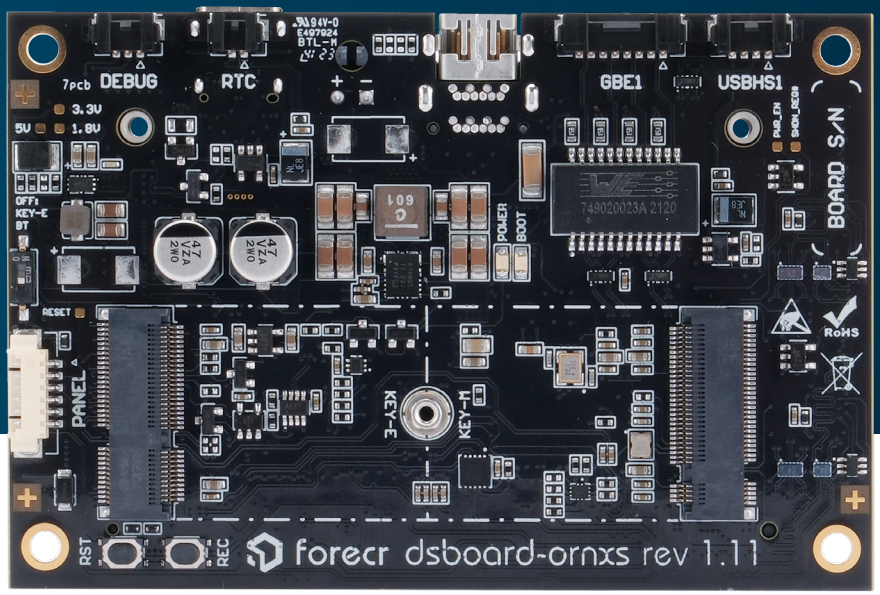


DSBOARD ORNXS

USER MANUAL

UM-DSBDORNXS-01
Document Revision: 1.23
20/10/2026

NVIDIA Elite Partner

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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	22.04.2024	Preliminary Release
1.1	17.07.2024	Added JetPack 6.x Installation details.
1.2	02.09.2024	Added Key-M and Key-E connector pinouts.
1.21	01.10.2024	Updated Ordering Information section.
1.22	21.10.2024	Added Accessories section.
1.23	20.10.2026	Added JetPack 7.2+ Installation details and Power Delivery & Operating Limits for Orin NX Super Mode, CAN Bus Interface, and On-Board I2C Devices List sections. Updated the Block diagram, Technical Specification, MTBF Prediction, 2D Drawing, GPIO, and Accessories sections. Renamed the IO Terminal Connector to the Serial Communication Connector. Updated power supply voltage range from 9-28 V to 9-30 V.

1. Introduction

The DSBOARD-ORNXS is a high-performance industrial carrier board engineered to deliver exceptional processing power and versatile connectivity in a compact form factor. Powered by the NVIDIA® Jetson Orin™ Nano and Orin™ NX SoMs, this device provides robust computational capabilities designed for demanding edge AI workloads. Featuring integrated Wi-Fi and Bluetooth connectivity, the platform enables seamless wireless communication and efficient data integration across industrial networks.

Equipped with LPDDR5 memory options ranging from 4 GB to 16 GB, the board ensures high-bandwidth multitasking and efficient data handling. Its graphical interfaces, including a Mini DisplayPort supporting resolutions up to 3840x2160, deliver high-definition visual output. Furthermore, by offering versatile expansion slots such as M.2 Key-E and a 5V fan connector, the device provides the flexibility required to customize and scale the system according to specific application demands.

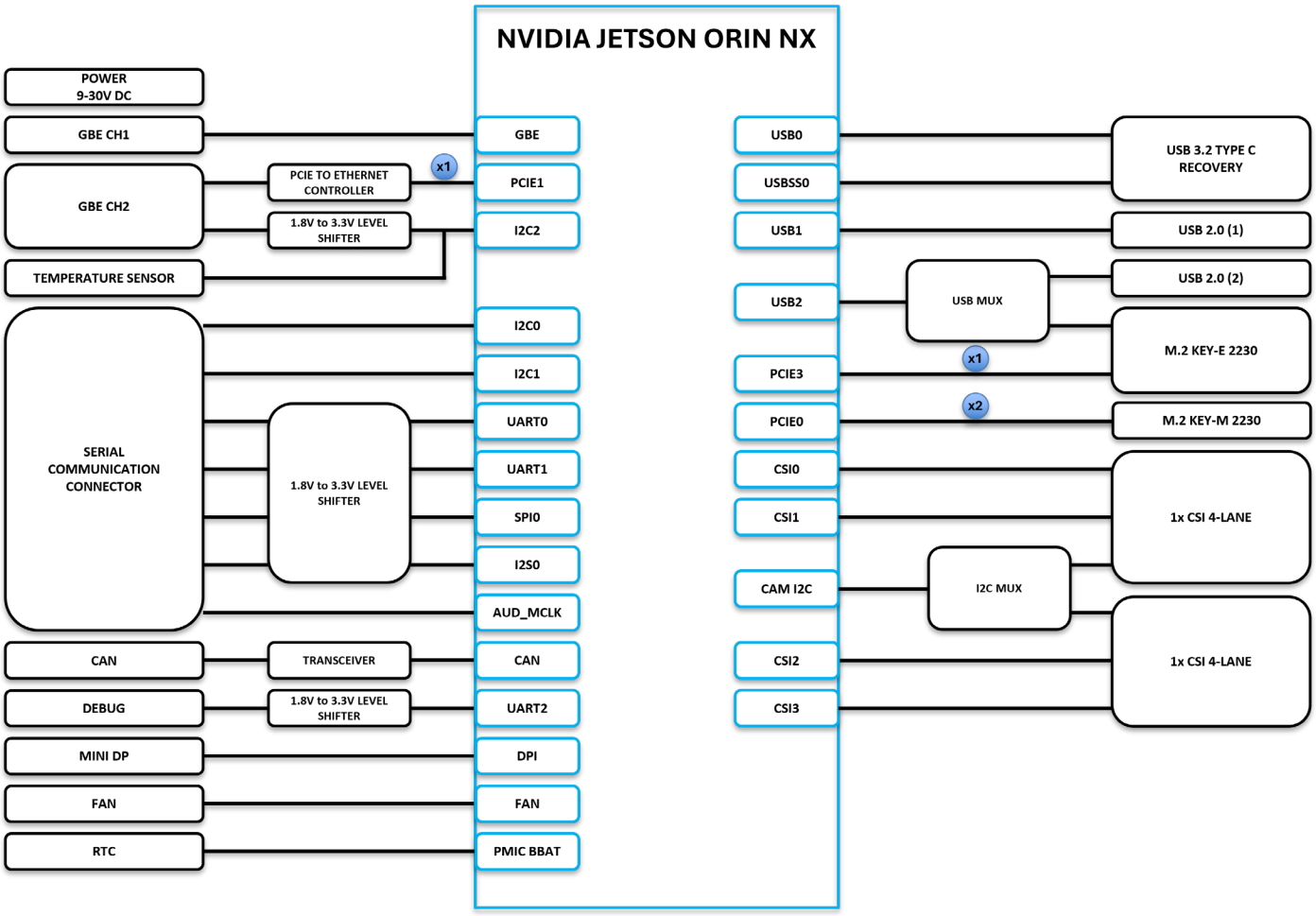
The latest revision of this user manual, datasheet, and 3D model can be downloaded from the Forecr website.

2. Product Specification

2.1 Technical Specification

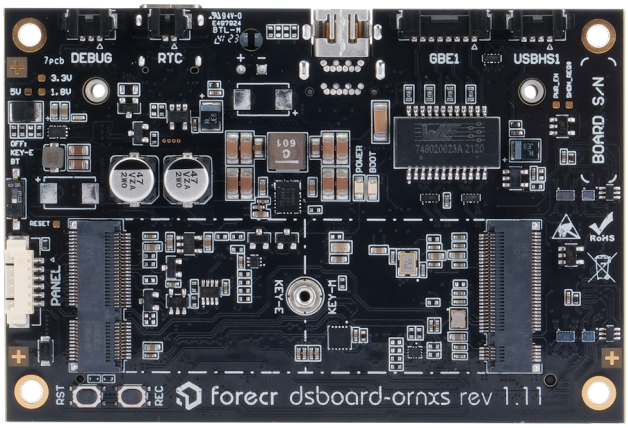
Supported Modules	NVIDIA Jetson Orin Nano 4GB / 8GB NVIDIA Jetson Orin NX 8GB / 16GB
Memory	4 GB 64-bit LPDDR5 / 8 GB 128 bit LPDDR5 8 GB 256-bit LPDDR5 / 16 GB 128 bit LPDDR5
Graphics Interfaces	1x Mini DisplayPort
Interfaces	2x Gigabit Ethernet 2x USB 2.0 1x CAN Bus 2x CSI 4-LANE 1x USB 3.2 Type-C (Recovery) 1x UART (Debug - 3.3V) 1x RTC
Other Features	Temperature Sensor
Wireless Communication	WiFi/Bluetooth Connectivity by extension sockets
Power Supply	9-30 VDC
Extension Sockets	1x M.2 Key-E 1x 5V FAN 1x SPI 1x I2S 2x I2C 2x UART
Mass Storage	1x M.2 Key-M 2230
Ambient Conditions	-25°C ... +85°C
Form Factor / Dimensions	61 mm x 91 mm, 43gr
Operating Systems	Ubuntu Linux 20.04 / 22.04 / 24.04
JetPack Support	JetPack 5.x / 6.x / 7.2+

2.2 Block Diagram

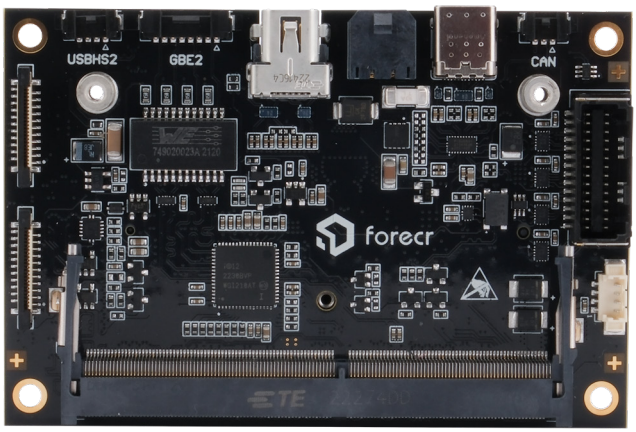


2.3 Board Visuals

Front Side



Rear Side



2.4 Power Delivery & Operating Limits for Orin NX Super Mode

When our initial carrier board revisions were developed, NVIDIA had not yet introduced Super Mode for the Jetson Orin family. Consequently, the power architecture was designed around a dedicated 5V input rail, providing a 5A (25W) power budget in full alignment with the maximum module power specifications at the time.

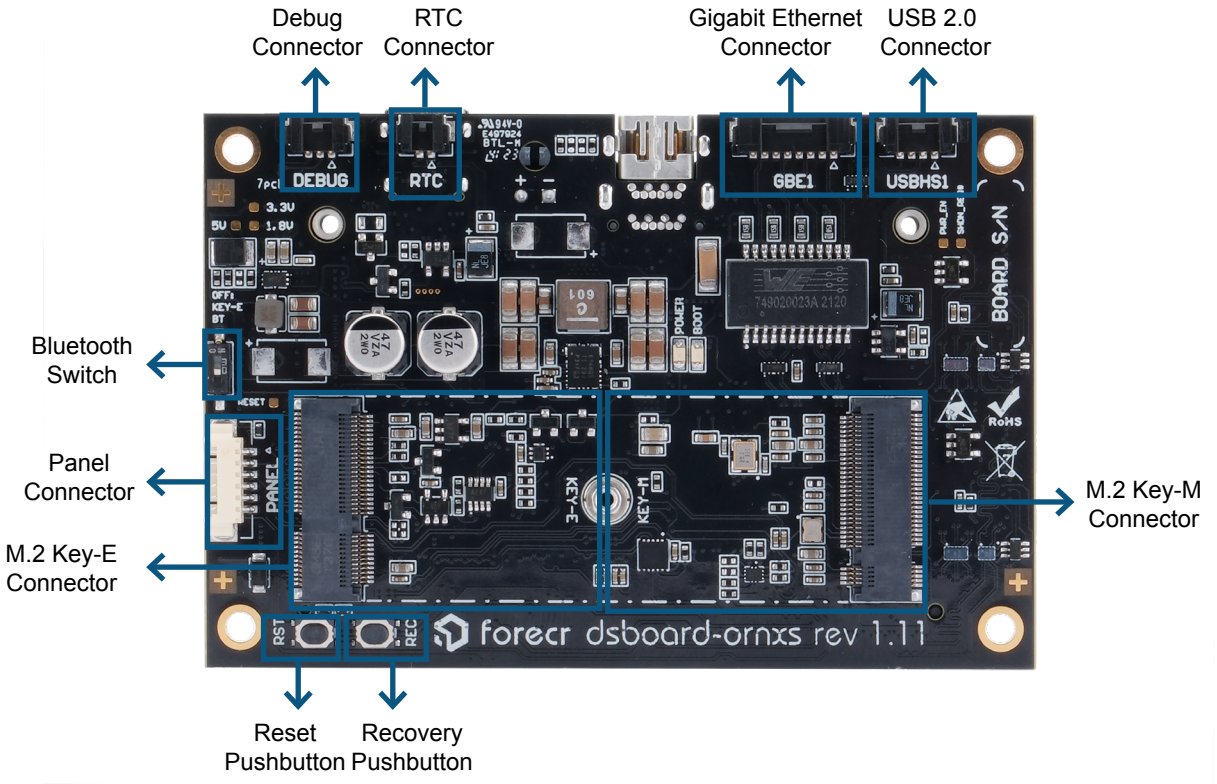
When Super Mode was later introduced, Orin Nano modules remained well within these original power margin, making Super Mode on Orin Nano completely safe and fully compatible with your current hardware revision. However, for Orin NX modules, NVIDIA specifically recommended an input supply of 8V or higher to ensure stable operation under peak compute loads. We addressed this by releasing Revision 2.0, which incorporates dynamic 8V power delivery specifically tailored for Orin NX high-power demands.

While it is technically possible to enable Super Mode on an Orin NX using your existing revision, it places substantial stress on the onboard power delivery network. If you intend to operate an Orin NX in Super Mode on legacy hardware, two strict precautions are mandatory: system power draw must be capped at 40W, and active auxiliary cooling must be added over the voltage regulators to prevent thermal throttling or overheating. Furthermore, running an Orin NX at 5V rather than the recommended 8V forces higher sustained current through the connector pins and regulators, which can adversely affect long-term hardware longevity and system stability.

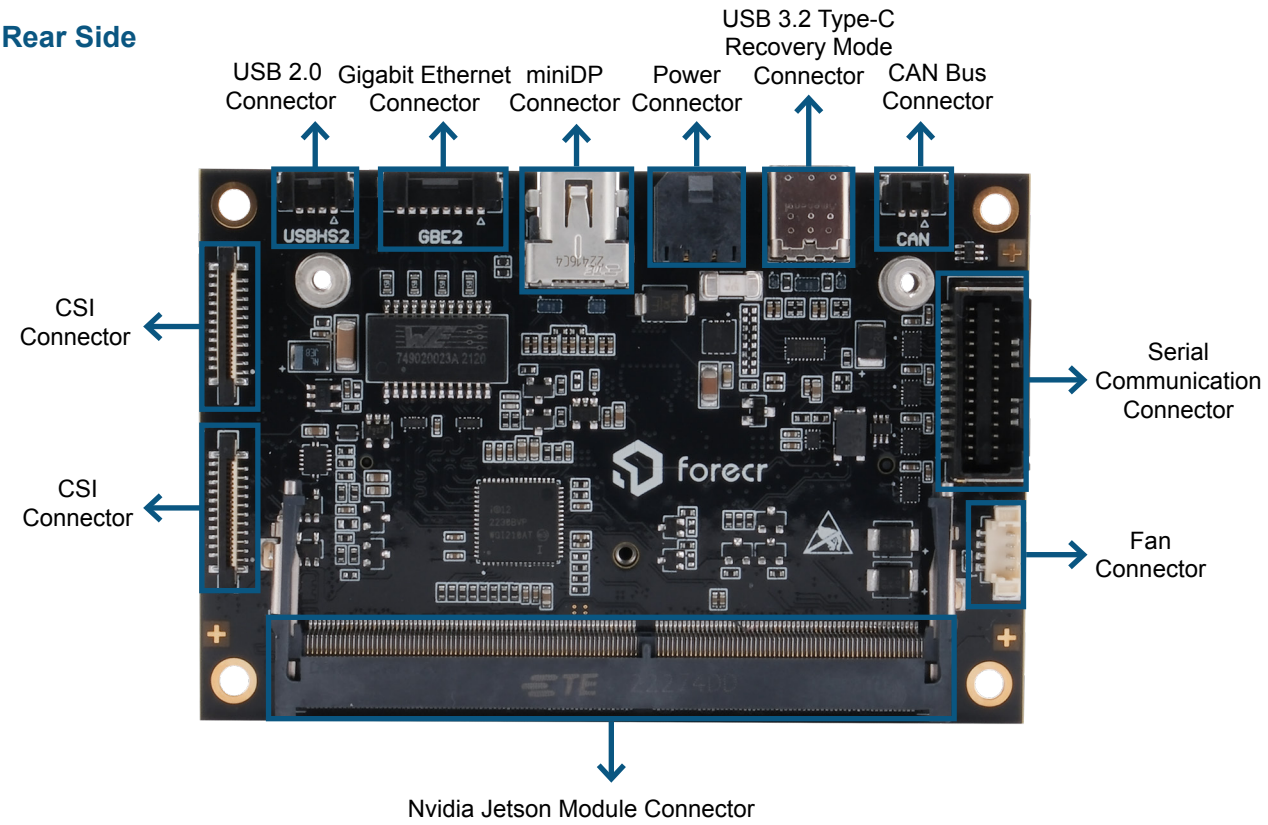
3. Hardware Information

3.1 Connector and Button Location

3.1.1 Front Side



3.1.2 Rear Side



3.2 List of Connectors, Buttons and Switches

Connectors
DSBOARD-ORNXS Power Connector
DSBOARD-ORNXS RTC Connector
DSBOARD-ORNXS M.2 Key-M Connector
DSBOARD-ORNXS M.2 Key-E Connector
DSBOARD-ORNXS Debug Connector
DSBOARD-ORNXS Gigabit Ethernet Connectors
DSBOARD-ORNXS CSI Connectors
DSBOARD-ORNXS Fan Connector
DSBOARD-ORNXS Panel Connector
DSBOARD-ORNXS Serial Communication Connector
DSBOARD-ORNXS USB 2.0 Connectors
DSBOARD-ORNXS CAN Bus Connector
DSBOARD-ORNXS miniDP Connector
DSBOARD-ORNXS USB 3.2 Type-C Recovery Mode Connector
Buttons and Switches
DSBOARD-ORNXS Reset Pushbutton
DSBOARD-ORNXS Recovery Pushbutton
DSBOARD-ORNXS Bluetooth Switch

3.3 Definition of Each Connector

3.3.1 Power Connector



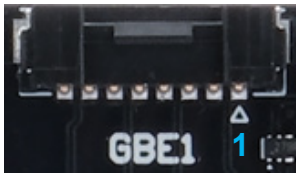
Function	Description	
Connector Type	0436500200	
Mating Connector	0436450200	
Minimum Input Voltage	+9V	
Maximum Input Voltage	+30V	
Pinout	Pin	Description
	1	Negative
	2	Positive

3.3.2 RTC Connector



Function	Description	
Connector Type	5055670281	
Mating Connector	5055650201	
Pinout	Pin	Description
	1	VRTC (1.85V to 5.5V)
	2	GND

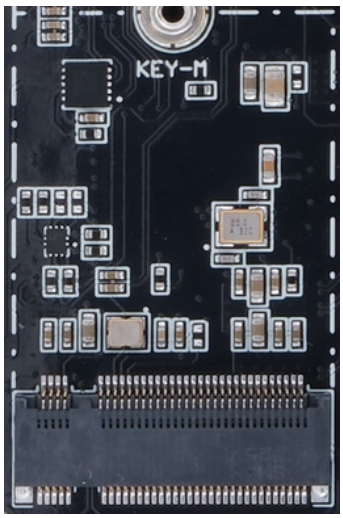
3.3.3 Gigabit Ethernet Connectors





Function	Description	
Connector Type	5055670881	
Mating Connector	5055650801	
Pinout	Pin	Description
	1	DATA3-
	2	DATA3+
	3	DATA2-
	4	DATA2+
	5	DATA1-
	6	DATA1+
	7	DATA0-
	8	DATA0+

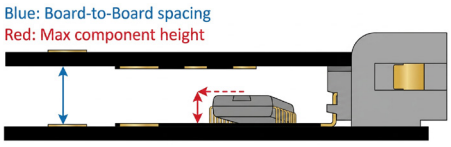
3.3.4 M.2 Key-M Connector



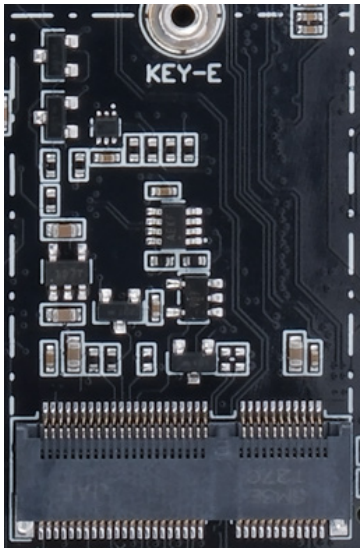
Description

Pinout	Pin	Description	Pin	Description	Pin	Description
	1	DGND	24	NC	47	PCIE0.TX0_N
	2	VDD_3V3	25	NC	48	NC
	3	DGND	26	NC	49	PCIE0.TX0_P
	4	VDD_3V3	27	DGND	50	PCIE0.RST_N
	5	NC	28	NC	51	DGND
	6	NC	29	PCIE0.RX1_N	52	PCIE0. CLKREQ_N
	7	NC	30	NC	53	PCIE0.CLK_N
	8	NC	31	PCIE0.RX1_P	54	PCI.WAKE_N
	9	DGND	32	NC	55	PCIE0.CLK_P
	10	NC	33	DGND	56	NC
	11	NC	34	NC	57	DGND
	12	VDD_3V3	35	PCIE0.TX1_N	58	NC
	13	NC	36	NC	67	NC
	14	VDD_3V3	37	PCIE0.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	PCIE0.RX0_N	72	VDD_3V3
	19	NC	42	NC	73	DGND
	20	NC	43	PCIE0.RX0_P	74	VDD_3V3
	21	DGND	44	NC	75	DGND
	22	NC	45	DGND		
	23	NC	46	NC		

Board to board spacing=2.45 mm
Max component height=1.45 mm

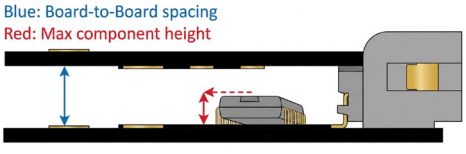


3.3.5 M.2 Key-E Connector



Description				
Pinout	Pin	Description	Pin	Description
	1	DGND	44	NC
	2	VDD_3V3	45	DGND
	3	USB2_KEYE.AP_P	46	NC
	4	VDD_3V3	47	PCIE3.CLK_P
	5	USB2_KEYE.AP_N	48	NC
	6	NC	49	PCIE3.CLK_N
	7	DGND	50	M2E_SUSCLK_32KHZ
	8	NC	51	DGND
	9	NC	52	PCIE3.RST_N
	10	NC	53	PCIE3.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	NC	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	PCIE3.TX0_P	70	NC
	36	NC	71	NC
	37	PCIE3.TX0_N	72	VDD_3V3
	38	NC	73	NC
	39	DGND	74	VDD_3V3
	40	NC	75	DGND
	41	PCIE3.RX0_P		
	42	NC		
	43	PCIE3.RX0_N		

Board to board spacing=2.45 mm
Max component height=1.45 mm

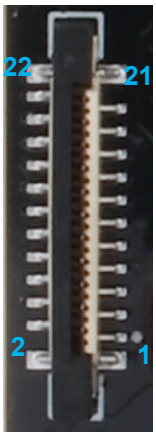


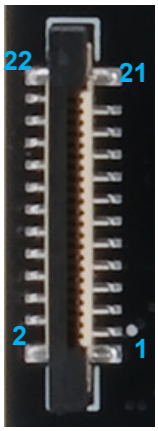
3.3.6 Debug Connector



Function	Description	
Connector Type	5055670381	
Mating Connector	5055650301	
Pinout	Pin	Description
	1	GND
	2	UART2_RX (3.3V)
	3	UART2_TX (3.3V)

3.3.7 CSI Connectors





CAM0	CAM1	Function	Description			
		Connector Type	687322124422			
		Pin/Pitch/Bottom contact	22-pin, 0.5mm pitch, bottom contact			
		Pinout	CAM0 Pinout		CAM1 Pinout	
			Pin	Description	Pin	Description
			1	VDD_3V3	1	VDD_3V3
			2	CAM0_I2C_SDA	2	CAM1_I2C_SDA
			3	CAM0_I2C_SCL	3	CAM1_I2C_SCL
			4	GND	4	GND
			5	CAM0_MCLK_1V8	5	CAM1_MCLK_1V8
			6	CAM0_PWDN_3V3	6	CAM1_PWDN_3V3
			7	GND	7	GND
			8	CSI1_D1_P	8	CSI3_D1_P
			9	CSI1_D1_N	9	CSI3_D1_N
			10	GND	10	GND
			11	CSI1_D0_P	11	CSI3_D0_P
			12	CSI1_D0_N	12	CSI3_D0_N
			13	GND	13	GND
			14	CSI0_CLK_P	14	CSI2_CLK_P
			15	CSI0_CLK_N	15	CSI2_CLK_N
			16	GND	16	GND
			17	CSI0_D1_P	17	CSI2_D1_P
			18	CSI0_D1_N	18	CSI2_D1_N
			19	GND	19	GND
			20	CSI0_D0_P	20	CSI2_D0_P
			21	CSI0_D0_N	21	CSI2_D0_N
			22	GND	22	GND

3.3.8 Panel Connector



Function	Description			
Connector Type	0532610671			
Mating Connector	0510210600			
Pinout	Pin	Description	Pin	Description
	1	PWR_BTN (1.8V)	4	GND
	2	GND	5	RECOVERY (1.8V)
	3	RESET (1.8V)	6	GND

3.3.9 Serial Communication Connector



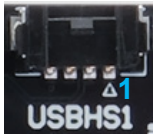
Function	Description		
Connector Type	5054332881		
Mating connector	5054322801		
Pinout	Pin	Description	I/O Type
	1	UART0_CTS (3.3V)	INPUT
	2	UART0_RTS (3.3V)	OUTPUT
	3	UART0_RX (3.3V)	INPUT
	4	UART0_TX (3.3V)	OUTPUT
	5	UART1_TX (3.3V)	OUTPUT
	6	UART1_RX (3.3V)	INPUT
	7	GND	GROUND
	8	GND	GROUND
	9	I2C0_SCL (3.3V)	BI-DIR
	10	I2C1_SCL (3.3V)	BI-DIR
	11	I2C0_SDA (3.3V)	BI-DIR
	12	I2C1_SDA (3.3V)	BI-DIR
	13	SPI0_CS1 (3.3V)	OUTPUT
	14	SPI0_MISO (3.3V)	INPUT
	15	SPI0_MOSI (3.3V)	OUTPUT
	16	SPI0_CS0 (3.3V)	OUTPUT
	17	SPI0_SCK (3.3V)	OUTPUT
	18	AUD_MCLK (3.3V)	OUTPUT
	19	I2S0_DOUT (3.3V)	OUTPUT
	20	I2S0_FS (3.3V)	OUTPUT
	21	I2S0_DIN (3.3V)	INPUT
	22	I2S0_SCLK (3.3V)	OUTPUT
	23	GND	GROUND
	24	GND	GROUND
	25	GND	GROUND
	26	VDD_1V8 (50mA max)	POWER
	27	VDD_3V3 (1A max, 0.5A nominal)	POWER
	28	VDD_5V (1A max, 0.5A nominal)	POWER

3.3.10 Fan Connector



Function	Description	
Connector Type	0533980471	
Mating Connector	0510210400	
Pinout	Pin	Description
	1	GND
	2	VDD_5V
	3	TACH (1.8V)
	4	PWM (1.8V)

3.3.11 USB 2.0 Connectors





Function	Description	
Connector Type	5055670481	
Mating Connector	5055650401	
Pinout	Pin	Description
	1	VBUS
	2	D-
	3	D+
	4	GND

3.3.12 CAN Bus Connector



Function	Description	
Connector Type	5055670381	
Mating Connector	5055650301	
Pinout	Pin	Description
	1	CAN_N
	2	CAN_P
	3	GND

3.3.13 miniDP Connector



The miniDP connector is used for display output.

3.3.14 USB 3.2 Type-C Recovery Mode Connector



The USB 3.2 Type-C connector is used for software installation in recovery mode and device usage in regular use case.

3.4 Definition of Each Button

3.4.1 Reset Pushbutton

	The reset pushbutton is used to reset the Jetson module.

3.4.2 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.

3.4.3 Bluetooth Switch

	The switch is used to select one USB 2.0 channel between the M.2 Key-E Bluetooth (OFF position) and USBHS2 port (ON position).

4. Software Information

4.1 Installation

The JetPack-5.x installation guide can be found here.

The JetPack-6.x installation guide can be found here.

The JetPack-7.2+ 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
116	CAM0_MCLK	CAM0_MCLK	OUTPUT	Camera 0 reference clock (1.8V Level)
114	CAM0_PWDN	CAM0_PWDN	OUTPUT	Camera 0 powerdown (3.3V Level)
122	CAM1_MCLK	CAM1_MCLK	OUTPUT	Camera 1 reference clock (1.8V Level)
120	CAM1_PWDN	CAM1_PWDN	OUTPUT	Camera 1 powerdown (3.3V Level)
118	CAM2_MCLK	GPIO01	OUTPUT	Camera 2 reference clock (1.8V Level)
127	CAM2_PWDN	GPIO04	OUTPUT	Camera 2 powerdown (3.3V Level)

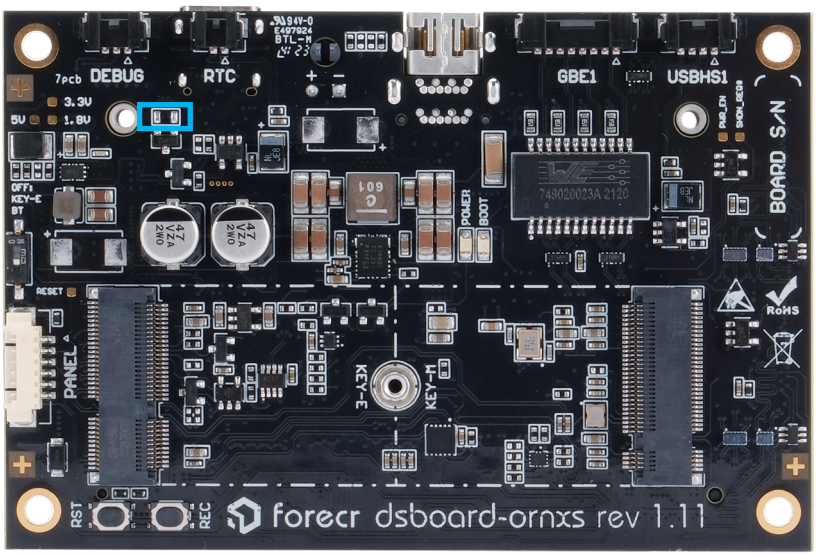
216	CAM3_MCLK	GPIO11 (CLK)	OUTPUT	Camera 3 reference clock (1.8V Level)
126	CAM3_PWDN	GPIO03	OUTPUT	Camera 3 powerdown (3.3V Level)
206	CAM_SYNC	GPIO07 (PWM)	OUTPUT	Camera frame synchronization signal for multi-camera timing alignment.
87	USB_VBUS_EN0	GPIO00	OUTPUT	Connect to enable and overcurrent pins of load switch.
128	#USB0_VBUS_ DET	GPIO05	INPUT	Connect to VBUS pin of USB connector receiving USB0_+/– interface through level shifter.
228	M2E_WDISABLE1	GPIO13 (PWM)	OUTPUT	WiFi/BT module full powerdown control for the WiFi/BT radio. Drive low to disable WiFi/ BT. Drive high for normal operation.
218	M2E_WDISABLE2	GPIO12 (PWM)	OUTPUT	Reset for Bluetooth. Active low by default.
210	M2E_SUS-CLK_32KHZ	CLK_32K_OUT	OUTPUT	32.768 kHz clock module input.
211	AUD_MCLK	GPIO09 (AUD_MCLK)	OUTPUT	Audio codec reference clock signal.
208	FAN_TACH	GPIO08 (FAN_TACH)	INPUT	Fan Tachometer signal
230	FAN_PWM	GPIO14 (PWM)	OUTPUT	Fan Pulse Width Modulation signal.
179	PCIE.WAKE _N	PCIE_WAKE	INPUT	Wake signal shared by all PCIe interfaces.

5.2 I/O Connector

5.2.1 CANBus Interface

There is a single CAN Bus interface on the DSBOARD-ORNXS. MAX3051 transceiver is used between native CAN pins of the Jetson and connector. There is a 0805 size 120R termination resistor between CAN_H and CAN_L pins on the board, which is not populated by default. A standard resistor with above specs can be fitted if termination resistor is needed on the DSBOARD-ORNXS side.

CANBus Termination Resistor



5.3 On-Board I2C Devices List

5.3.1 I2C0 Bus

- Power Monitor (on Jetson SOM) — 0x40 (40h)

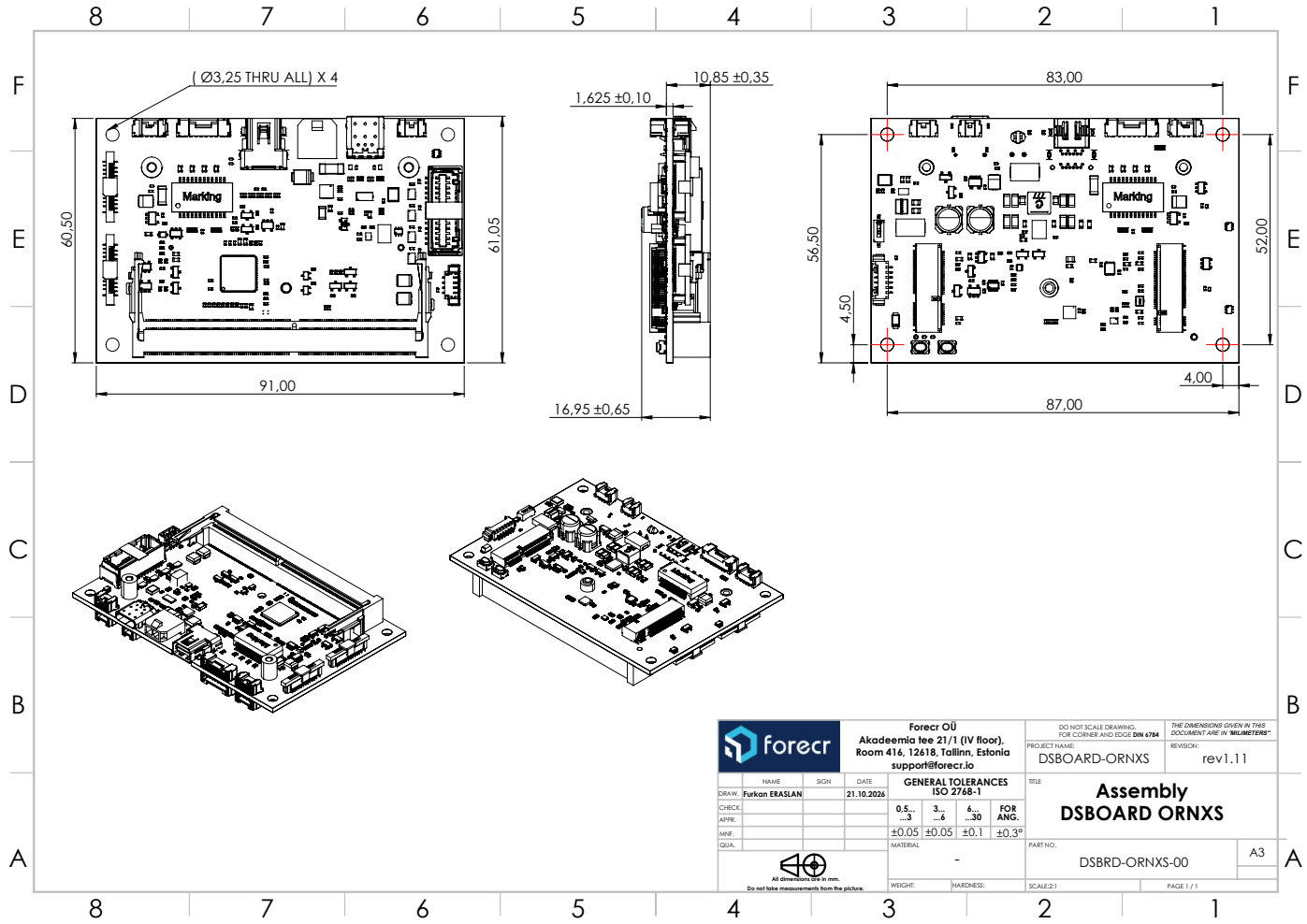
5.3.2 I2C2 Bus

- Temperature Sensor (P/N: TMP102AIDRLR) — 0x49 (49h)
- EEPROM (on Jetson SOM) — 0x50 (50h)

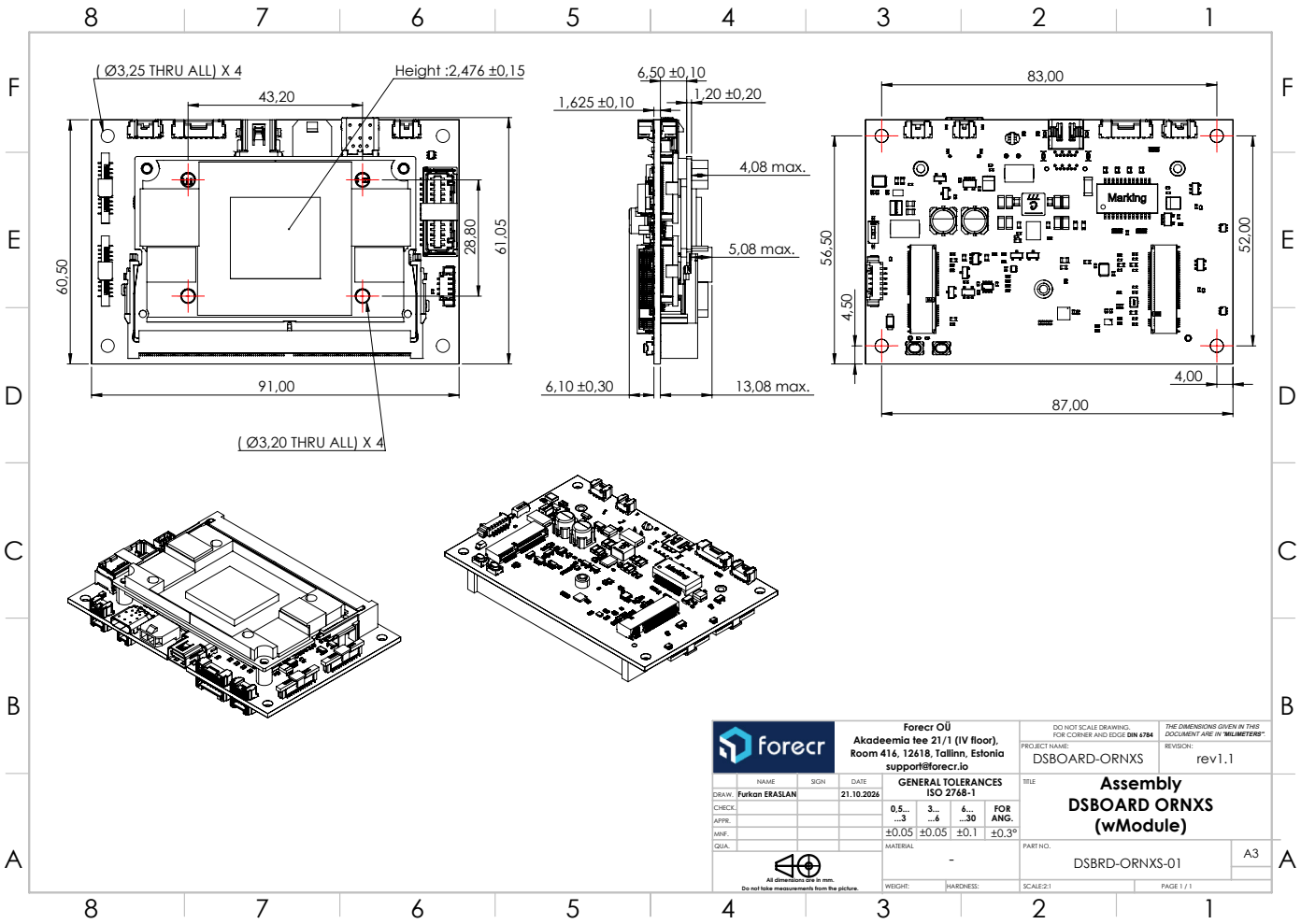
6. 3D Model & Mechanical Information

The full 3D models of DSBOARD-ORNXS can be found here.

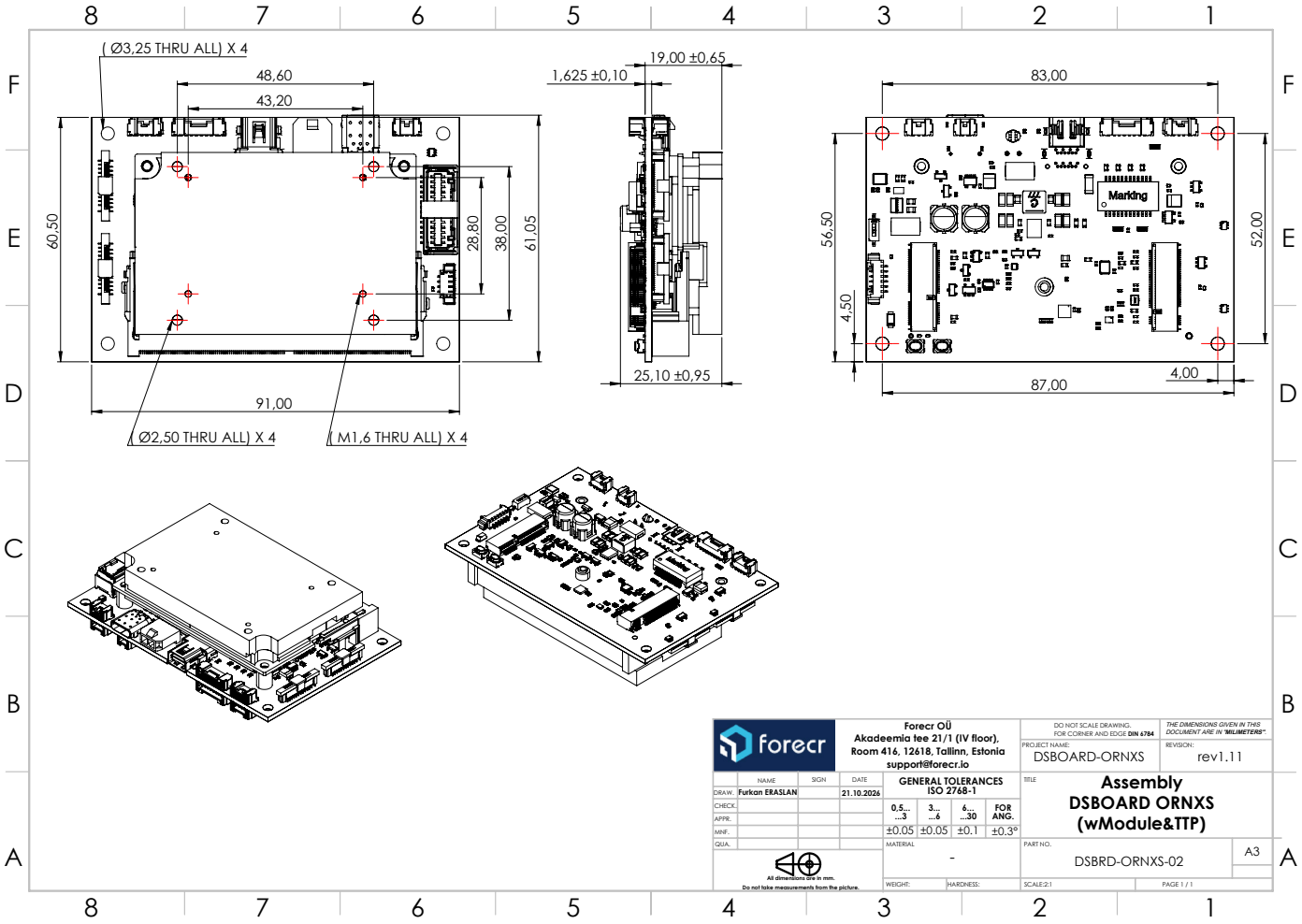
DSBOARD-ORNXS Stand Alone



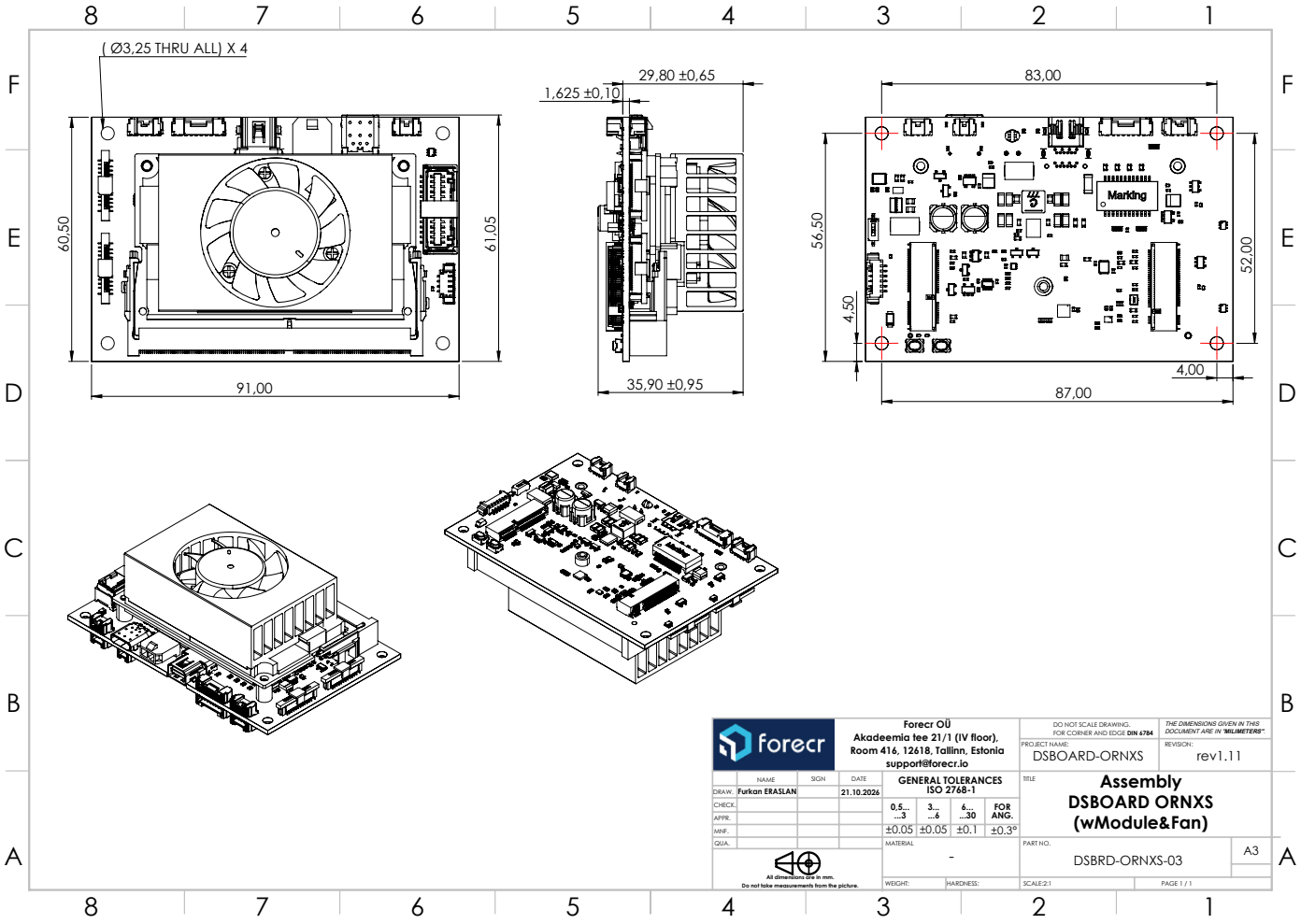
DSBOARD-ORNXS with Jetson Orin Nano/NX Module



DSBOARD-ORNXS with Jetson Orin Nano/NX Module and TTP Integration Details



DSBOARD-ORNXS with Jetson Orin Nano/NX Module and Thermal Integration Details



7. Power Consumption

7.1 Orin NX 16GB

Power Supply: 12V-5A

All CPU and GPU cores are %100 loaded.

	Power Up Sequence	Idle	Standby (Suspend mode)	10W (4 core)	15W (4 core)	25W (8 core)	MAXN (8 core)
Current (A)	1,44	0,7	0,1	1,5	1,7	2,02	2,8
Power (W)	17,28	8,4	1,2	18	20,4	24,24	33,6

7.2 Orin NX 8GB

Power Supply: 12V-5A

All CPU and GPU cores are %100 loaded.

	Power Up Sequence	Idle	Standby (Suspend mode)	10W (4 core)	15W (4 core)	20W (6 core)	MAXN (6 core)
Current (A)	1,4	0,7	0,08	1,4	1,6	1,81	2,24
Power (W)	16,8	8,4	0,96	16,8	19,2	21,72	26,88

7.3 Orin Nano 8GB

Power Supply: 12V-5A

All CPU and GPU cores are %100 loaded.

	Power Up Sequence	Idle	Standby (Suspend mode)	7W (4 core)	15W (6 core)
Current (A)	1,15	0,65	0,09	1,23	1,82
Power (W)	13,8	7,8	1,08	14,76	21,84

7.4 Orin Nano 4GB

Power Supply: 12V-5A

All CPU and GPU cores are %100 loaded.

	Power Up Sequence	Idle	Standby (Suspend mode)	7W_CPU (4 core)	7W_AI (4 core)	10W (6 core)
Current (A)	1,17	0,61	0,08	1,06	1,11	1,21
Power (W)	14,04	7,32	0,96	12,72	13,32	14,52

8. MTBF Prediction

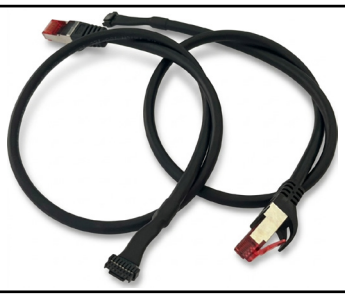
Methodology	Telcordia SR-332 Issue 4
Operating Environment	Ground Benign (GB), Controlled
Ambient Temperature	25 °C
Analysis Date	20.10.2026
Board Failure Rate	0.82889 failures / 10^6 hours
MTBF	1,206,432.08 hours, 137.72 years

Methodology	Telcordia SR-332 Issue 4
Operating Environment	Ground Fixed (GF), Uncontrolled
Ambient Temperature	40 °C
Analysis Date	20.10.2026
Board Failure Rate	2.051943 failures / 10^6 hours
MTBF	487,342.98 hours, 55.63 years

9. Accessories

The following accessories are optional.

DSBOARD-ORNXS CABLE SET			
#	**Cable**	**Description**	**Quantity**
1		RTC Cable 2-position 30 cm	1
2		Power Cable 2-position 30 cm	1

3		CAN Bus Cable 3-position 30 cm	1
4		Debug Cable 3-position 30 cm	1
5		Panel Cable 6-position 30 cm	1
6		I/O Cable 28-position 30 cm	1
7		USB 2.0 Cable 4-position 15 cm	2
8		Gigabit Ethernet Cable 8-position 55 cm	2

10. Ordering Information

