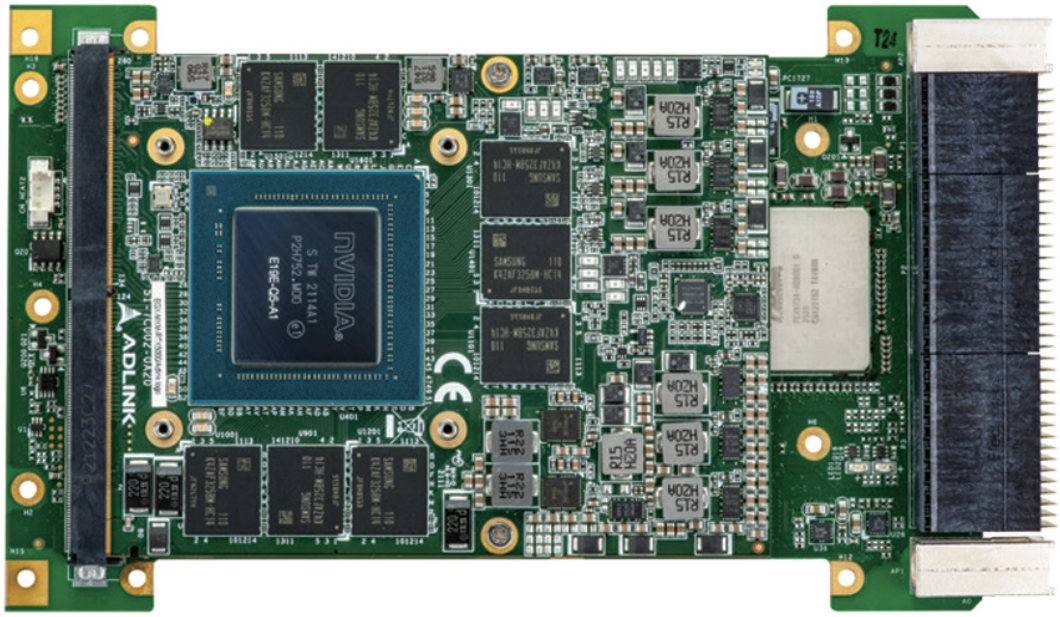
VPX3-MXM/A4500

User's Manual

3U VPX Rugged GPGPU Blade with NVIDIA® RTX™ A4500



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Leading **EDGE COMPUTING**

Revision History

Revision	Description	Date	By
1.0	Initial release	2026-01-06	AL

Preface

Copyright

Disclaimer

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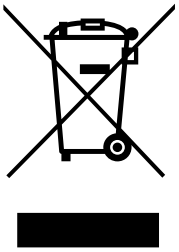
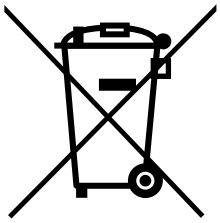
Environmental Responsibility

ADLINK is committed to fulfill its social responsibility to global environmental preservation through compliance with the European Union's Restriction of Hazardous Substances (RoHS) directive and Waste Electrical and Electronic Equipment (WEEE) directive. Environmental protection is a top priority for ADLINK. We have enforced measures to ensure that our products, manufacturing processes, components, and raw materials have as little impact on the environment as possible. When products are at their end of life, our customers are encouraged to dispose of them in accordance with the product disposal and/or recovery programs prescribed by their nation or company.



Battery Labels (for products with battery)



California Proposition 65 Warning

WARNING: This product can expose you to chemicals including acrylamide, arsenic, benzene, cadmium, Tris(1,3-dichloro-2-propyl)phosphate (TDCPP), 1,4-Dioxane, formaldehyde, lead, DEHP, styrene, DINP, BBP, PVC, and vinyl materials, which are known to the State of California to cause cancer, and acrylamide, benzene, cadmium, lead, mercury, phthalates, toluene, DEHP, DIDP, DnHP, DBP, BBP, PVC, and vinyl materials, which are known to the State of California to cause birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

Trademarks

Product names mentioned herein are used for identification purposes only and may be trademarks and/or registered trademarks of their respective companies.

Conventions

Take note of the following conventions used throughout this manual to make sure that users perform certain tasks and instructions properly.

NOTE:

Additional information, aids, and tips that help users perform tasks.

CAUTION:

Information to prevent ***minor*** physical injury, component damage, data loss, and/or program corruption when trying to complete a task.

WARNING:

Information to prevent ***serious*** physical injury, component damage, data loss, and/or program corruption when trying to complete a specific task.

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1 Introduction

1.1 Overview

The VPX3-MXM/A4500 is a 3U VPX general-purpose GPU (GPGPU) blade based on the NVIDIA A4500, supporting 16GB GDDR6 graphics memory with 4x DisplayPort or 4x HDMI output. The VPX3-MXM/A4500 brings a new level of performance to visual graphics and a wide range of computing applications, fully integrating hardware acceleration for both graphics and computing workloads.

The VPX3-MXM/A4500 features rugged, conduction-cooled construction with conformal-coating, making it ideal for mission-critical applications requiring artificial intelligence and machine learning (AI/ML) and parallel computing, as well as SWaP optimization, including radar processing, target tracking, software-defined radio (SDR), intelligence, surveillance and reconnaissance (ISR), degraded visual environments (DVE), digital signal Processing (DSP), electronic warfare (EW), and signals intelligence (SIGINT).

The VPX3-MXM/A4500 is also SOSA-aligned, with SOSA being one of several standards that fall broadly within the Modular Open Systems Approach (MOSA) initiative. SOSA centers on key interfaces and open standards, based on the VPX standard (VITA 46/48/65), and aims to develop a common, modular hardware architecture for next-generation, mission-critical applications.

1.2 Features

- NVIDIA® A4500 embedded graphics based on Ampere architecture
- 5888 CUDA cores, 17.66 TFLOPS peak FP32 performance
- 16GB GDDR6 memory, 256-bit, Bandwidth: 512 GB/s
- Four DisplayPort 1.4
- VITA 46/48/65 compliant for quick deployment
- SOSA-aligned

1.3 Package Contents

The VPX3-MXM/A4500 is packaged with the following components. If any items from the contents list are missing or damaged, retain the shipping carton and packing materials, and contact the dealer for inspection. Please obtain authorization before returning any product to ADLINK. The packing contents of the VPX3-MXM/A4500 are non-standard configurations and may vary depending on customer requests.

GPGU Blade

- VPX3-MXM/A4500
  - Thermal module is assembled on the board

Rear Transition Module (optional)

- VPX3-RMXM-DP


NOTE:

The contents of non-standard VPX3-MXM configurations may vary depending on the customer’s requirements.


CAUTION:

This product must be protected from static discharge and physical shock. Never remove any of the components except at a static-free workstation. Use the anti-static bag shipped with the product when putting the board on a surface. Wear an anti-static wrist strap properly grounded on one of the system's ESD ground jacks when installing or servicing system components.

2 Specifications

2.1 Product Specifications

VITA Standards	• VITA 46.0 VPX Base Standard • VITA 46.4 PCI Express on VPX Fabric Connector • VITA 48.0 Mechanical Specification for Microcomputers using REDI Conduction Cooling Applied to VITA 46 • VITA 65 OpenVPX Architecture Framework for VPX • SOSA aligned w/o PCIe interface from P2
MXM Module	• EGX-MXM-A4500 (TGP 115W, Standard MXM 3.1 Type B)
Power Entry	• 12V(VS1/VS2) and 3.3V_AUX only (SOSA-aligned)
Display	• 4x DisplayPort 1.4 4K@120Hz • Supports DP++ (CONFIG1 on P2)
Mechanical	• 3U VPX 0.85" with conduction cooling; secondary side retainer • Dimensions: 100mm x 160mm • Supports MXM 4.1 Type-B+ (110mm) • Conformal coating
Profiles	• Supports SOSA slot profile (PCIe x8) - SLT3-PAY-2F2U-14.2.3 Legacy Payload Slot Profile
PCIe Configuration	• PCIe interface over P1 • PCIe bifurcation 1 x16, 1 x8 (default), 1 x4, 2 x8, 2 x4, 1 x8 + 2 x4 • Support two ports NTB
Clock Configuration	PCIe Clock Mode selection by System Management request • Synchronize mode (default) • Unsynchronized mode
IPMC	• Smart fusion Intelligent A2F200M3F-CSG288 compliant with VITA 46.11
Reset Button	• Yes (front panel)
RTM Support	• 4x DP display ports from RTM
Environmental	• Operating Temp: -40°C to 85°C at wedge lock (VITA47.0, ECC4-CC4) • Storage Temp: -55°C to 105°C • Relative Humidity: 95% non-condensing • Shock: 40G, 11ms (VITA47.0, ECC4-OS2) • Vibration (Random): 12Grms, 5Hz to 2000Hz (VITA47.0, ECC4-V3) • Vibration (Sinusoidal): 5G, 20Hz to 2000Hz • Altitude: 60,000 feet, operating
EMI	• CE EN55032/55035 • FCC 47 CFR Part 15 Subpart B, Class A

2.2 GPGPU Specifications

GPU	NVIDIA RTX A4500 GA104-955 GPU
Module TGP	115W
Architecture	Ampere
Memory	16GB GDDR6 memory, 256-bit, Bandwidth: 512 GB/s
CUDA Cores	5888 CUDA cores
TFLOPs	17.66 TFLOPS peak FP32 performance
Tensor Cores	184 Tensor Cores
RT Cores	46 RT Cores
Compute API	CUDA Compute 8.0 and above, OpenCL™ 1.2
Graphic API	DirectX® 12, OpenGL 4.6

2.2.1 GDDR6 Memory

GDDR6 (Graphics Double Data Rate 6) synchronous graphics RAM (SGRAM) conforms to the standards set by the JEDEC GDDR6 specification. It is specifically designed for use in graphics devices that demand high memory bandwidth, such as 3D gaming systems and HD video editing platforms. This dedicated memory serves the Graphics Processing Unit (GPU), reducing the display and graphics load on the system's main memory and significantly improving GPU and overall display performance. As a result, it enables a much richer visual experience than would be possible with integrated graphics alone.

2.2.2 Display Interfaces

The VPX3-MXM/A4500 provides four digital output channels, all of which can be active simultaneously. The VPX3-MXM/A4500 utilizes the P2 rear I/O connector for DisplayPort outputs via the RTM.


NOTE:

Specifications are subject to change without prior notice.

2.3 Power Consumption

VPX3-MXM/A4500 + DP (SOSA)	
Windows Idle mode	
3.3V(A)	0
5V(A)	0
12V(A)	2
3.3 AUX(A)	2.31
Power consumption(W)	28.29
Windows Max mode	
3.3V(A)	0
5V(A)	0
12V(A)	11.62
3.3 AUX(A)	0.16
Power consumption(W)	140.02

3 Block Diagram

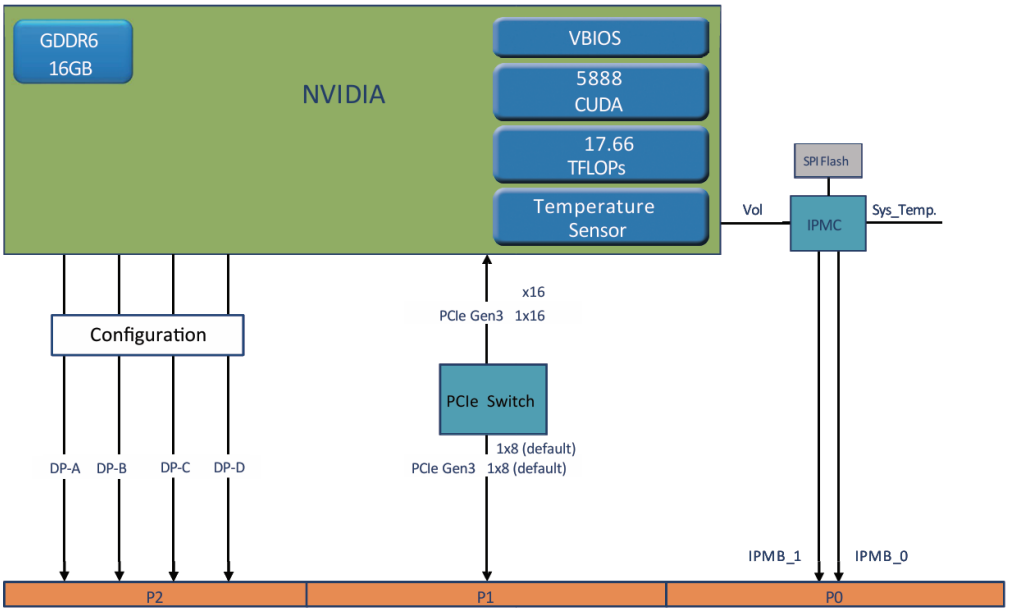

Figure 1: VPX3-MXM/A4500 functional block diagram

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4 Mechanical Layout

4.1 Mechanical Dimensions

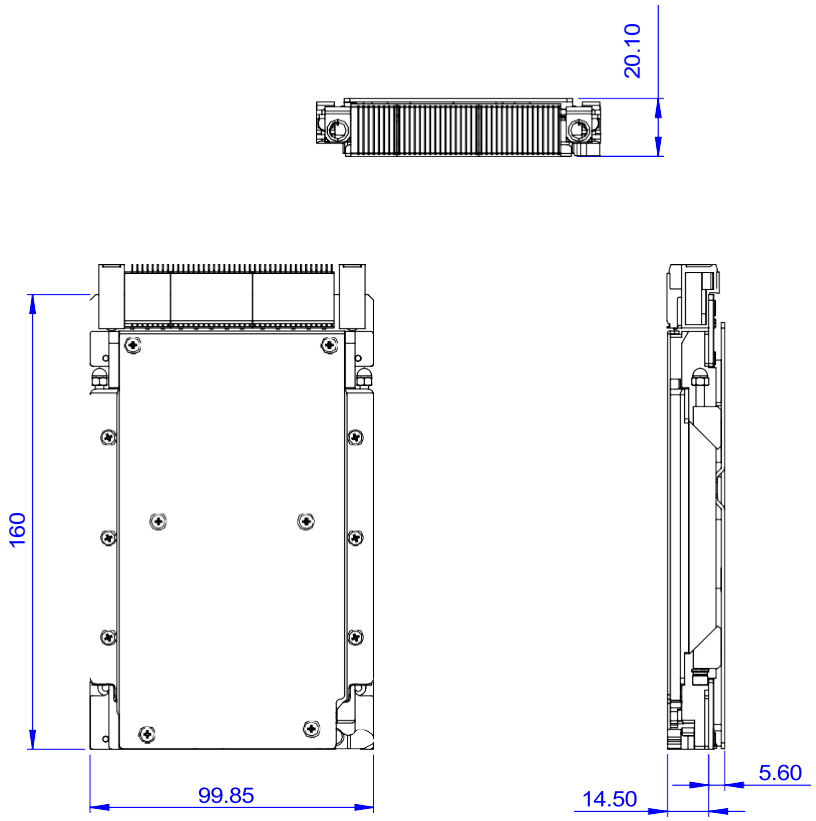

Figure 2: Mechanical dimensions

4.2 Connectors, Switch Locations, and LEDs

This chapter illustrates the board layouts, connector pin assignments, and jumper settings.

4.2.1 VPX3-MXM/A4500 Board Layout

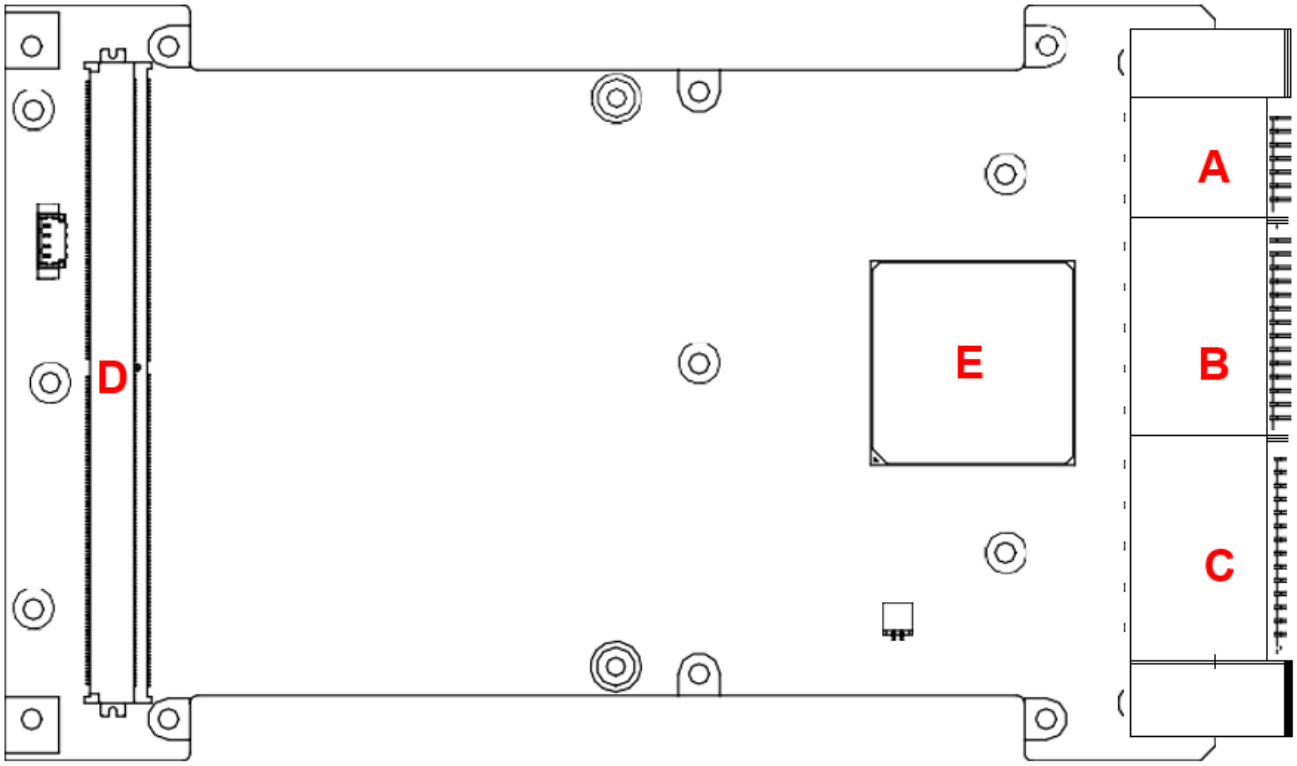

Figure 3: Board layout

Table 1: Board layout labels

A	VPX Connector_P0	**D**	MXM Connector
B	VPX_Connector_P1	**E**	PCIe Switch PEX8734
C	VPX Connector_P2		

4.2.2 System LEDs

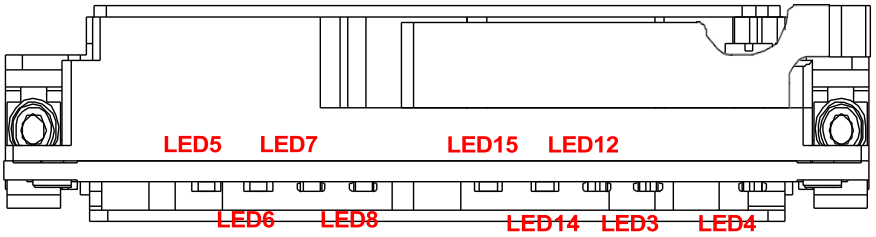

Figure 4: LED locations

Table 2: System LED status

LED	Function	Color	Description
LED3	GPU Active	Green	On: GPU ready Off: GPU not ready
LED4	All Power Good	Green	On: All power ready Off: All power not ready
LED5	MXM Critical Temperature	Red	On: Temperature too high Off: Temperature normal
LED6	Input Power Failure	Red	On: Input power fail Off: Input power pass
LED7	Ambient Temperature Alert	Yellow	On: temperature too high Off: temperature normal
LED8	MXM High Temperature alert	Yellow	On: temperature too high Off: temperature normal
LED12	IPMC Heartbeat	Green	Flashing: IPMC ready Off: IPMC not ready
LED14	IPMC WDT	Red	On: WDT start up Off: WDT not working
LED15	MTN_MODE SEL (RS232/UART)	Red	On: RS232 Off: UART Mode

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5 Driver Installation

The VPX3-MXM/A4500 drivers are available on the ADLINK website:

https://www.adlinktech.com/products/vpx/vpxgraphicscards_xmcmodules/vpx3-mxm_a4500?lang=n

ADLINK provides validated drivers for Windows & Linux. We recommend using these drivers to ensure compatibility.

Install the Windows operating system before installing any driver. Most standard I/O device drivers are installed during Windows installation.

1. Install the chipset driver by extracting the contents of **Nvidia-Win10_x64(551.61)** or **Nvidia-Linux-x86_64(550.120).run**, running the program **setup.exe**.
2. The driver package will auto-extract to the default location. Change the path if desired.
3. Continue the driver installation as instructed.

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6 Connector Pinouts and Jumper Settings

6.1 VPX Connectors

6.1.1 P0 Connector (SOSA SKU)

Pin	G	F	E	D	C	B	A
1	P12V	P12V	P12V	NC	NC	NC	NC
2	P12V	P12V	P12V	NC	NC	NC	NC
3	NC	NC	NC	NC	NC	NC	NC
4	IPMB_CLK	IPMB_DAT	GND	NC	GND	SYSTEM RESET	NVMRO
5	GAP	GA4	GND	P3V3_ AUX	GND	IPMA_ CLK	IPMA_ DAT
6	GA3	GA2	GND	NC	GND	GA1	GA0
7	JTAG_TCK	GND	JTAG_TDO	JTAG_TDI	GND	JTAG_ TMS	JTAG_ TRST
8	GND	REF_CLK-	REF_CLK+	GND	RES_BUS-	RES_ BUS+	GND

6.1.2 P1 Connector

Pin	G	F	E	D	C	B	A
1	GDiscrete1#	GND	EP00_T-	EP00_T+	GND	EP00_R-	EP00_R+
2	GND	EP01_T-	EP01_T+	GND	EP01_R-	EP01_R+	GND
3	P1_VBAT	GND	EP02_T-	EP02_T+	GND	EP02_R-	EP02_R+
4	GND	EP03_T-	EP03_T+	GND	EP03_R-	EP03_R+	GND
5	SYSCON#	GND	EP04_T-	EP04_T+	GND	EP04_R-	EP04_R+
6	GND	EP05_T-	EP05_T+	GND	EP05_R-	EP05_R+	GND
7	NC	GND	EP06_T-	EP06_T+	GND	EP06_R-	EP06_R+
8	GND	EP07_T-	EP07_T+	GND	EP07_R-	EP07_R+	GND
9	Maintenance Port TX	GND	EP08_T-	EP08_T+	GND	EP08_R-	EP08_R+
10	GND	EP09_T-	EP09_T+	GND	EP09_R-	EP09_R+	GND
11	Maintenance Port RX	GND	EP10_T-	EP10_T+	GND	EP10_R-	EP10_R+
12	GND	EP11_T-	EP11_T+	GND	EP11_R-	EP11_R+	GND
13	NC	GND	EP12_T-	EP12_T+	GND	EP12_R-	EP12_R+
14	GND	EP13_T-	EP13_T+	GND	EP13_R-	EP13_R+	GND
15	MASKABLE RESET#	GND	EP14_T-	EP14_T+	GND	EP14_R-	EP14_R+
16	GND	EP15_T-	EP15_T+	GND	EP15_R-	EP15_R+	GND

6.1.3 P2 Connector (DP SKU)

Pin	G	F	E	D	C	B	A
1	P3V3_DPA	GND	DPA_L1-	DPA_L1+	GND	DPA_L0-	DPA_L0+
2	GND	DPA_L3-	DPA_L3+	GND	DPA_L2-	DPA_L2+	GND
3	P3V3_DPB	GND	DPA_CFG1	HOTPLUGA	GND	DPA_AUX-	DPA_AUX+
4	GND	DPB_L1-	DPB_L1+	GND	DPB_L0-	DPB_L0+	GND
5	P3V3_DPC	GND	DPB_L3-	DPB_L3+	GND	DPB_L2-	DPB_L2+
6	GND	DPB_CF G1	HOTPLUG B	GND	DPB_AUX-	DPB_AUX+	GND
7	P3V3_DPD	GND	DPC_L1-	DPC_L1+	GND	DPC_L0-	DPC_L0+
8	GND	DPC_L3-	DPC_L3+	GND	DPC_L2-	DPC_L2+	GND
9	P3V3_DPE	GND	DPC_CFG1	HOTPLUGC	GND	DPC_AUX-	DPC_AUX+
10	GND	DPD_L1-	DPD_L1+	GND	DPD_L0-	DPD_L0+	GND
11	NC	GND	DPD_L3-	DPD_L3+	GND	DPD_L2-	DPD_L2+
12	GND	DPD_CF G1	HOTPLUG D	GND	DPD_AUX-	DPD_AUX+	GND
13	NC	GND	DPE_L1-	DPE_L1+	GND	DPE_L0-	DPE_L0+
14	GND	DPE_L3-	DPE_L3+	GND	DPE_L2-	DPE_L2+	GND
15	NC	GND	DPE_CFG1	HOTPLUGE	GND	DPE_AUX-	DPE_AUX+
16	GND	NC	NC	GND	NC	NC	GND

- DDI Port A: DPA_xx
- DDI Port B: DPB_xx
- DDI Port C: DPC_xx
- DDI Port D: DPD:xx
- DDI Port E: No Function

NOTE:

- VPX-MXM/A4500 supports up to 4x DisplayPort.
- DP[A:D]_CFG1 for DP++ of CONFIG1 pin definition in DP connector.
- HOTPLUG[A:D] for DP port hot-plug detection.
- 3.3V for DP.

7 RTM Board Interfaces

This chapter illustrates the board layout, connector pin assignments, and jumper settings to familiarize users with the VPX3-RMXM-DP RTM.

7.1 VPX-RMXM-DP Block Diagram

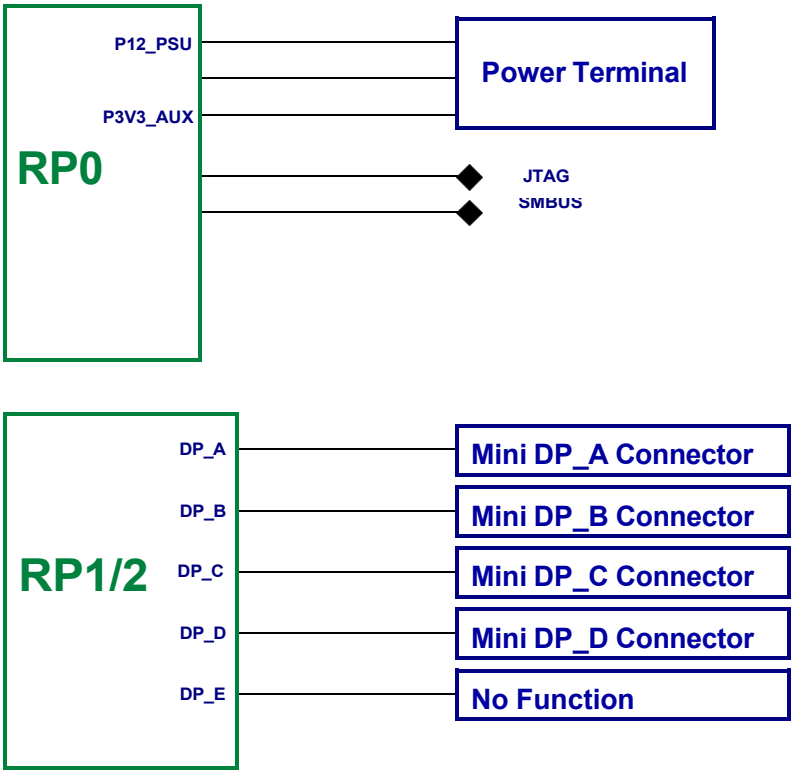


Figure 5: VPX3-RMXM-DP functional block diagram

NOTE:

The VPX3-MXM/A4500 supports 4x DP outputs. Ports A, B, C, D are active on the RTM.

7.2 RTM Board Layout

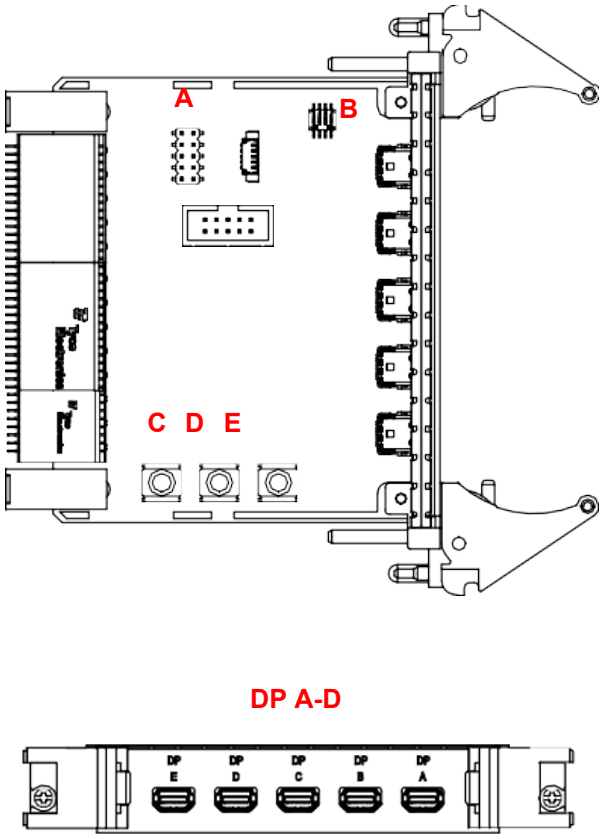


Figure 6: RTM board layout

Table 3: RTM board labels

A	JTAG Header	**D**	3.3V Power Terminal (No Function)
B	IPM1/IPM2 Selection Switch	**E**	Ground Terminal
C	5V Power Terminal (No Function)		

NOTE:

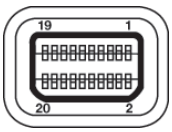
The VPX3-MXM/A4500 supports 4x DP outputs. Ports A, B, C, D are active on the VPX3-RMXM-DP.

7.3 RTM Connector Pin Assignments

7.3.1 VPX3-RMXM-DP Rear I/O Connectors

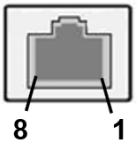
Mini DisplayPort Connector

Pin	Signal	Pin	Signal
1	GND	11	DP1_TXN1_CN
2	DP_CN_HPD	12	DP1_TXN3_CN
3	DP1_TXP0_CN	13	GND
4	DP1_CFG1_CN	14	GND
5	DP1_TXN0_CN	15	DP1_TXP2_CN
6	DP1_CFG2_CN	16	DP_AUX_C_P
7	GND	17	DP1_TXN2_CN
8	GND	18	DP_AUX_C_N
9	DP1_TXP1_CN	19	GND
10	DP1_TXP3_CN	20	P_+3V3_DP1_CN



IPMC Debug Port (RJ-45)

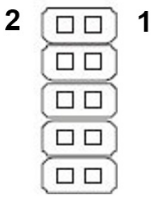
Pin	Signal
1	NC
2	NC
3	MTN_TXD
4	GND
5	GND
6	MTN_RXD
7	NC
8	NC



7.3.2 RTM Onboard Connectors and Switches

JTAG Header

Pin #	Signal
1	GND
2	TCK
3	NC
4	TDO
5	+3.3V
6	TMS
7	TRST
8	+3.3V
9	GND
10	TDI



IPM1/IPM2 Selection Switch

Function	Pin Settings
IPM1	1,2 OFF 3,4 ON
IPM2	1,2 ON 3,4 OFF

Safety Instructions

Read and follow all instructions marked on the product and in the documentation before you operate your system. Retain all safety and operating instructions for future use.

- Please read these safety instructions carefully.
- Please keep this User‘s Manual for later reference.
- Read the specifications section of this manual for detailed information on the operating environment of this equipment.
- When installing/mounting or uninstalling/removing equipment, turn off the power and unplug any power cords/cables.
- To avoid electrical shock and/or damage to equipment:
  - Keep equipment away from water or liquid sources.
  - Keep equipment away from high heat or high humidity.
  - Keep equipment properly ventilated (do not block or cover ventilation openings).
  - Make sure to use recommended voltage and power source settings.
  - Always install and operate equipment near an easily accessible electrical socket-outlet.
  - Secure the power cord (do not place any object on/over the power cord).
  - Only install/attach and operate equipment on stable surfaces and/or recommended mountings.
  - If the equipment will not be used for long periods of time, turn off and unplug the equipment from its power source.
- Never attempt to fix the equipment. Equipment should only be serviced by qualified personnel.

Getting Services

Ask an Expert: https://www.adlinktech.com/en/Askanexpert

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