

DSBOARD-AGXMAX Rev 1.22

USER MANUAL

UM-DSBDAGXMAX-01

Revision 1.3

09/10/2024



Forecr
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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
rev 1.0	25.03.2024	Preliminary Release
rev 1.1	16.07.2024	JetPack 6.x has been added to the 2.1 Technical Specification Section and the 4.1 Installation Section. Fan Voltage Switch description has been added to the 3.3 The Definition of Each Connector Section.
rev 1.2	21.08.2024	Key-M, Key-B and Key-E connector pinouts have been added to section 3.3.2, 3.3.3, 3.3.4.
rev 1.21	01.10.2024	Ordering information has been edited in Section 9.
rev 1.3	09.10.2024	Serial Communication Interface in section 5.2.3 has been edited. The revision of the DSBOARD-AGXMAX has been changed. Section 9 - Accessories have been added.

1. Introduction

Introducing the DSBOARD-AGXMAX, the industrial carrier board that is built to maximize your productivity and connectivity. Powered by the high-performance AGX Orin SoM, which can deliver up to 275 TOPS of AI performance, this board offers top-of-the-line 10G connectivity, as well as Dual Gigabit Ethernet, USB 3.2, HDMI, CAN, Serial Ports, and MIPI CSI-2 Camera support.

The AGX Orin SoM processor delivers exceptional performance for industrial applications that require high-speed data transfer, real-time communication, and reliable performance. Whether you're working on machine vision, robotics, automation, or any other industrial project, the DSBOARD-AGXMAX will deliver the power and versatility you need to get the job done.

With its easy-to-use design and extensive connectivity options, the DSBOARD-AGXMAX offers an unparalleled level of convenience and flexibility. And with its robust construction and long-lasting reliability, you can be confident that this carrier board will continue to meet your needs for years to come.

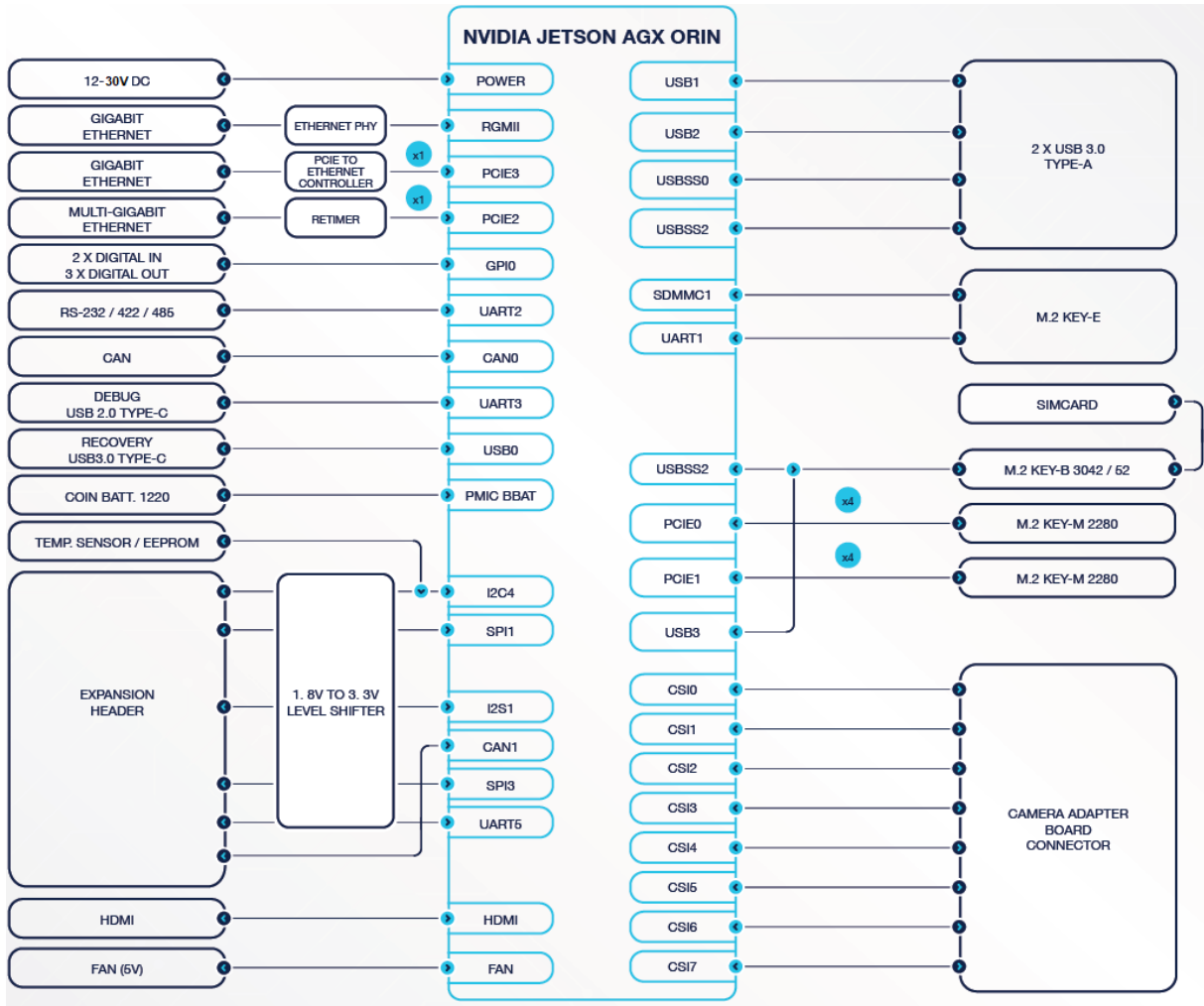
Latest revision of this user manual, datasheet, and 3D model can be downloaded from [Forecr Web Page](#).

2. Product Specification

2.1 Technical Specification

Supported Modules	NVIDIA Jetson AGX Orin 32GB NVIDIA Jetson AGX Orin 64GB
Memory	32 GB 256-bit LPDDR5x 64 GB 256-bit LPDDR5x
Graphics Interfaces	1x HDMI 2.0(max resolution 3840x2160)
Interfaces	2x Gigabit Ethernet 1x 10G (SFP+Based) 2x USB 3.1 Type-A 1x CAN Bus 1x RS232/422/485 (software configurable) 2x USB-C (Debug/Recovery) 2x Digital Input 3x Digital Output
Wireless Communication	WiFi/Bluetooth/LTE/5G Connectivity by extension sockets
Power Supply	12-30 VDC
Extension Sockets	1x M.2 Key-B, 1x M.2 Key-E, 1x SIM, 1x 11V/5V Fan, 1x I2C, 2x UART, 1x I2S, 2x SPI, 1x CAN, 1x Camera Connector (6 CSI camera support)
Mass Storage	64 GB eMMC 5.1 Flash 2x M.2 Key-M SSD Slot
Ambient Conditions	-25°C ... +85°C
Form Factor / Dimensions	140 mm x 125 mm, 132gr
Operating Systems	Ubuntu Linux 20.04 Ubuntu Linux 22.04
JetPack Support	JetPack 5.x JetPack 6.x

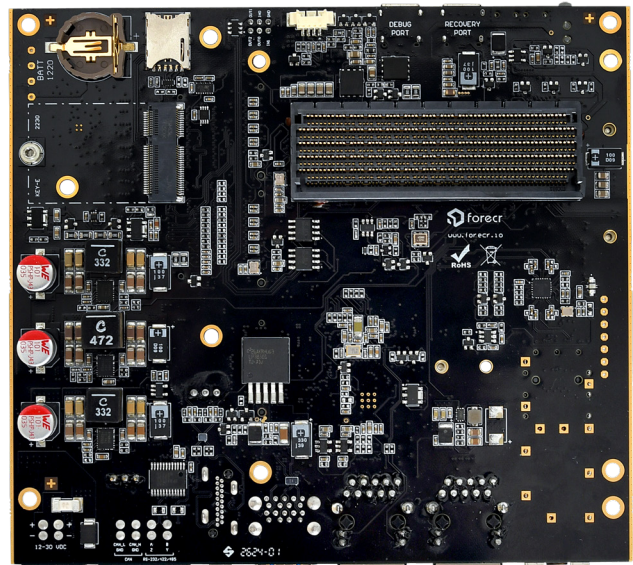
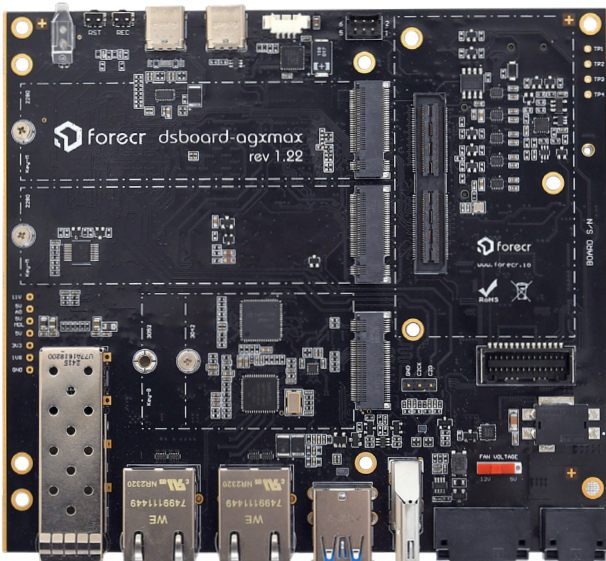
2.2 Block Diagram



2.3 Board Visuals

Top Side

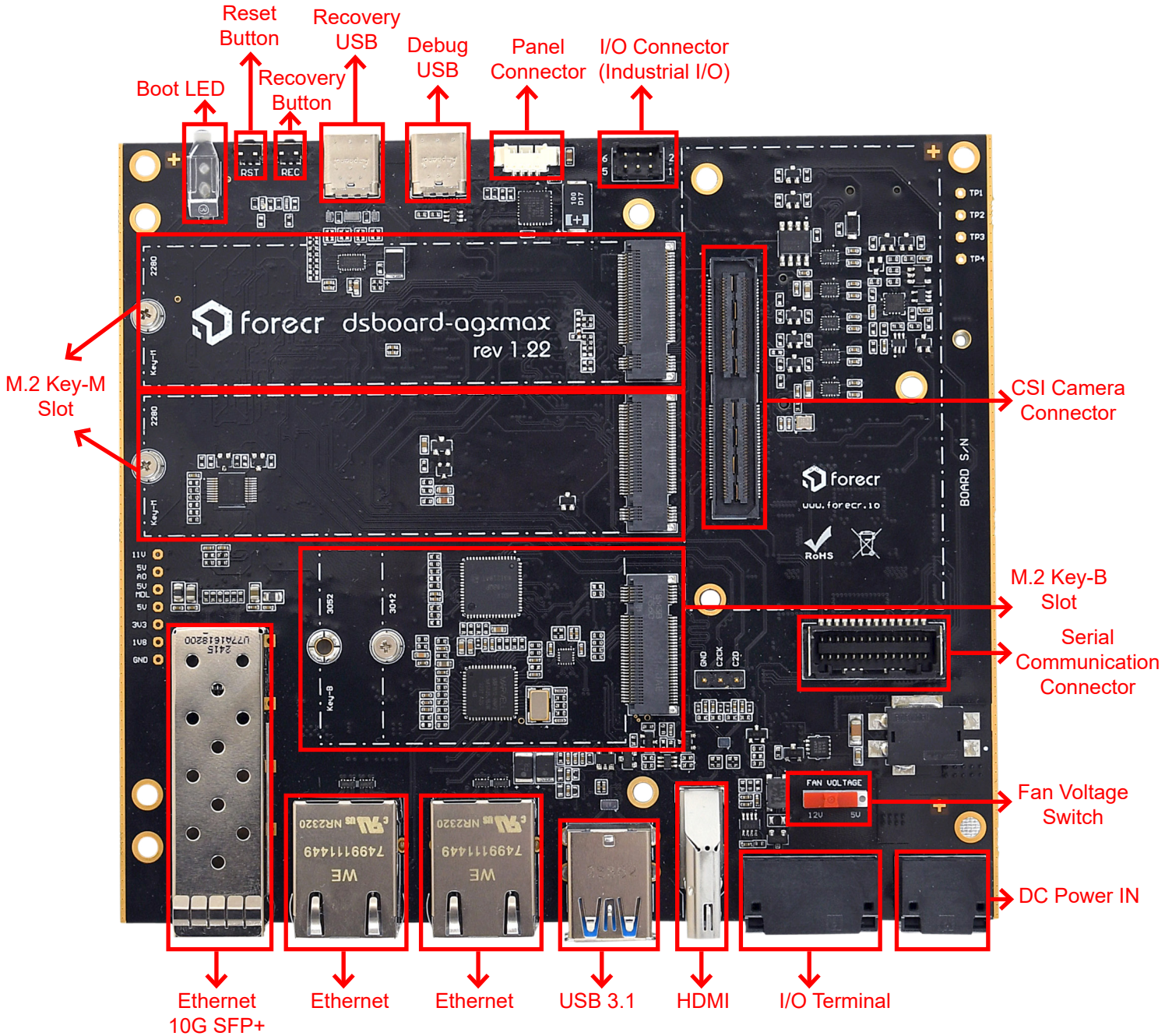
Bottom Side



3. Hardware Information

3.1 Connector and Button Location

3.1.1 Top Side




3.2 List of Connectors and Buttons

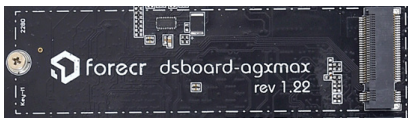
Connectors
DSBOARD-AGXMAX Power Connector
DSBOARD-AGXMAX M.2 Key-M Connectors
DSBOARD-AGXMAX M.2 Key-B Connector
DSBOARD-AGXMAX M.2 Key-E Connector
DSBOARD-AGXMAX SIM Card Connector
DSBOARD-AGXMAX CSI Camera Connector
DSBOARD-AGXMAX I/O Terminal Connectors
DSBOARD-AGXMAX Serial Communication Connector
DSBOARD-AGXMAX Panel Connector
DSBOARD-AGXMAX RTC Battery Connector
DSBOARD-AGXMAX HDMI Connector
DSBOARD-AGXMAX USB 3.1 Type-A Connector
DSBOARD-AGXMAX 10G Ethernet Slot
DSBOARD-AGXMAX 10/100/1000 Ethernet Connectors
DSBOARD-AGXMAX Fan Connector
DSBOARD-AGXMAX Recovery Mode USB Type-C Connector
DSBOARD-AGXMAX Debug Mode Type-C USB Connector
DSBOARD-AGXMAX Fan Voltage Switch
Buttons
DSBOARD-AGXMAX Recovery Pushbutton
DSBOARD-AGXMAX Reset Pushbutton

3.3 The Definition of Each Connector

3.3.1 Power Connector

	Function		Description		
	Mating Connector		1708595		
	Minimum Input Voltage		+12V		
	Maximum Input Voltage		+30V		
	Pinout		Pin	Description	Pin
		1	Positive	3	Negative
		2	Positive	4	Negative

3.3.2 M.2 Key-M Connector

<p>M.2 Key-M Connector</p> 	Description						
	Pinout	Pin	Description	Pin	Description	Pin	Description
		1	DGND	24	NC	47	UPHY_TX12_N
		2	VDD_3V3	25	UPHY_TX14_P	48	NC
		3	DGND	26	NC	49	UPHY_TX12_P
		4	VDD_3V3	27	DGND	50	PEX.L5_RST_N
		5	UPHY.RX15_N	28	NC	51	DGND
		6	NC	29	UPHY.RX13_N	52	PEX.L5_CLKREQ_N
		7	UPHY.RX15_P	30	NC	53	PEX.CLK5_N
		8	NC	31	UPHY.RX13_P	54	GPIO29_M2_KEYM_PEWAKE*
		9	DGND	32	NC	55	PEX.CLK5_P
		10	NC	33	DGND	56	NC
		11	UPHY_TX15_N	34	NC	57	DGND
		12	VDD_3V3	35	UPHY_TX13_N	58	NC
		13	UPHY_TX15_P	36	NC	67	NC
		14	VDD_3V3	37	UPHY_TX13_P	68	32KHZ_CLK
		15	DGND	38	NC	69	NC
		16	VDD_3V3	39	DGND	70	VDD_3V3
		17	UPHY.RX14_N	40	I2C2.SCL	71	DGND
		18	VDD_3V3	41	UPHY.RX12_N	72	VDD_3V3
		19	UPHY.RX14_P	42	I2C2.SDA	73	DGND
		20	NC	43	UPHY.RX12_P	74	VDD_3V3
		21	DGND	44	GPIO34_M2_KEYM_ALERT*	75	DGND
		22	NC	45	DGND		
	23	UPHY_TX14_N	46	NC			

Board to board spacing=2.45 mm
 Max component height=1.2 mm

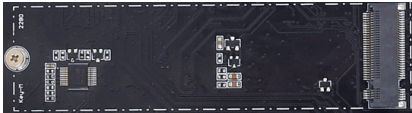
Blue: Board-to-Board spacing
 Red: Max component height



M.2 Key-M 2 Connector

Description

Pinout	Pin	Description	Pin	Description	Pin	Description
	1	DGND	24	NC	47	UPHY_TX22_N
	2	VDD_3V3	25	UPHY_TX10_P	48	NC
	3	DGND	26	NC	49	UPHY_TX22_P
	4	VDD_3V3	27	DGND	50	PEX.L4_RST_N
	5	UPHY.RX11_N	28	NC	51	DGND
	6	NC	29	UPHY.RX23_N	52	PEX.L4_CLKREQ_N
	7	UPHY.RX11_P	30	NC	53	PEX.CLK4_N
	8	NC	31	UPHY.RX23_P	54	GPIO35_M2_KEYM_PE-WAKE*_2
	9	DGND	32	NC	55	PEX.CLK4_P
	10	NC	33	DGND	56	NC
	11	UPHY_TX11_N	34	NC	57	DGND
	12	VDD_3V3	35	UPHY_TX23_N	58	NC
	13	UPHY_TX11_P	36	NC	67	NC
	14	VDD_3V3	37	UPHY_TX23_P	68	32KHZ_CLK
	15	DGND	38	NC	69	NC
	16	VDD_3V3	39	DGND	70	VDD_3V3
	17	UPHY.RX10_N	40	I2C2.SCL	71	DGND
	18	VDD_3V3	41	UPHY.RX22_N	72	VDD_3V3
	19	UPHY.RX10_P	42	I2C2.SDA	73	DGND
	20	NC	43	UPHY.RX22_P	74	VDD_3V3
	21	DGND	44	GPIO33_M2_KEYM_ALERT*	75	DGND
	22	NC	45	DGND		
	23	UPHY_TX10_N	46	NC		



Board to board spacing=2.45 mm
Max component height=1.2 mm

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




3.3.3 M.2 Key-B Connector

Pinout	Description			
	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_P2_KEYB.RX_N	63	NC
	30	M2_USIM_RST	64	NC
	31	USBSS_P2_KEYB.RX_P	65	NC
	32	M2_USIM_CLK	66	NC
	33	DGND	67	M2B_RESET
	34	M2_USIM_DAT	68	NC
	35	USBSS_P2_KEYB.TX_N	69	NC
	36	M2_USIM_VDD	70	VDD_3V8
	37	USBSS_P2_KEYB.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=2.45 mm
 Max component height=1 mm

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

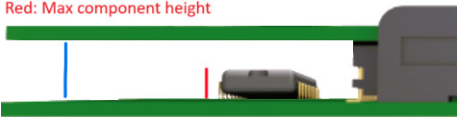


3.3.4 M.2 Key-E Connector

Pinout	Description			
	Pin	Description	Pin	Description
	1	DGND	44	NC
	2	VDD_3V3	45	DGND
	3	NC	46	NC
	4	VDD_3V3	47	NC
	5	NC	48	NC
	6	NC	49	NC
	7	DGND	50	M2E_32KHZ
	8	NC	51	DGND
	9	SDMMC1_CLK	52	NC
	10	NC	53	NC
	11	SDMMC1_CMD	54	M2E_WDISABLE2_N
	12	NC	55	NC
	13	SDMMC1_D0	56	M2E_WDISABLE1_N
	14	NC	57	DGND
	15	SDMMC1_D1	58	NC
	16	NC	59	NC
	17	SDMMC1_D2	60	NC
	18	DGND	61	NC
	19	SDMMC1_D3	62	NC
	20	M2E_BT_WAKE_N	63	DGND
	21	M2E_SDIO_WAKE_N	64	NC
	22	UART1.RX	65	NC
	23	M2E_SDIO_RESET_N	66	NC
	32	UART1.TX	67	NC
	33	DGND	68	NC
	34	UART1.CTS	69	DGND
	35	NC	70	NC
	36	UART1.RTS	71	NC
	37	NC	72	VDD_3V3
	38	NC	73	NC
	39	DGND	74	VDD_3V3
	40	NC	75	DGND
	41	NC	MNT1	DGND
	42	NC	MNT2	DGND
	43	NC		

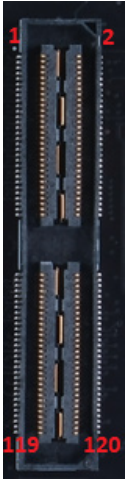
Board to board spacing=2.45 mm
Max component height=0 mm

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




3.3.5 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	CAM_BAC KLIGHT_PWM
	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	CAM_ERROR1	112	NC
	5	GND	41	GND	77	CAM_I2C.SDA	113	NC
	6	GND	42	GND	78	CAM_ERROR2	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	AVDD_ CAM_2V8	117	CAM_INT1
	10	CSI1.CLK_N	46	CSI6.CLK_N	82	AVDD_ CAM_2V8	118	VDD_3V3
	11	GND	47	GND	83	AVDD_ CAM_2V8	119	CAM_VDD_ SYS_EN
	12	GND	48	GND	84	CAM_ERROR3	120	VDD_3V3
	13	CSI0.D1_P	49	CSI4.D1_P	85	CAM_FRSYNC1		
	14	CSI1.D1_P	50	CSI6.D1_P	86	CAM_ERROR4		
	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	CAM_FRSYNC4		
	25	CSI2.CLK_P	61	CSI5.D0_N	97	CAM_FRSYNC3		
	26	CSI3.CLK_P	62	CSI7.D0_N	98	CAM_FRSYNC2		
	27	CSI2.CLK_N	63	GND	99	GND		
	28	CSI3.CLK_N	64	GND	100	GND		
	29	GND	65	CSI5.CLK_P	101	CAM_TE_RSV		
	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	CAM_INT4		
	33	CSI2.D1_N	69	GND	105	I2C5.SCL		
	34	CSI3.D1_N	70	GND	106	CAM_INT2		
	35	GND	71	CSI5.D1_P	107	I2C5.SDA		
36	GND	72	CSI7.D1_P	108	VDD_3V3			




3.3.6 I/O Terminal Connectors

8 Pin Connector (Serial Communication)	Function	Description		
	8 Pin Connector's Mating Connector	"1790315" (DFMC 1,5/ 4-STF-3,5) from Phoenix Contact		
	6 Pin Connector's Mating Connector	"DF11-6DS-2C" from Hirose Electric Co Ltd		
	Pinout	8 Pin Connector		
		Pin	Description	I/O Type
		1	RS422 B	I/O
		2	RS422 Y	I/O
		3	RS232 RX / RS422 A	I/O
		4	RS232 TX / RS422 Z	I/O
		5	CAN0_H	I/O
		6	GND	Power
	7	CAN0_L	I/O	
8	GND	Power		
6 Pin Connector (Industrial I/O)	6 Pin Connector			
	Pin	Description	I/O Type	
	1	DIGITAL_OUT2	I/O	
	2	DIGITAL_OUT1	I/O	
	3	DIGITAL_OUT0	I/O	
	4	DIGITAL_IN0	I/O	
	5	DIGITAL_IN1	I/O	
	6	GND	Power	


3.3.7 Serial Communication Connector

	Function	Description			
	Connector Type	505433-2881			
	Mating connector	5054322801			
	Pinout	Pin	Description	Pin	Description
		1	VDD_5V	15	SPI3_3V3_CS0
		2	VDD_3V3	16	SPI3_3V3_CLK
		3	VDD_1V8	17	SPI3_3V3_MISO
		4	GND	18	SPI3_3V3_MOSI
		5	GND	19	GND
		6	I2S1_3V3_CLK	20	GND
		7	I2S1_3V3_FS	21	SPI1_3V3_CS0
		8	I2S1_3V3_SDOUT	22	SPI1_3V3_CLK
		9	I2S1_3V3_SDIN	23	SPI1_3V3_MISO
		10	AUD_3V3_MCLK	24	SPI1_3V3_MOSI
		11	CAN1_DOUT	25	UART5_3V3_TX
12		I2C4_3V3_SDA	26	UART5_3V3_RX	
13		CAN1_DIN	27	UART5_3V3_RTS	
14	I2C4_3V3_SCL	28	UART5_3V3_CTS		


3.3.8 SIM Card Connector

	Description	
	The DSBOARD-AGXMAX implements a nano SIM card connector together.	


3.3.9 Panel Connector

	Function		Description	
	Connector Type		53261-0471	
	Mating Connector		0510210400 from Molex	
	Pinout		Pin	Description
			1	FORCE_RECOVERY
			2	GND
		3	SYS_RST_IN	
		4	GND	


3.3.10 RTC Battery Connector

	Description	
	The DSBOARD-AGXMAX implements a RTC battery holder. The connector is suitable for CR1220 batteries.	


3.3.11 HDMI Connector

	Description	
	The NVIDIA® Jetson Orin modules will output video via the DSBOARD-AGXMAX vertical HDMI connector that is HDMI 2.0 capable.	


3.3.12 USB 3.1 Type-A Connector

	Description	
	The DSBOARD-AGXMAX incorporates 2 USB 3.1 Type-A connectors with a 1.5A current limit per connector.	

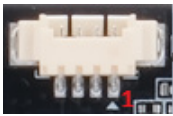
3.3.13 10G Ethernet Slot

	Description	
	The DSBOARD-AGXMAX implements a Multi-Gigabit Ethernet slot for 10Gb SFP+ supported transceivers.	


3.3.14 10/100/1000 Ethernet Connectors

	Description	
	<p>The DSBOARD-AGXMAX implements 2 port RJ-45 Ethernet connectors for network communication.</p>	


3.3.15 Fan Connector

	Function		Description	
	Connector Type		53261-0471 from Molex	
	Mating Connector		0510210400	
	Pinout		Pin	Description
			1	GND
		2	VDD_FAN	
		3	TACH	
		4	PWM	

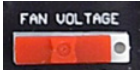
3.3.16 Recovery Mode Type-C USB Connector

	Description	
	<p>The DSBOARD-AGXMAX implements a USB Type-C connector to allow to install or upgrade the operating system.</p>	

3.3.17 Debug Mode Type-C USB Connector


	Description	
	<p>The DSBOARD-AGXMAX implements a Type-C USB connector to access the module by using serial connection.</p>	

3.3.18 Fan Voltage Switch


	Description	
	<p>The DSBOARD-AGXMAX implements a fan voltage switch. The switch is slid to set the fan voltage between 5V-11V.</p>	

3.4 The Definition of Buttons

3.4.1 Recovery Pushbutton

	Description	
	<p>The DSBOARD-AGXMAX implements a recovery pushbutton. 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).</p>	

3.4.2 Reset Pushbutton

	Description The DSBOARD-AGXMAX implements a reset button. It is recommended to use needle-like material.
---	--

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-agxmax>

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

5. Connectivity

5.1 General Purpose Input/Output (GPIO)

MODULE PIN NUMBER	I/O NAME	MODULE PIN NAME	TYPE	DESCRIPTION
A54	M2B_W_DISABLE2#	GPIO17	OUTPUT	GNSS disable control. Drive low to disable GNSS. Drive high for normal operation.
C55	M2B_W_DISABLE1#	GPIO18	OUTPUT	LTE/5G module airplane mode control. Drive low to enable airplane mode. Drive high for normal operation.
J55	M2B_RESET	GPIO32	OUTPUT	LTE/5G module reset control input. Drive low to trigger reset. Drive high for normal operation.
B59	M2B_FULLCARD_PWROFF#	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 3.8V power supply LDO enable control. Drive high to disable LDO. Drive low for normal operation. Drive low for normal operation.
E56	USBSS_P2.TYPEA_KEYB	SPI3_CS1_N	OUTPUT	Selecting USB 3.0 signal source. Drive HIGH to enable TypeA. Drive low to enable M.2 KEY-B.
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	GPIO38	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	OUTPUT	Driver control for RS485 communication. Drive high for enable receiver.
H52	SERIAL_RE	GPIO27	OUTPUT	Receiver control for RS485 communication. Drive low for enable receiver.
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.

B62	GPIO08_DATA_IN0	GPIO08	OUTPUT	Control signal for DIGITAL_IN1 in I/O Connector.
C61	GPIO09_DATA_IN1	GPIO09	OUTPUT	Control signal for DIGITAL_IN1 in I/O Connector.
K56	GPIO19_DATA_OUT0	GPIO19	OUTPUT	Control signal for DIGITAL_OUT0 in I/O Connector.
K49	GPIO25_DATA_OUT1	GPIO25	OUTPUT	Control signal for DIGITAL_OUT1 in I/O Connector.
H51	GPIO26_DATA_OUT2	GPIO26	OUTPUT	Control signal for DIGITAL_OUT2 in I/O Connector.

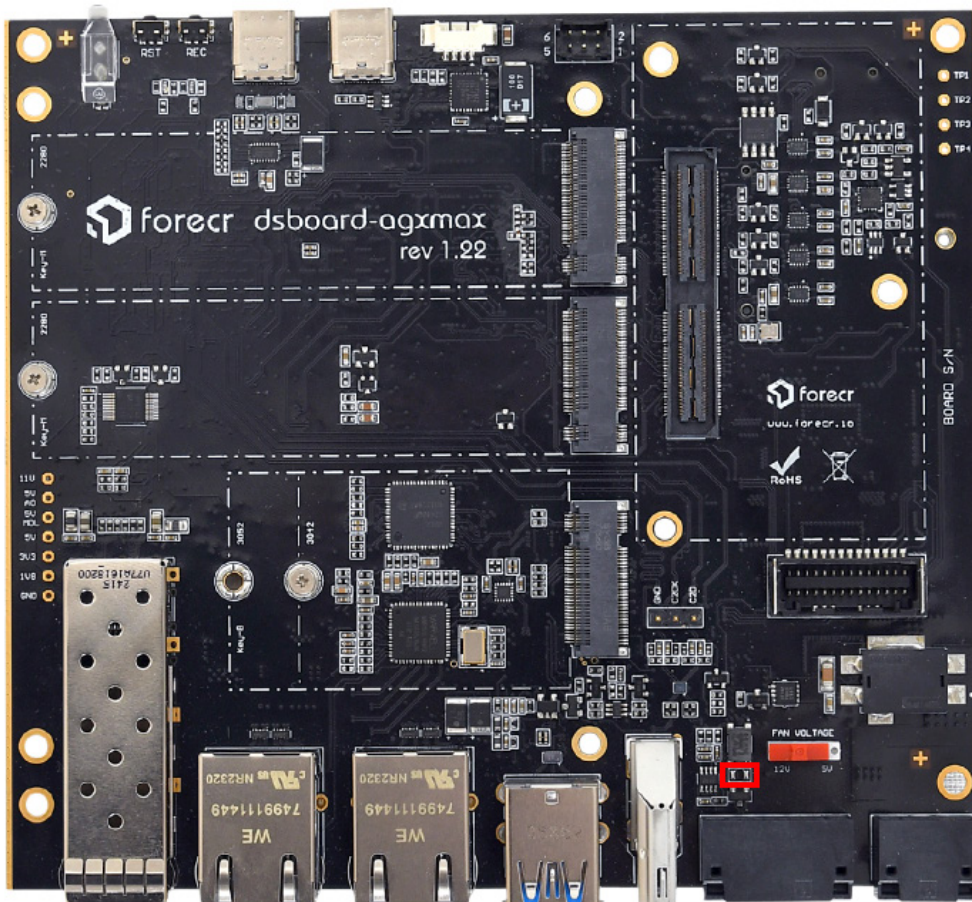
5.2 I/O Connector

On the 8 pin IO connector (serial communication), there are 4 serial communication, 2 ground, 2 CANBus pins. On the 6 pin IO connector (industrial I/O), there are 1 ground, 2 digital input and 3 digital output pins.

5.2.1 CANBus Interface

There is a single CAN Bus interface on the DSBOARD-AGXMAX. 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-AGXMAX.

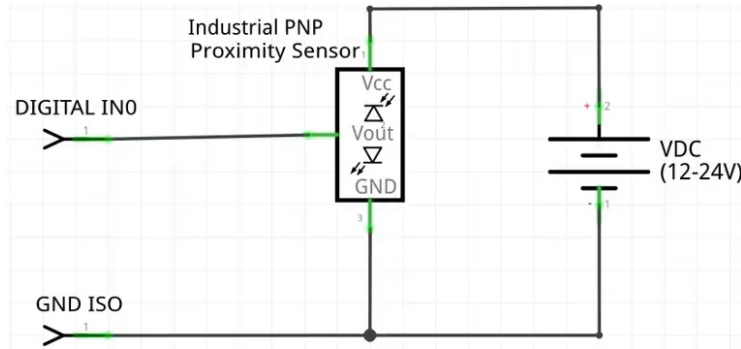
CANBus Termination Resistor



5.2.2 Industrial Input Output Interface

5.2.2.1 Setting and Reading Input Pin

Digital input side accepts signals between 12-24V (rated for 2.25mA). 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, the software side can be continued.

Pin Name	Sysfs Name
DIGITAL_IN0	gpio-325 (PBB.01)
DIGITAL_IN1	gpio-324 (PBB.00)
GROUND	DGND

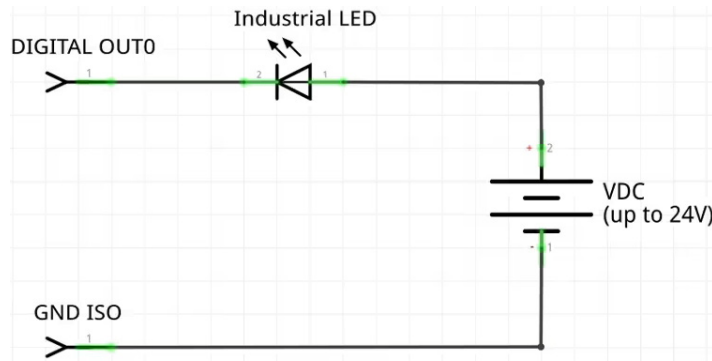
Set DIGITAL_IN0 as input and read sensor value. To do this, you should use the commands below.

```

sudo sh -c "echo 325 > /sys/class/gpio/export"
sudo sh -c "echo in > /sys/class/gpio/PBB.01/direction"
sudo sh -c "cat /sys/class/gpio/PBB.01/value"
    
```

5.2.2.2 Setting Digital Output as High and Low

Digital output side can drive loads up to 24V 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, the software side can be continued.

Pin Name	Sysfs Name
DIGITAL_OUT0	gpio-434(PN.02)
DIGITAL_OUT1	gpio-429(PM.05)
DIGITAL_OUT2	gpio-430(PM.06)
GROUND	DGND

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

```
sudo sh -c "echo 434 > /sys/class/gpio/export"
sudo sh -c "echo out > /sys/class/gpio/PN.02/direction"
```

To short output:

```
sudo sh -c "echo 1 > /sys/class/gpio/PN.02/value"
```

To open output:

```
sudo sh -c "echo 0 > /sys/class/gpio/PN.02/value"
```

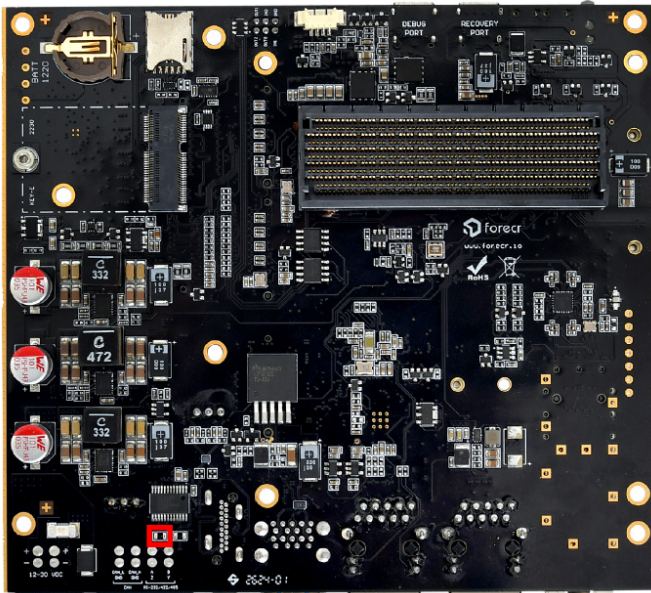
5.2.3 Serial Communication Interface

5.2.3.1 RS232/RS422/RS485

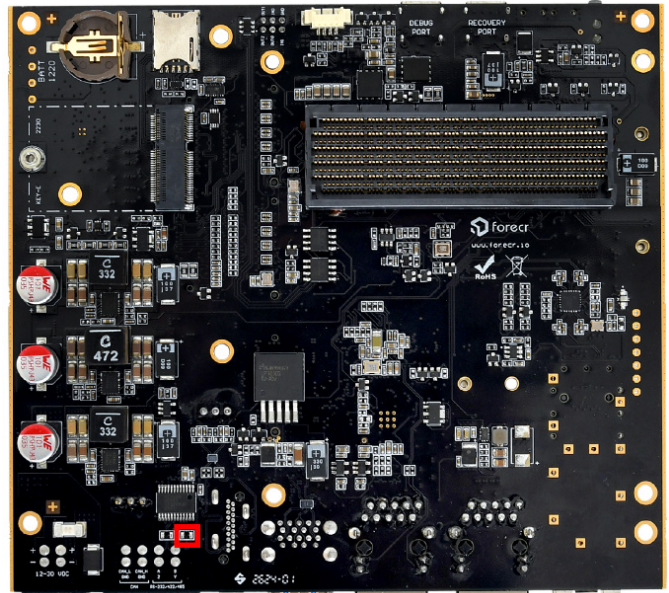
SP330EEY-L from MaxLinear is used to UART2 to RS422/RS232 from Jetson. An example application can be found on the Forecr blog webpage <https://www.forecr.io/blogs/connectivity/dsboard-agxmax-serial-communication-interfaces-tutorial>

There are two 0805 size 120R termination resistors, one between transmit lanes and one between receive lanes. These are not populated by default. In case termination resistors are needed on the DSBOARD-AGXMAX side, standard resistors with above specs can be fitted.

RS422 RX (A/B) Termination Resistor



RS422 TX (Z/Y) Termination Resistor



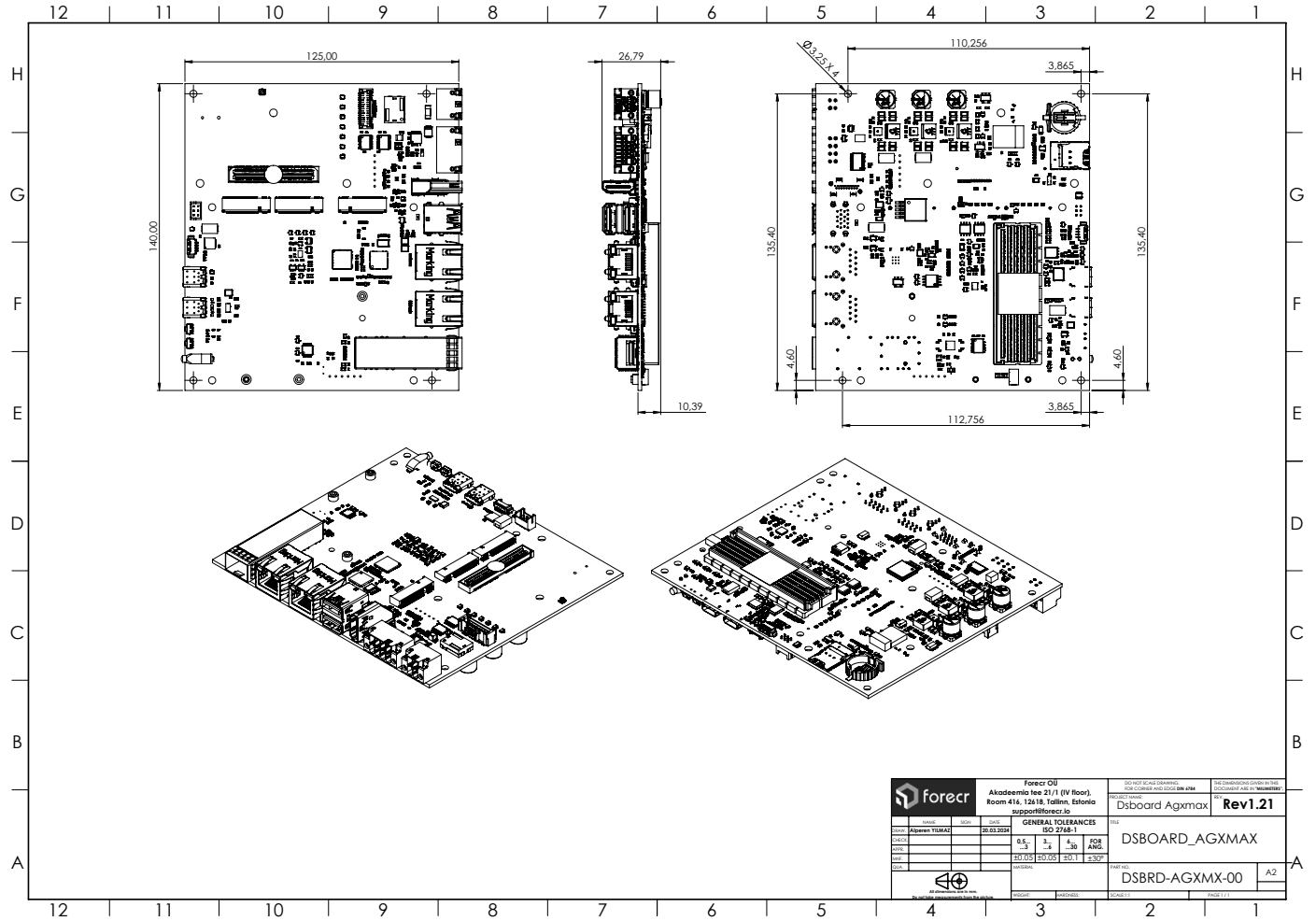
For RS422 communication protocol, SERIAL.485/232 GPIO from Jetson should be driven high. To use half-duplex mode, SERIAL.HALF/FULL GPIO should be driven high. To use full-duplex mode, SERIAL.HALF/FULL GPIO should be driven low. In half-duplex mode, SERIAL_RE and SERIAL_DE GPIOs must be used to switch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

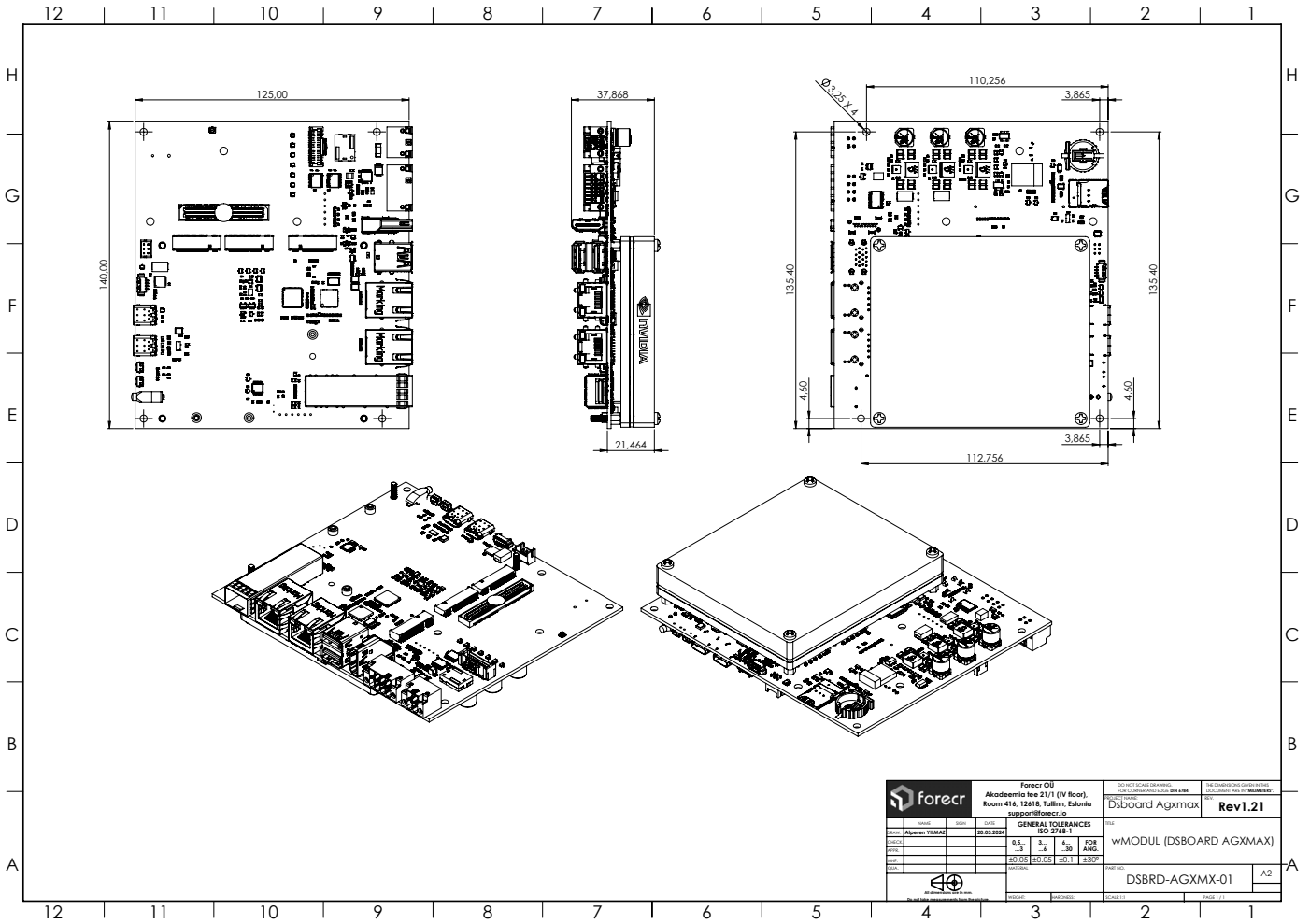
6. 3D Model & Mechanical Information

Full 3D models of all DSBOARD AGXMAX Carrier Board can be found here: https://github.com/forecr/forecr_3d_models/tree/master/DSBOARD-AGXMAX

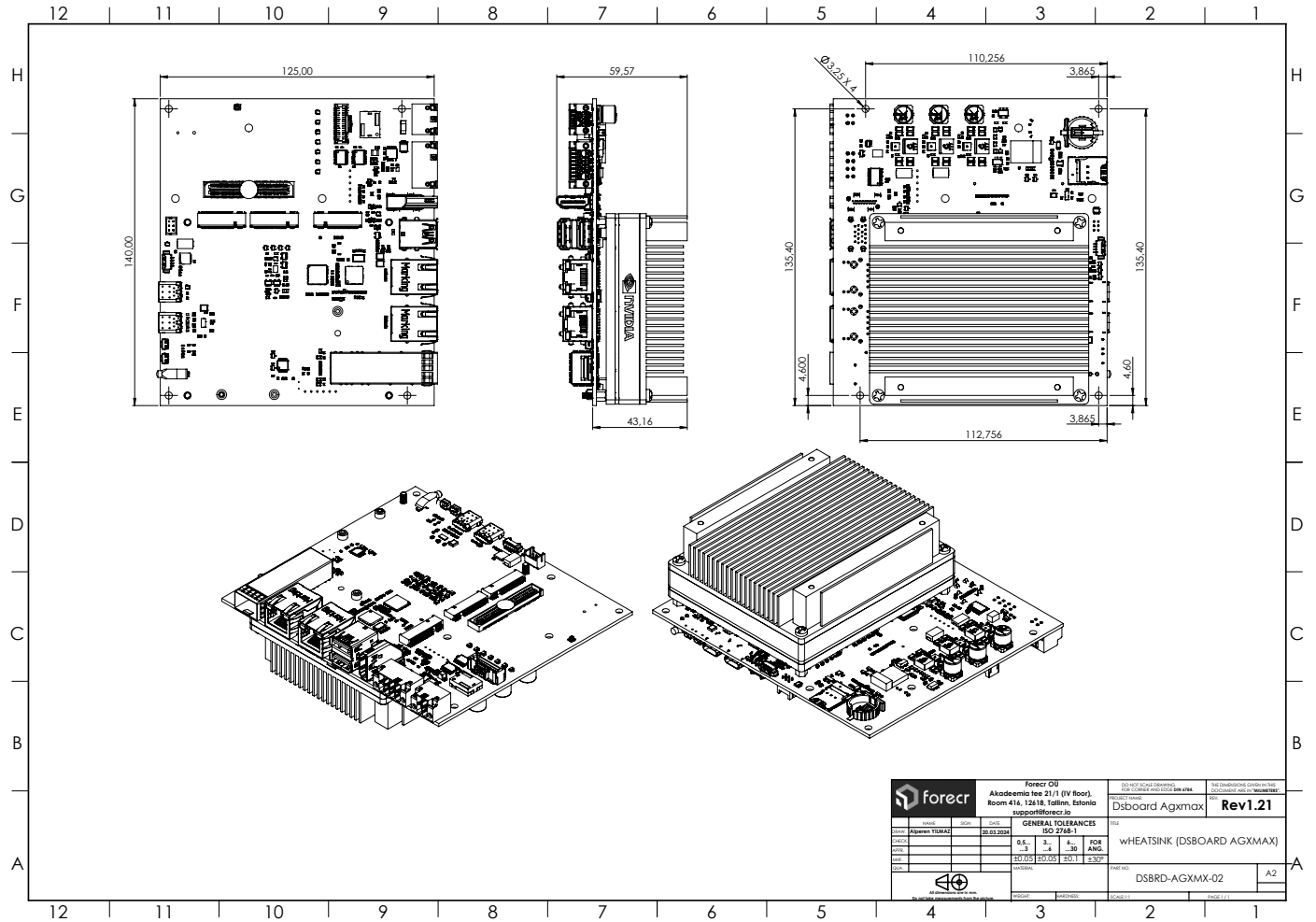
DSBOARD-AGXMAX Stand Alone



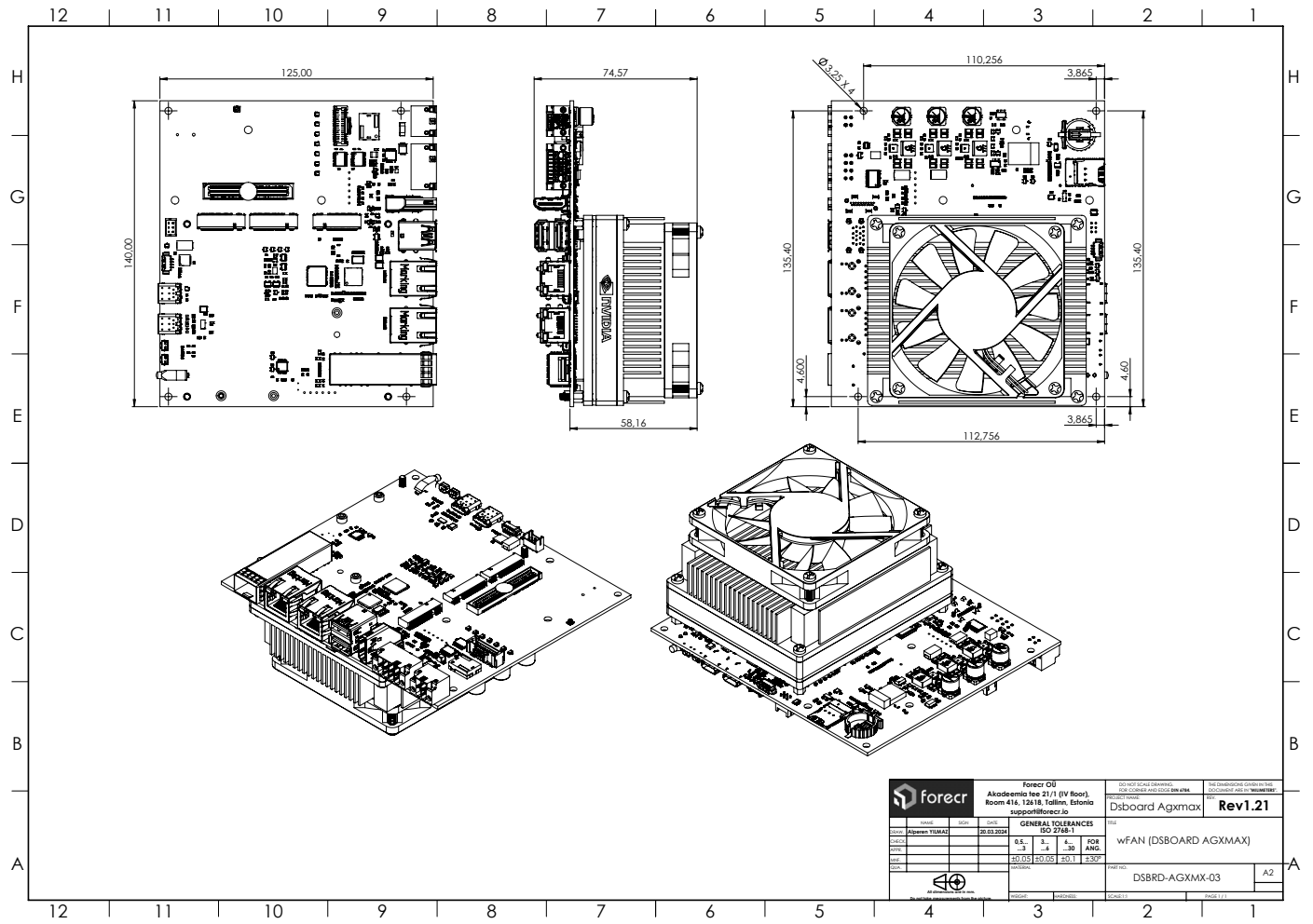
DSBOARD-AGXMAX with Jetson AGX Orin Module



DSBOARD-AGXMAX with Jetson AGX Orin Module and Heatsink Integration Details



DSBOARD-AGXMAX with Jetson AGX Orin Module, Heatsink and Thermal Integration Details



7. Power Consumption

7.1 AGX Orin 32GB

Power Supply: 24V-5A

All CPU and GPU cores are %100 loaded.

	Power Up Sequence	Idle	Standby (Suspend mode)	15W (4 core)	30W (8 core)	40W (8 core)	MAXN (8 core)
Current (A)	1	0,6	0,16	0,85	1,30	1,78	2,19
Power (W)	24	14,4	3,84	20,4	31,2	42,72	52,56

7.2 AGX Orin 64GB

Power Supply: 24V-5A

All CPU and GPU cores are %100 loaded.

	Power Up Sequence	Idle	Standby (Suspend mode)	15W (4 core)	30W (8 core)	50W (12 core)	MAXN (12 core)
Current (A)	1,5	0,6	0,21	0,87	1,33	1,89	3,27
Power (W)	36	14,4	5,04	20,88	31,92	45,36	78,48

7.3 AGX Orin Industrial

Power Supply: 24V-5A


All CPU and GPU cores are %100 loaded.


	Power Up Sequence	Idle	Standby (Suspend mode)	15W (4 core)	35W (8 core)	60W (12 core)	MAXN (12 core)
Current (A)	1,42	0,52	0,16	0,93	1,42	2,1	3,26
Power (W)	34,08	12,48	3,84	22,32	34,08	50,4	78,24


8. MTBF Prediction

Prediction method	Mil Hdbk 217F2, parts count
Environment	GF - Ground Fixed, $T_A=40^{\circ}\text{C}$, $T_J=60^{\circ}\text{C}$
Date	19-Feb-2024
Total Failure Rate	9.636116 (FPMH)
MTBF	103776 (Hours) 11.85 (Years)

9. Accessories

	#	Description	Quantity
	1	M3X30 Screw	4
	2	M3 Lock Nut	4
	3	M3X4.5 Standoff	4

	Part Number	Description	Quantity
	1790315	IO Connector	1

	Part Number	Description	Quantity
	1708595	Power Connector	1

10. Ordering Information

