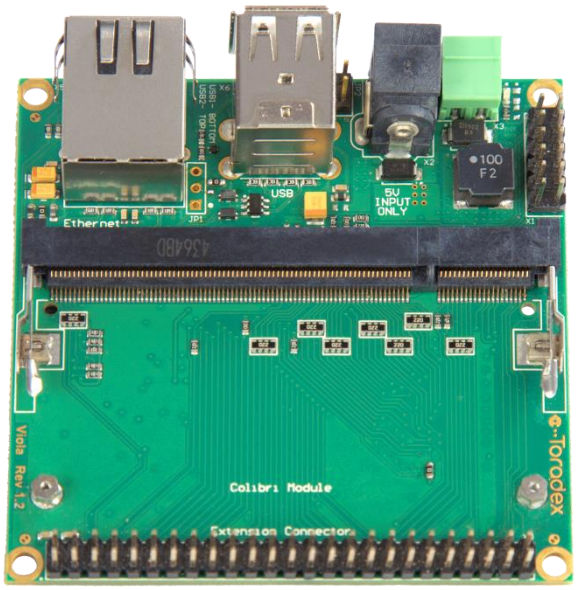
Viola V1.2
Viola Plus V1.2

Datasheet



Revision History

Date	Doc. Rev.	Viola Version	Changes
24-June-15	Rev. 1.0	V1.2	- Preliminary Draft
07-Oct-15	Rev. 1.1	V1.2	- Section 6, Mechanical Data: Updated dimensional drawings.
23-Nov-15	Rev. 1.2	V1.2	- Section 3.8.1, Extension Connector (X9): Minor Corrections.
12-Jan-16	Rev. 1.3	V1.2	- Section 3.8.2, Audio Connector (X10): Added note (Use DC blocking capacitors with the headphone out signals).
09-June-16	Rev. 1.4	V1.2	- Section 2.2, Hardware Architecture Block Diagram: Updated block diagram.
15-June-16	Rev. 1.5	V1.2	- Section 2.4.1, Viola Assembly Options – Top Side: Corrected position of the resistors R73 and R74 in the image. - Section 3.4.2, Center Tab Jumper (JP1): Corrected description with respect to the default assembly.
04-Aug-16	Rev. 1.6	V1.2	- Section 2.2, Hardware Architecture Block Diagram: Updated block diagram.

Contents

1. Introduction

The Viola carrier board is compatible with the entire family of the Colibri computer-on-modules. It has the smallest form factor among the Colibri carrier boards. Its optimized price v/s features trade-off makes it ideal for designing end-products for emerging markets.

1.1 Reference Documents

For detailed technical information about the suitable computer modules, please refer to the sections below:

1.1.1 Colibri Computer Modules

An overview of the Colibri product family:

http://www.toradex.com/products/colibri-arm-modules

1.1.2 Synchronous DC/DC Buck Converter

http://diodes.com/datasheets/AP6503.pdf

1.1.3 USB, Current Limiter, Power Distribution Switches

http://www.ti.com/product/tps2042b

2. Features

2.1 Overview

The Viola carrier board V1.2 is available in two assembly variants:

- Viola V1.2
- Viola Plus V1.2

These assembly variants have been created to provide optimized solution in terms of cost and design flexibility to our customers.

In this document, the term **"Viola carrier board"** will refer to both the variants of the carrier board, unless otherwise explicitly stated.

Please note that some of the features are module-specific and may not be supported by all the computer-on-modules in the Colibri family. For more details, refer to the datasheet of Colibri computer-on-modules.

Please note that changing the PCB assembly will void the product warranty.

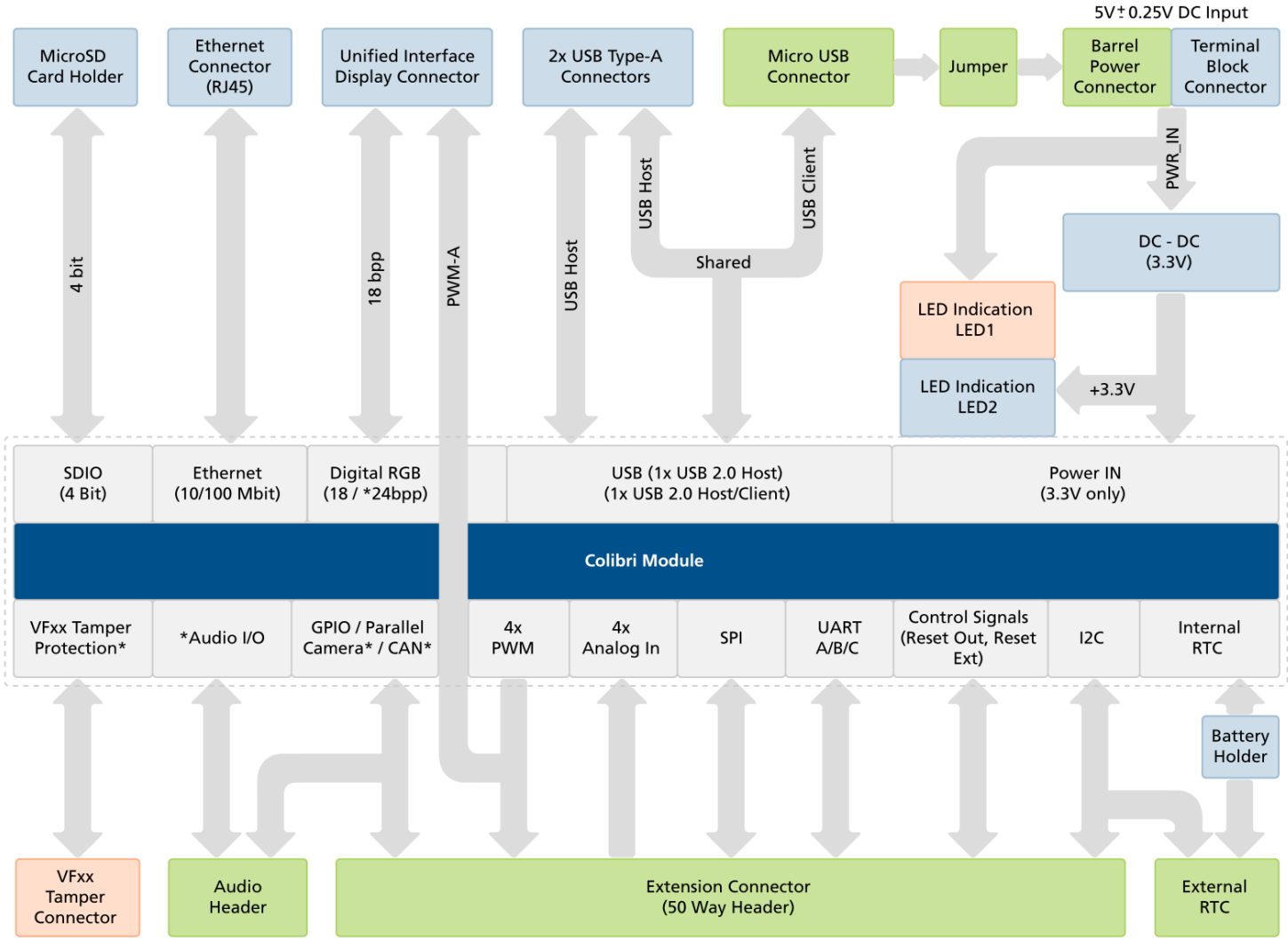
The following table lists down the differences between the two variants of the Viola carrier boards:

Features	Viola V1.2	Viola Plus V1.2
Ethernet Connector (X5)	✓	✓
2x USB Host, Type A USB Connector (X6)	✓	✓
USB Client, Micro AB type Connector (X4)	×	✓
Micro SD Card Connector (X8)	✓	✓
Unified TFT Interface with built-in resistive touch (X7)	✓	✓
Extension Connector (X9) • SPI, I2C, UART-A/B/C • PWM Outputs • CAN *(For more details, refer to Note 1)* • Parallel Camera Interface (CIF) ***** • Up to 35 GPIOs	×	✓
Audio Connector (X10) • Headphone L/R • Mic In • Audio Line In L/R • Parallel Camera Interface (CIF) *****	×	✓
External RTC	×	✓
Battery Connector (BAT1)	✓	✓
Barrel Power Supply Connector (X2)	×	✓
Terminal Block Power Supply Connector (X3)	✓	✓
VFxx Tamper Connector (X11)	×	×
Wide Input Voltage (+5V to +22V DC) *(For more details, refer to Section 3.2, Power Supply)*	✓	✓
Indication (LED2)	✓	✓

Note:

***** Parallel Camera Interface (CIF) signals are connected to the connectors X9 and X10.

2.2 Hardware Architecture Block Diagram



***** Please note that these features are module-specific and may not be supported by all the computer-on-modules in the Colibri family. For more details, refer to the datasheet of Colibri computer-on-modules.

Fig. 1 Viola Carrier Board Hardware Architecture

2.3 Physical Drawings

2.3.1 Top Side Connectors

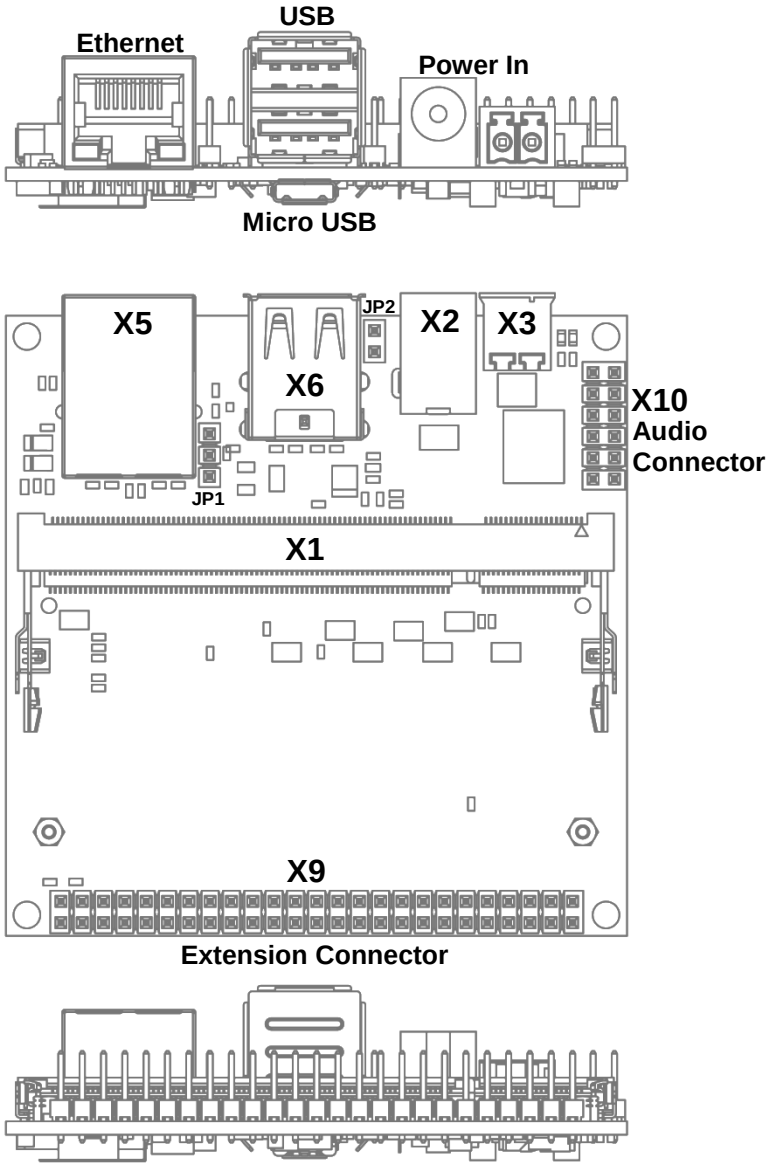


Fig. 2 Viola Carrier Board Connectors – Top Side

Ref	Description	Remarks
X1	Colibri SODIMM connector	
X2	Barrel power supply connector	
X3	Terminal Block power supply connector	
JP1	Central tab jumper	
X5	Ethernet connector	
X6	2x USB Host, Type A	Bottom: USB1 (shared with connector X4), Top: USB2
JP2	USB power jumper	
X9	Extension connector	
X10	Audio connector	

2.3.2 Bottom Side Connectors

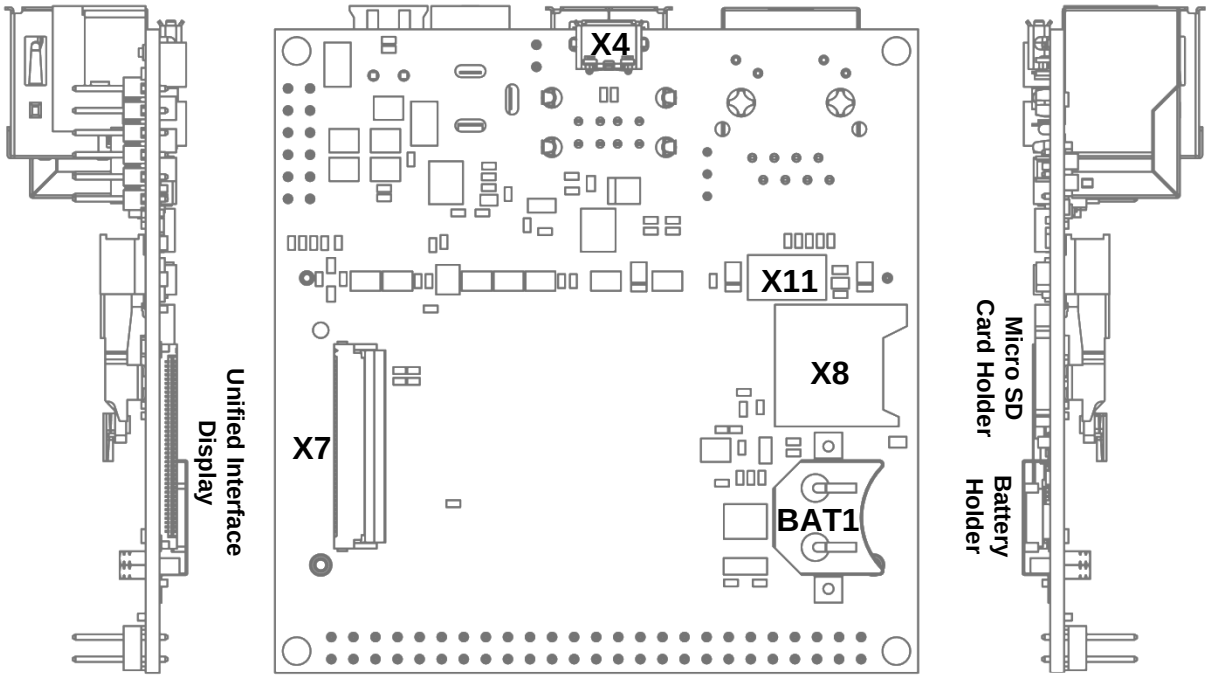


Fig. 3 Viola Carrier Board Connetors – Bottom Side

Ref.	Description	Remarks
X4	USB Client	Shared with connector X6 bottom (USB1)
X7	Unified TFT Interface	
X8	Micro SD Card Holder	
BAT1	12 mm Battery Holder	Supported batteries: BR1216, CR1216, BR1220, CL1220, CR1220, BR1225
X11	VFxx Tamper Connector	Not assembled

2.4 Assembly Options

This section marks/highlights the components on the Viola 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 Viola Assembly Options – Top Side

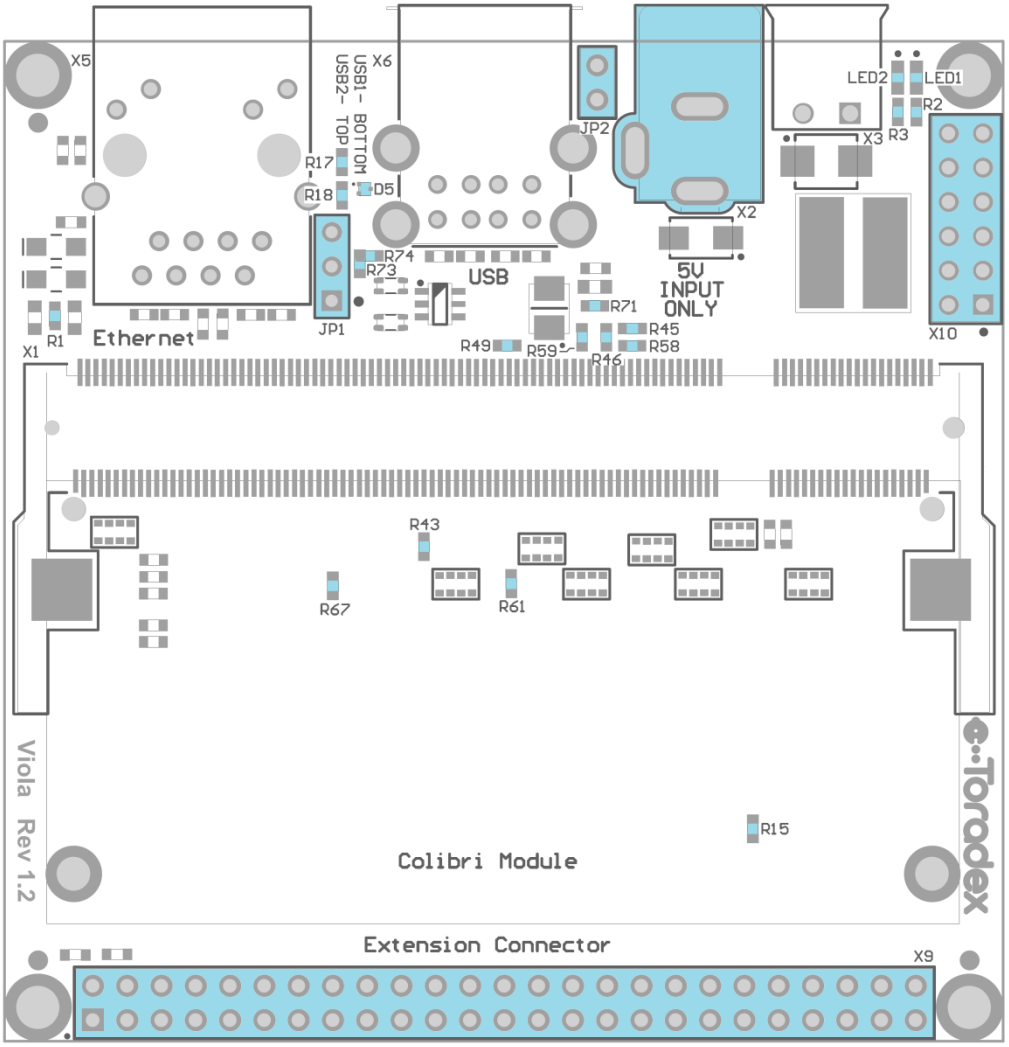


Fig.4 Viola Assembly Options – Top Side

2.4.2 Viola Assembly Options – Bottom Side

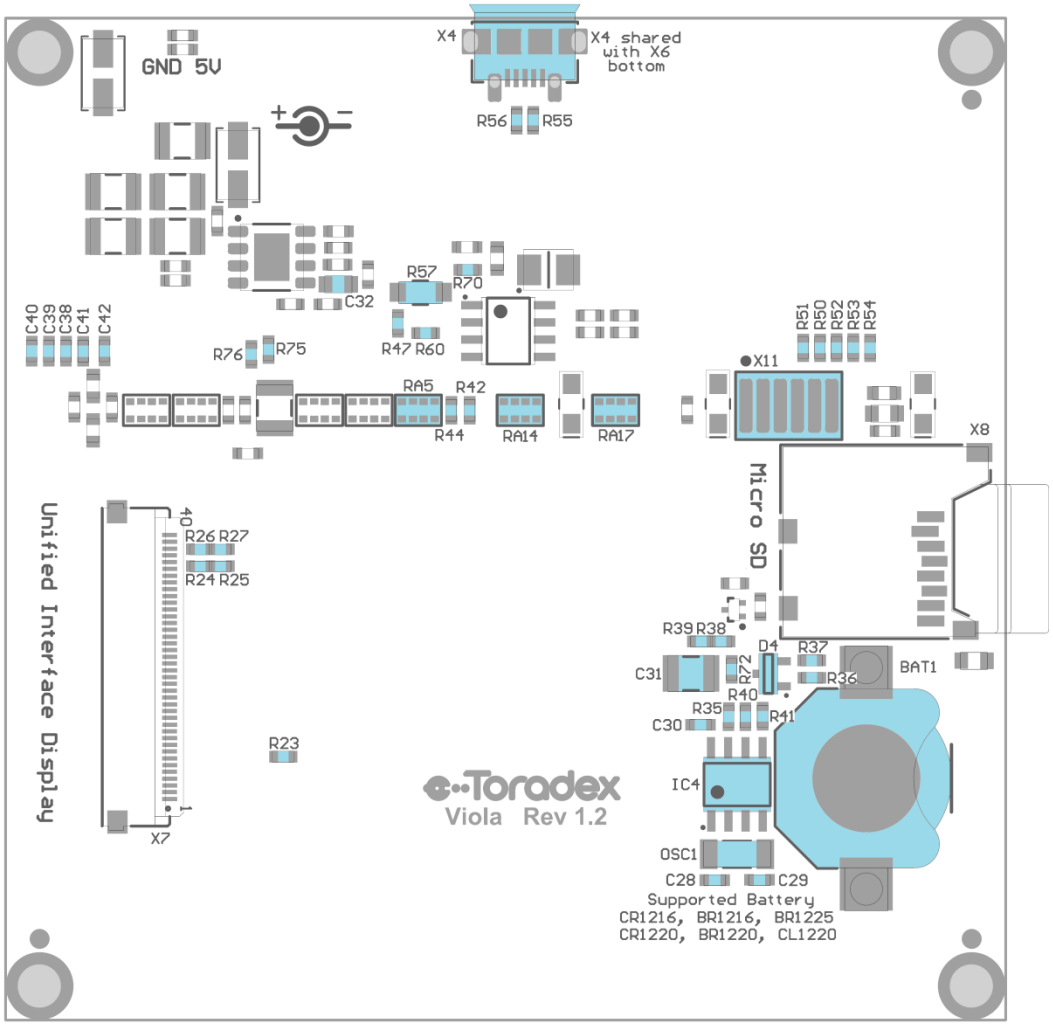


Fig.5 Viola Assembly Options – Bottom Side

3. Interface Description

3.1 Colibri Computer-On-Module

3.1.1 Colibri SODIMM Connector (X1)

Type: SODIMM 200 Socket
Manufacturer: Tyco Electronics-1473005-1
Refer to the *Colibri datasheets* for pin-out assignment details of the Colibri modules.

3.2 Power Supply

The Viola carrier board provides two connectors to supply the power to the board. It is recommended to use 5V +/-0.25V DC power supply to power-up the Viola carrier board.

- The connector X2, which is a standard 5.5 mm power jack barrel connector, is widely used in consumer electronic devices.
- The connector X3, which is a pluggable, terminal block type connector, is widely used in industrial applications.

WARNING:

- Power supply is not protected against reverse input voltage polarity and overvoltage.
- External power supply from +5V to +22V DC can be used to power-up the Viola carrier board. ***Special attention should be paid while using power supply rated higher than 5V +/-0.25V DC.***

  The power pins of a few interfaces or components are connected to **PWR_IN_FILT power rail** on the Viola carrier board, which are not rated to be used above 5V +/-0.25V DC. If an external power supply rated higher than 5V DC is used to power-up the Viola carrier board without the recommended hardware configuration, some components or connected devices may get permanently damaged due to overvoltage.

  The following condition should be met before using an external power supply rated higher than 5V +/-0.25V DC:

  1. Resistor R57 is ***not assembled*** (as USB power switch is rated for 5V DC). Jumper JP2 is left open circuited. The USB interface will not be functional during this condition.
  2. LED1 and R2 are ***not assembled***.
  3. Connector X9, pin 1 voltage level will be same as the external power supply. It should be ensured that any circuit which is rated lower than the external power supply should not be connected to the pin 1 of connector X9.

Toradex doesn't take any responsibility for any modification done by customers.

The following table describes the assembly option available on the Viola carrier board with respect to the Recovery mode:

Solution Selected	Assembly Options	Assembled Components on Viola V1.2	Assembled Components on Viola Plus V1.2	PCB Side
Recovery mode (Only with Colibri Txx)	Assemble 10 KΩ resistors R49 to enter recovery mode			Top

Please refer to figure 4 in *Section 2.5, Assembly Options* for the position of the resistor R49.

3.2.1 Barrel Power Supply Connector (X2)

Connector type: RAPC722X

Pin	Description	Voltage / range
1	PWR_IN	Recommended, 5V, +/- 0.25V
2	GND_IN	

By default, the Barrel Power Supply Connector (X2) is assembled on the Viola Plus V1.2.
Please refer to figure 4 in *Section 2.5, Assembly Options* for the position of the Barrel Power Supply Connector (X2).

3.2.2 Terminal Block Power Supply Connector (X3)

Connector type: Tyco 284512-2

Pin	Description	Voltage / range
1	GND_IN	
2	PWR_IN	Recommended, 5V, +/- 0.25V

3.2.3 USB Power Jumper (JP2)

Jumper JP2 can be used to power the Viola Carrier board using connector X4 (Micro USB).

The total power consumption of the system depends on the module/peripheral/accessories used. Please note that power available via Micro USB connector may not be sufficient for the modules or applications with high power requirements. In such cases, it is recommended to use an external power supply to power-up the system.

Connector type: 1x2 Pin Header Male, 2.54 mm

Jumper position	Description
Open	Use this configuration to power-up the Viola carrier board using external power supply
Closed	Use this configuration to power-up the Viola carrier board using Micro USB connector only

WARNING:

The Jumper JP2 should be left open circuited when using an external power supply rated higher than +5V to power-up the Viola carrier board.

For more details, please refer to *Viola carrier board V1.2 schematics*.

The USB Power Jumper (JP2) is assembled on the Viola Plus V1.2 by default.
Please refer to figure 4 in *Section 2.5, Assembly Options* for the position of the USB Power Jumper (JP2).

3.3 Indications

The Viola carrier board houses LEDs on the top side of the PCB for power indications. These LEDs start to glow when the input power supply is provided in the correct polarity.

Ref.	Description	Remarks
LED1	PWR_IN	Not assembled on both Viola V1.2 and Viola Plus V1.2. *For more details, refer to Section 3.2, Power Supply*
LED2	3.3V	Assembled on both Viola V1.2 and Viola Plus V1.2, by default.

3.4 Ethernet

3.4.1 Ethernet Connector (X5)

Connector type: RJ-45, Pulse J00-0065NL

Pin	Signal Name	SODIMM Pin	I/O Type	Voltage	Pull-up/Pull-down
1	ETH_TX0_P	189	O	+3.3V	50R to ETH_AVCC
2	ETH_TX0_N	187	O	+3.3V	50R to ETH_AVCC
3	ETH_RX1_P	195	I	+3.3V	50R to ETH_AVCC
4	ETH_AVCC (ETH_CT_TX)		PWR		
5	ETH_AGND (ETH_CT_RX)		PWR		
6	ETH_RX1_N	193	I	+3.3V	50R to ETH_AVCC
7	NC				
8	SHIELD				
9	+3.3V		PWR		
10	ETH_LINK_ACT	183	I	+3.3V	
11	ETH_SPEED	185	I	+3.3V	
12	+3.3V		PWR		
S1	SHIELD				
S2	SHIELD				

3.4.2 Central Tab Jumper (JP1)

Jumper JP1 should be configured based upon the Ethernet controller which is present on the installed Colibri module.

Header pin pitch: 2.54 mm.

Jumper position	Description
1-2	Use this configuration for Colibri PXA270 modules
2-3	Use this configuration for all other modules

Resistors R73 and R74 are placed in parallel with the Central Tab jumper. These resistors can be assembled instead of jumper JP1 to configure the Ethernet controller which is present on the installed Colibri module.

Jumper Resistor	Description
R73	Use this configuration for Colibri PXA270 modules
R74	Use this configuration for all other modules

By default, the resistor R74 is assembled whereas the resistor R73 and Central Tab Jumper (JP1) are not assembled on the Viola carrier board.
Please refer to figure 4 in *Section 2.5, Assembly Options* for the positions of resistors R73, R74 and Central Tab Jumper (JP1).

3.5 USB Interface

3.5.1 USB Host (X6)

The Viola carrier board features 2x USB 2.0 host interface using a dual stacked USB 2.0 type-A connector X6. The USB interface supports USB 2.0 high-speed and can operate at a maximum of 480 Mbit/s, depending on the Colibri module being used.

Connector type: USB Type-A Stacked, Mill-Max 896-43-008-90-000000

Pin	Description	SODIMM Number	I/O Type	Voltage	Remarks
L1	VCC_USB1		PWR	+5V	Refer *Section 3.2, Power Supply*
L2	USB_D1_N	145	I/O		Shared with connector X4
L3	USB_D1_P	143	I/O		Shared with connector X4
L4	GND		PWR		
U1	VCC_USB2		PWR	+5V	Refer *Section 3.2, Power Supply*
U2	USB_D2_N	141	I/O		
U3	USB_D2_P	139	I/O		
U4	GND		PWR		
S1	SHIELD				
S2	SHIELD				
S3	SHIELD				
S4	SHIELD				

3.5.2 USB Client (X4)

The USB Client interface is shared with the dual stacked USB 2.0 type-A connector X6 bottom (USB1). By default, USB1 interface is configured as the host device. Assembly options have been provided to configure and use USB Client interface. Special attention should be paid while using the USB Client Interface.

Connector type: Micro AB Type, Molex 47589-0001

Pin	Description	SODIMM Number	I/O Type	Voltage	Remarks
1	VCC_USB1		PWR	PWR_IN_FILT	Refer *Section 3.2, Power Supply*
2	USB_CLIENT_D1_N	145 (via R56)	I/O		Shared with connector X6
3	USB_CLIENT_D1_P	143 (via R55)	I/O		Shared with connector X6
4	USB_ID				Not Connected
5	GND		PWR		
S1	SHIELD				
S2	SHIELD				
S3	SHIELD				
S4	SHIELD				

The Micro USB Connector (X4) is assembled on the Viola Plus V1.2 by default.
The following table describes the assembly options available on the Viola carrier board with respect to the USB Client:

Solution Selected	Assembly Options	Assembled Components on Viola V1.2	Assembled Components on Viola Plus V1.2	PCB Side
USB Client	Assemble components X4, D5, R17, R18, R55, R56	R18	X4, D5, R17, R18, R55, R56	Top/Bottom

Please refer to figure 4 & 5 in *Section 2.5, Assembly Options* for the position of the components.

3.6 SD/MMC Interface

3.6.1 Micro SD Card Holder (X6)

Connector type: Amphenol 101-00581-59

Pin	Signal Name	SODIMM Number	I/O Type	Voltage	Pull-up/Pull-down
1	MM_DAT_2	51	I/O	+3.3V	68K to +3.3V
2	MM_DAT_3	53	I/O	+3.3V	68K to +3.3V
3	MM_CMD	190	I	+3.3V	33K to +3.3V
4	+3.3V		PWR	+3.3V	
5	MM_CLK	47	I	+3.3V	
6	GND		PWR		
7	MM_DAT_0	192	I/O	+3.3V	68K to +3.3V
8	MM_DAT_1	49	I/O	+3.3V	68K to +3.3V
CD1/2	MM_CD				
S1/2	SHIELD				

3.7 Display Interface

Viola carrier board provides a digital RGB interface port (18-bpp) to interface with the LCD panels using a 40-way, Unified Interface Display connector (X7). It also includes a 4-wire resistive touch screen interface on the same FFC connector.
The Unified Interface Display connector (X7) is compatible with the EDT Unified TFT Interface. A variety of LCD panels with integrated touch support for evaluation purposes are available at the Toradex Webshop.

The following image shows the display interface architecture that has been implemented on the Viola carrier board.

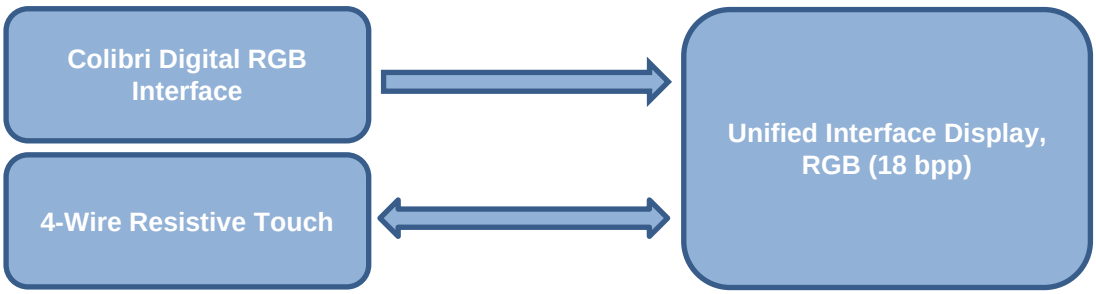


Fig.6 Display Interface Architecture

For customers looking for capacitive touch display solution, Viola carrier boards are fully compatible with the Toradex Capacitive Multi-Touch Display solution. Please refer to the following developer page link for more details:

- http://developer.toradex.com/product-selector/capacitive-multi-touch-display

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

- 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

3.7.1 Unified Interface Display Connector (X7)

Connector type: Omron XF2M-4015-1A

Pin	Signal Name	SODIMM Number	I/O Type	Voltage	Pull-up/Pull-down
1	GND		PWR		
2	GND		PWR		
3	+3.3V		PWR	+3.3V	
4	+3.3V		PWR	+3.3V	
5	BL_ON	71	O	+3.3V	
6	PWM_A	59	O	+3.3V	
7	LCD_RESET_OUT#	87	O	+3.3V	
8	LCD_BLUE_5	72	O	+3.3V	
9	LCD_BLUE_4	78	O	+3.3V	
10	LCD_BLUE_3	58	O	+3.3V	
11	LCD_BLUE_2	60	O	+3.3V	
12	LCD_BLUE_1	70	O	+3.3V	
13	LCD_BLUE_0	76	O	+3.3V	
14	GND		PWR		
15	LCD_GREEN_5	50	O	+3.3V	
16	LCD_GREEN _4	74	O	+3.3V	
17	LCD_GREEN _3	48	O	+3.3V	
18	LCD_GREEN _2	62	O	+3.3V	
19	LCD_GREEN _1	46	O	+3.3V	
20	LCD_GREEN _0	80	O	+3.3V	
21	GND		PWR		
22	LCD_RED_5	61	O	+3.3V	
23	LCD_RED_4	57	O	+3.3V	
24	LCD_RED_3	64	O	+3.3V	
25	LCD_RED_2	66	O	+3.3V	
26	LCD_RED_1	54	O	+3.3V	
27	LCD_RED_0	52	O	+3.3V	
28	LCD_PCLK_WR	56	O	+3.3V	
29	GND		PWR		
30	LCD_LCLK_A0	68	O	+3.3V	
31	LCD_FCLK_RD	82	O	+3.3V	
32	LCD_BIAS	44	O	+3.3V	
33	Connected to 3.3V or GND via assembly option. The default assembly is GND.		I	+3.3V / GND	
34	Connected to 3.3V or GND via assembly option. The default assembly is GND.		I	+3.3V / GND	
35	GND		PWR		
36	+3.3V		PWR	+3.3V	
37	TOUCH_TSPY	18	I	+3.3V	
38	TOUCH_TSMX	16	I	+3.3V	
39	TOUCH_TSMY	20	I	+3.3V	
40	TOUCH_TSPX	14	I	+3.3V	

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

Solution Selected	Assembly Options	Assembled Components on Viola V1.2	Assembled Components on Viola Plus V1.2	PCB Side
Unified Interface Display , Rotate display	Assemble appropriate 0R resistors R24, R25, R26, and R27. Refer to LCD TFT datasheet for configuration details.	R25, R27	R25, R27	Bottom

Please refer to figure 5 in *Section 2.5, Assembly Options* for the position of the resistors.

3.8 Digital and Analog I/O Interface

3.8.1 Extension Connector (X9)

The extension connector provides 50 pins with different functionalities. Some of these functions might change depending on the Colibri module that is used. The available signals are selected to provide good flexibility in terms of peripherals which can be attached to it.

Connector type: 2x25 Pin Header Male, 2.54 mm

Pin	Signal Name	SODIMM Number	I/O Type	Voltage	Pull-up/Pull-down
1	PWR_IN_FILT Refer *Section 1.2.7, Power Supply*		PWR	PWR_IN	
2	RESET_EXT#	26	I	+3.3V	
3	RESET_OUT#	87	O	+3.3V	
4	+3.3V		PWR	+3.3V	
5	I2C_SCL	196	I/O	+3.3V	4.7K to +3.3V
6	I2C_SDA	194	I/O	+3.3V	4.7K to +3.3V
7	GND		PWR		
8	SODIMM_135 (GPIO)	135	I/O	+3.3V	
9	SODIMM_98 (GPIO)	98	I/O	+3.3V	
10	SODIMM_133 (GPIO)	133	I/O	+3.3V	
11	SODIMM_103 (GPIO)	103	I/O	+3.3V	
12	SODIMM_101 (GPIO)	101	I/O	+3.3V	
13	SODIMM_97 (GPIO)	97	I/O	+3.3V	
14	SODIMM_85 (GPIO)	85	I/O	+3.3V	
15	SODIMM_79(GPIO)	79	I/O	+3.3V	
16	SODIMM_45 (GPIO)	45	I/O	+3.3V	
17	SODIMM_55 (GPIO) *(Refer note 1)*	55	I/O	+3.3V	100K to +3.3V
18	SODIMM_63 (GPIO) *(Refer note 1)*	63	I/O	+3.3V	100K to +3.3V
19	GND		PWR		
20	SSP_TX	92	O	+3.3V	
21	SSP_RX	90	I	+3.3V	
22	SSP_CLK	88	I/O	+3.3V	
23	SSP_CS	86	I/O	+3.3V	
24	GND		PWR		
25	UART_A_RI	37	I	+3.3V	
26	UART_A_TXD	35	O	+3.3V	
27	UART_A_RXD	33	I	+3.3V	

Pin	Signal Name	SODIMM Number	I/O Type	Voltage	Pull-up/Pull-down
28	UART_A_ DCD	31	I	+3.3V	
29	UART_A_ DSR	29	I	+3.3V	
30	UART_A_ RTS	27	O	+3.3V	
31	UART_A_ CTS	25	I	+3.3V	
32	UART_A_ DTR	23	O	+3.3V	
33	GND		PWR		
34	UART_C_ TXD	21	O	+3.3V	
35	UART_C_ RXD	19	I	+3.3V	
36	UART_B_TXD	38	O	+3.3V	
37	UART_B_RXD	36	I	+3.3V	
38	UART_B_RTS	34	O	+3.3V	
39	UART_B_CTS	32	I	+3.3V	
40	GND		PWR		
41	PWM_A *(Refer note 2)*	59	O	+3.3V	
42	PWM_B	28	O	+3.3V	
43	PWM_C	30	O	+3.3V	
44	PWM_D *(Refer note 2)*	67, 152	O	+3.3V	
45	GND		PWR		
46	AGND_AUDIO		PWR		
47	ANALOG_IN0	8	I	+3.3V	
48	ANALOG_IN1	6	I	+3.3V	
49	ANALOG_IN2	4	I	+3.3V	
50	ANALOG_IN3	2	I	+3.3V	

Note 1:

- On Colibri VFxx and iMX6, PIN_55 and PIN_63 supports on-module CAN. CAN1_TX and CAN1_RX are available on PIN_55 and PIN_63 respectively. This is a module-specific feature and may not be supported by all the computer-on-modules in the Colibri family. For more details, refer to the datasheet of Colibri computer-on-modules.

Note 2:

- The PWM_A signal is also routed to the RGB display connector (X7) to provide backlight brightness control for the connected LCD displays. It is the reason why a populated zero ohm resistor (R15) has been placed before the connector X9.
  Please refer to figure 4 in *Section 2.5, Assembly Options* for the position of R15.
- The Colibri PXA3XX does not support the PWM_D signal on pin 67; however, it is available on pin 152 of the SODIMM connector. An option has been provided through a 0 (zero) ohm resistor (R42), which is, by default, not part of the assembly. This resistor allows you to connect SODIMM 152 to pin 42 of the Extension Connector.
  Please refer to the figure 5 in *Section 2.5, Assembly Options* for the position of R42.

The Extension Connector (X9) is assembled on the Viola Plus V1.2 by default.
Please refer to figure 4 in *Section 2.5, Assembly Options* for the position of the Extension Connector (X9).

3.8.2 Audio Connector (X10)

The audio connector provides analogue audio signals like Headphone Out (Left/Right/Ground), Mic In, Audio In (Left/Right). In addition, five (5) parallel camera interface/GPIO signals are also connected to the audio connector.

Please note that these features are module-specific and may not be supported by all the computer-on-modules in the Colibri family. For more details, refer to the datasheet of Colibri computer-on-modules.

Connector type: 2x6 Pin Header Male, 2.54 mm

Pin	Signal Name	SODIMM Number	I/O Type	Voltage	Pull-up/Pull-down
1	AUDIO_MIC_IN	1	I		
2	AUDIO_HEADPHONE_R *	17	O		
3	AUDIO_LINEIN_R	7	I		
4	AUDIO_HEADPHONE_GND	13	PWR		
5	AUDIO_LINEIN_L	5	I		
6	AUDIO_HEADPHONE_L *	15	O		
7	AGND_AUDIO		PWR		
8	SODIMM_81	81	I/O	+3.3V	100K to GND
9	SODIMM_94	94	I/O	+3.3V	
10	SODIMM_96	96	I/O	+3.3V	
11	SODIMM_65	65	I/O	+3.3V	100K to +3.3V
12	SODIMM_75	75	I/O	+3.3V	

The Audio Connector (X10) and its related components are assembled on the Viola Plus V1.2 by default.
The following table describes the assembly options available on the Viola carrier board with respect to the Audio Interface:

Solution Selected	Assembly Options	Assembled Components on Viola V1.2	Assembled Components on Viola Plus V1.2	PCB Side
Audio Interface	Assemble components X10, C38, C39, C40, C41, C42		X10, C38, C39, C40, C41, C42	Top/Bottom

Please refer to figure 4 & 5 in *Section 2.5, Assembly Options* for the position of the Audio Connector (X10).

Note:

***** Audio output circuit without DC blocking capacitors produce poor quality sound.
It is highly recommended to use the DC blocking capacitors (externally) in series with AUDIO_HEADPHONE_R/L signals and AGND_AUDIO signal should be used as reference ground. Headphone Out circuit used on the Colibri Evaluation board can be used as reference circuit. Please refer the Colibri Evaluation board schematic for more details.

3.8.3 Parallel Camera Interface (CIF)

The parallel camera interface signals are available at connectors X9 and X10 on the Viola carrier board.

Please note that parallel camera interface signals available on the connectors X9 and X10 are configured as alternate functions when using the factory settings. The user is responsible for reconfiguring these default settings prior to using the interface, which may involve changing the software configuration.

This is a module-specific feature and may not be supported by all the computer-on-modules in the Colibri family. For more details, refer to the datasheet of Colibri computer-on-modules.

The following table shows the Parallel Camera Interface (CIF) signals available on the connector X9:

Pin	Signal Name	SODIMM Number	I/O Type	Voltage	Pull-up/Pull-down
9	CIF_D_1	98	I/O	+3.3V	
11	CIF_D_3	103	I/O	+3.3V	
12	CIF_D_2	101	I/O	+3.3V	
13	CIF_D_5	97	I/O	+3.3V	
14	CIF_D_8	85	I/O	+3.3V	
15	CIF_D_4	79	I/O	+3.3V	
41	CIF_D_7	59	I/O	+3.3V	
44	CIF_D_6	67	I/O	+3.3V	

The following table shows the Parallel Camera Interface (CIF) signals available on the connector X10:

Pin	Signal Name	SODIMM Number	I/O Type	Voltage	Pull-up/Pull-down
8	CIF_VSYNC	81	I/O	+3.3V	100K to GND
9	CIF_HSYNC	94	I/O	+3.3V	
10	CIF_PCLK	96	I/O	+3.3V	
11	CIF_D_9	65	I/O	+3.3V	100K to +3.3V
12	CIF_MCLK	75	I/O	+3.3V	

The following table describes the assembly options available on the Viola carrier board with respect to the Parallel Camera Interface:

Solution Selected	Assembly Options	Assembled Components on Viola V1.2	Assembled Components on Viola Plus V1.2	PCB Side
Parallel Camera Interface Signals	Assemble components X9, X10, R58, R59, R60, R67, R75, R76, RA5, RA14, RA17	R58, R60, R67, RA5, RA14, RA17	X9, X10, R58, R59, R60, R67, R75, R76, RA5, RA14, RA17	Top/Bottom

Please refer to figure 4 & 5 in *Section 2.5, Assembly Options* for the position of the components.

3.9 Real Time Clock (RTC)

3.9.1 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 internal or external RTC circuits when external power supply is not available. The following type of batteries are supported: BR1216, CR1216, BR1220, CL1220, CR1220, BR1225.
Connector type: KEYSTONE-3000

Pin	Description	Voltage
1	VCC_BAT	+3.0V
2	GND	

On Viola V1.2, Battery Holder (BAT) is used to provided backup power to the Internal RTC (available on the Colibri module).
On Viola Plus V1.2, Battery Holder (BAT) is used to provided backup power to the External RTC (available on the Viola carrier board). Internal RTC is powered using external power supply, backup power is not available.

3.9.2 External RTC

The Viola carrier board provides an on-board External RTC solution using STMicroelectronics, M41T0M6.

The External RTC circuit is assembled on the Viola Plus V1.2 by default.
The following table describes the assembly options available on the Viola carrier board with respect to the Real Time Clock (RTC):

Solution Selected	Assembly Options	Assembled Components on Viola V1.2	Assembled Components on Viola Plus V1.2	PCB Side
Battery powered internal RTC	Assemble components BAT1, D4, R36, R37, R38 Disassemble components R39, R72	BAT1, D4, R36, R37, R38	BAT1, D4, R36, R37, R39, R72	Bottom
Battery powered external RTC	Assemble components BAT1, D4, R35, R36, R37, R39, R72, C28, C29, C30, C31, OSC1, IC4 Disassemble components R38	BAT1, D4, R36, R37, R38	BAT1, D4, R35, R36, R37, R39, R72, C30, C31, OCS1, IC4	Bottom

Please refer to figure 5 in *Section 2.5, Assembly Options* for the position of the components.

3.10 Colibri VFxx Anti-Tamper Protection

3.10.1 VFxx Tamper Connector (X11)

The Freescale Vybrid SoC supports advance security features like Passive and Active Tamper Detection. This is a module-specific feature and may not be supported by all the computer-on-modules in the Colibri family.

For more details, refer to the Freescale Security Reference Manual OR contact Toradex Support.

Connector type: 1x6 Pin Header, 1.27 mm

Pin	Signal Name	SODIMM Number	I/O Type	Voltage	Pull-up/Pull-down
1	VFXX_EXT_TAMPER0	170	I		
2	VFXX_EXT_TAMPER1	172	I		
3	VFXX_EXT_TAMPER2	174	I/O		
4	VFXX_EXT_TAMPER3	176	I/O		
5	VFXX_EXT_TAMPER4	178	I/O		
6	VFXX_EXT_TAMPER5	180	I/O		

By default, the VFxx Tamper Connector (X11) is not assembled on Viola V1.2 and Viola Plus V1.2. Please refer to the figure 5 in *Section 2.5, Assembly Options* for the position of VFxx Tamper Connector (X11).

4. Electrical Characteristics

4.1 Electrical Specifications

Symbol	Description	Voltage	Min	Typ	Max	Unit
PWR_IN_V	Main power supply voltage (PWR_IN)		4.75	5	22	V
PWR_IN_I	Main power supply current		-		5	A
V_BACKUP	Optional RTC battery voltage		2.3	3	3.6	V
I_(PWR_IN)	Maximum continuous current at power rail	PWR_IN			2.0	A
I_(+3.3V)	Maximum continuous current at power rail	+3.3V			3.0	A
I_Pin(X9)	Current for single power pin 4 of connector X9	+3.3V			2.5	A
I_Pin(X9)	Current for single power pin 1 of connector X9	PWR_IN			2.5	A
I_Pin(X6)	Current available for 2X USB Host on connector X6 Maximum current limit on each USB is 500mA	+5V			1.0	A

5. Temperature Range

5.1 Operating Temperature Range

- +0 °C to +70 °C

We are working on extending temperature range of the Viola carrier board.

6. Mechanical Data

6.1 Viola Dimensions – Top Side

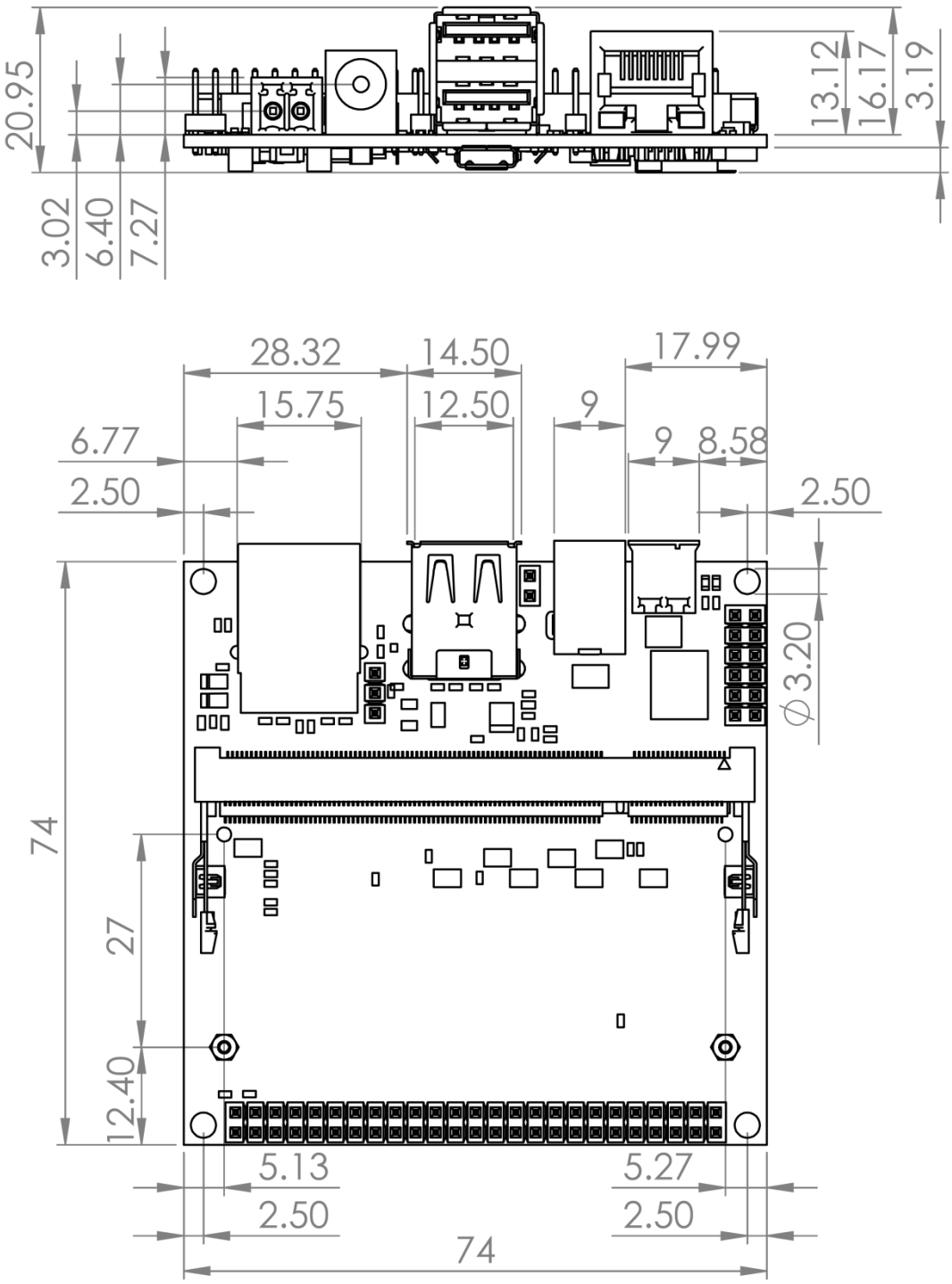


Fig.7 Viola Dimensions – Top Side, all dimensions are in millimetres (mm)

6.2 Viola Dimensions - Bottom Side

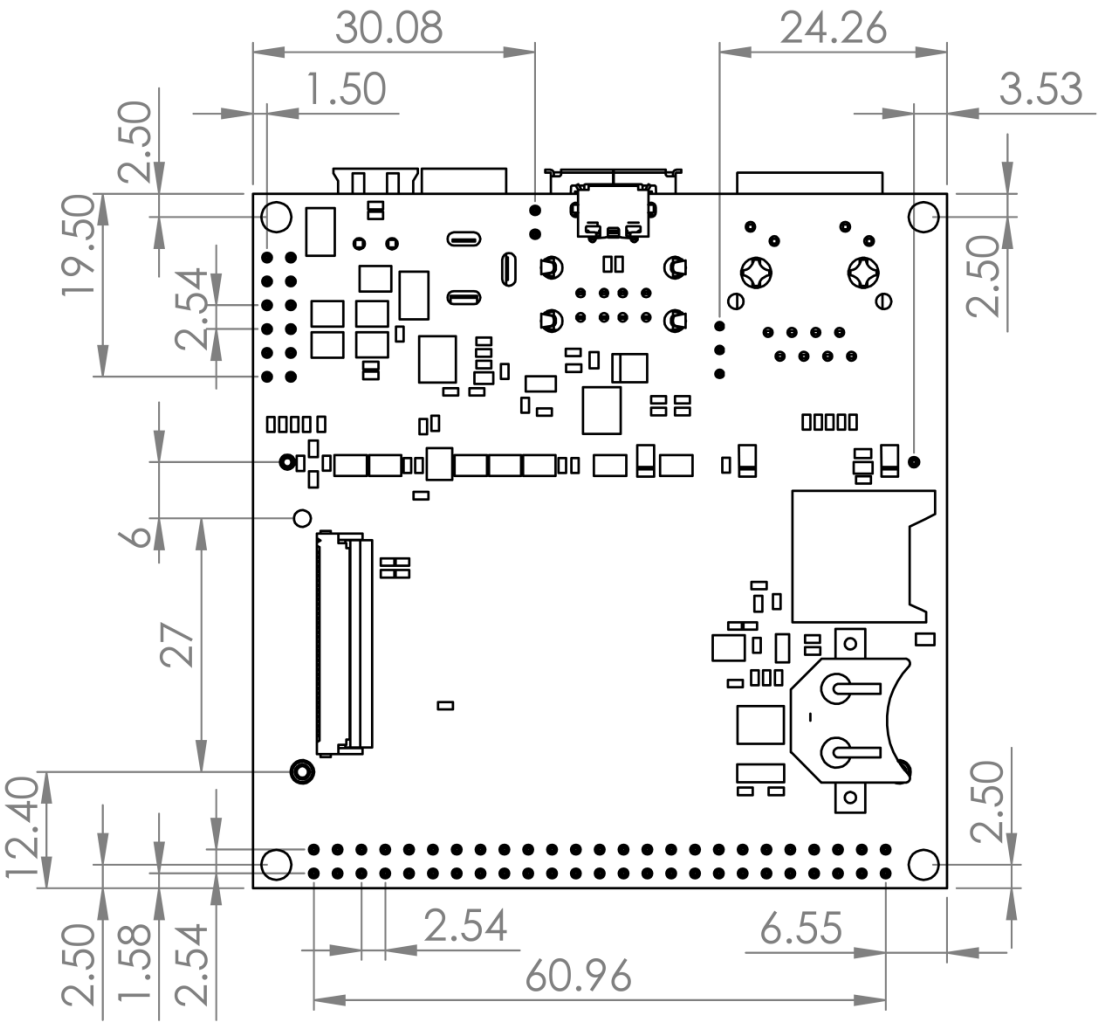


Fig.8 Viola Dimensions – Bottom Side, all dimensions are in millimetres (mm)

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/hardware-resources/arm-family/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