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Ixora

Datasheet

Revision History

Date	Doc. Rev.	Board Version	Changes
10-Feb-17	Rev. 1.0	V1.1	Preliminary Release
25-April-17	Rev. 1.1	V1.1	Section 2.3.2, Bottom Side Connector: Corrected connector X26 name in figure 3.
19-July-17	Rev. 1.2	V1.1	- Section 3.2.2, Power Control: Updated MXM3 pin number mentioned in the description. - Section 3.2.2.1, Power Control Header (X5): Updated table. - Section 3.6, PCIe: Updated MXM3 pin number mentioned in the description. - Section 3.9.3, HDMI Connector (X17): Added note regarding HDMI issue. - Section 3.11.1, UART: Updated MXM3 pin number mentioned in the description.
17-April-18	Rev. 1.3	V1.1	- Section 4, Temperature Range: Updated operating and storage temperature range.
18-June-18	Rev. 1.4	V1.1	- Section 4, Temperature Range: Updated operating and storage temperature range. Added a note.
20-Sept-18	Rev. 1.0	V1.2	- Preliminary Release
31-May-19	Rev. 1.1	V1.2	- Added Section 4, Electrical Characteristics - Section 3.9.2, Added information about Pin 36 and 38 - Section 3.11.3, Corrected MXM3 Pin number of X27 Pin 27 - Minor fixes
19-Sept-19	Rev. 1.2	V1.2	- Section 1.1, Added links - Section 4.1, minor changes - Section 3.10, New CTIA (AHJ) Audio Standard, changed pinout - Section 3.4, 3.5, 3.9, Chassis GND - Section 3.8, Remove Pull-up/Pull-down - Section 3.9, Pinout upgrade, new X24 Connector - Added Section 3.12, New EEPROM - Added Section 3.13, Recovery Mode - Minor changes and fixes

Contents

1 Introduction

Ixora is a carrier board for the Apalis family of System-on-Modules (SoMs) / Computer on modules (CoMs). Ixora is designed to provide access to some of the most important features supported by the Apalis family.

The major part of the standard interfaces, which are supported by the Apalis modules, are exposed on the Ixora carrier board through a combination of real-world connector interfaces, card slot and 2.54mm pitch pin headers.

The real world connectors, LEDs, and push buttons are all placed on the board edge in a way that easily allows for a boxed version of the Ixora carrier board.

1.1 Reference Documents

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

1.1.1 Apalis System on Modules

An overview of the Apalis product family:

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

1.1.2 Push button On/Off Controller Datasheet

http://cds.linear.com/docs/en/datasheet/2954fb.pdf

1.1.3 DC/DC Buck / Step-down converter Datasheets

http://www.aosmd.com/res/data_sheets/AOZ2261QI-10.pdf

http://www.aosmd.com/res/data_sheets/AOZ2260QI-11.pdf

1.1.4 Isolated CAN Transceiver Datasheet

https://www.analog.com/media/en/technical-documentation/data-sheets/ADM3053.pdf

1.1.5 HDMI ESD and overcurrent protection IC Datasheet

https://assets.nexperia.com/documents/data-sheet/IP4786CZ32.pdf

1.1.6 RS232 Transceiver Datasheet

http://www.ti.com/lit/ds/slls353h/slls353h.pdf

1.1.7 Serial RTC Datasheet

https://www.st.com/resource/en/datasheet/m41t0.pdf

1.1.8 EEPROM Datasheet

http://ww1.microchip.com/downloads/en/devicedoc/atmel-8781-seeprom-at34c02d-datasheet.pdf

1.1.9 Toradex Developer Website - Carrier Board Design

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

2 Features

2.1 Overview

The Ixora Carrier Board provides the following features and communication interfaces:

- 1x USB 2.0
- 2x USB 3.0 port
- USB 2.0 OTG Micro-AB connector (shared) for host and host/client
- RJ45 Ethernet (10/100/1000 Mbit)
- 1x microSD 4 Bit
- 1x mSATA
- Mini PCIe with SIM card connector
- Digital (TDMS) interface on HDMI connector
- Dual channel LVDS interface (up to 24 bit color)
- Unified Interface Display with built in resistive touch for direct LCD panel connection
- Resistive touch screen connector 4/5-wire
- Capacitive touch screen connector
- Analog audio I/O on 3.5mm stereo jack
- S/PDIF I/O on header
- Line IN on header
- 1x MIPI CSI Interface
- 10 bit Parallel Camera Interface
- 3x RS232 Serial Interfaces
- 2x I2C, 1x SPI, 4x PWM, 4x Analog inputs, 8xGPIOs
- 2x CAN 2.0B Interface (up to 1Mbit/s)
- Real-time clock with battery backup
- GPIO Controlled LEDs
- FAN connector

2.2 Hardware Architecture Block Diagram

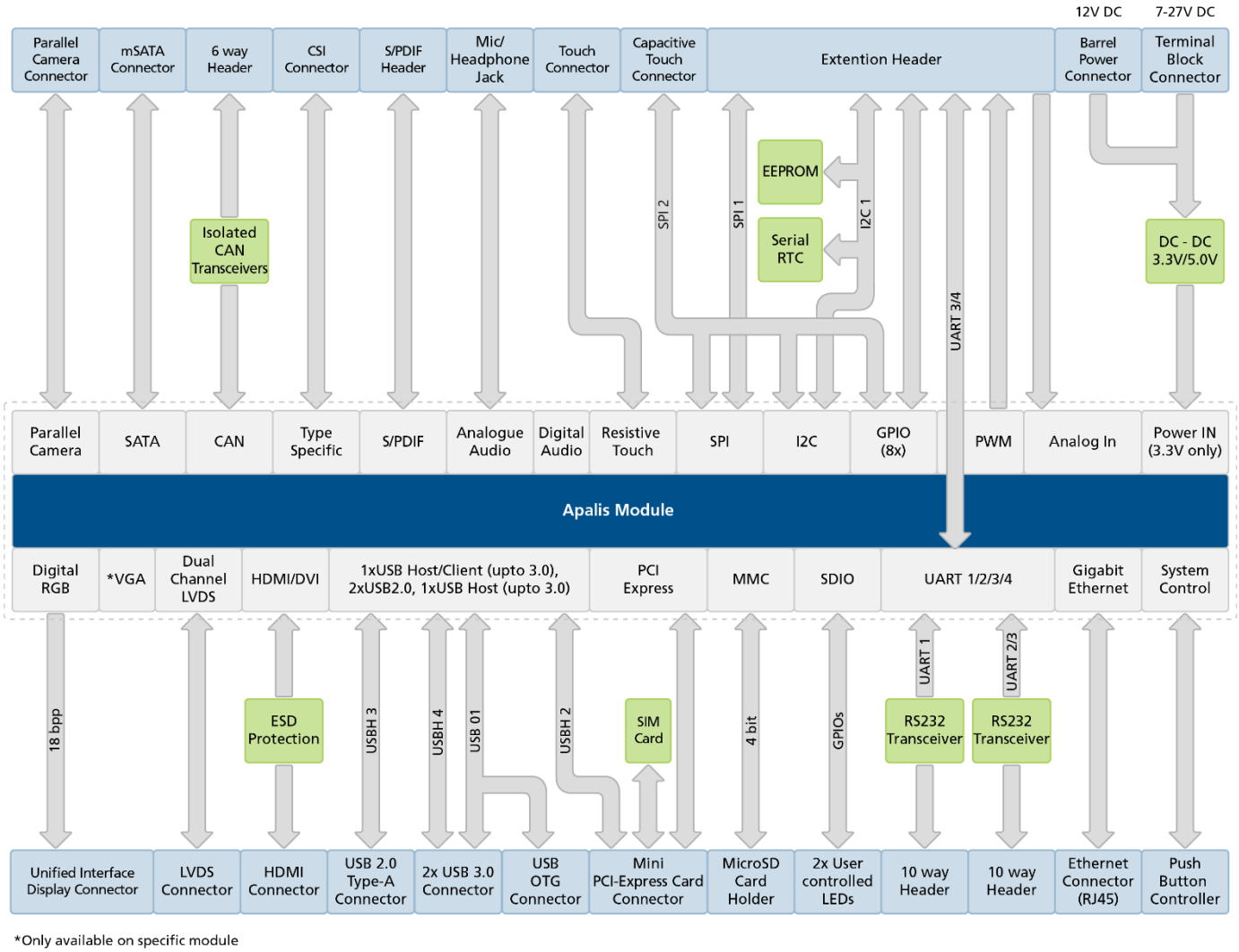

Fig.1 Ixora Carrier Board Hardware Architecture

2.3 Physical Drawing

2.3.1 Top Side Connectors

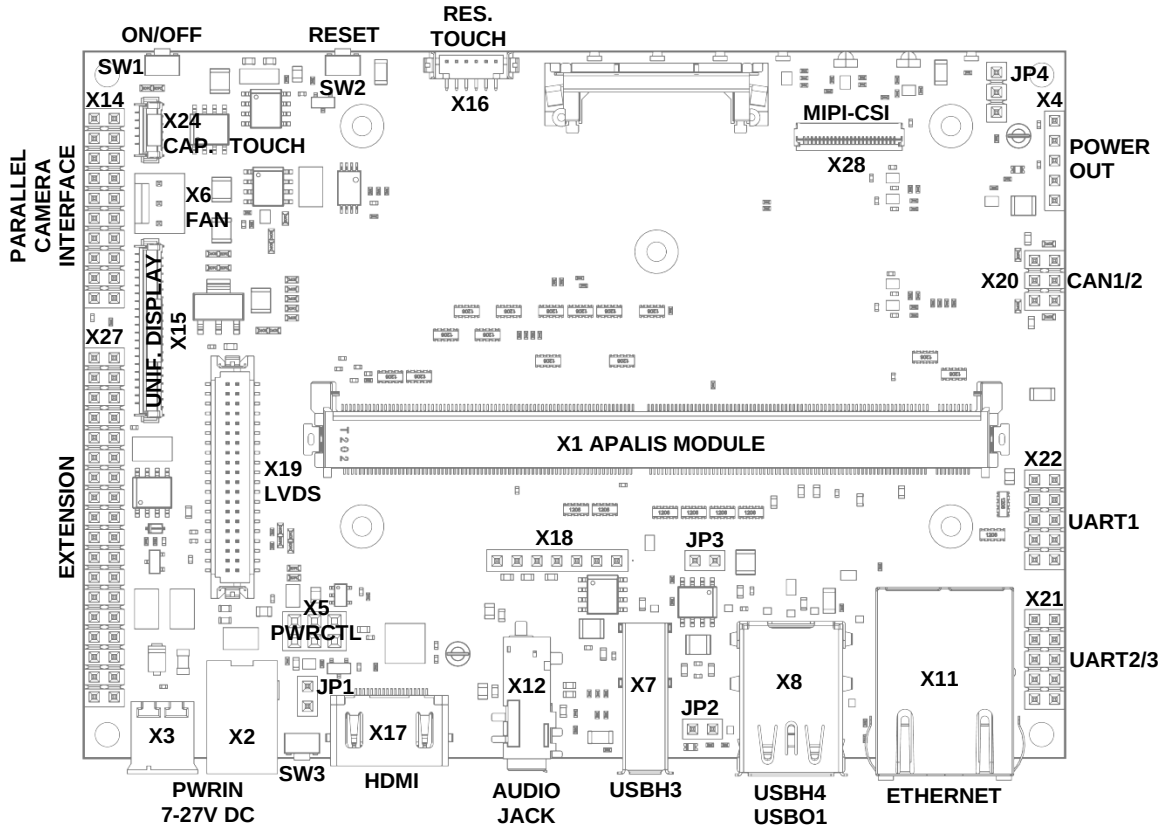

Fig.2 Ixora Carrier Board Connectors – Top Side

Ref	Description	Remarks
X1	Apalis MXM3 Connector	
X2	Terminal Block Power Supply Connector (Power In)	
X3	Barrel Power Supply Connector (Power In)	
X4	Power Out Header	
X5	Power Control Header	
X6	FAN Connector	
X7	USB HOST	USBH3
X8	USB HOST SS	TOP: USBH4 – BOTTOM: USBO1 (Shared with X9)
X11	Gigabit Ethernet	
X12	Audio In/Out Jack	
X14	Parallel Camera Header	
X15	Unified Interface Display	
X16	Touch-Screen Connector	
X17	HDMI Connector	
X18	Line IN – S/PDIF Header	
X19	LVDS Connector	
X20	CAN Header	

Ref	Description	Remarks
X21	RS232 Header	RS232-2 – RS232-3
X22	RS232 Header	RS232-1
X24	Capacitive Touch Connector	
X27	Extension Header	
X28	MIPI-CSI Connector	
JP4	Recovery Mode Jumper	Refer to modules datasheet for more information

2.3.2 Bottom Side Connectors

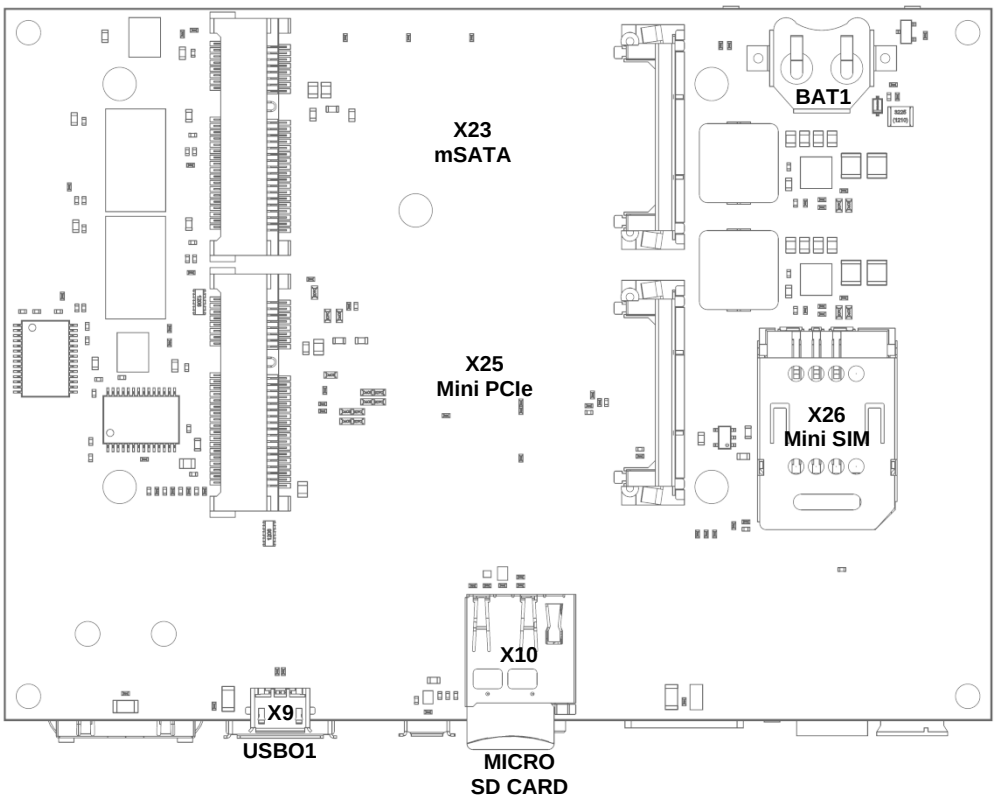

Fig.3 Ixora Carrier Board Connectors – Bottom Side

Ref	Description	Remarks
X9	USB OTG	USBO1 (High Speed shared with X8)
X10	Micro SD Card Holder	
X23	mSATA	
X25	Mini PCIe	
X26	Mini SIM card Holder	
BAT1	12mm Battery holder	Supported batteries: CR1216, BR1220, CL1225

2.4 Assembly Options

This section marks/highlights the components on the Ixora carrier board that can be used to configure different features and functional options.

WARNING:

- Changing the PCB assembly voids the product warranty.
- Toradex doesn't take any responsibility for malfunction or damages caused by changing any assembly option.

2.4.1 Ixora Assembly Option – Top Side

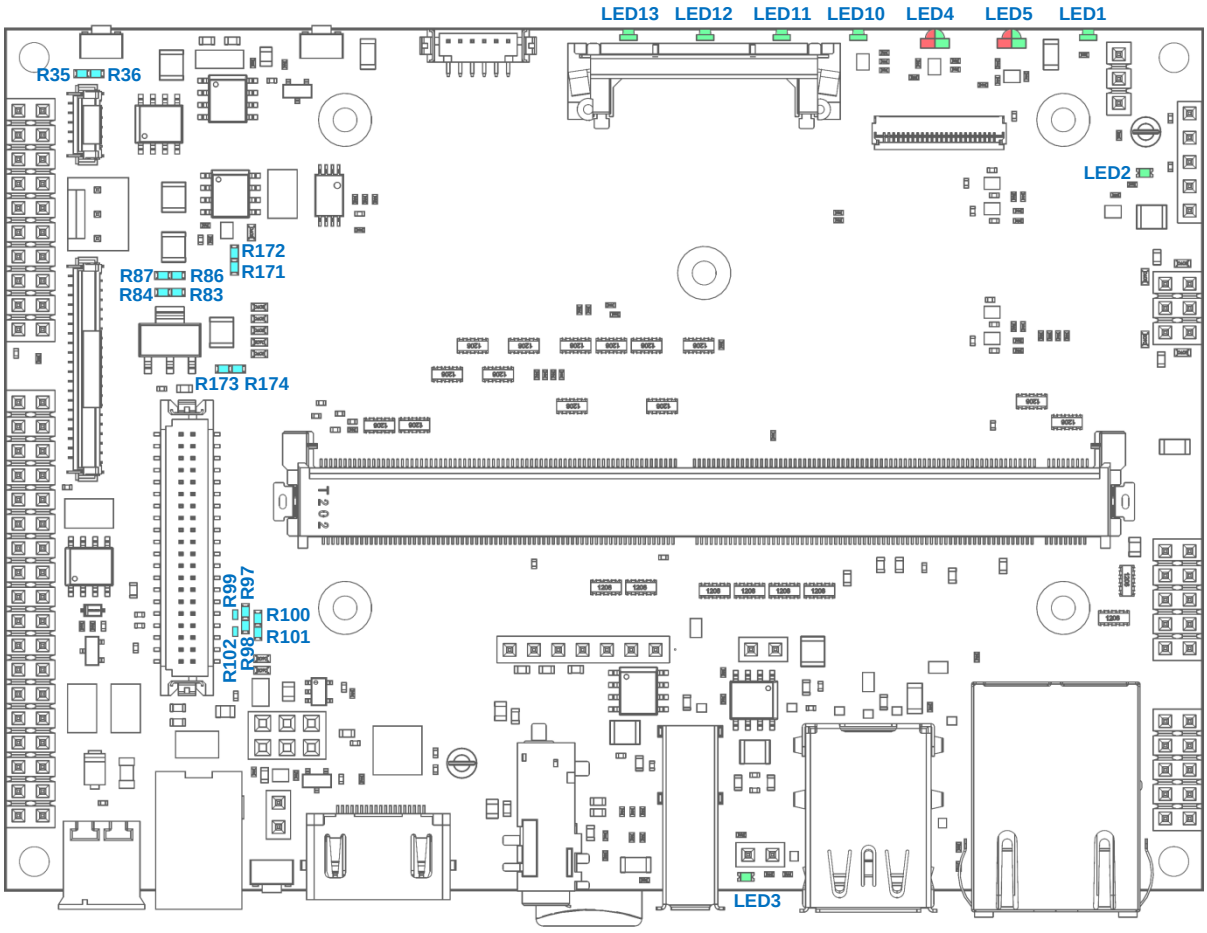

Fig.4 Ixora Carrier Board Assembly Options – Top Side

2.4.2 Ixora Assembly Option – Bottom Side

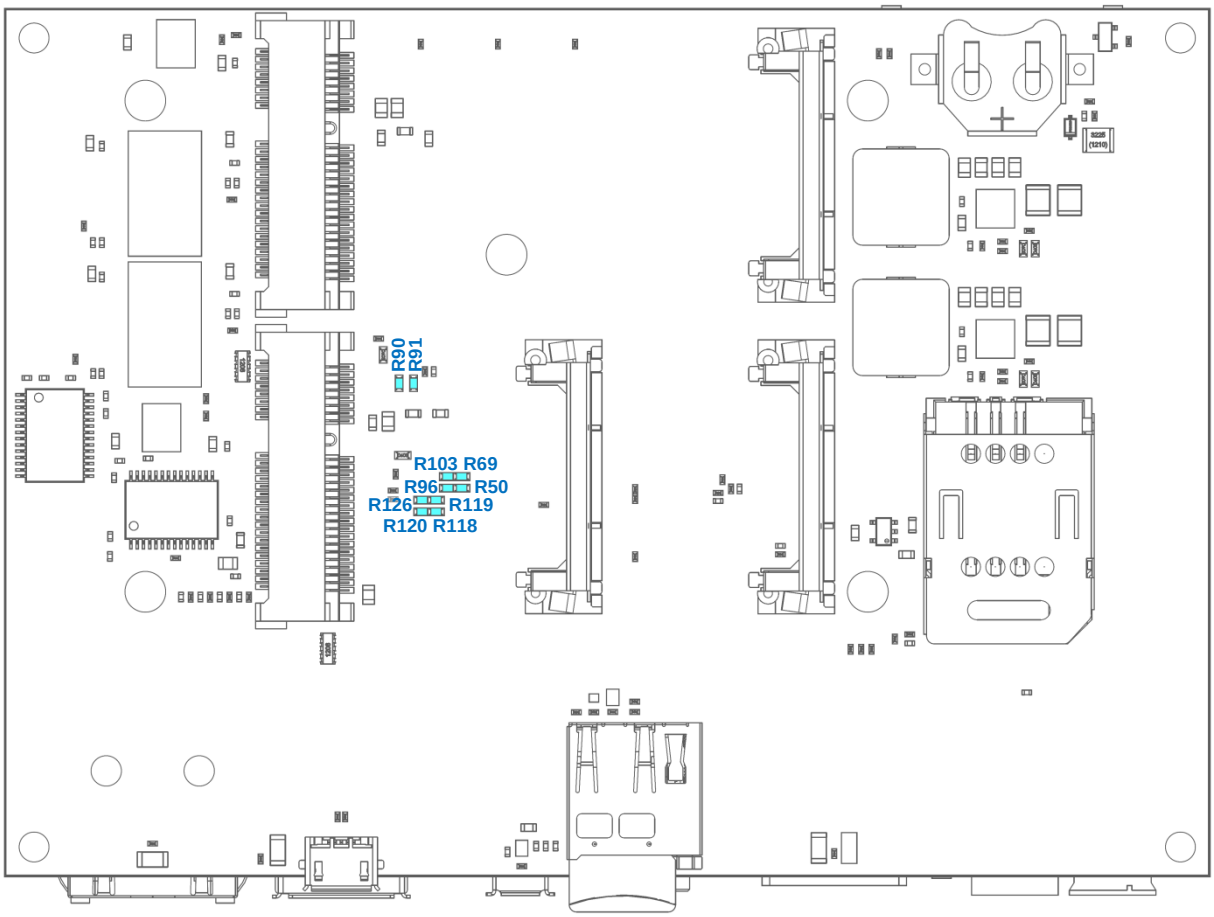

Fig.5 Ixora Carrier Board Assembly Options – Bottom Side

3 Interface Description

3.1 Apalis System-On-Module

Type: MXM3 321 pin Socket

Manufacturer: JAE - MM70-314-310B1

For the pin-out of the Apalis module, please refer to the applicable Apalis module datasheet.

MXM3 SnapLock and Spacers are available on Ixora for fixing the Apalis module with the carrier board. Please use M3 size screws to fasten Apalis module with the Spacers.

3.2 Power Supply

3.2.1 Power Supply Connectors

Ixora provides two methods of supplying power to the board:

- The connector X2, which is a standard 5.5mm power jack barrel connector which is widely used in consumer electronic devices.
- The connector X3, which is a pluggable, dual-pin male screw type terminal block which is widely used in industrial applications. This connector is not assembled by default.

The connectors X2 and X3 are directly connected to the power output connector X4, to the FAN connector X6 and to the LVDS connector X19. For this reason, when the 12V voltage supply is required on these connectors, the input voltage must be 12V +/-10%.

Both the connectors have a wide input voltage range of 7 - 27V DC.

The on-board power supply provides the following supplies (maximum power).

5V / 6A (30W)
3.3V / 8A (26.4W)

The supply is protected against reverse input voltage polarity and short circuits.

3.2.1.1 Barrel Power Supply Connector (X2)

Connector type: SwitchCraft RAPC722X

Pin	Description	Voltage / range
1	GND_IN	
2	PWR_IN	7 – 27V

3.2.1.2 Terminal Block Power Supply Connector (X3)

Connector type: Tyco 284512-2, not assembled

Pin	Description	Voltage / range
1	GND_IN	
2	PWR_IN	7 – 27V

3.2.1.3 Power Out Header (X4)

Connector type: 1x5 Pin Header Male, 2.54mm, not assembled

Pin	Description	Voltage / range
1	+3.3V_SW	+3.3V
2	GND	
3	+5V_SW	+5V
4	GND	
5	V_SUPPLY_FILT_SW	PWR_IN

Please note that the pin 5 is not regulated because it is directly connected to the power supply connectors X2 and X3.

3.2.2 Power Control

Power control of the Ixora is implemented using a Linear LTC2954 Pushbutton On/Off controller and with the signal POWER_ENABLE_MOCI, which is used to enable the peripheral power supplies.

For information about the signals provided by the controller LTC2954 please refer to the datasheet. For more information regarding the power up sequence which is implemented on the board please refer to the document “Apalis Carrier Board Design Guide”.

The switches SW1 and SW2 have been assigned the ON/OFF and Reset function, respectively. The SW3 is, by default, connected to pin 186 of the MXM3 connector and can be used to activate particular functionalities such as factory default restore. By disassembling resistor R91 and assembling resistor R90, SW3 will be routed to pin 63 which is, for the Apalis T30 module, the Recovery Mode pin.

Please note that pin 63 of the MXM3 connector can only be used to enter Recovery Mode on the Apalis T30 and TK1 module, not on iMX6 and iMX8 modules, due to the inverted signal level.

The Power Control Header X5 allows the Reset and Power Button control signals to be accessed externally.

3.2.2.1 Power Control Header (X5)

Connector type: 2x3 Pin Header Female, 2.54mm

Pin	Signal Name	MXM3 Pin Number	I/O Type	Voltage	Pull-up/Pull-down
1	PWR_BTN#		I		100k to +1.9V
2	GND		PWR		
3	PWR_CTRL		I	+3.3V max	100k to GND
4	INT#		I		10k to +3.3V
5	FORCE_OFF#		I		100k to +3.3V
6	RESET_MICO#	28	I/O	+3.3V	

The pin 3 of the Power Control Header X5 can be used to override the Pushbutton controller. The following table shows the behaviour of the board according to the level of the PWR_CTRL signal:

PWR_CTRL Level	Description
0V	The Pushbutton controller is working normally
3.3V	The Ixora carrier board is Always On when power is applied

3.2.2.2 Always On Jumper (JP1)

Jumper JP1 can be used to obtain “Always On” behaviour.

Connector type: 1x2 Pin Header Male, 2.54 mm

Jumper position	Description
Open	Board power supply is controlled via Power On/Off Switch.
Closed	Board power supply will be in the “Always On” state. Ixora carrier board will be powered-up as soon as external power is applied.

The following table describes the assembly options available on the Ixora carrier board with respect to the Switch SW3:

Solution Selected	Assembly Options	Assembled Components on Ixora V1.1	PCB Side
SW3 connected to pin 63 of the MXM3 connector (Recovery Mode pin on Apalis T30).	Assemble resistors R90 Disassemble resistors R91	R91	Bottom
SW3 connected to pin 186 of the MXM3 connector.	Assemble resistors R91 Disassemble resistors R90	R91	Bottom

Please refer to figure 5 in *Section 2.4, Assembly Options* for the position of the resistors.

3.2.3 FAN Connector

Ixora provides a FAN connector, X6. The voltage which is available at this connector is connected to the V_SUPPLY_FILT voltage using a transistor which is controlled by 3.3V_SW or, optionally, using the GPIO8 signal for software control.

3.2.3.1 FAN Connector (X6)

Connector type: 1x3 Pin Header Male with friction lock, 2.54 mm

Pin	Signal Name	I/O Type	Voltage	Pull-up/Pull-down
1	GND	PWR	PWR_IN	
2	V_FAN_UNREG	PWR		
3	NC			

Please note that this voltage (V_FAN_UNREG) is not regulated because it is the same voltage that has been provided on the connectors X2 or X3.

The following table describes the assembly options available on the Ixora carrier board with respect to the FAN connector:

Solution Selected	Assembly Options	Assembled Components on Ixora V1.0	PCB Side
Use the GPIO_8 to control the FAN power	Assemble resistors R35 Disassemble resistors R36	R35	Top
Use 3.3V_SW signal to control the FAN power	Assemble resistors R36 Disassemble resistors R35	R35	Top

Please refer to figure 4 in *Section 2.4, Assembly Options* for the position of the resistors.

3.3 Indications

Ixora features nine LEDs as indications for the status of some of the interfaces available on board. Two of these LEDs are dual colour type and can be controlled using Apalis module GPIOs.

Following table describes the signal associated with the LEDs:

LED No.	Signal Name
LED1	The 3.3_SW voltage is available
LED2	The signal RESET_MOCI# is low therefore the module is reset (not assembled by default)
LED3	The VCC_USBO1 voltage is available therefore the bottom part of the connector X8 is used as HOST.
LED4_RED	Dual colour LED. This LED is RED when the signal on the pin 178 of the MXM3 connector is high.
LED4_GREEN	Dual colour LED. This LED is GREEN when the signal on the pin 188 of the MXM3 connector is high.
LED5_RED	Dual colour LED. This LED is RED when the signal on the pin 156 of the MXM3 connector is high.
LED5_GREEN	Dual colour LED. This LED is GREEN when the signal on the pin 152 of the MXM3 connector is high.
LED10	This LED indicates that the mSATA device is active.
LED11	Mini PCIe status indicator: WLAN
LED12	Mini PCIe status indicator: WWAN
LED13	Mini PCIe status indicator: WPAN

3.4 Ethernet

Ixora provides an RJ45 connector with integrated magnetics for 10/100/1000Mbit Ethernet.

3.4.1 Ethernet Connector (X11)

Connector type: RJ45, BEL Fuse A829-1J1T-KM

Pin	Signal Name	MXM3 Pin Number	I/O Type	Voltage	Pull-up/Pull-down
1	ETH1_CTREF_2				
2	ETH1_MDI2_N	34			
3	ETH1_MDI2_P	32			
4	ETH1_MDI1_P	56			
5	ETH1_MDI1_N	54			
6	ETH1_CTREF_1				
7	ETH1_CTREF_3				
8	ETH1_MDI3_P	38			
9	ETH1_MDI3_N	40			
10	ETH1_MDI0_N	48			
11	ETH1_MDI0_P	50			
12	ETH1_CTREF_0				
13	ETH1_ACT_C	42 (via R70)			
14	3.3V_SW		PWR	+3.3V	
15	ETH1_LINK_GB	44 (via R72)			
16	3.3V_SW		PWR	+3.3V	
17	ETH1_LINK_C	44 (via R71)			
S1/S2	CHASSIS_GND		PWR		

3.5 USB

Ixora has 1x USB 2.0 host interface (X7), as well as a USB 2.0 OTG interface available on a Micro-AB connector (X9).

The USB 2.0 part of the USB OTG interface is shared with the dual stacked USB 3.0 type A connector X8 (bottom), which can be used with the modules that support USB Super Speed interface.

By using the jumper JP2, it is possible to determine whether the interface USBO1 is used as an OTG interface through the connector X9 or as a Host interface available on the bottom part of the connector X8.

The Jumper JP2 is basically used to connect the signal USBO1_ID signal to GND: the USBO1_ID signal enables the VCC_USBO1 voltage in the same way as when the port X9 is used as HOST.

When the VCC_USBO1 is enabled, the bottom part of the connector X8 or X9 is used as HOST.

For this reason, special attention needs to be paid to this jumper when the connector X9 has to be used as CLIENT.

In order to give an indication that the voltage VCC_USBO1 is enabled, LED3 has been installed on the board.

The following table summarizes the jumper JP2 configuration.

Connector type: 1x2 Pin Header Male, 2.54 mm

Jumper position	Description
Open	The connector X8 (bottom) is not powered. The connector X9 is used as OTG.
Closed	The connectors X8 (bottom) and X9 are configured as HOST only.

3.5.1 USB Host (X7)

Connector type: USB Type-A, FCI 73725-0110BLF

Pin	Signal Name	MXM3 Pin Number	I/O Type	Voltage	Pull-up/Pull-down
1	VCC_USBH2		PWR	+5V	
2	USBH_D_CON_N	88			
3	USBH_D_CON_P	86			
4	GND_USBH2		PWR		
S1,S2, S3,S4	CHASSIS_GND		PWR		

By default, Apalis USBH2 and USBH3 interfaces are connected to Mini PCIe Connector (X25) and USB Host connector (X7) respectively. Using the assembly options, it is possible to connect the USB Host connector (X7) and Mini PCIe Connector (X25) to connect to either the USBH2 or USBH3 interface. Customers must pay special attention while making the assembly changes to ensure that only one USBH interface is connected to one connector at a time.

The following table describes the assembly options available on the Ixora carrier board with respect to the USB Host connector (X7):

Solution Selected	Assembly Options	Assembled Components on Ixora V1.1	PCB Side
Connect Apalis USBH3 interface to USB Host connector (X7) and Apalis USBH2 interface to Mini PCIe Connector (X25)	Assemble resistors R96, R103, R118, R119 Disassemble resistors R50, R69, R120, R126	R96, R103, R118, R119	Bottom
Connect Apalis USBH2 interface to USB Host connector (X7) and Apalis USBH3 interface to Mini PCIe Connector (X25)	Assemble resistors R50, R69, R120, R126 Disassemble resistors R96, R103, R118, R119	R96, R103, R118, R119	Bottom

Please refer to figure 5 in *Section 2.4, Assembly Options* for the position of the resistors.

3.5.2 USB Host SS (X8)

Connector type: Stacked USB 3.0 Type-A, Amphenol GSB311231HR

Pin	Signal Name	MXM3 Pin Number	I/O Type	Voltage	Pull-up/Pull-down
U1	VCC_USBH4		PWR	+5V	
U2	USBH4_D_CON_N	100			
U3	USBH4_D_CON_P	98			
U4	GND_USBH4		PWR		
U5	USBH4_SSRX_N	92			
U6	USBH4_SSRX_P	94			
U7	GND_USBH4		PWR		
U8	USBH4_SSTX_N	104			
U9	USBH4_SSTX_P	106			
L1	VCC_USBO1		PWR	+5V	
L2	USBO1_D_CON_N	76			
L3	USBO1_D_CON_P	74			
L4	GND_USBO1		PWR		
L5	USBO1_SSRX_N	64			
L6	USBO1_SSRX_P	62			
L7	GND_USBO1		PWR		
L8	USBO1_SSTX_N	70			
L9	USBO1_SSTX_P	68			
S1,S2, S3,S4	CHASSIS_GND		PWR		

3.5.3 USB Client (X9)

Connector type: Micro AB Type, Hirose ZX62-AB-5PA(31)

Pin	Signal Name	MXM3 Pin Number	I/O Type	Voltage	Pull-up/Pull-down
1	VCC_USBO1		PWR	+5V	
2	USBO1_D_CL_N	76 (via R55)			
3	USBO1_D_CL_P	74 (via R54)			
4	USBO1_ID	72			100K
5	GND_USBO1		PWR		
S1,S2, S3	CHASSIS_GND		PWR		

3.6 PCIe

Ixora supports the PCI Express interface on the Apalis module and allows Mini PCIe devices to be connected.

By changing the value of the GPIO connected to pin 176 of the MXM3 connector, it is possible to disable the wireless capabilities of the mini PCIe card assembled in the connector X25. In particular, the wireless is disabled when this signal voltage is zero.

3.6.1 Mini PCIe (X25)

Connector type: Mini PCIe Card Connector and Latch, Molex 67910-5700, 48099-5701

Pin	Signal Name	MXM3 Pin Number	I/O Type	Voltage	Pull-up/Pull-down
1	PCIE1_WAKE#	37 (via R137)	I/O	+3.3V	
2	3.3V_PCIE1		PWR	+3.3V	
3	NC				
4	GND		PWR		
5	NC				
6	1.5V_PCIE1		PWR	+1.5V	
7	NC				
8	PCIE1_UIM_PWR				
9	GND		PWR		
10	PCIE1_UIM_DATA		I/O		
11	PCIE1_CLK_N	53	O		
12	PCIE1_UIM_CLK				
13	PCIE1_CLK_P	55	O		
14	PCIE1_UIM_RESET				
15	GND		PWR		
16	PCIE1_UIM_VPP				
17	NC				
18	GND		PWR		
19	NC				
20	PCIE1_WDISABLE#	176 (via R53)	I/O		47K to 3.3V_PCIE1
21	GND		PWR		
22	RESET_MOCI#	26	O	+3.3V	
23	PCIE1_RX_N	41	I		
24	3.3V_PCIE1		PWR	+3.3V	
25	PCIE1_RX_P	43	I		
26	GND		PWR		
27	GND		PWR		
28	1.5V_MSATA1		PWR	+1.5V	
29	GND		PWR		
30	PCIE1_SMCLK		I2C CLK	+3.3V	
31	PCIE1_TX_N	47	O		
32	PCIE1_SMDAT		I/O	+3.3V	
33	PCIE1_TX_P	49	O		
34	GND		PWR		
35	GND		PWR		
36	USBH_PCIE_N	82	I/O		

Pin	Signal Name	MXM3 Pin Number	I/O Type	Voltage	Pull-up/Pull-down
37	GND		PWR		
38	USBH_PCIE_P	80	I/O		
39	3.3V_PCIE1		PWR	+3.3V	
40	GND		PWR		
41	3.3V_PCIE1		PWR	+3.3V	
42	PCIE1_WWLAN#		O		
43	GND		PWR		
44	PCIE1_WLAN#		O		
45	NC				
46	PCIE1_WPAN#		O		
47	NC				
48	1.5V_MSATA1		PWR	+1.5V	
49	NC				
50	GND		PWR		
51	NC				
52	3.3V_PCIE1		PWR	+3.3V	

By default, the Apalis USBH2 and USBH3 interfaces are connected to the Mini PCIe Connector (X25) and USB Host connector (X7) respectively. Using the assembly options, it is possible to connect the USB Host connector (X7) and Mini PCIe Connector (X25) to connect to either the USBH2 or USBH3 interface. Customers must pay special attention while making the assembly changes to ensure that only one USBH interface is connected to the one connector at a time.

The following table describes the assembly options available on the Ixora carrier board with respect to the Mini PCIe connector (X25):

Solution Selected	Assembly Options	Assembled Components on Ixora V1.1	PCB Side
Connect Apalis USBH3 interface to USB Host connector (X7) and Apalis USBH2 interface to Mini PCIe Connector (X25)	Assemble resistors R96, R103, R118, R119 Disassemble resistors R50, R69, R120, R126	R96, R103, R118, R119	Bottom
Connect Apalis USBH2 interface to USB Host connector (X7) and Apalis USBH3 interface to Mini PCIe Connector (X25)	Assemble resistors R50, R69, R120, R126 Disassemble resistors R96, R103, R118, R119	R96, R103, R118, R119	Bottom

Please refer to figure 5 in *Section 2.4, Assembly Options* for the position of the resistors.

3.6.2 Mini-SIM Card Holder (X26)

Connector type: Molex 47023-0001

Pin	Signal Name	I/O Type	Voltage	Pull-up/Pull-down
1	PCIE1_UIM_PWR	PWR		
2	PCIE1_UIM_RESET	I/O		
3	PCIE1_UIM_CLK	I/O		
5	GND	PWR		
6	PCIE1_UIM_VPP	PWR		
7	PCIE1_UIM_DATA	I/O		

3.7 SATA

Ixora supports the Serial ATA (SATA) interface on the Apalis module and allows peripherals such as mSATA SSDs to be connected.

3.7.1 mSATA (X23)

Connector type: Mini PCIe Card Connector and Latch, Molex 67910-5700, 48099-5701

Pin	Signal Name	MXM3 Pin Number	I/O Type	Voltage	Pull-up/Pull-down
1	NC				
2	3.3V_MSATA1		PWR	+3.3V	
3	NC				
4	GND		PWR		
5	NC				
6	1.5V_MSATA1		PWR	+1.5V	
7	NC				
8	NC				
9	GND		PWR		
10	NC				
11	NC				
12	NC				
13	NC				
14	NC				
15	GND		PWR		
16	NC				
17	NC				
18	GND		PWR		
19	NC				
20	NC				
21	GND		PWR		
22	NC				
23	SATA1_MSATA_RX_P	25	I		
24	3.3V_MSATA1		PWR		
25	SATA1_MSATA_RX_N	27	I		
26	GND		PWR		
27	GND		PWR		
28	1.5V_MSATA1		PWR	+1.5V	
29	GND		PWR		
30	SATA1_MSATA_SCL	211 (via R121)	O	+3.3V	1.8K to 3.3V_SW
31	SATA1_MSATA_TX_N	31	O		
32	SATA1_MSATA_SDA	209 (via R122)	IO	+3.3V	1.8K to 3.3V_SW
33	SATA1_MSATA_TX_P	33	O		
34	GND		PWR		
35	GND		PWR		
36	NC				
37	GND		PWR		
38	NC				

Pin	Signal Name	MXM3 Pin Number	I/O Type	Voltage	Pull-up/Pull-down
39	3.3V_MSATA1		PWR	+3.3V	
40	GND		PWR		
41	3.3V_MSATA1		PWR	+3.3V	
42	NC				
43	NC				
44	NC				
45	NC				
46	NC				
47	NC				
48	1.5V_MSATA1		PWR	+1.5V	
49	SATA1_MSATA_ACT#		O		
50	GND		PWR		
51	SATA1_MSATA_PREDET#				
52	3.3V_MSATA1		PWR	+3.3V	

For further information regarding the mSATA interface, please refer to Serial ATA Specification Rev. 3.1 Gold.

3.8 SD Card / MMC

Ixora features a 4bit SDIO interface through a micro SD card holder. The hardware supported card detect function is implemented.

On Ixora V1.2, it is possible to enable/disable SD Card / MMC power. MXM3_148 (MMC1_D4) can be used to enable/disable power to the SD Card / MMC power. Please refer to the Ixora carrier board schematics for more details.

3.8.1 Micro SD Card Holder (X10)

Connector type: Wurth 693071010811

Pin	Signal Name	MXM3 Pin Number	I/O Type	Voltage	Pull-up/Pull-down
1	MMC1_D2	144	I/O	+3.3V	
2	MMC1_D3	146	I/O	+3.3V	
3	MMC1_CMD	150	I	+3.3V	
4	3.3V_SD		PWR	+3.3V	
5	MMC1_CLK	154	I	+3.3V	
6	GND		PWR		
7	MMC1_D0	160	I/O	+3.3V	
8	MMC1_D1	162	I/O	+3.3V	
CD1/2	MMC1_CD#	164	O	+3.3V	

3.9 Display

Ixora provides many options for connecting LCD panels and monitors, with the following three interfaces supported:

- 18 bit digital RGB
- Dual Channel 24 bit LVDS
- HDMI

Not all the display interfaces are available on all Apalis modules. Carefully check the corresponding datasheet of the module.

Toradex provides a range of different tools and utilities to help with the easy configuration of different LCD panels. For details please refer to: http:/developer.toradex.com

3.9.1 Unified Interface Display (X15)

Ixora carrier board provides a digital RGB interface port (18-bpp) to interface with the LCD panels using a 40-way, Unified Interface Display connector (X15). It also includes a 4-wire resistive touch screen interface on the same FFC connector.

The Unified Interface Display connector (X15) is compatible with the Resistive Touch Display and EDT display offered by Toradex. A variety of LCD panels with integrated touch support for evaluation purposes are available at the Toradex Webshop.

- https://developer.toradex.com/products/parallel-resistive-touch-display
- http://developer.toradex.com/products/edt-display

For customers looking for a capacitive touch display solution, Ixora carrier boards are fully compatible with the Toradex Capacitive Touch Display solution offered by Toradex. Please refer to the following developer webpages for more details:

- https://developer.toradex.com/products/capacitive-touch-display-7inch-parallel
- http://developer.toradex.com/products/capacitive-multi-touch-display

For more TFT display solutions, refer to the following developer webpages:

- http://developer.toradex.com/knowledge-base/supported-displays
- http://developer.toradex.com/knowledge-base/tianma-rgb-display-adapter-board
- http://developer.toradex.com/knowledge-base/generic-rgb-display-adapter-board

Connector type: Omron XF2M-4015-1A

Pin	Signal Name	Color Mapping 18bpp	MXM3 Number	I/O Type	Voltage	Pull-up/ Pull-down
1	GND			PWR		
2	GND			PWR		
3	+3.3V_SW			PWR	+3.3V	
4	+3.3V_SW			PWR	+3.3V	
5	BKL1_ON		286	O	+3.3V	
6	PWM_BKL1		239	O	+3.3V	
7	RESET_MOCI_EDT#		26 (via R81)	O	+3.3V	
8	LCD1_B7	BLUE 5	301	O	+3.3V	
9	LCD1_B6	BLUE 4	299	O	+3.3V	
10	LCD1_B5	BLUE 3	297	O	+3.3V	
11	LCD1_B4	BLUE 2	295	O	+3.3V	
12	LCD1_B3	BLUE 1	293	O	+3.3V	
13	LCD1_B2	BLUE 0	291	O	+3.3V	
14	GND			PWR		
15	LCD1_G7	GREEN 5	283	O	+3.3V	

Pin	Signal Name	Color Mapping 18bpp	MXM3 Number	I/O Type	Voltage	Pull-up/ Pull-down
16	LCD1_G6	GREEN 4	281	O	+3.3V	
17	LCD1_G5	GREEN 3	279	O	+3.3V	
18	LCD1_G4	GREEN 2	277	O	+3.3V	
19	LCD1_G3	GREEN 1	275	O	+3.3V	
20	LCD1_G2	GREEN 0	273	O	+3.3V	
21	GND			PWR		
22	LCD1_R7	RED 5	265	O	+3.3V	
23	LCD1_R6	RED 4	263	O	+3.3V	
24	LCD1_R5	RED 3	261	O	+3.3V	
25	LCD1_R4	RED 2	259	O	+3.3V	
26	LCD1_R3	RED 1	257	O	+3.3V	
27	LCD1_R2	RED 0	255	O	+3.3V	
28	LCD1_PCLK		243	O	+3.3V	
29	GND			PWR		
30	LCD1_HSYNC		247	O	+3.3V	
31	LCD1_VSYNC		245	O	+3.3V	
32	LCD1_DE		249	O	+3.3V	
33	LCD1_CONF1: Connected to 3.3V or GND via assembly option. The default assembly is GND			O	+3.3V/GND	
34	LCD1_CONF2: Connected to 3.3V or GND via assembly option. The default assembly is GND			O	+3.3V/GND	
35	GND			PWR		
36	+3.3V_SW			PWR	+3.3V	
37	AN1_TSPY		319	O	+3.3V	
38	AN1_TSMX		317	O	+3.3V	
39	AN1_TSMY		321	O	+3.3V	
40	AN1_TSPX		315	O	+3.3V	

The following table describes the assembly options available on the Ixora carrier board with respect to the Unified Interface Display:

Solution Selected	Assembly Options	Assembled Components on Ixora V1.0	PCB Side
Unified Interface Display, Rotate display	Assemble appropriate 0R resistors R83, R84, R86, and R87. Refer to LCD TFT datasheet for configuration details.	R84, R87	Bottom

Please refer to figure 5 in *Section 2.4, Assembly Options* for the position of the resistors.

3.9.2 LVDS Connector (X19)

Connector type: Hirose DF13A-40DP-1.25V(55)

Pin	Signal Name	MXM3 Pin Number	I/O Type	Voltage	Pull-up/Pull-down
1	LVDS1_A_TX3_P	272			
2	GND				
3	LVDS1_A_TX3_N	270			
4	LVDS1_B_CLK_N	276			

Pin	Signal Name	MXM3 Pin Number	I/O Type	Voltage	Pull-up/Pull-down
5	GND				
6	LVDS1_B_CLK_P	278			
7	LVDS1_A_TX2_P	266			
8	GND				
9	LVDS1_A_TX2_N	264			
10	LVDS1_B_TX0_N	282			
11	GND				
12	LVDS1_B_TX0_P	284			
13	LVDS1_A_TX1_P	260			
14	GND				
15	LVDS1_A_TX1_N	258			
16	LVDS1_B_TX1_N	288			
17	GND				
18	LVDS1_B_TX1_P	290			
19	LVDS1_A_TX0_P	254			
20	GND				
21	LVDS1_A_TX0_N	252			
22	LVDS1_B_TX2_N	294			
23	GND				
24	LVDS1_B_TX2_P	296			
25	LVDS1_A_CLK_P	248			
26	GND				
27	LVDS1_A_CLK_N	246			
28	LVDS1_B_TX3_N	300			
29	GND				
30	LVDS1_B_TX3_P	302			
31	LVDS1_SEL_1: Can be connected to 5V or 3.3V or GND via assembly option. The default assembly is 3.3V.				
32	LVDS1_3.3V_SW		PWR	3.3V_SW	
33	LVDS1_SEL_2: Can be connected to 5V or 3.3V or GND via assembly option. The default assembly is 3.3V.				
34	LVDS1_5V		PWR	5V_SW	
35	PWM_BKL1	239			
36	LVDS1_I2C2_SDA: Only available on V1.1A and above.	205			
37	BKL1_ON	286			
38	LVDS1_I2C2_SCL: Only available on V1.1A and above.	207			
39	LVDS1_12V_SW_UNREG		PWR	V_SUPPLY_FILT_SW	
40	LVDS1_12V_SW_UNREG		PWR	V_SUPPLY_FILT_SW	

Toradex provides a range of different tools and utilities to help with the easy configuration of different LCD panels. For details please refer to: http:/developer.toradex.com

By using the assembly option, it is possible to configure the values of the pins 31 and 33 of the connector X19.

The following table describes the assembly options available on the Ixora carrier board with respect to the LVDS interface:

Solution Selected	Assembly Options	Assembled Components on Ixora V1.0	PCB Side
LVDS1_SEL_1 to LVDS1_3.3V_SW	Assemble resistors R97 Disassemble resistors R98 and R99	R97	Top
LVDS1_SEL_1 to LVDS1_5V	Assemble resistors R98 Disassemble resistors R97 and R99	R97	Top
LVDS1_SEL_1 to GND	Assemble resistors R99 Disassemble resistors R97 and R98	R97	Top
LVDS1_SEL_2 to LVDS1_3.3V_SW	Assemble resistors R100 Disassemble resistors R101 and R102	R100	Top
LVDS1_SEL_2 to LVDS1_5V	Assemble resistors R101 Disassemble resistors R100 and R102	R100	Top
LVDS1_SEL_2 to GND	Assemble resistors R102 Disassemble resistors R100 and R101	R100	Top

Please refer to figure 5 in *Section 2.4, Assembly Options* for the position of the resistors.

3.9.3 HDMI Connector (X17)

Connector type: FCI 10029449-111RLF

Pin	Signal Name	MXM3 Pin Number	I/O Type	Voltage	Pull-up/Pull-down
1	HDMI1_TXD2_P	222			
2	GND		PWR		
3	HDMI1_TXD2_N	224			
4	HDMI1_TXD1_P	228			
5	GND		PWR		
6	HDMI1_TXD1_N	230			
7	HDMI1_TXD0_P	234			
8	GND		PWR		
9	HDMI1_TXD0_N	236			
10	HDMI1_TXC_P	240			
11	GND		PWR		
12	HDMI1_TXC_N	242			
13	HDMI1_CEC_CON	220 (via IC9)	I/O	+5V	
14	NC				
15	HDMI_DDC_SCL	207 (via IC9)	O	+5V	
16	HDMI_DDC_SDA	205 (via IC9)	I/O	+5V	
17	GND				
18	HDMI_VDISP		PWR	+5V	
19	HDMI1_HPD_CON	232 (via IC9)	I	+5V	
S1, S2, S3, S4	CHASSIS_GND		PWR		

Note:

The Ixora carrier board in combination with the Apalis TK1 module shows issues with some HDMI monitors. Please refer to the Ixora Carrier Board Errata “Errata #1: HDMI DDC issues with Apalis TK1” for more details: http://developer.toradex.com/products/ixora-carrier-board#errata

Ixora carrier board V1.0 and V1.1 are affected by this issue.

3.9.4 Resistive Touch-Screen (X16)

Connector type: Hirose DF13C-6P-1.25V(51)

Pin	Signal Name	MXM3 Pin Number	I/O Type	Voltage	Pull-up/Pull-down
1	GND		PWR		
2	AN1_TSMY	321	I	+3.3V	
3	AN1_TSPY	319	I	+3.3V	
4	AN1_TSMX	317	I	+3.3V	
5	AN1_TSPX	315	I	+3.3V	
6	AN1_TSWIP	311 (via R145)	I	+3.3V	

Remarks:

- For further information about the 5-wire resistive touch interface, please refer to our developer site:

  http://developer.toradex.com/knowledge-base/5-wire-resistive-touch-interface

3.9.5 Capacitive Touch-Screen (X24)

Connector type: Hirose FH12-10S-0.5SVA(54)

Pin	Signal Name	MXM3 Pin Number	I/O Type	Voltage	Pull-up/Pull-down
1	I2C1_SDA	209	I/O	+3.3V	1.8K to 3.3V_SW
2	I2C1_SCL	211	O	+3.3V	1.8K to 3.3V_SW
3	GND		PWR		
4	GPIO5 / TOUCH_INT#	11	I/O	+3.3V	
5	GPIO6 / TOUCH_RESET#	13	I/O	+3.3V	
6	3.3V_SW		PWR	+3.3V	
7	SPI2_CLK / TOUCH_SSP_CLK	235	O	+3.3V	
8	SPI2_CS / TOUCH_SSP_CS	233	O	+3.3V	
9	SPI2_MOSI / TOUCH_SSP_TX	231	O	+3.3V	
10	SPI2_MISO / TOUCH_SSP_RX	229	O	+3.3V	

3.10 Audio

Ixora offers one analogue audio interface, which is provided by the Apalis Module. It is available on the connector X12. This connector is a standard jack for active loudspeakers or headphones and microphone input. The audio jack follows the *CTIA (AHJ)* pinout standard. Please refer to this Wikipedia (https://en.wikipedia.org/wiki/Phone_connector_(audio)#TRRS_standards) to view the list of the compatible headphones.

In addition, Ixora features the Line IN and S/PDIF IN and OUT interfaces on a non-assembled 7-pin header.

3.10.1 Audio Jack (X12)

Connector type: CUI SJ-43516-SMT

Pin	Signal Name	MXM3 Pin Number	I/O Type	Voltage	Pull-up/Pull-down
1	AAP1_MICIN	306	I	+3.3V	
2	AAP1_HP_AC_L	316 (via C76)	O	+3.3V	
3	AAP1_HP_AC_R	312 (via C77)	O	+3.3V	
4	AGND				
5	AAP1_HP_AC_L	316 (via C76)	O	+3.3V	
6	AAP1_HP_AC_R	312 (via C77)	O	+3.3V	

3.10.2 Line IN – S/PDIF Header (X18)

Connector type: 1x7 Pin Header Male, 2.54mm, not assembled

Pin	Signal Name	MXM3 Pin Number	I/O Type	Voltage	Pull-up/Pull-down
1	5V_SW		PWR		
2	SPDIF1_IN	217	I	+3.3V	
3	SPDIF1_OUT	215	O		
4	GND		PWR		
5	AGND		PWR		
6	AAP1_LIN_L	310	I	+3.3V	
7	AAP1_LIN_R	312	I		

3.11 Digital and Analog I/O Interface

3.11.1 UART

Ixora features 4 UART interfaces that are connected to the following connectors:

- UART 1 to the connector X22 through an RS232 transceiver.
- UART 2 to the connector X21 through an RS232 transceiver.
- UART 3 to the connector X21 through an RS232 transceiver and to the connector X27.
- UART 4 to the connector X27.

It is possible to disconnect the signal UART3_RXD from the RS232 IC12 SN65C3243 transceiver by disassembling the jumper JP3. In addition, it is possible to put the transceiver IC12 in high impedance status by forcing to zero, the value of the GPIO connected to pin 180 of the MXM3 connector.

One of these two configurations is required when the interface UART3 need to be used at the TTL level on the connector X27.

3.11.1.1 RS232 Header (X21)

Connector type: 2x5 Pin Header Male, 2.54mm

Pin	Signal Name	I/O Type	Voltage	Pull-up/Pull-down
1	UART3_RS232_RXD	I		
2	NC			
3	UART2_RS232_RXD	I		
4	UART2_RS232_RTS	O		
5	UART2_RS232_TXD	O		
6	UART2_RS232_CTS	I		
7	UART3_RS232_TXD	O		
8	NC			
9	GND			

3.11.1.2 RS232 Header (X22)

Connector type: 2x5 Pin Header Male, 2.54mm

Pin	Signal Name	I/O Type	Voltage	Pull-up/Pull-down
1	UART1_RS232_DCD	I		
2	UART1_RS232_DSR	I		
3	UART1_RS232_RXD	I		
4	UART1_RS232_RTS	O		
5	UART1_RS232_TXD	O		
6	UART1_RS232_CTS	I		
7	UART1_RS232_DTR	O		
8	UART1_RS232_RI	I		
9	GND			

3.11.2 CAN

Ixora uses the Microchip ADM3053BRWZ signal and power CAN transceiver to implement two CAN 2.0b interfaces in conjunction with the two CAN interfaces on the Apalis module. The CAN ports are electrically isolated from the system power supply.

On Ixora V1.2, it is possible to enable/disable CAN1 and CAN2 transceiver. MXM3_158 (MMC1_D7) and MXM3_35 (SATA1_ACT#) can be used to enable/disable power to the CAN1 and CAN2 transceivers respectively. Please refer to the Ixora carrier board schematics for more details.

The CAN interfaces are available on the Header X20.

3.11.2.1 CAN Header (X20)

Connector type: 2x3 Pin Header Male, 2.54mm

Pin	Signal Name	I/O Type	Voltage	Pull-up/Pull-down
1	CAN1_L	I/O	+5V	
2	CAN1_H	I/O	+5V	
3	CAN1_GND_ISO	PWR		
4	CAN2_GND_ISO	PWR		
5	CAN2_H	I/O	+5V	
6	CAN2_L	I/O	+5V	

3.11.3 Extension Header (X27)

Connector type: 2x18 Pin Header Male, 2.54mm

Pin	Signal Name	MXM3 Pin Number	I/O Type	Voltage	Pull-up/Pull-down
1	RESET_MICO#	28	I	+3.3V	
2	POWER_ENABLE_MOCI	24	O	+3.3V	
3	WAKE1_MICO#	37	I	+3.3V	
4	RESET_MOCI#	26	O	+3.3V	
5	I2C1_SDA	209	I/O	+3.3V	1.8K to 3.3V_SW
6	I2C1_SCL	211	I/O	+3.3V	1.8K to 3.3V_SW
7	GND		PWR		
8	SPI1_CLK	221	I/O	+3.3V	
9	SPI1_CS	227	I/O	+3.3V	
10	SPI1_MISO	223	I	+3.3V	
11	SPI1_MOSI	225	O	+3.3V	
12	5V_SW		PWR	+5V	
13	GPIO1	1	I/O	+3.3V	
14	GPIO2	3	I/O	+3.3V	
15	GPIO3	5	I/O	+3.3V	
16	GPIO4	7	I/O	+3.3V	
17	GPIO5	11	I/O	+3.3V	
18	GPIO6	13	I/O	+3.3V	
19	GPIO7	15	I/O	+3.3V	
20	GPIO8	17	I/O	+3.3V	
21	GND		PWR		
22	AN1_ADC0	305	I	+3.3V	
23	AN1_ADC1	307	I	+3.3V	
24	AN1_ADC2	309	I	+3.3V	
25	AN1_TSWIP_ADC3	311	I	+3.3V	
26	AGND		PWR		
27	UART3_RXD	136	I	+3.3V	
28	UART3_TXD	134	O	+3.3V	
29	3.3V_SW		PWR	+3.3V	
30	UART4_RXD	140	I	+3.3V	
31	UART4_TXD	138	O	+3.3V	
32	GND		PWR		
33	PWM1	2	O	+3.3V	
34	PWM2	4	O	+3.3V	
35	PWM3	6	O	+3.3V	
36	PWM4	8	O	+3.3V	

3.11.4 Camera

Ixora offers a MIPI-CSI and Parallel Camera interface which is provided by the Apalis Module. These interfaces can be used capture image and video using CMOS or CDD image sensors. This interface supports a wide variety of operating modes, data widths, formats, and clocking schemes. For details, please see the corresponding Apalis module datasheet.

3.11.4.1 MIPI-CSI Connector (X28)

Connector type: Wurth, 687124182122 (24 pin , 0.5mm Pitch)

Pin	Signal Name	MXM3 Pin Number	I/O Type	Voltage	Pull-up/Pull-down
1	GND		PWR		
2	CSI_D0_N	155			
3	CSI_D0_P	157			
4	GND		PWR		
5	CSI_D1_N	149			
6	CSI_D1_P	151			
7	GND		PWR		
8	CSI_CLK_N	161			
9	CSI_CLK_P	163			
10	GND		PWR		
11	CSI_GPIO0_RST	1 (via R150)	I/O	+3.3V	
12	CAM1_MCLK	193	O	+3.3V	
13	I2C_CAM1_SCL	203	O	+3.3V	1.8K to 3.3V_SW
14	I2C_CAM1_SDA	201	I/O	+3.3V	1.8K to 3.3V_SW
15	3.3V_SW		PWR	+3.3V	
16	CSI_D2_N	143			
17	CSI_D2_P	145			
18	GND		PWR		
19	CSI_D3_N	137			
20	CSI_D3_P	139			
21	5V_SW		PWR	+5V	
22	CSI_GPIO1	3 (via R151)	I/O	+3.3V	
23	CSI_GPIO2	5 (via R152)	I/O	+3.3V	
24	CSI_GPIO3	7 (via R153)	I/O	+3.3V	

3.11.4.2 Parallel Camera Interface (X14)

Connector type: 2x10 Pin Header Male, 2.54mm

Pin	Signal Name	MXM3 Pin Number	I/O Type	Voltage	Pull-up/Pull-down
1	3.3V_SW		PWR		
2	3.3V_SW		PWR		
3	CAM1_MCLK	193	I/O	+3.3V	
4	CAM1_PCLK	191	I	+3.3V	
5	CAM1_HSYNC	197	I	+3.3V	
6	CAM1_VSYNC	195	I	+3.3V	
7	CAM1_D0	187	I	+3.3V	
8	CAM1_D1	185	I	+3.3V	
9	CAM1_D2	183	I	+3.3V	

Pin	Signal Name	MXM3 Pin Number	I/O Type	Voltage	Pull-up/Pull-down
10	CAM1_D3	181	I	+3.3V	
11	CAM1_D4	179	I	+3.3V	
12	CAM1_D5	177	I	+3.3V	
13	CAM1_D6	175	I	+3.3V	
14	CAM1_D7	173	I	+3.3V	
15	I2C_CAM1_SCL	203	O	+3.3V	1.8K to 3.3V_SW
16	I2C_CAM1_SDA	201	I/O	+3.3V	1.8K to 3.3V_SW
17	CAM1_D8	135	I	+3.3V	
18	CAM1_D9	159	I	+3.3V	
19	GND		PWR		
20	GND		PWR		

3.11.5 Real-Time Clock (RTC)

3.11.5.1 External RTC

The Ixora carrier board uses the STMicroelectronics, M41T0M6 chip as external RTC. I2C1 bus (MXM3_209 and MXM3_211) RTC can be assessed the external RTC.

3.11.5.2 Battery Holder (BAT1)

A 12 mm (diameter) coin cell/battery should be used with the Battery Holder (BAT1). Coin cell can be used to provide power backup to the external RTC circuits when external power supply is not available. The following types of batteries are supported: BR1216, CR1216, BR1220, CL1220, CR1220, BR1225.

Note:

The spring contact on the top side of the battery holder sets/bends based on the battery thickness.

In case a thicker battery (like BR1225, 2.5mm thickness) is inserted first, the spring contact will set and later if the battery is replaced by a thinner battery (like BR1220, 2.0mm thickness), the battery holder will not hold the replacement battery firmly.

Customers are advised to not to use a thinner battery after using the thicker battery with the battery holder (BAT1).

Connector type: KEYSTONE-3000

Pin	Description	Voltage
1	VCC_BATT	+3.0V
2	GND	

3.12 Memory

3.12.1 I2C EEPROM

With the Version 1.2, the Ixora carrier board supports an I2C EEPROM. The 2-Kbit AT34C02D is assembled and is connected through I2C1 bus (MXM3_209 and MXM3_211). The default I2C address is 0xA0. The address can be configured with external pull-up resistors. Floating pins are connected internally to GND. For Write Protect (WP) features, please consider the datasheet and the schematics. The default configuration allows normal write operations.

3.13 Recovery Mode

Connector type: 1x3 Pin Header Male, 2.54mm, not assembled

Pin	Description
1	1K to 3.3V
2	Recovery Mode
3	GND

For the recovery mode sequence, please refer to the Apalis module datasheet.

4 Electrical Characteristics

4.1 Electrical Specifications

Symbol	Description	Voltage	Min	Typ	Max	Unit
PWR_IN_V	Main power supply voltage (PWR_IN)	PWR_IN	7	24	27	V
PWR_IN_I	Main power supply current	PWR_IN	2.2		8	A
V_BACKUP	Optional RTC battery voltage		2	3	3.6	V
I_BACKUP	Optional RTC batter current at 3V (standby)			0.9	1.2	µA
I_(+5V)	Total current for external devices at power rail: X4 Pin 3 X27 Pin 12	+5V			2.5	A
I_(+3.3V)	Total current for external devices at power rail: X4 Pin 1 X27 Pin 29	+3.3V			1.5	A
I_Pin(X27)	Current for single power pin 29 of connector X27	+3.3V		0.5	1.5	A
I_Pin(X4)	Current for single power pin 1 of connector X4	+3.3V		1	1.5	A
I_Pin(X4)	Current for single power pin 3 of connector X4	+5V		1	2.5	A
I_Pin(X27)	Current for single power pin 12 of connector X27	+5V		1	2.5	A
I_Pin(X7)	Current for a single of connector X7	+5V			0.5	A
I_Pin(X8)	Current for a single pin of connector X8	+5V			0.5	A
I_Pin(X9)	Current for a single pin of connector X9	+5V			0.5	A

5 Temperature Range

5.1 Operating Temperature Range ($T_{ambient}$)

- -20 °C to +85 °C

5.2 Storage Temperature Range ($T_{storage}$)

- -20 °C to +85 °C

6 Mechanical Data

6.1 Ixora Carrier Board Dimensions - Top Side

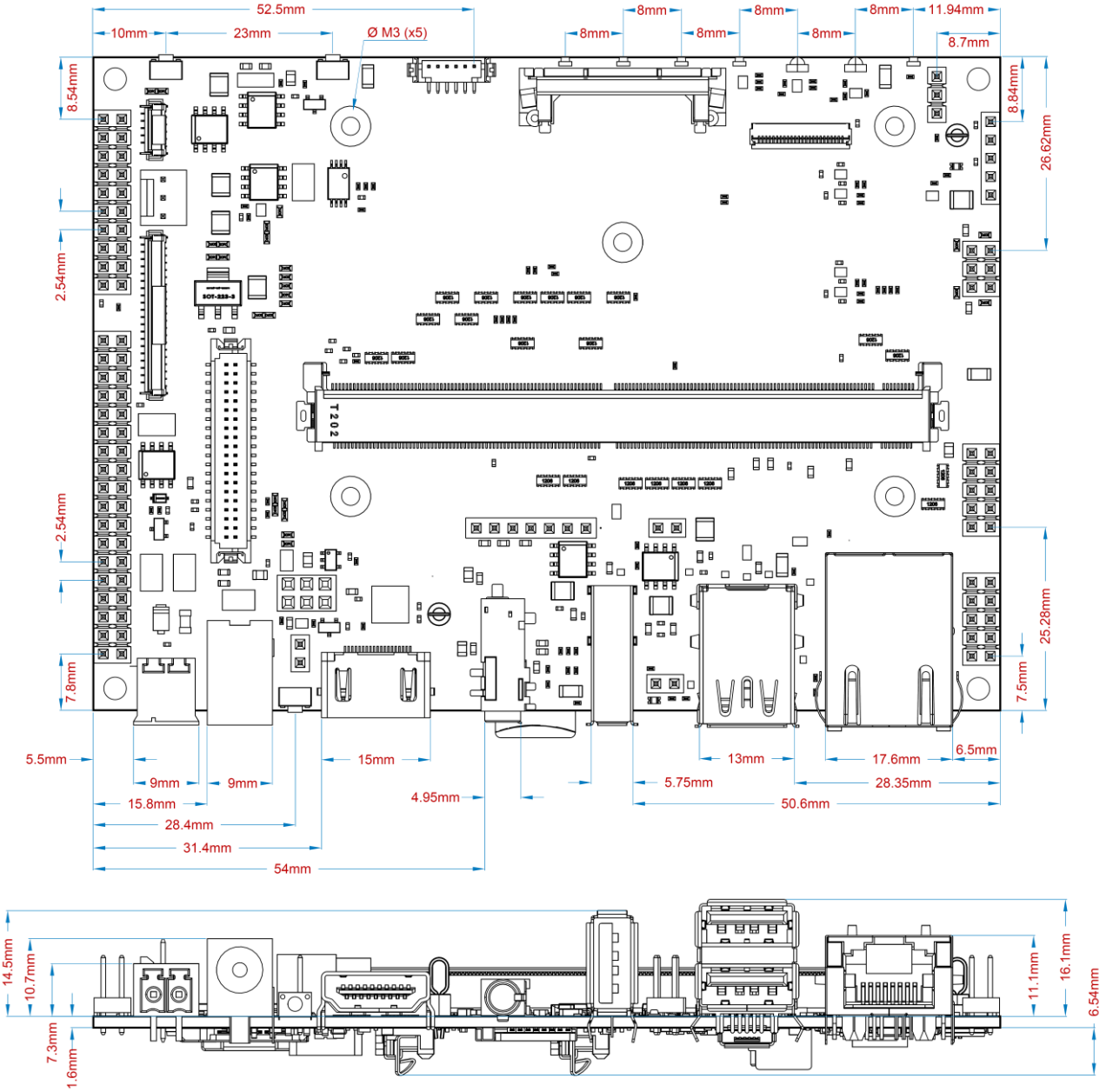

Fig.6 Ixora Carrier Board Mechanical Drawing – Top Side (All dimensions in millimeter)

6.2 Ixora Carrier Board Dimensions - Bottom Side

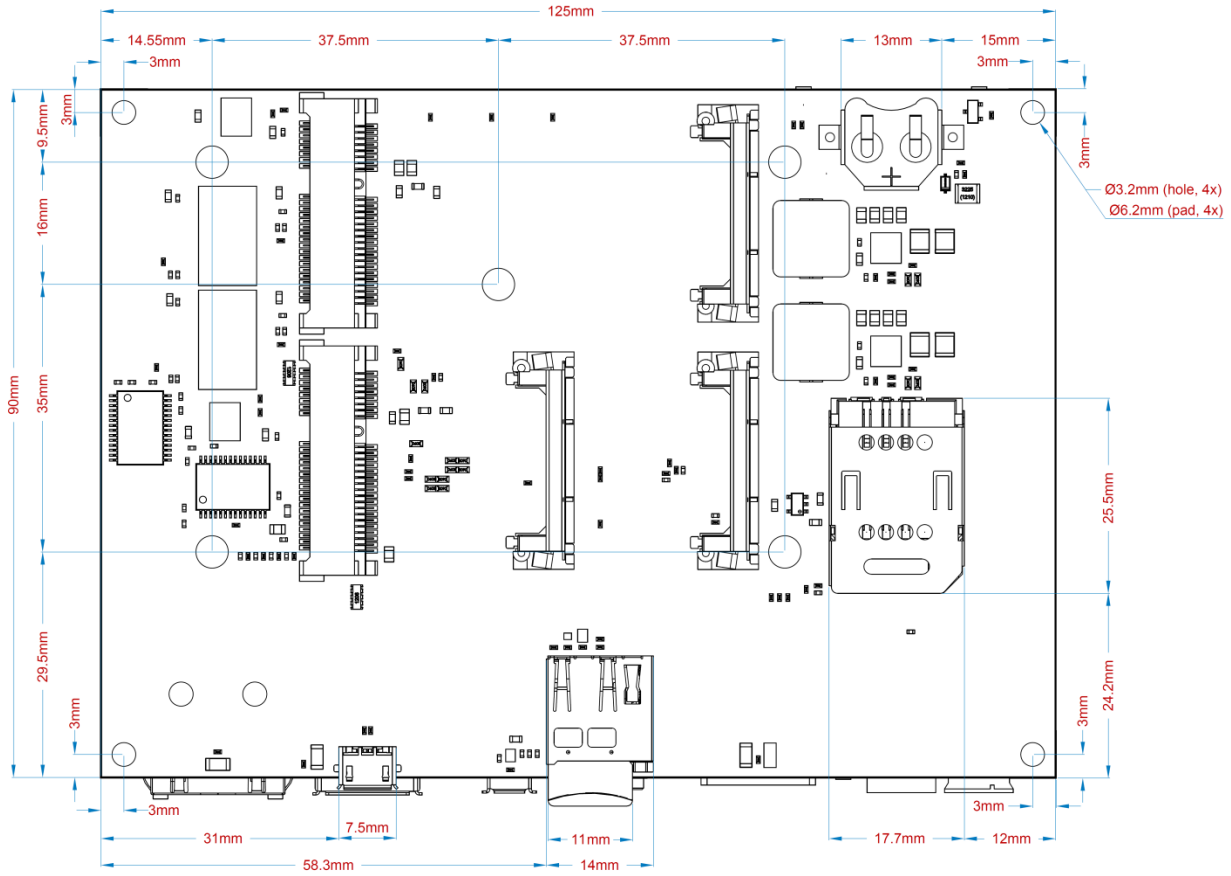

Fig.7 Ixora Carrier Board Mechanical Drawing – Bottom Side (All dimensions in millimeter)

7 Design Data

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

To download the carrier board design data, please use the web-link below:
http://developer.toradex.com/carrier-board-design

8 Product Compliance

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