

DSBOX ORNX

# USER MANUAL

UM-DSBXORNX-01

Revision 1.0

07/10/2024



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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 DSBOX-ORNX. Therefore, this manual only represents the technical status of Forecr DSBOX-ORNX 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 DSBOX-ORNX, please reach out to the Forecr reseller from which you purchased the DSBOX-ORNX.

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

### Contact Information

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Website	<p><a href="https://www.forecr.io">https://www.forecr.io</a></p>

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## Limited Product Warranty

Forecr provides a 1-year Warranty for the DSBOX-ORNX. This warranty period is valid from the original purchase date of the DSBOX-ORNX. In order to maintain warranty, the DSBOX-ORNX must not be altered or modified in any way. Changes or modifications to the DSBOX-ORNX, 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 DSBOX-ORNX 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
rev 1.0	07.10.2024	Preliminary Release

## 1. Introduction

DSBOX-ORNX is a high-performance industrial fanless PC that delivers exceptional computing power for demanding industrial applications. Built with the latest NVIDIA Jetson Orin NX System on Module (SOM), it offers advanced AI and machine learning capabilities with 100 TOPS of computing performance.

With a range of connectivity options and advanced thermal management, the DSBOX-ORNX is designed to operate reliably in a range of harsh industrial environments. Its rugged and durable construction ensures long-lasting performance, while its compact design allows for easy integration into existing industrial systems.

Whether you need a powerful computing solution for advanced robotics, automation, or other industrial applications, the DSBOX-ORNX is the ideal choice. Upgrade your industrial computing power with the DSBOX-ORNX today.

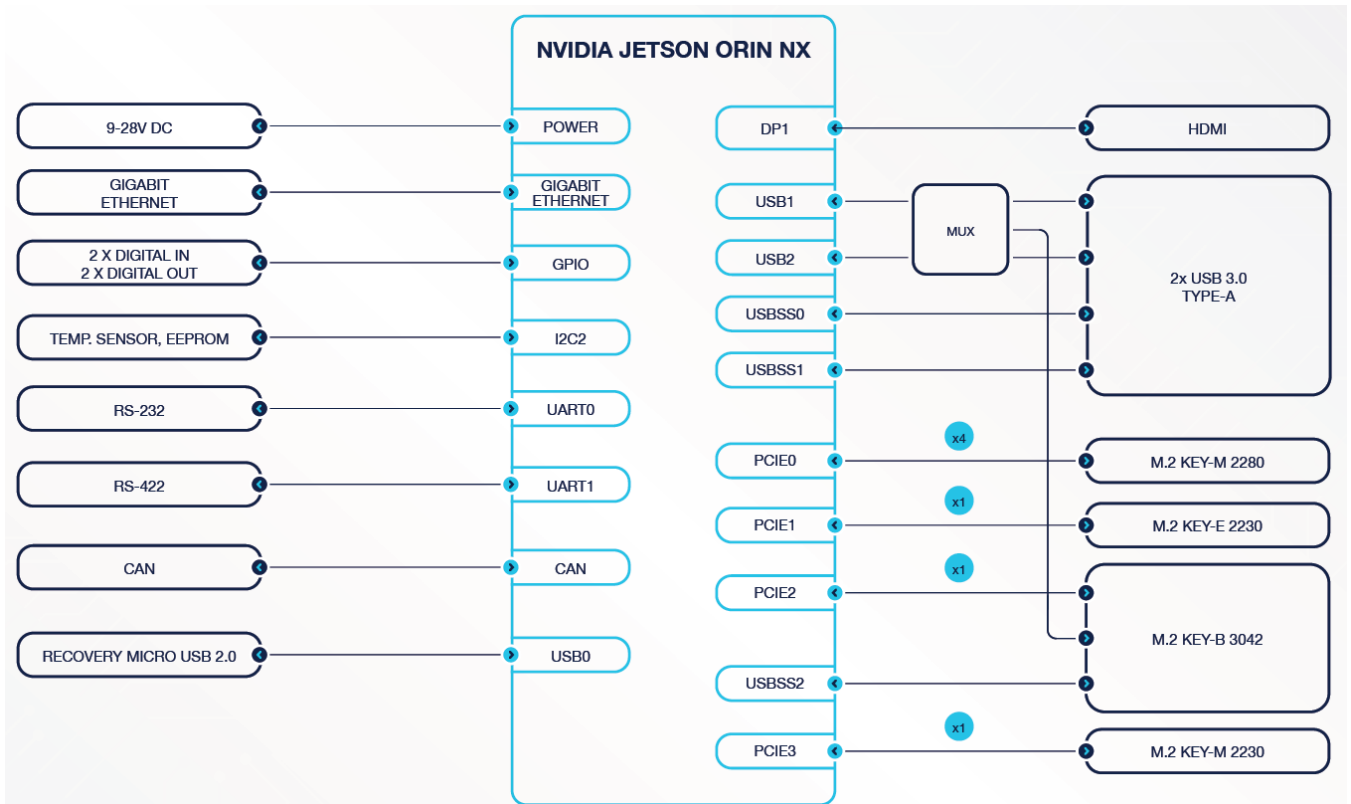
Latest revision of this user manual, datasheet, and 3D model can be downloaded from [Forecr](#) Web Page.

## 2. Product Specification

### 2.1 Technical Specification

<b>Supported Modules</b>	NVIDIA Jetson Orin NX 8GB / 16GB
<b>Memory</b>	4 GB 64-bit LPDDR5 / 8 GB 128 bit LPDDR5 8 GB 256-bit LPDDR5 / 16 GB 128 bit LPDDR5
<b>Graphics Interfaces</b>	1x HDMI 2.0(max resolution 3840x2160)
<b>Interfaces</b>	1x Gigabit Ethernet 2x USB 3.1 Type-A 1x CAN Bus 1x RS232 & 1x RS422 1x microUSB 2.0 (Recovery) 2x Digital Input 2x Digital Output
<b>Wireless Communication</b>	WiFi/LTE/5G/Bluetooth Connectivity by extension sockets
<b>Power Supply</b>	9-28 VDC
<b>Extension Sockets</b>	1x M.2 Key-E, 1x M.2 Key-B, 1x SIM
<b>Mass Storage</b>	2x M.2 Key-M SSD Slot
<b>Ambient Conditions</b>	-25°C ... +85°C
<b>Form Factor / Dimensions</b>	110 mm x 130 mm x 60 mm 760gr
<b>Operating Systems</b>	Ubuntu Linux 20.04 Ubuntu Linux 22.04
<b>JetPack Support</b>	JetPack 5.x JetPack 6.x

## 2.2 Block Diagram



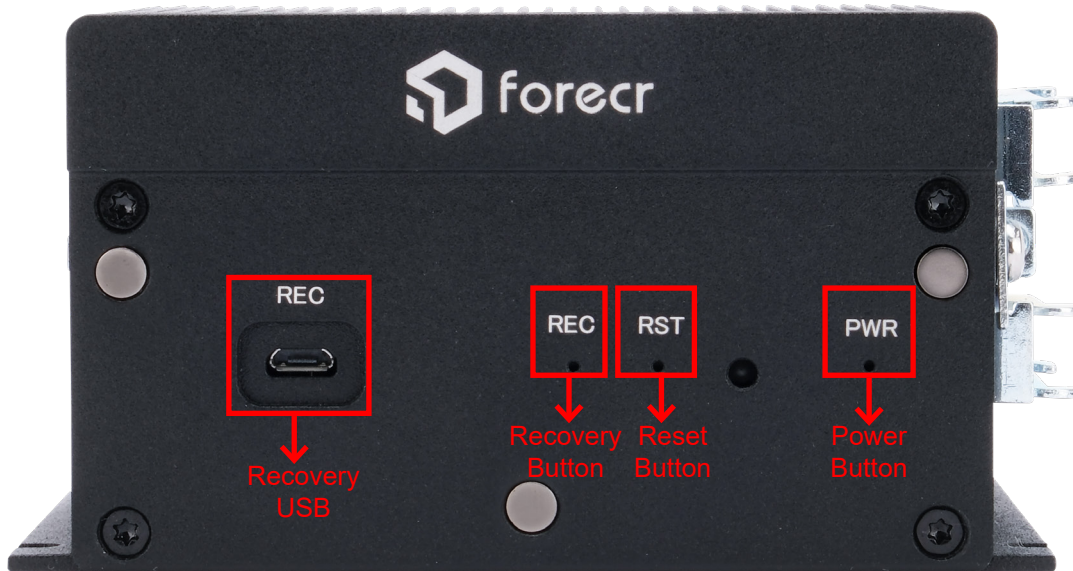
## 2.3 DSBOX-ORNX Visuals



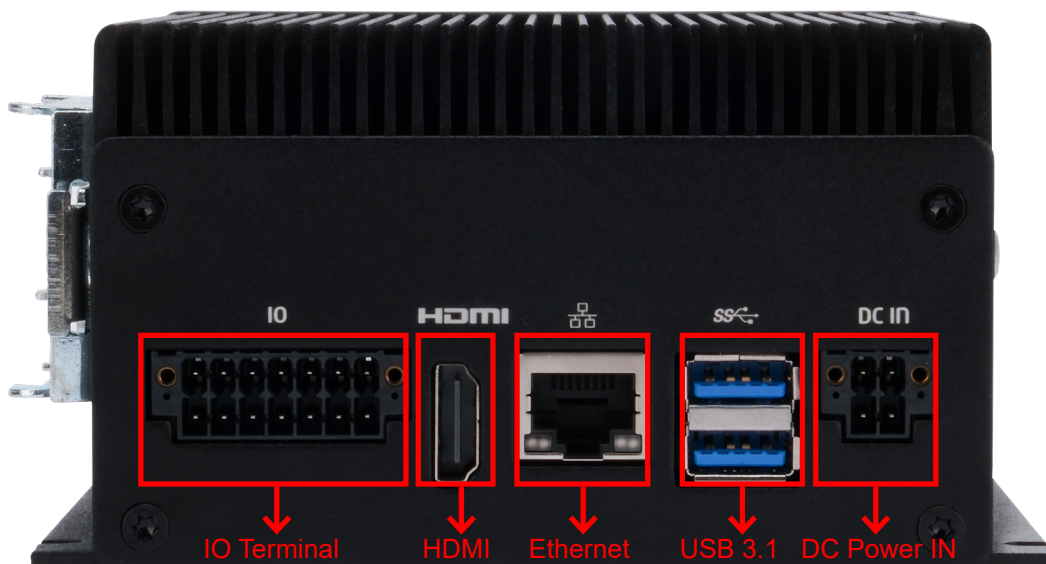
### 3. Hardware Information

#### 3.1 Connector Location

##### 3.1.1 Front Connectors Layout



##### 3.1.2 Rear Connectors Layout



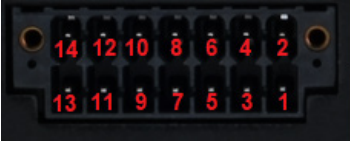


### 3.2 List of Connectors and Buttons


Connectors
DSBOX-ORNX I/O Terminal Connector
DSBOX-ORNX HDMI Conector
DSBOARD-ORNX Gigabit Ethernet Connector
DSBOARD-ORNX USB 3.1 Type-A Connector
DSBOARD-ORNX Power Connector
DSBOARD-ORNX Recovery mode USB 3.1 Type C Connector
DSBOARD-ORNX Recovery Button
DSBOARD-ORNX Reset Button
DSBOARD-ORNX Power Button

### 3.3 The Definition of Each Connector


#### 3.3.1 I/O Terminal Connector

	Function	Description		
	Mating connector	1790344 (DFMC 1,5/ 7-STF-3,5) from Phoenix Contact.		
	Pinout	Pin	Description	I/O Type
		1	RS232 TX	I/O
		2	RS232 RX	I/O
		3	RS422 A	I/O
		4	RS422 Z	I/O
		5	RS422 B	I/O
		6	RS422 Y	I/O
		7	CAN_H	I/O
		8	CAN_L	I/O
		9	GROUND	Power
		10	GROUND	Power
		11	DIGITAL_OUT1 <i>Note: Up to 24V, low-side switch</i>	Output
		12	DIGITAL_IN1	Input
13		DIGITAL_OUT0 <i>Note: Up to 24V, low-side switch</i>	Output	
14	DIGITAL_IN0	Input		

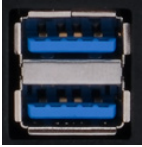
### 3.3.2 HDMI Connector

	Description	
	<p>The NVIDIA® Jetson Orin NX module will output video via the vertical HDMI connector that is HDMI 2.0 capable.</p>	


### 3.3.3 Gigabit Ethernet Connector

	Description	
	<p>It is a RJ-45 ethernet connector for internet communication.</p>	


### 3.3.4 USB 3.1 Type-A Connector

	Description	
	<p>There are 2 USB 3.1 Type-A connectors with a 1.5A current limit per connector.</p>	


### 3.3.5 Power Connector

	Function		Description			
	Mating Connector		1708595			
	Minimum Input Voltage		+9V			
	Maximum Input Voltage		+28V			
	Pinout		Pin		Description	
			1		Positive	
2			Negative			
3			Positive			
		4		Negative		


### 3.3.6 Recovery Mode USB 3.1 Type-C Connector

	Description	
	<p>It is used to allow to install or upgrade the operating system.</p>	


### 3.3.7 Recovery Button

	<table border="1"> <thead> <tr> <th data-bbox="544 271 1332 315">Description</th> </tr> </thead> <tbody> <tr> <td data-bbox="544 315 1332 450">                     Recovery button should be pressed with reset button at the same time. After released reset button, recovery button should be pressed a little bit more (min. 250 ms).                 </td> </tr> </tbody> </table>	Description	Recovery button should be pressed with reset button at the same time. After released reset button, recovery button should be pressed a little bit more (min. 250 ms).
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### 3.3.8 Reset Button

	<table border="1"> <thead> <tr> <th data-bbox="544 560 1332 604">Description</th> </tr> </thead> <tbody> <tr> <td data-bbox="544 604 1332 703">                     Reset button is used to reset the Jetson SoM.                 </td> </tr> </tbody> </table>	Description	Reset button is used to reset the Jetson SoM.
Description			
Reset button is used to reset the Jetson SoM.			

### 3.3.9 Power Button

	<table border="1"> <thead> <tr> <th data-bbox="544 815 1332 860">Description</th> </tr> </thead> <tbody> <tr> <td data-bbox="544 860 1332 960">                     Power button is used to energize the platform.                 </td> </tr> </tbody> </table>	Description	Power button is used to energize the platform.
Description			
Power button is used to energize the platform.			

## 4. Software Information

### 4.1 Installation

JetPack-5.x Installation can be found here: <https://www.forecr.io/blogs/installation/jetpack-5-x-installation-for-ds-board-ornx>

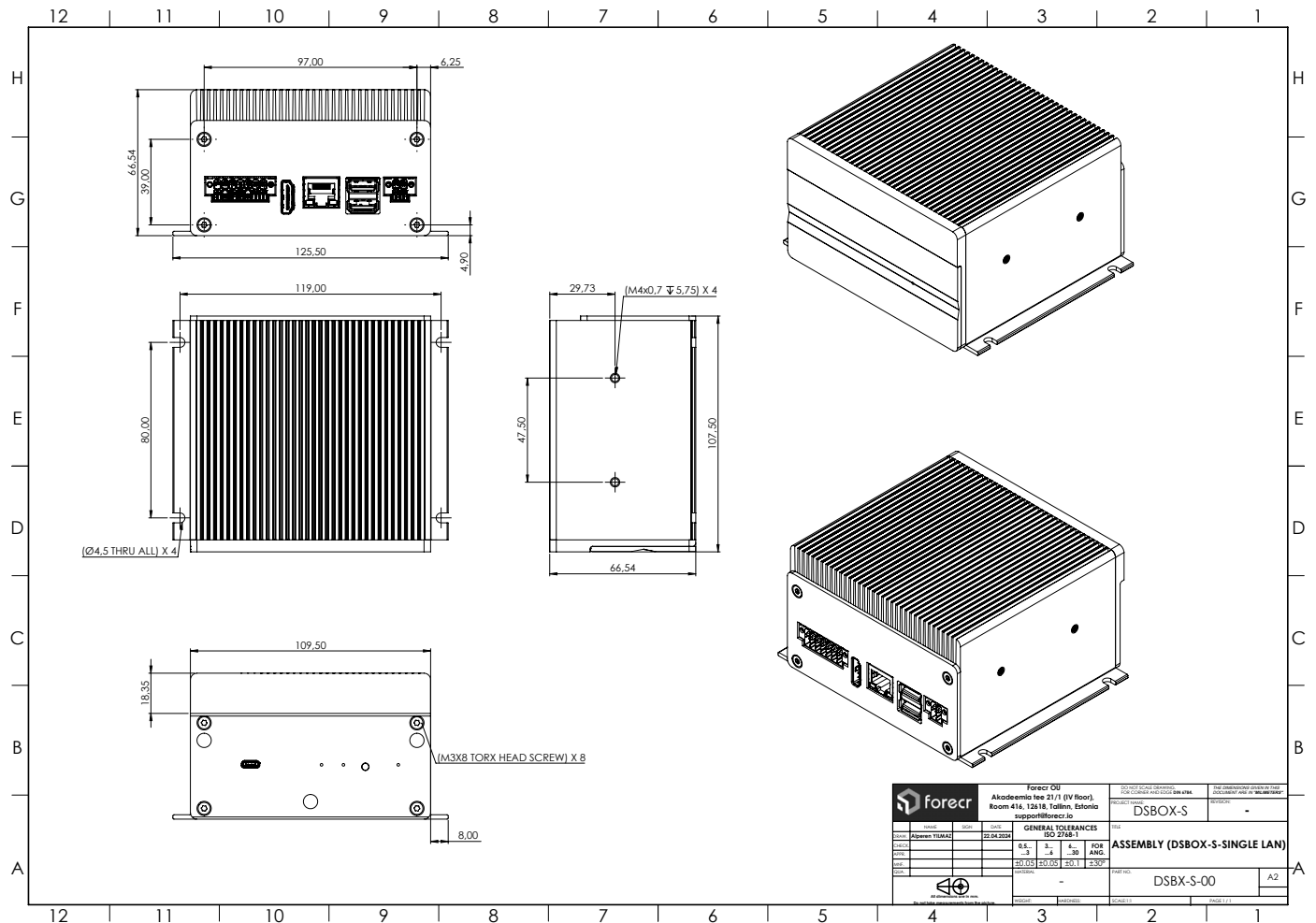
JetPack-6.x Installation can be found here: <https://www.forecr.io/blogs/installation/jetpack-6-x-installation-for-ds-board-ornx>

## 5. 3D Model & Mechanical Information

### 5.1 3D Model

Full 3D models of all DSBOX-ORNX can be found here: [https://github.com/forecr/forecr\\_3d\\_models/tree/master/DS-BOX-ORNX](https://github.com/forecr/forecr_3d_models/tree/master/DS-BOX-ORNX)

### 5.2 2D Mechanical Drawing



## 6. Power Consumption

### 6.1 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)	1,34	0,55	0,07	1,23	1,51	1,8	2,5
Power (W)	16,08	6,6	0,84	14,76	18,12	21,6	30

### 6.2 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)	1,44	0,6	0,08	1,3	1,56	1,64	2,04
Power (W)	17,28	7,2	0,96	15,6	18,72	19,68	24,48

### 6.3 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)	1,1	0,6	0,09	1,08	1,6
Power (W)	13,2	7,2	1,08	12,96	19,2

### 6.4 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)	1,05	0,5	0,06	0,92	0,96	1,04
Power (W)	12,6	6	0,72	11,04	11,52	12,48

## 7. Cables

This section will be completed soon. It will be published on our website once completed. Please check our <https://www.forecr.io> Web Page regularly.

## 8. MTBF Prediction

This section will be completed soon. It will be published on our website once completed. Please check our <https://www.forecr.io> Web Page regularly.

## 9. Ordering Information

