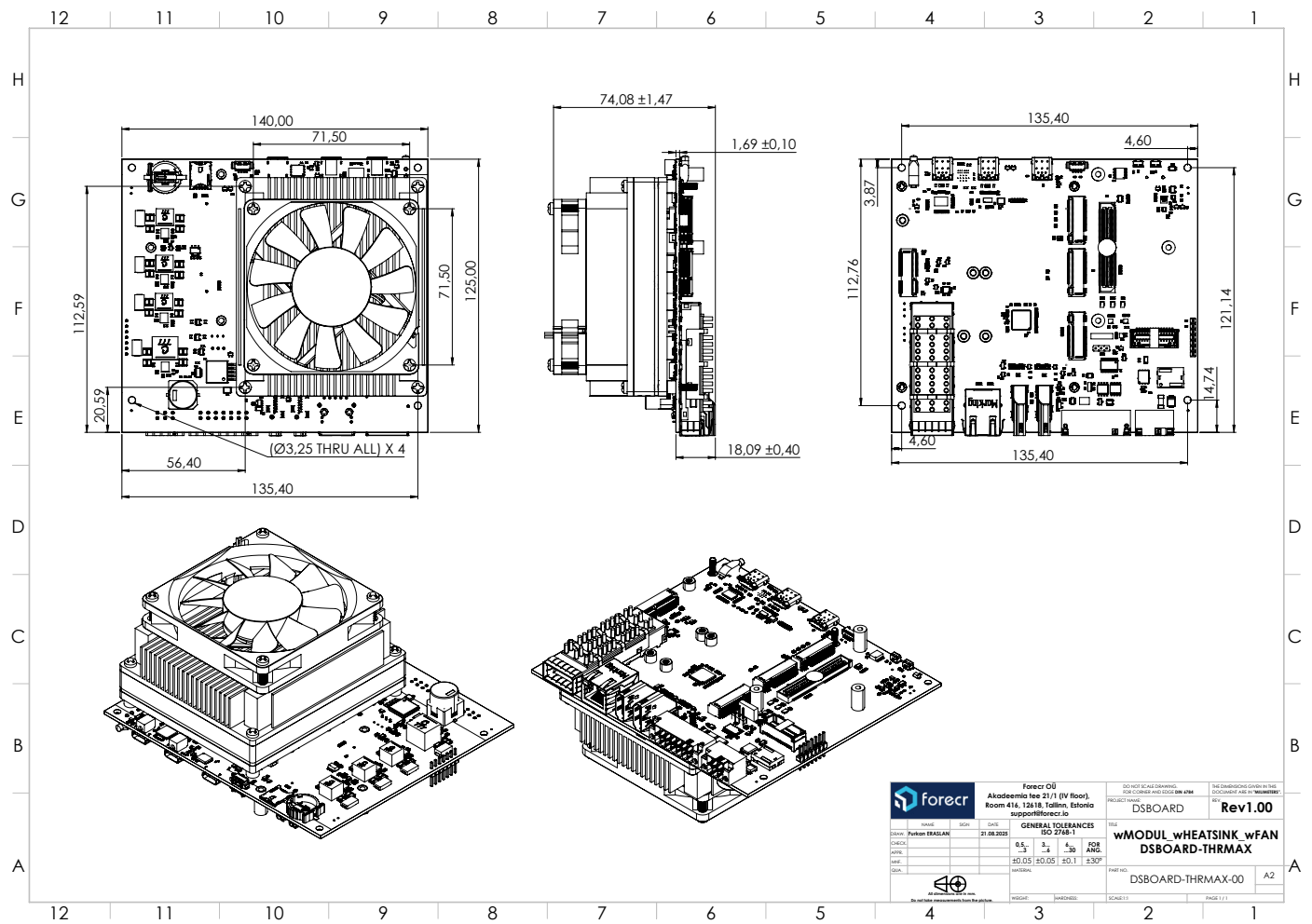
- Top Width: 135,40
- Top Height: 4,60
- Right Edge: 121,14
- Right Edge: 14,74
- Bottom Width: 135,40
- Bottom Height: 4,60
- Left Edge: 112,76
- Left Edge: 3,87

Title Block:

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Project: Parvum THRAXIAN		Date: 21.08.2025		Scale: 1:1		Title: DSBOARD		Rev1.00	
Author: ...		Checked: ...		Released: ...		General Tolerances: ISO 2768-1		File: wMODUL DSBOARD-THRMAX	
Date: 20.05.2025		Date: 20.05.2025		Date: 20.05.2025		For Ang: 30°		Part No: DSBOARD-THRMAX-00	
Scale: 1:1		Scale: 1:1		Scale: 1:1		Scale: 1:1		A2	



DSBOARD-THRMAX with Jetson Thor Module, Heatsink and Thermal Integration Details



7. Power Consumption

7.1 AGX THOR T4000

Input Voltage: 24V

All CPU and GPU cores are %100 loaded.

	Power Up Sequence	Idle	Standby (Suspend mode)	70W (12 core)	MAXN (12 core)
Current (A)	1.3	0.96	0.13	3.17	3.37
Power (W)	31.2	23.04	3.12	76.08	80.88

7.2 AGX THOR T5000

Input Voltage: 24V

All CPU and GPU cores are %100 loaded.

	Power Up Sequence	Idle	Standby (Suspend mode)	70W (12 core)	90W (12core)	120W (14 core)	MAXN (14 core)
Current (A)	2.34	1.1	0.12	5.16	5.72	6.72	6.84
Power (W)	56.16	26.4	2.88	123.84	137.28	161.28	164.16

8. MTBF Prediction

Methodology	Telcordia SR-332 (Parts Count) *Preliminary
Operating Environment	Ground Fixed (GF), Uncontrolled
Ambient Temperature	40 °C
Board Failure Rate	6.504 failures / 10 ⁶ hours
MTBF	153744 (Hours), 17.55 (Years)

9. Accessories

	Part Number	Description	Quantity
	1790344	Mating IO Connector	1

	Part Number	Description	Quantity
	1790302	Mating Power Connector	1

	Description		
	AGX Thor Fan Kit		

	Description		
	Meanwell 221W / 24V Power Adapter - Power cable		

	Description		
	Heatsink Set: Includes four heatsinks to externally cool down power ICs for better thermal management.		

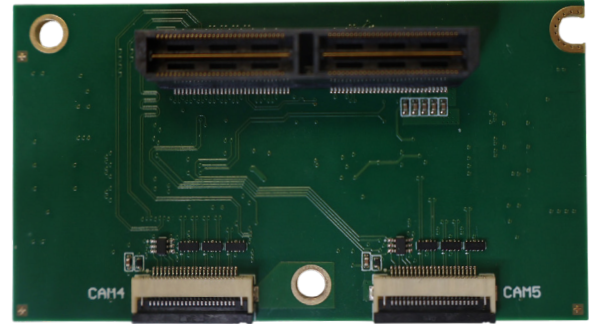
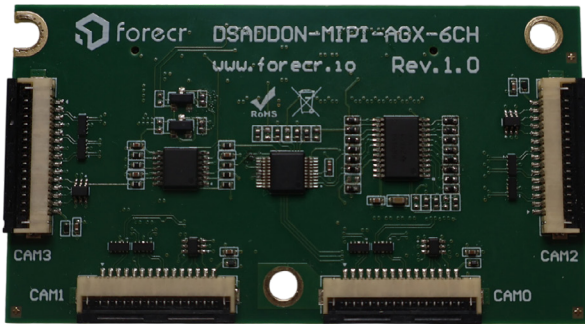
10. Expansion and Add-On Boards

10.1 6-Channel MIPI CSI Add-on Board

Our 6-channel MIPI CSI add-on board breaks out the camera expansion signals into six onboard FFC/FPC connectors:

4× 15-pin (1.0 mm pitch): Supports 2-lane MIPI CSI configurations.

2× 22-pin (0.5 mm pitch): Supports both 2-lane and 4-lane MIPI CSI configurations with a compatible cable.



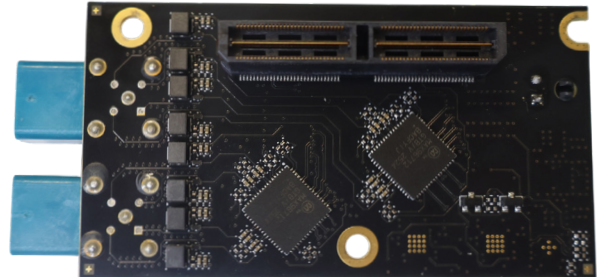
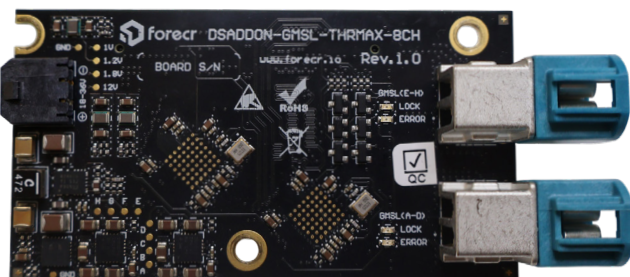
10.2 8-Channel GMSL Add-On Board

8-Channel GMSL2 Support: Features dual MAX96712 quad-channel deserializers, enabling up to 8× GMSL2 camera inputs.

Flexible Lane Configuration: Hardware-configurable for 2-lane or 4-lane MIPI modes via an onboard DIP switch (Hardware Rev 1.1 or later).

Smart Power over Coax (PoC): Supplies up to 12V @ 600mA per channel with integrated I²C-controlled current limiters for per-channel power monitoring and complete channel shutdown.

External Power Input: Requires external power. Integrates directly with the DSBOARD-THRMAL via its dedicated CAM power connector.



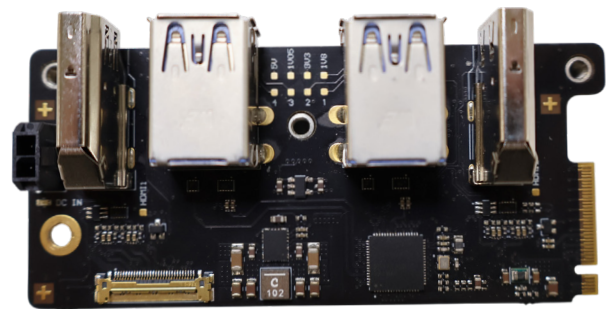
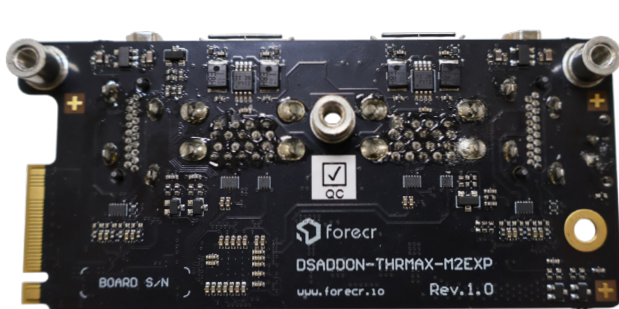
10.3 M.2 Expansion Board

Dedicated Form Factor: Custom-designed specifically for the M.2 Key-M 2280 slot on the DSBOARD-THRMUX (Hardware Rev 1.1 or later).

Quad USB 3.0 Ports: Adds four USB 3.0 Type-A ports, sharing a combined 5 Gbps bus bandwidth for SuperSpeed USB 3.0 and 480 Mbps for USB 2.0 fallback.

Dual HDMI 2.0 Output: Features two HDMI 2.0 ports for multi-display setups. Requires a bridge cable to the onboard micro-coaxial DisplayPort (DP) connector on the DSBOARD-THRMUX (Hardware Rev 1.1 or later).

External Power Input: Requires external power, connecting directly to the dedicated expansion power connector on the DSBOARD-THRMUX.

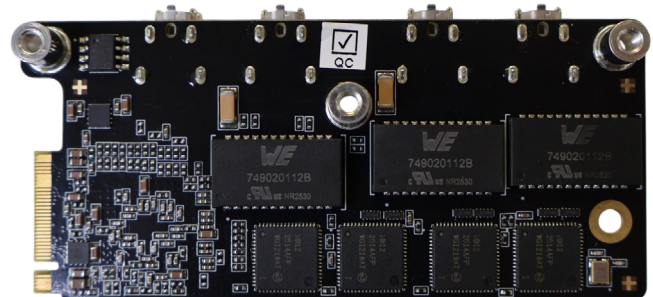
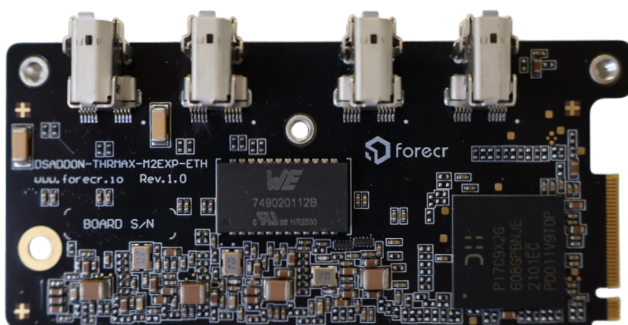


10.4 M.2 Ethernet Expansion Board

Targeted Form Factor: Form-factor tailored specifically for the M.2 Key-M 2280 slot on DSBOARD-THRMUX (Hardware Rev 1.1 or later).

Quad 1GbE Ports: Adds four additional Gigabit Ethernet ports, each featuring dedicated, unshared 1 Gbps bandwidth.

Rugged Industrial Connectors: Utilizes HARTING ix Industrial® connectors engineered for high vibration resistance and robust locking integrity in harsh environments.



11. Ordering Information

