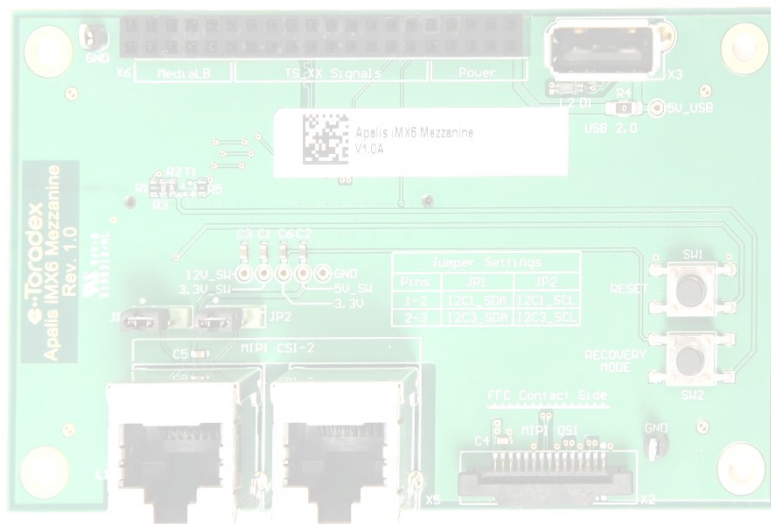


# Apalis iMX6 Mezzanine

## Datasheet



## Revision History

Date	Doc. Rev.	Board Version	Changes
15-Jan-18	Rev. 1.0	V2.0	- Initial revision

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## 1. Introduction

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Apalis iMX6 Mezzanine is an add-on board for the Apalis Evaluation Board which provides access to the type specific interfaces available on the Apalis iMX6 module. It allows the user to test and evaluate the type specific features available on the Apalis iMX6 module.

Since type specific features are dependent on the Apalis module. Specific types of mezzanine boards will be available for each Apalis module. Customers are free to develop their own type specific mezzanine board for prototyping and development purposes. Please refer to the datasheets for the individual Apalis module for more information.

### 1.1. Reference Documents

For detailed technical information about suitable computer modules, please refer to the documents listed below.

#### 1.1.1 Apalis Computer Modules

An overview of the Apalis product family:

<https://www.toradex.com/computer-on-modules/apalis-arm-family>

An overview of the Apalis iMX6 module:

<https://www.toradex.com/computer-on-modules/apalis-arm-family/nxp-freescale-imx-6>

<http://developer.toradex.com/products/apalis-imx6>

#### 1.1.2 Toradex Developer Website - Apalis Evaluation Board

<http://developer.toradex.com/products/apalis-evaluation-board>

#### 1.1.3 Toradex Developer Website - Carrier Board Design

<http://developer.toradex.com/carrier-board-design>

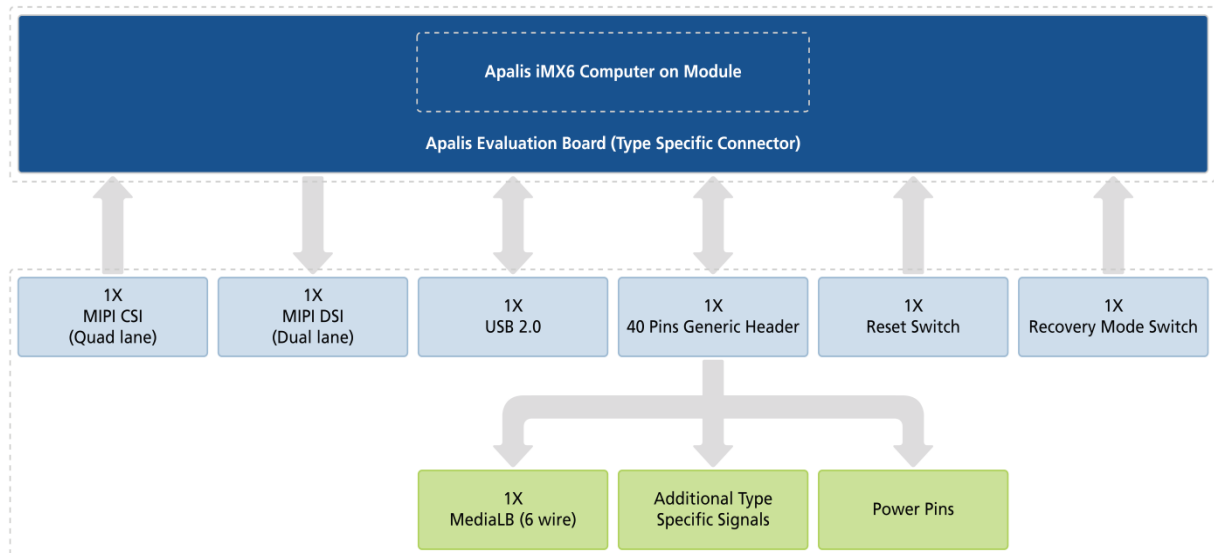
## 2. Features

### 2.1. Overview

The Apalis iMX6 Mezzanine provides the following features and interfaces:

- 1x MIPI CSI (Quad-lane) connector
- 1x MIPI DSI (Dual-lane) connector
- 1x USB 2.0 connector
- 1x Recovery mode switch
- 1x Reset switch
- 1x Generic header
  - Media Local Bus (MediaLB) interface signals
  - Power Pins
  - Additional type specific (TS\_XX) signals

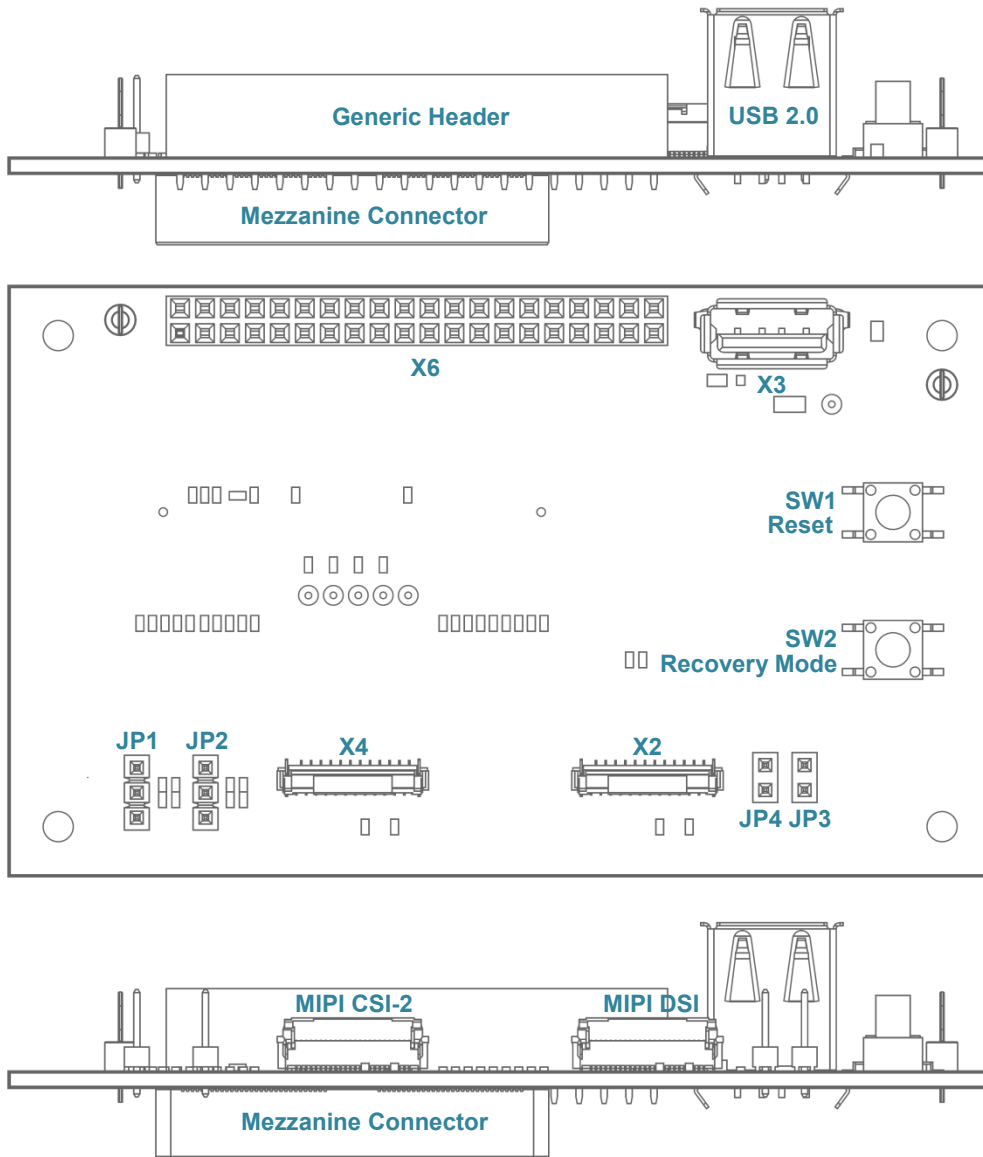
### 2.2. Block Diagram



**Fig.1 Apalis iMX6 Mezzanine Board Hardware Architecture**

## 2.3. Physical Drawings

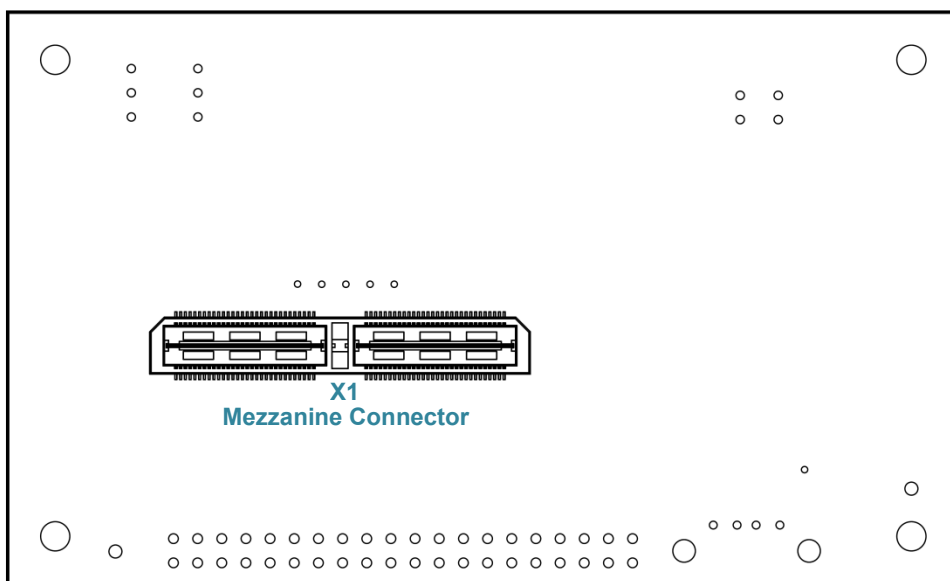
### 2.3.1 Top Side Connectors



**Fig.2 Apalis iMX6 Mezzanine Board Connectors – Top Side**

Ref	Description	Remarks
X2	MIPI DSI connector	
X3	USB connector	
X4	MIPI CSI-2 connector	
X6	Generic Header	
SW1	Reset switch	
SW2	Recovery mode switch	
JP1	I2C Jumper: data signal selection	No assembled
JP2	I2C Jumper: clock signal selection	No assembled
JP3	DSI_GPIO_BLK_LED_A Jumper (for X2, Pin 23)	
JP4	DSI_GPIO_BLK_LED_K Jumper (for X2, Pin 24)	

### 2.3.2 Bottom Side Connectors



**Fig.3 Apalis iMX6 Mezzanine Board Connectors – Bottom Side**

Ref	Description	Remarks
X1	Mezzanine Connector	

## 3. Apalis iMX6 Mezzanine Connectors

### 3.1. Mezzanine Connector (X1)

Manufacturer: Samtec, QTH-060-02-L-D-A

Pin No.	Signal Name	MXM Number	IO Type	Voltage	Pullup/Pulldown
1	GND		PWR		
2	NC				
3	CSI_1_CLK_P	163	I		
4	GND		PWR		
5	CSI_1_CLK_N	161	I		
6	GPIO_MXM3_235	235	I/O		
7	EIM_WAIT	159	I/O		
8	GPIO_MXM3_233	233	I/O		
9	CSI_1_D1_P	157	I		
10	GPIO_MXM3_231	231	I/O		
11	CSI_1_D1_N	155	I		
12	GPIO_MXM3_229	229	I/O		
13	GND		PWR		
14	NC				
15	CSI_1_D2_P	151	I		
16	GPIO_MXM3_225	225	I/O		
17	CSI_1_D2_N	149	I		
18	NC				
19	GND		PWR		
20	GPIO_MXM3_221	221	I/O		
21	CSI_1_D3_P	145	I		
22	GND		PWR		
23	CSI_1_D3_N	143	I		
24	NC				
25	GND		PWR		
26	NC				
27	CSI_1_D4_P	139	I		
28	NC				
29	CSI_1_D4_N	137	I		
30	NC				
31	GND		PWR		
32	GND		PWR		
33	EIM_DATA29	135	I/O		
34	CSI_CAM_CLK	193	O		
35	CLK2_P	133	O		
36	GND		PWR		
37	CLK2_N	131	O		
38	I2C3_SCL	203	O		



Pin No.	Signal Name	MXM Number	IO Type	Voltage	Pullup/Pulldown
39	GND		PWR		
40	GND		PWR		
41	DSI_1_CLK_P	127	O		
42	I2C3_SDA	201	I/O		
43	DSI_1_CLK_N	125	O		
44	5V_SW		PWR	+5V	
45	GND		PWR		
46	5V_SW		PWR	+5V	
47	SD4_DATA3	123	I/O		
48	5V_SW		PWR	+5V	
49	DSI_1_D1_P	121	O		
50	5V_SW		PWR	+5V	
51	DSI_1_D1_N	119	O		
52	5V_SW		PWR	+5V	
53	GND		PWR		
54	NC				
55	DSI_1_D2_P	115	O		
56	NC				
57	DSI_1_D2_N	113	O		
58	NC				
59	GND		PWR		
60	NC				
61	USBDN4_D_P	109	I/O		
62	3.3V		PWR	+3.3V	
63	USBDN4_D_N	107	I/O		
64	3.3V		PWR	+3.3V	
65	GND		PWR		
66	3.3V		PWR	+3.3V	
67	TAMPER	103	I		
68	3.3V		PWR	+3.3V	
69	NC				
70	NC				
71	GND		PWR		
72	3.3V_SW		PWR	+3.3V	
73	SD4_CMD	99	I/O		
74	3.3V_SW		PWR	+3.3V	
75	NC				
76	3.3V_SW		PWR	+3.3V	
77	SD4_DATA0	95	I/O		
78	3.3V_SW		PWR	+3.3V	
79	GND		PWR		
80	NC				
81	NAND_ALE	91	I/O		

Pin No.	Signal Name	MXM Number	IO Type	Voltage	Pullup/Pulldown
82	12V_SW_UNREG_F		PWR	+12V	
83	NAND_CS3_B	89	I/O		
84	12V_SW_UNREG_F		PWR	+12V	
85	GND		PWR		
86	12V_SW_UNREG_F		PWR	+12V	
87	BOOT_MODE1	87	I		
88	GND		PWR		
89	SD4_CLK	85	I/O		
90	I2C1_SCL	211	O		
91	NAND_CLE	83	I/O		
92	I2C1_SDA	209	I/O		
93	GND		PWR		
94	NC				
95	NAND_CS0_B	79	I/O		
96	NC				
97	CSI0_DATA_EN	77	I/O		
98	GPIO_MXM3_37	37	I/O		
99	GND		PWR		
100	NC				
101	MLB_SIG_P	73			
102	RESET_MOCI#	26	O		
103	MLB_SIG_N	71			
104	RESET_MICO#	28	I		
105	GND		PWR		
106	GPIO_1	1	I/O		
107	MLB_DATA_P	67			
108	GPIO_2	3	I/O		
109	MLB_DATA_N	65			
110	GPIO_3	5	I/O		
111	GND		PWR		
112	GPIO_4	7	I/O		
113	BOOT_MODE0	63	I		
114	GPIO_5	11	I/O		
115	MLB_CLK_P	61			
116	GPIO_6	13	I/O		
117	MLB_CLK_N	59			
118	NC				
119	GND		PWR		
120	NC				
121	GND		PWR		

### 3.2. MIPI DSI Connector (X2)

Manufacturer: Hirose, FH12-24S-0.5SV(55)

Pin No.	Signal Name	MXM Number	IO Type	Voltage	Pullup/Pulldown
1	GND		PWR		
2	DSI_1_D1_N	119			
3	DSI_1_D1_P	121			
4	GND		PWR		
5	DSI_1_D2_N	113			
6	DSI_1_D2_P	115			
7	GND		PWR		
8	DSI_1_CLK_N	125			
9	DSI_1_CLK_P	127			
10	GND		PWR		
11	DSI_RESET	1 / 26 / 99 / 221	I/O		
12	DSI_BLK_ON	11 / 37 / 225	I/O		
13	DSI_I2C_SCL	203 / 211	I		
14	DSI_I2C_SDA	201 / 209	I/O		
15	3.3V_SW		PWR	+3.3V	
16	NC				
17	NC				
18	GND		PWR		
19	NC				
20	NC				
21	5V_SW		PWR	+5V	
22	DSI_BLK_PWM	123 / 233	I/O		
23	DSI_GPIO_BLK_LED_A	135 / 231	I/O		
24	DSI_GPIO_BLK_LED_K	159 / 225	I/O		

As default assembly, I2C1 bus has been connected to the MIPI DSI Connector. Following table describes the assembly options available on the Apalis iMX6 Mezzanine V2.0 with respect of the MIPI DSI interface I2C bus selection:

Solution Selected	Assembly Options	Assembled Components on Apalis iMX6 Mezzanine V2.0	PCB Side
I2C1	Assemble components R27 and R29 Disassemble components R26 and R28	R27, R29	Top
I2C3	Assemble components R26 and R28 Disassemble components R27 and R29	R27, R29	Top

Please refer to Apalis iMX6 Mezzanine assembly drawing for the position of the components.

Jumpers JP3 and JP4 are connected to pins 23 and 24 of connector X2. If the jumpers are short circuited using shunt jumpers, GPIO signals connected to jumpers JP3 and JP4 will be available at pins 23 and 24 of connector X2. In-case customer wants to connect external power or I/O, they can remove the shunt jumpers from jumper JP3 and JP4 and then connect external power or I/O to pin 1 of the jumpers JP3 and JP4 using jumper wires.

### 3.3. USB Connector (X3)

Manufacturer: Amphenol, UE27AE54100

Pin No.	Signal Name	MXM Number	IO Type	Voltage	Pullup/Pulldown
1	5V_USB		PWR	+5V	
2	USB_N	107	I/O		
3	USB_P	109	I/O		
4	GND		PWR		

Please note that on Apalis iMX6 Mezzanine, USB power circuit is not over current protected. Special attention need to be paid while testing the USB available on the Apalis iMX6 Mezzanine. Please refer Apalis iMX6 Mezzanine schematics for more details.

### 3.4. MIPI CSI-2 Connectors (X4)

Manufacturer: Hirose, FH12-24S-0.5SV(55)

Pin No.	Signal Name	MXM Number	IO Type	Voltage	Pullup/Pulldown
1	GND		PWR		
2	CSI_1_D1_N	155			
3	CSI_1_D1_P	157			
4	GND		PWR		
5	CSI_1_D2_N	149			
6	CSI_1_D2_P	151			
7	GND		PWR		
8	CSI_1_CLK_N	161			
9	CSI_1_CLK_P	163			
10	GND		PWR		
11	CSI_GPIO0_RST	1 / 26 / 221	I/O		
12	CSI_MCLK	193	O		
13	CSI_I2C_SCL	203 / 211	O		
14	CSI_I2C_SDA	201 / 209	I/O		
15	3.3V_SW		PWR	+3.3V	
16	CSI_1_D3_N	143			
17	CSI_1_D3_P	145			
18	GND		PWR		
19	CSI_1_D4_N	137			
20	CSI_1_D4_P	139			
21	5V_SW		PWR	+5V	
22	CSI_GPIO1	3 / 225	I/O		
23	CSI_GPIO2	5 / 229	I/O		
24	CSI_GPIO3	7 / 13	I/O		

As default assembly, I2C3 bus has been connected to the MIPI-CSI Connector. Following table describes the assembly options available on the Apalis iMX6 Mezzanine V2.0 with respect of the MIPI-CSI interface I2C bus selection:

Solution Selected	Assembly Options	Assembled Components on Apalis iMX6 Mezzanine V2.0	PCB Side
I2C1	Assemble components R6 and R8 Disassemble components R7 and R9	R7, R9	Top
I2C3	Assemble components R7 and R9 Disassemble components R6 and R8	R7, R9	Top

Please refer to Apalis iMX6 Mezzanine assembly drawing for the position of the components.

Jumpers JP1 and JP2 have been provided in parallel with resistors R6, R7, R8 and R9 for I2C bus selection.

#### Jumper (JP1)

Connected Pins	Signal Name I2C_CSI_SDA
1-2	I2C_SDA1
2-3	I2C_SDA3

#### Jumper (JP2)

Connected Pins	Signal Name I2C_CSI_SCL
1-2	I2C_SCL1
2-3	I2C_SCL3

Jumpers JP1 and JP2 are not assembled by default. Please refer to Apalis iMX6 Mezzanine schematics for more details.

### 3.5. Generic Header Pins (X6)

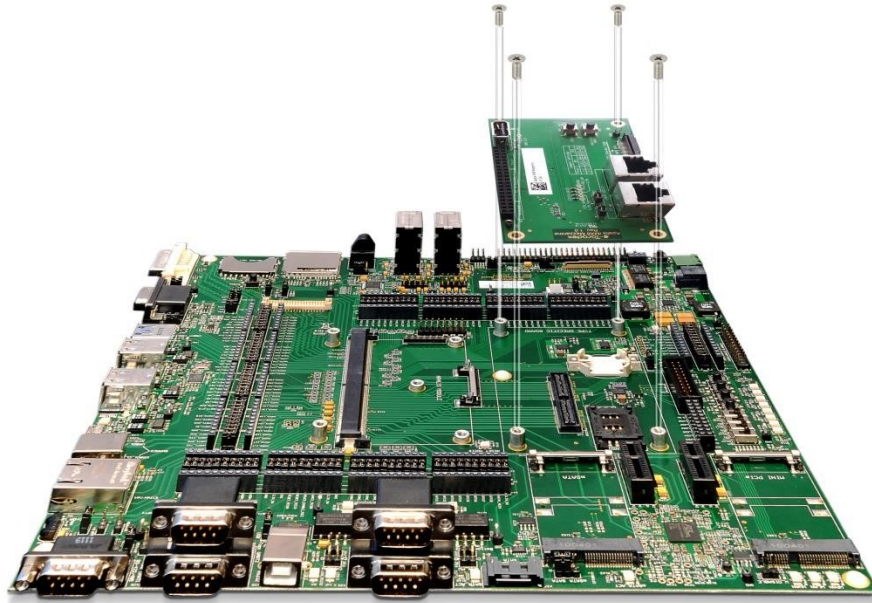
Manufacturer: Sullins Connector, PPPC202LFBN-RC, Header Female Type, 2.54mm Pitch

Pin No.	Signal Name	MXM Number	IO Type	Voltage	Pullup/Pulldown
1	MLB_CLK_N	59			
2	MLB_CLK_P	61			
3	GND		PWR		
4	GND		PWR		
5	MLB_DATA_N	65			
6	MLB_DATA_P	67			
7	GND		PWR		
8	GND		PWR		
9	MLB_SIG_N	71			
10	MLB_SIG_P	73			
11	GND		PWR		
12	GND		PWR		
13	CSI0_DATA_EN	77	I/O		
14	NAND_CS0_B	79	I/O		
15	GND		PWR		
16	GND		PWR		
17	CLK2_N	131			

Pin No.	Signal Name	MXM Number	IO Type	Voltage	Pullup/Pulldown
18	CLK2_P	133			
19	GND		PWR		
20	GND		PWR		
21	SD4_CLK	85	I/O		
22	SD4_DATA0	95	I/O		
23	SD4_CMD	99	I/O		
24	SD4_DATA3	123	I/O		
25	NAND_CLE	83	I/O		
26	NAND_ALE	91	I/O		
27	EIM_DATA29	135	I/O		
28	EIM_WAIT	159	I/O		
29	TAMPER	103	I		
30	NAND_CS3_B	89	I/O		
31	3.3V_SW		PWR	+3.3V	
32	3.3V_SW		PWR	+3.3V	
33	GND		PWR		
34	GND		PWR		
35	12V_SW_UNREG_F		PWR	+12V	
36	12V_SW_UNREG_F		PWR	+12V	
37	GND		PWR		
38	GND		PWR		
49	5V_SW		PWR	+5V	
40	5V_SW		PWR	+5V	

## 4. Assembly

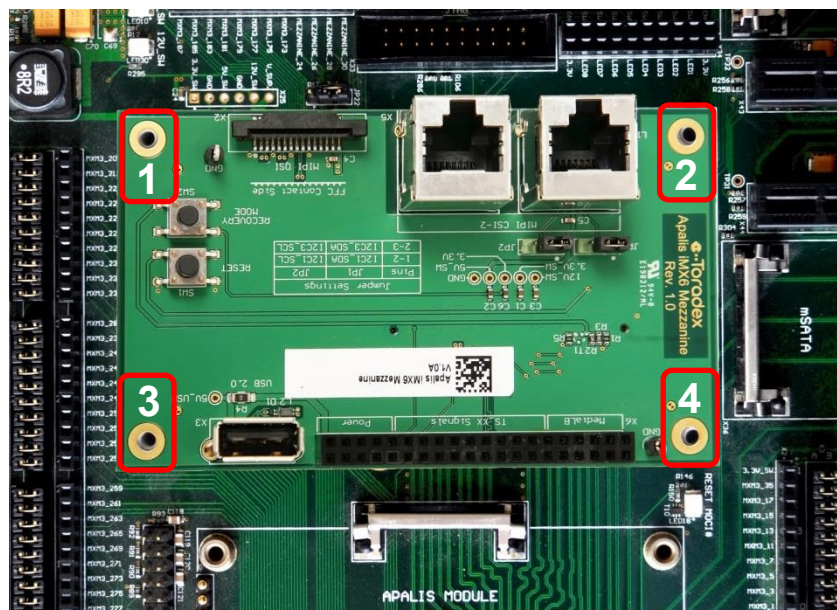
The illustration shown below represents how to attach the Apalis iMX6 Mezzanine to the Apalis Carrier Board. Please note that Apalis iMX6 Mezzanine V1.0A board is used for illustration, actual product may look different from the images shown below:



### 4.1. Assembly Procedure

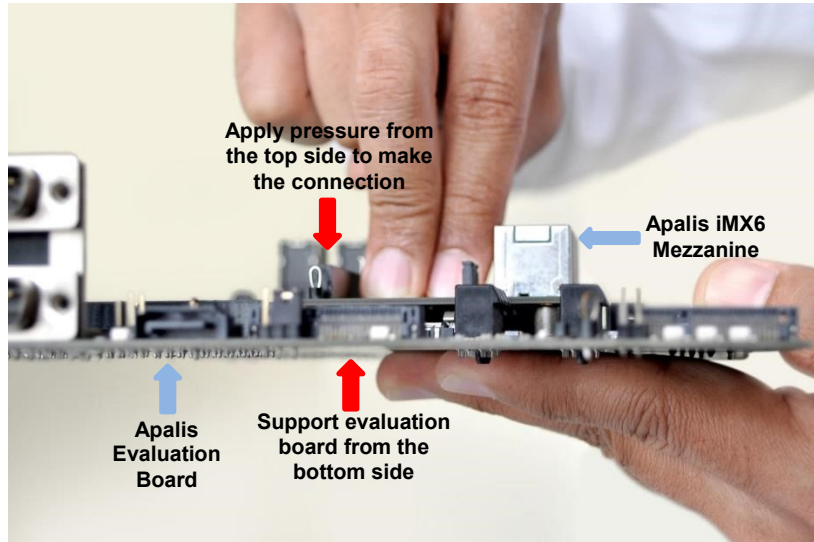
The following procedure demonstrates how to attach the Apalis iMX6 Mezzanine to the Apalis Evaluation Board. Please read the instructions carefully to ensure that the connectors or circuit board does not get damaged. Necessary precautions should be taken to avoid the electrostatic charge.

1. Carefully align the mounting holes {1}, {2}, {3}, and {4} on the mezzanine to be in-line with the fasteners available on the Apalis Evaluation board. Place the mezzanine on the Apalis Evaluation Board.

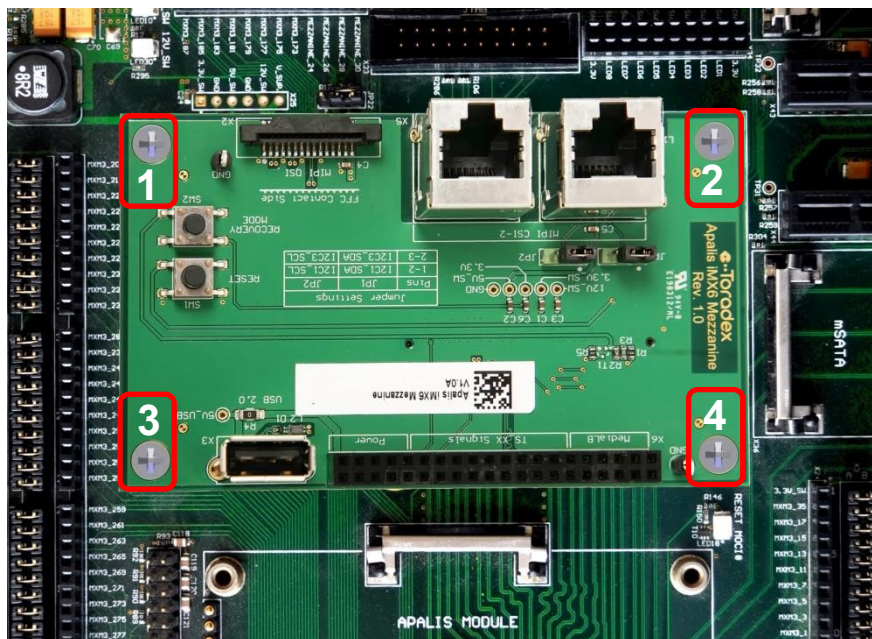




2. As shown in the image below, support the Apalis Evaluation Board from the bottom side, place the fingers just beneath the mezzanine mating connector. Apply pressure on the mezzanine board from the top to make the proper connection. This procedure ensures that the Apalis Evaluation Board PCB does not flex or bent while connecting the Apalis iMX6 Mezzanine.



3. Optional: Use 4 units of M3 screws to affix the mezzanine together with the Apalis Evaluation Board.



4. Done. The Apalis iMX6 Mezzanine is now firmly connected to the Apalis Evaluation Board.



## 5. Temperature Range

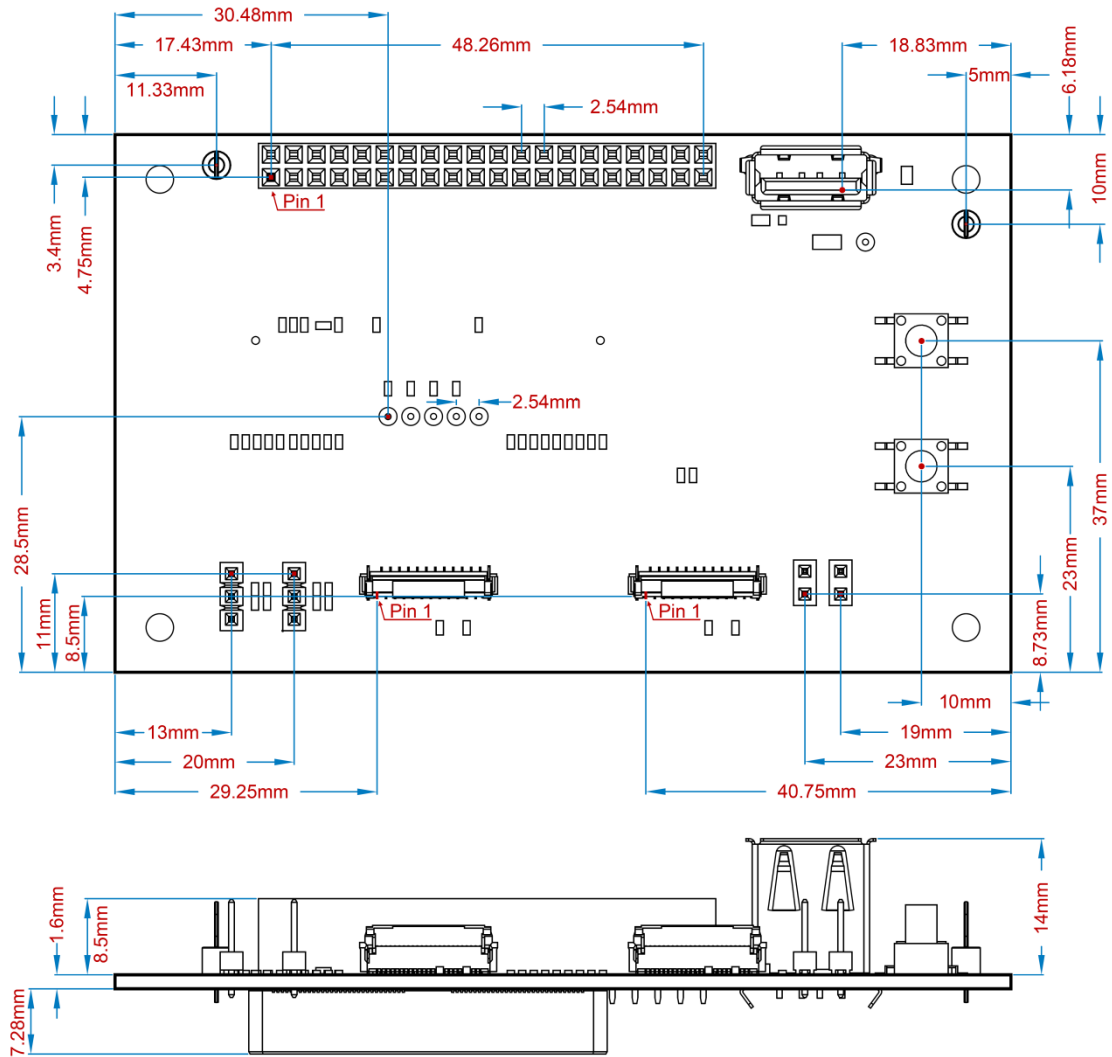
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### 5.1. Operating Temperature Range

- -40°C to +85°C

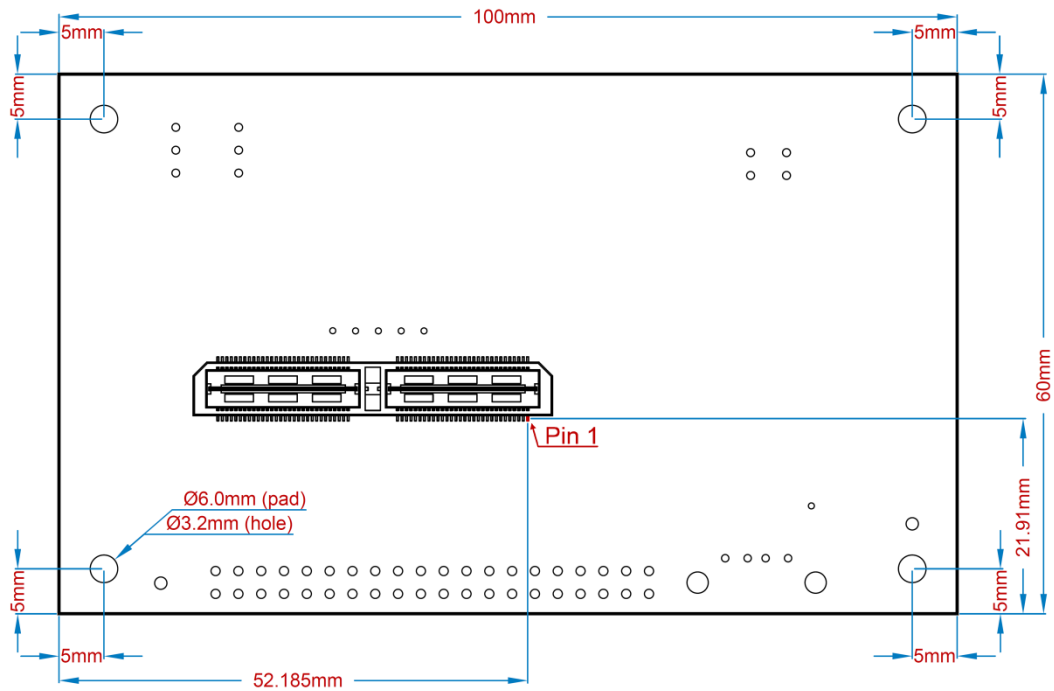
## 6. Mechanical Data

### 6.1. Dimensions - Top Side



**Fig.4 Apalis iMX6 Mezzanine Board Mechanical Drawing – Top Side**  
All dimensions in millimetres (mm)

## 6.2. Dimensions - Bottom Side



**Fig.5 Apalis iMX6 Mezzanine Board Mechanical Drawing – Bottom Side**  
All dimensions in millimetres (mm)

## 7. Design Data

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The design data for the Toradex carrier board and adapter board are freely available in the Altium Designer format. The design data includes schematics, layout, and component libraries.

To download the adapter board design data, please use the web-link below:

<http://developer.toradex.com/carrier-board-design/reference-designs>

## 8. Product Compliance

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Up-to-date information about product compliance such as RoHS, CE, UL-94, Conflict Materials, REACH etc. can be found on our website at: <http://www.toradex.com/support/product-compliance>

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