

## 1.Specifications:

<b>Model</b>	MD730A3-2G
<b>GPU Architecture</b>	NVIDIA Kepler
<b>Graphics Processing Unit</b>	NVIDIA GeForce GT730
<b>NVIDIA CUDA Core</b>	192SP
<b>Bus Type</b>	MXM3 .1 / up to PCI Express 3.0
<b>Graphics Clock</b>	902MHz
<b>Single Precision FLOPS</b>	298.7GFLOPS
<b>Double Precision FLOPS</b>	14.42GFLOPS
<b>Memory Size</b>	2GB 64bit DDR3
<b>Memory Clock</b>	800MHz
<b>Display Features</b>	DP A: HDMI1.4 DP B: HDMI1.4 DP C: HDMI1.4 DP D: HDMI1.4
<b>Max Resolution</b>	3840x2160@60Hz
<b>Board Power</b>	25.87W
<b>Board Dimensions</b>	MXM Graphics Module Version 3.1 Type A (70x82mm)
<b>Number of output Channel</b>	4
<b>Operation System</b>	Windows XP7/8/8.1/10 32/64bit 、 Linux 32/64bit
<b>VIN Range</b>	DC 12~19V, 3.3V & 5V; +/-5%

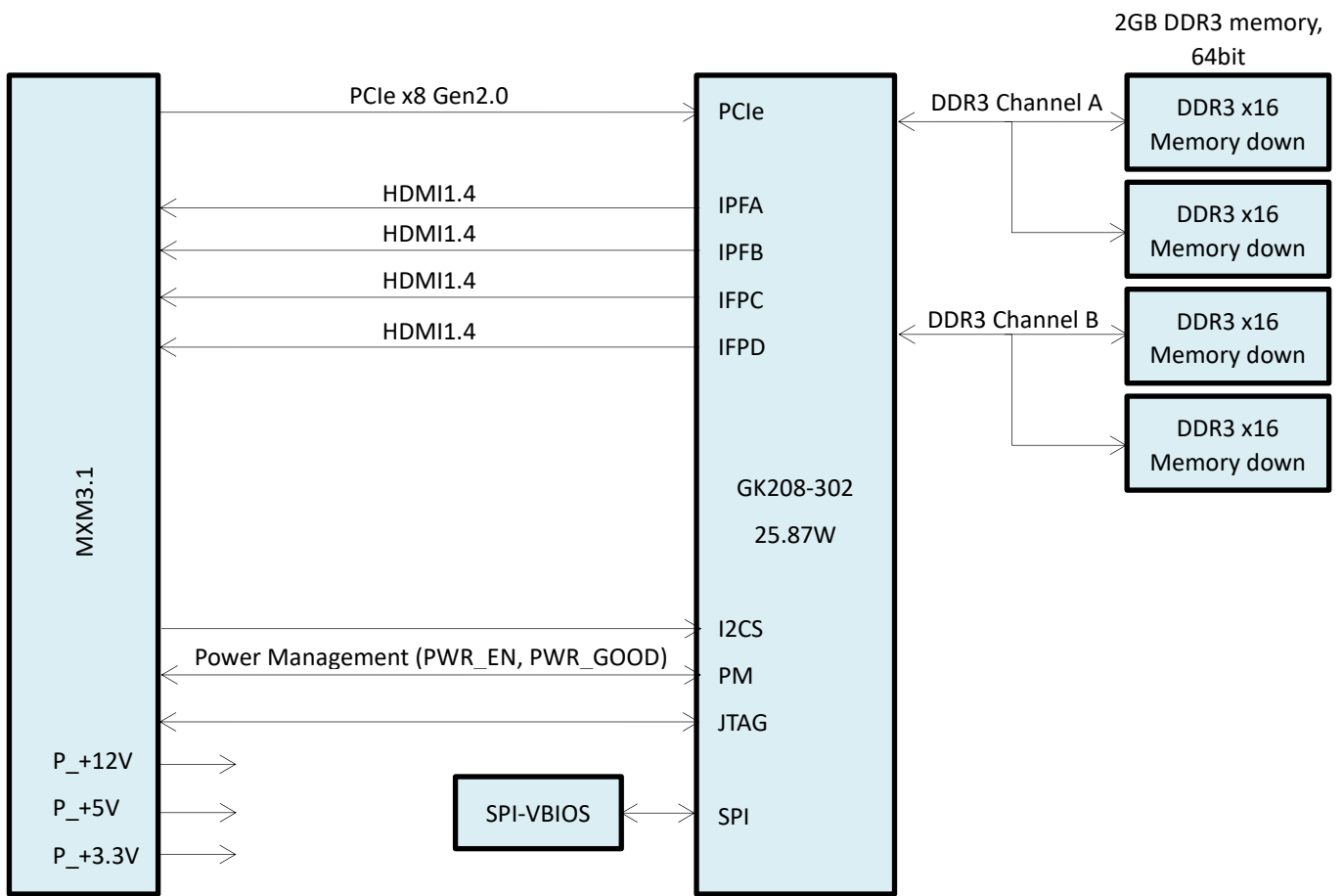
<b>OpenGL</b>	4.4
<b>OpenCL</b>	1.2
<b>DirectX</b>	11
<b>Video Playback</b>	H.264, VC1, MPEG2 1080P

<b>Operating Temperature</b>	0~45°C
<b>Storage Temperature</b>	-20~75°C
<b>Operating Humidity</b>	0~95% (non-condensing)
<b>Storage Humidity</b>	10~90%

<b>Surround (Landscape)</b>	<b>Surround (Portrait)</b>
2x1(3840x1080@60Hz)	2x1(2160x1920@60Hz)
1x2(1920x2160@60Hz)	1x2(1080x3840@60Hz)
3x1(5760x1080@60Hz)	3x1(3240x1920@60Hz)
1x3(1920x3240@60Hz)	1x3(1080x5760@60Hz)
4x1(7680x1080@60Hz)	4x1(1080x7680@60Hz)
1x4(7680x1080@60Hz)	1x4(1080x7680@60Hz)
2x2(3840x2160@60Hz)	2x2(2160x3840@60Hz)

*\*Total resolution based on every display resolution is 1920\*1080@60Hz.*

### 3. Block Diagram:



### 3.MXM Board Outlines:

Figure 3.1 shows the board outlines (top side view) for Type A MXM modules. An additional system keep-out of 0.5mm [0.020] per side is allowed on the PCB to accommodate whatever means of production panelization is required. This additional clearance is above and beyond the dimensional limits presented here. The location of these features is not specified or controlled.

Figure 3.1: Board Outlines

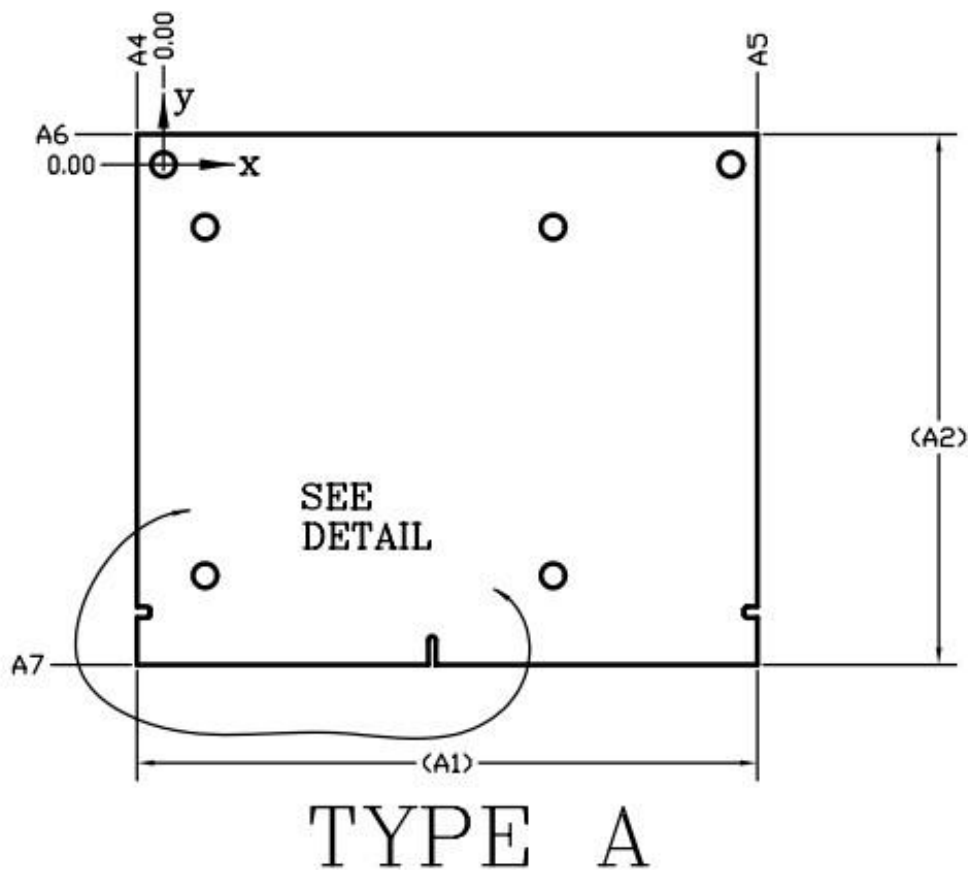


Table 3.1: Board Outline Dimensions

Symbol	[mm]			[in]		
	min	nom	max	min	nom	max
A1		82.00			3.228	
A3		105.00			4.134	
A4	3.37	3.50	3.63	0.133	0.138	0.143
A5	78.37	78.50	78.63	3.085	3.091	3.096
A7	65.87	66.00	66.13	2.593	2.598	2.604
A8	38.87	39.00	39.13	1.530	1.535	1.541

Figure 3.2: Board Slots Detail

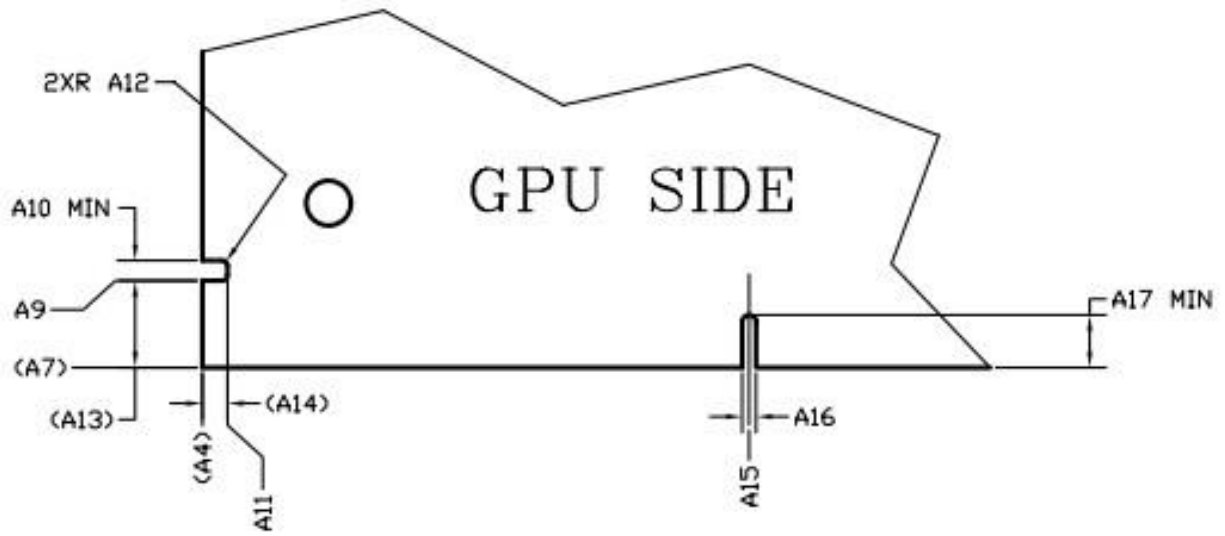


Table 3.2: Board Slots Dimensions

Symbol	[mm]			[in]		
	min	nom	max	min	nom	max
A4		3.50			0.138	
A7		66.00			2.598	
A9	59.67	59.80	59.93	2.349	2.354	2.359
A10	1.45			0.057		
A11	1.57	1.70	1.83	0.062	0.067	0.072
A12	0.32	0.50	0.58	0.013	0.020	0.023
A13		6.20			0.244	
A14		1.80			0.071	
A15	35.37	35.50	35.63	1.393	1.398	1.403
A16	0.95	1.00	1.05	0.037	0.039	0.041
A17	3.75			0.148		

#### 4.MXM PCB Mounting Holes:

All MXM version 3.1 modules have 6 holes. Two are used to secure the board to the system and the other four to fasten the thermal solution to the module.

Figure 4.1: Mounting Holes

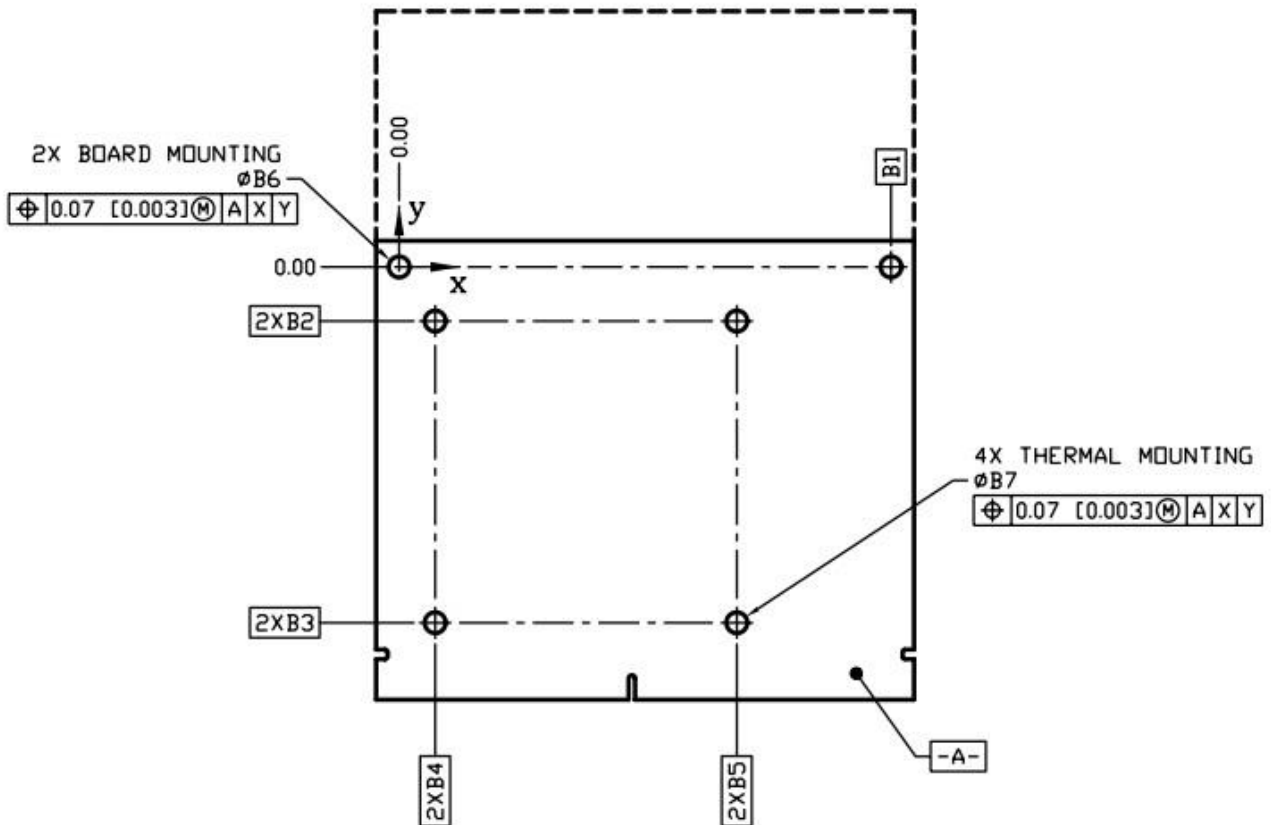


Table 4.1: Mounting Holes Dimensions

Symbol	[mm]			[in]		
	min	nom	max	min	nom	max
B1		75.00			2.953	
B2		8.25			0.325	
B3		54.25			2.136	
B4		5.50			0.217	
B5		51.50			2.028	
B6	3.07	3.20	3.33	0.121	0.126	0.131
B7	3.07	3.20	3.33	0.121	0.126	0.131

## 5.Connector Pinout:

Table 5.1, Table 5.2 and Table 5.3 list the connector pinout.

Table 5.1: Connector Pinout

Pin	Signal Name	Pin	Signal Name	Pin	Signal Name	Pin	Signal Name
E1	PWR_SRC	E2	PWR_SRC	59	GND	60	N/A
E3	GND	E4	GND	61	N/A	62	N/A
1	5V	2	PRSNT_R	63	N/A	64	GND
3	5V	4	WAKE	65	GND	66	N/A
5	5V	6	PWR_GOOD	67	N/A	68	N/A
7	5V	8	PWR_EN	69	N/A	70	GND
9	5V	10	27MHZ_REF	71	GND	72	N/A
11	GND	12	GND	73	N/A	74	N/A
13	GND	14		75	N/A	76	GND
15	GND	16	RSVD	77	GND	78	N/A
17	GND	18	PWR_LEVEL	79	N/A	80	N/A
19	PEX_STD_SW#	20	TH_OVERT#	81	N/A	82	GND
21	VGA_DISABLE#	22	TH_ALERT#	83	GND	84	N/A
23	N/A	24	TH_PWM	85	N/A	86	N/A
25	N/A	26	GPIO0	87	N/A	88	GND
27	N/A	28	GPIO1	89	GND	90	N/A
29	HDMI_CEC	30	GPIO2	91	N/A	92	N/A
31	N/A	32	N/A	93	N/A	94	GND
33	N/A	34	N/A	95	GND	96	PEX_TX7#
35	N/A	36	GND	97	PEX_RX7#	98	PEX_TX7
37	GND	38	OEM0	99	PEX_RX7	100	GND
39	OEM1	40	OEM2	101	GND	102	PEX_TX6#
41	OEM3	42	OEM4	103	PEX_RX6#	104	PEX_TX6
43	OEM5	44	OEM6	105	PEX_RX6	106	GND
45	OEM7	46	GND	107	GND	108	PEX_TX5#
47	GND	48	N/A	109	PEX_RX5#	110	PEX_TX5
49	N/A	50	N/A	111	PEX_RX5	112	GND
51	N/A	52	GND	113	GND	114	PEX_TX4#
53	GND	54	N/A	115	PEX_RX4#	116	PEX_TX4
55	N/A	56	N/A	117	PEX_RX4	118	GND
57	N/A	58	GND	119	GND	120	PEX_TX3#

Table 5.2: Connector Pinout(continued)

Pin	Signal Name	Pin	Signal Name	Pin	Signal Name	Pin	Signal Name
121	PEX_RX3#	122	PEX_TX3	191	N/A	192	N/A
123	PEX_RX3	124	GND	193	N/A	194	N/A
125	GND	126	KEY	195	N/A	196	N/A
127	KEY	128	KEY	197	GND	198	GND
129	KEY	130	KEY	199	DP_C_L0#	200	N/A
131	KEY	132	KEY	201	DP_C_L0	202	N/A
133	GND	134	GND	203	GND	204	GND
135	PEX_RX2#	136	PEX_TX2#	205	DP_C_L1#	206	DP_D_L0#
137	PEX_RX2	138	PEX_TX2	207	DP_C_L1	208	DP_D_L0
139	GND	140	GND	209	GND	210	GND
141	PEX_RX1#	142	PEX_TX1#	211	DP_C_L2#	212	DP_D_L1#
143	PEX_RX1	144	PEX_TX1	213	DP_C_L2	214	DP_D_L1
145	GND	146	GND	215	GND	216	GND
147	PEX_RX0#	148	PEX_TX0#	217	DP_C_L3#	218	DP_D_L2#
149	REX_RX0	150	PEX_TX0	219	DP_C_L3	220	DP_D_L2
151	GND	152	GND	221	GND	222	GND
153	PEX_REFCLK#	154	PEX_CLK_REQ	223	DP_C_AUX#	224	DP_D_L3#
155	PEX_REFCLK	156	PEX_RST#	225	DP_C_AUX	226	DP_D_L3
157	GND	158	N/A	227	RSVD	228	GND
159	JTAG_TDO	160	N/A	229	RSVD	230	DP_D_AUX#
161	JTAG_TDI	162	N/A	231	RSVD	232	DP_D_AUX
163	JTAG_TCLK	164	N/A	233	RSVD	234	DP_C_HPD
165	JTAG_TMS	166	GND	235	RSVD	236	DP_D_HPD
167	JTAG_TRST	168	N/A	237	RSVD	238	RSVD
169	N/A	170	N/A	239	RSVD	240	3V3
171	N/A	172	N/A	241	RSVD	242	3V3
173	GND	174	GND	243	RSVD	244	GND
175	N/A	176	N/A	245	RSVD	246	DP_B_L0#
177	N/A	178	N/A	247	RSVD	248	DP_B_L0
179	GND	180	GND	249	RSVD	250	GND
181	N/A	182	N/A	251	GND	252	DP_B_L1#
183	N/A	184	N/A	253	DP_A_L0#	254	DP_B_L1
185	GND	186	GND	255	DP_A_L0	256	GND
187	N/A	188	N/A	257	GND	258	DP_B_L2#
189	N/A	190	N/A	259	DP_A_L1#	260	DP_B_L2



Table 5.3: Connector Pinout(continued)

Pin	Signal Name	Pin	Signal Name	Pin	Signal Name	Pin	Signal Name
261	DP_A_L1	262	GND	273	DP_A_L3	274	DP_B_HPD
263	GND	264	DP_B_L3#	275	GND	276	DP_A_HPD
265	DP_A_L2#	266	DP_B_L3	277	DP_A_AUX#	278	3V3
267	DP_A_L2	268	GND	279	DP_A_AUX	280	3V3
269	GND	270	DP_B_AUX#	281	PRSNT_L	-	
271	DP_A_L3#	272	DP_B_AUX				

**6.MXM Connector:**

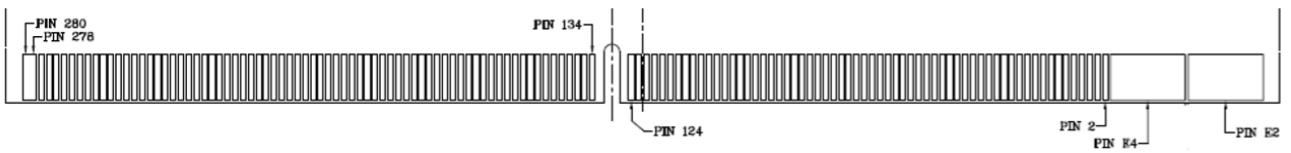


Figure 6.1 MXM Connector (Card Top)

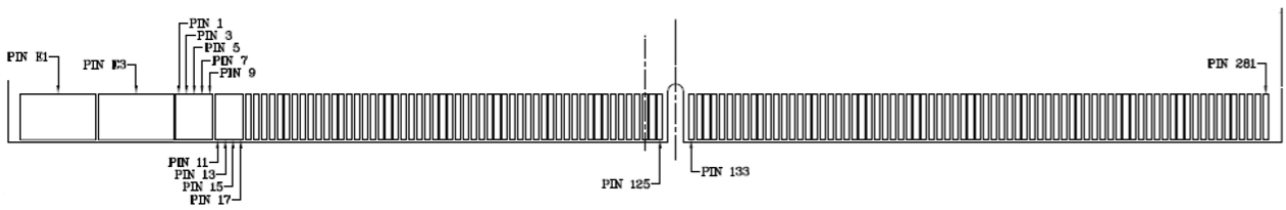


Figure 6.2 MXM Connector (Card Bottom)

## 7.DisplayPort Interface:

DC blocking capacitors of DisplayPort must be placed on the system board. In addition to the MXM implementation of Dual-mode DisplayPort requires the circuit in Figure 7.1 on the AUX lines for proper dongle detection. The HPD signal conditioning must also be placed on the system board.

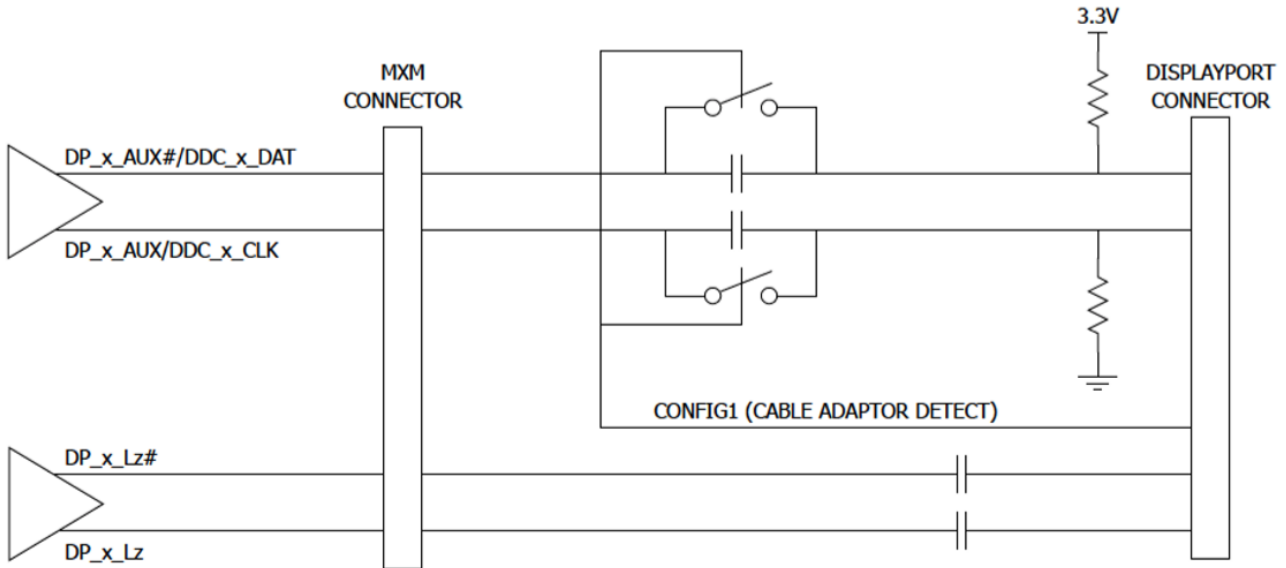


Figure 7.1 Dual-mode DisplayPort Implementation

## 8.Power Group:

Table 8.1 shows the MXM module power requirements. The voltage tolerances in the table are specified as measured on module edge finger. The system must be able to supply the full specified current on rails (except PWR\_SRC) at all times. The current capability of the PWR\_SRC rail must be defined by the system in the MXM system information structure.

Table 8.1: MXM Power Rails

Signal Name	I/O	Type	Impedance	Voltage	Current
PWR_SRC	I	Power	N/A	7-20V	up to 10A
5V	I	Power	N/A	5.0V $\pm$ 6%	2.5A
3.3V	I	Power	N/A	3.3V $\pm$ 6%	2.0A

**Note:** PWR\_SRC voltage range is assumed to be DC or RMS. However under any circumstances the maximum peak voltage shall not exceed 22V and minimum voltage shall not fall below 6.5V.

## 9.DVI/HDMI on DP Interface:

Native DVI or HDMI connector support can be implemented using a DisplayPort interface.

Additional circuitry is required on the system and the proper signal mapping must be observed. As Figure 9.1 shows,  $499\ \Omega$  1% pull-down resistors to ground on the DP lane signals must be placed on the connector side of AC coupling capacitors gated by a FET to limit the leakage. Additionally level shifting circuits must also be implemented on DDC Data and Clock.

Table 9.1 shows the mapping to connect the signals from the MXM connector to the HDMI/DVI connector.

Table 9.1: DisplayPort Multiplexed Signal Definition

Pin Name	DVI/HDMI
DP_xL0	TX_x_D2
DP_xL0#	TX_x_D2#
DP_x_L1	TX_x_D1
DP_x_L1#	TX_x_D1#
DP_x_L2	TX_x_D0
DP_x_L2#	TX_x_D0#
DP_x_L3	TX_x_CLK
DP_x_L3#	TX_x_CLK#
DP_x_AUX	DDC_x_CLK
DP_x_AUX#	DDC_x_DAT

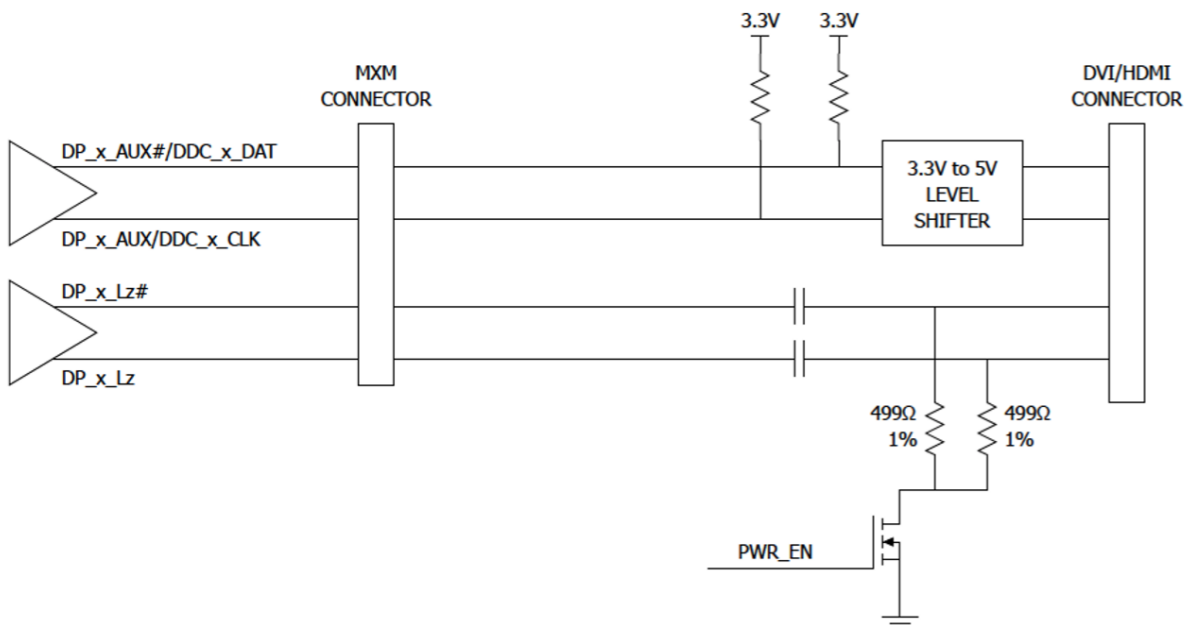
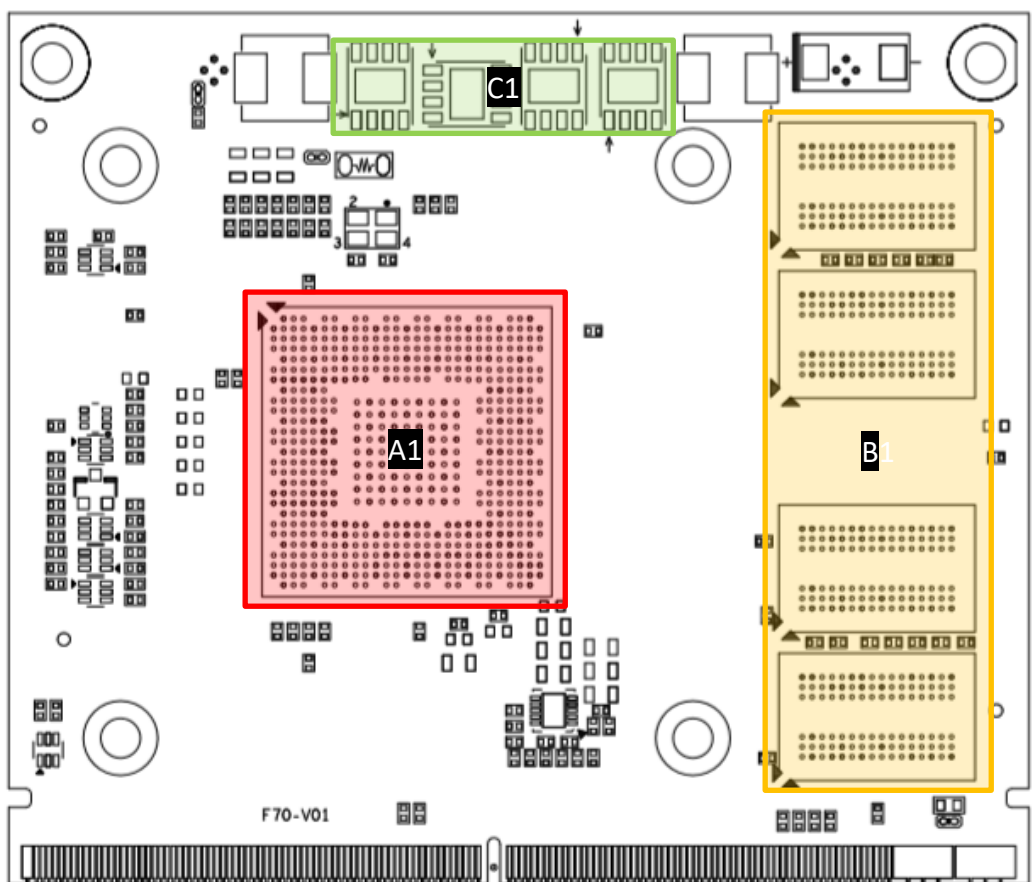


Figure 9.1 DVI/HDMI Implementation Using DP Interface

## 10.Thermal:



Components	Area	TDP	Height
GPU	A1	19W	1.7mm
Memory	B1	0.75W*4	0.9mm
Mosfet	C1	2W*4	0.75mm

### Cooling Suggestion:

- 1、显卡建议先固定在散热器上，散热器外径为 4mm，M2 的螺柱。
- 2、散热器的重量要用箱体来支撑固定。
- 3、显存和 MOS 要加导热垫。

Components	满载限温（环温 45℃）
GPU	95℃
Memory	85℃
Mosfet	105℃

\*显存和 MOS 由“探针”监测；GPU 由“Furmark（1920\*1080）”监测。

## 11.Performance:

<b>3Dmark11</b>	E2061 P1186 X327	<b>Cuda</b>	
<b>3Dmark Vantage</b>	3114	<b>single kernels</b>	127.561 / 13.8414
<b>Heaven</b>	80	<b>N=10 w/o streams</b>	155.937 / 14.0317
<b>鲁大师</b>	8302	<b>N=10 with streams</b>	150.425 / 14.0295
<b>glmark2</b>	1281	<b>N=10 batched</b>	77.3347 / 12.8993

	GPU	x64 CPU
Memory Read	3170 MB/s	19029 MB/s
Memory Write	3141 MB/s	18244 MB/s
Memory Copy	10377 MB/s	18146 MB/s
Single-Precision FLOPS	298.7 GFLOPS	745.6 GFLOPS
Double-Precision FLOPS	14.42 GFLOPS	373.1 GFLOPS
24-bit Integer IOPS	57.67 GIOPS	330.8 GIOPS
32-bit Integer IOPS	57.67 GIOPS	330.6 GIOPS
64-bit Integer IOPS	14.27 GIOPS	46.54 GIOPS
AES-256	574.9 MB/s	25799 MB/s
SHA-1 Hash	1280 MB/s	6398 MB/s
Single-Precision Julia	54.33 FPS	223.4 FPS
Double-Precision Mandel	3.71 FPS	116.0 FPS

AIDA64 v5.90.4200 (c) 1995-2017 FinalWire Ltd.

## 12.Driver:

Windows 10 64bit: <https://us.download.nvidia.com/Windows/456.71/456.71-desktop-win10-64bit-international-dch-whql.exe>

Windows 10 32bit: <http://us.download.nvidia.com/Windows/391.35/391.35-desktop-win10-32bit-international-whql.exe>

Windows 8.1 64bit: <https://us.download.nvidia.com/Windows/456.71/456.71-desktop-win8-win7-64bit-international-whql.exe>

Windows 8.1 32bit: <http://us.download.nvidia.com/Windows/391.35/391.35-desktop-win8-win7-32bit-international-whql.exe>

Windows 8 64bit: <https://us.download.nvidia.com/Windows/456.71/456.71-desktop-win8-win7-64bit-international-whql.exe>

Windows 8 32bit: <http://us.download.nvidia.com/Windows/391.35/391.35-desktop-win8-win7-32bit-international-whql.exe>

Windows 7 64bit: <https://us.download.nvidia.com/Windows/456.71/456.71-desktop-win8-win7-64bit-international-whql.exe>

Windows 7 32bit: <http://us.download.nvidia.com/Windows/391.35/391.35-desktop-win8-win7-32bit-international-whql.exe>

Windows Vista 64bit: <http://cn.download.nvidia.com/Windows/365.19/365.19-desktop-win8-win7-winvista-64bit-international-whql.exe>

Windows Vista 32bit: <http://cn.download.nvidia.com/Windows/365.19/365.19-desktop-win8-win7-winvista-32bit-international-whql.exe>

Windows XP 64bit: <http://cn.download.nvidia.com/Windows/368.81/368.81-desktop-winxp-64bit-international.exe>

Windows XP 32bit: <https://cn.download.nvidia.com/Windows/368.81/368.81-desktop-winxp-32bit-international.exe>

Linux 32bit: <https://us.download.nvidia.com/XFree86/Linux-x86/390.138/NVIDIA-Linux-x86-390.138.run>

Linux 32bit ARM: <https://us.download.nvidia.com/XFree86/Linux-x86-ARM/390.138/NVIDIA-Linux-armv7l-gnueabi-390.138.run>

Linux Aarch64: <https://us.download.nvidia.com/XFree86/aarch64/455.28/NVIDIA-Linux-aarch64-455.28.run>

Linux 64bit: [https://us.download.nvidia.com/XFree86/Linux-x86\\_64/455.28/NVIDIA-Linux-x86\\_64-455.28.run](https://us.download.nvidia.com/XFree86/Linux-x86_64/455.28/NVIDIA-Linux-x86_64-455.28.run)

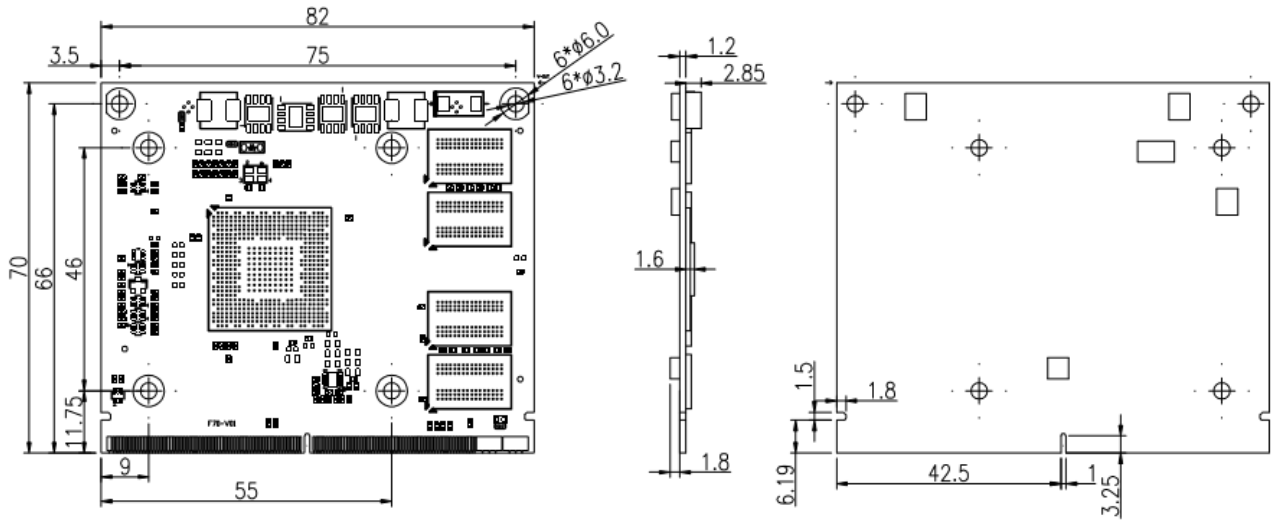
Solaris x86/x64: <http://us.download.nvidia.com/solaris/375.82/NVIDIA-Solaris-x86-375.82.run/>

FreeBSD x86: <https://us.download.nvidia.com/XFree86/FreeBSD-x86/390.138/NVIDIA-FreeBSD-x86-390.138.tar.gz>

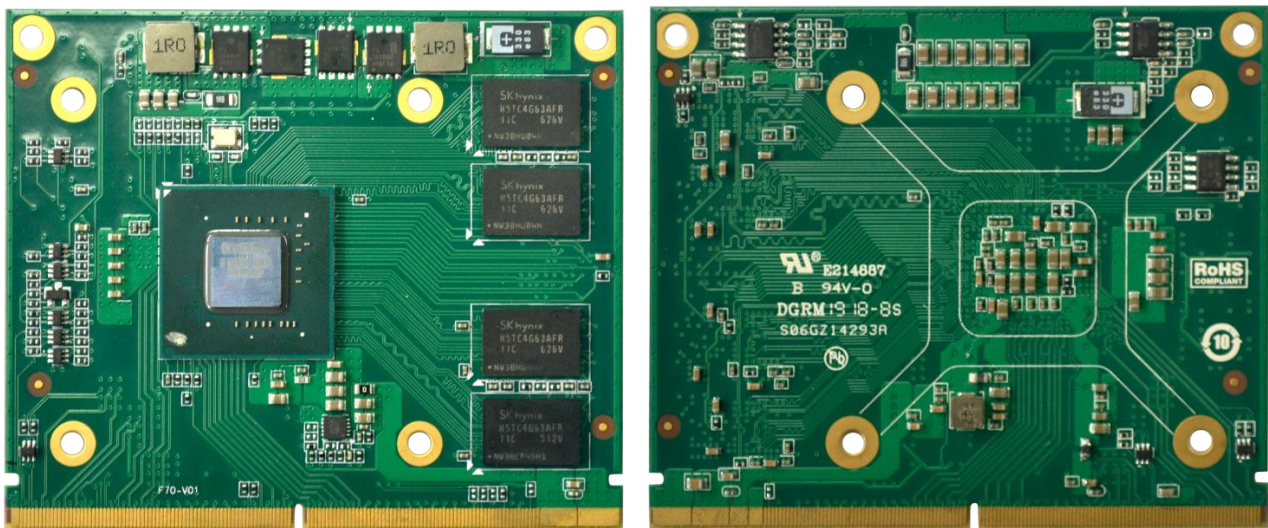
FreeBSD x64: [https://us.download.nvidia.com/XFree86/FreeBSD-x86\\_64/455.28/NVIDIA-FreeBSD-x86\\_64-455.28.tar.gz](https://us.download.nvidia.com/XFree86/FreeBSD-x86_64/455.28/NVIDIA-FreeBSD-x86_64-455.28.tar.gz)

The latest drive or the drive cannot be downloaded here, please log on the official website to download: <https://www.nvidia.cn/geforce/drivers/>

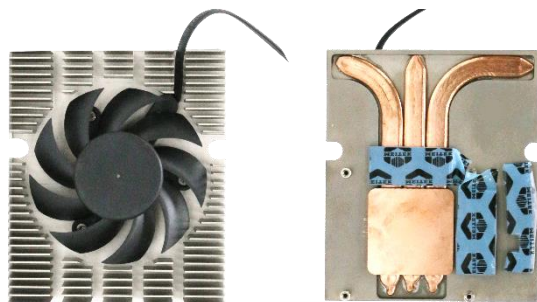
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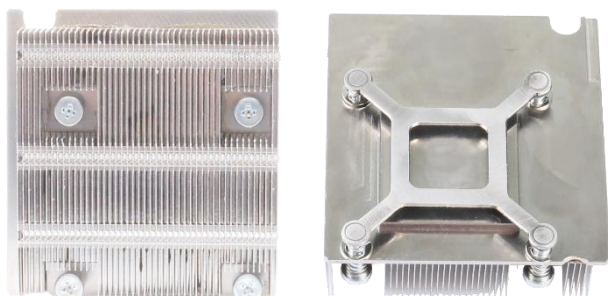
### 14.Photo:



## 15.Cooling Option:

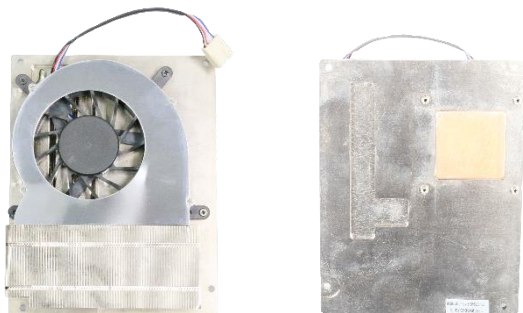


<b>1.ZRT.48-6209-00-A00</b>	
Dimension	96*80.2*25mm
Rated Speed	4500
Out of Frame Lead Wires	150mm
Connector	4Pin 2.54



<b>1.ZRT.48-6197-00-A00</b>	
Dimension	75.5*71*22.5mm
Rated Speed	N/A
Out of Frame Lead Wires	N/A
Connector	N/A

\*需搭配风扇辅助散热。



<b>1.ZRT.48-6140-00-A00</b>	
Dimension	133*103*26.5mm
Rated Speed	3800
Out of Frame Lead Wires	100mm
Connector	4Pin 2.54



### 15.Question:

故障	排除
不显示 (HDMI 输出)	1、4K 60Hz 显示屏，确认 HDMI 线材是否为 HDMI2.0。 2、将显示器分辨率降为 2K 60Hz。
设备管理员出现惊叹号	1、原系统显卡驱动删除干净。(请使用 Display Driver Uninstaller 删除， <a href="https://www.wagnardsoft.com/">https://www.wagnardsoft.com/</a> ) 2、Windows 10 版本 16299 不支持，需更新至最新版 (17763、17134 均可)。 3、Windows 7 打补丁 KB2685811。 4、确认核显驱动是否已安装。(不需独立显卡显示) 5、安装在移动平台上，主板 BIOS 需关闭电池管理。
显卡不工作	量下 3V3/5V/2V/Reset 信号是否有电/短路？若有电，显卡就会工作。
显卡无法辨视	检查 PCIE LANE Numbering Reversal 设置。
安装 Linux 系统，图形界面异常/无限循环登陆界面，无法登录系统	装驱动的时，加上--no-opengl-files。 (禁用 opengl，若系统上有用到这套组件，将无法使用)
控制面板无法正常开启	仅可在独显显示时，才能正常开启；若使用集显显示，将无法正常开启。
集显及独显在 Win7 下，无法同时开启 3D 启动	打系统补丁 (KB2685811)，解压后，把所有文件 COPY 到 C 盘 根目录下运行 BAT 文件。
X86 在中标麒麟系统下，显卡驱动后集显输出不能进系统	将 xorg.conf 文件内容清空。

### 16.Part Number:

Model	Part Number	Specification
MD730A3-2G	8.ZRT.80-6314-00-LFF	F70 GT730 2G 64bit DDR3 256*16 4HDMI MXM Type A 6L-工包六十人
	8.ZRT.80-6314-01-LFF	F70 GT730 2G 64bit DDR3 256*16 4HDMI MXM Type A 6L-ZRT 彩包二十人