

# Iris V1.1

## Datasheet



## Revision History

| Date       | Doc. Rev. | Iris Version | Changes                                                                                                                                                                                                                                                                               |
|------------|-----------|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 25-Sept-15 | Rev. 1.0  | V1.1         | Initial Release: Datasheet has been updated to new format.<br>Please note: FF UART has been renamed to UART-A, BT UART to UART-B and STD UART to UART-C.                                                                                                                              |
| 07-July-16 | Rev. 1.1  | V1.1         | Section 2.2, Hardware Architecture Block Diagram: Updated block diagram (fig 1).                                                                                                                                                                                                      |
| 04-Aug-16  | Rev. 1.2  | V1.1         | Section 2.2, Hardware Architecture Block Diagram: Updated block diagram (fig 1).                                                                                                                                                                                                      |
| 30-Sept-16 | Rev. 1.3  | V1.1         | Section 2.2, Hardware Architecture Block Diagram: Updated block diagram (fig 1).                                                                                                                                                                                                      |
| 07-Feb-17  | Rev. 1.4  | V1.1         | Section 1.1, Reference Documents: Updated web-links.<br>Section 3.7.2, Unified Interface Display Connector (X3): Updated web-links.<br>Section 3.10.2, Battery Holder (BAT1): Added note regarding battery holder spring contact issue.<br>Section 7, Design data: Updated web-links. |
| 11-Nov-18  | Rev. 1.5  | V1.1         | Section 2.3.1, Top Side Connectors: Updated figure 2.                                                                                                                                                                                                                                 |
| 02-May-19  | Rev. 1.6  | V1.1         | Updated 3.7 with correct graphic and information.                                                                                                                                                                                                                                     |

## Contents

|                                                               |    |
|---------------------------------------------------------------|----|
| 1. Introduction .....                                         | 5  |
| 1.1. Reference Documents .....                                | 5  |
| 1.1.1 Colibri Computer Modules .....                          | 5  |
| 1.1.2 Synchronous DC/DC Buck Converter .....                  | 5  |
| 1.1.3 USB, Current Limiter, Power Distribution Switches ..... | 5  |
| 1.1.4 LVDS Transmitter .....                                  | 5  |
| 1.1.5 Video DAC, Parallel RGB to VGA .....                    | 5  |
| 2. Features .....                                             | 6  |
| 2.1. Overview .....                                           | 6  |
| 2.2. Hardware Architecture Block Diagram .....                | 7  |
| 2.3. Physical Drawings .....                                  | 8  |
| 2.3.1 Top Side Connectors: Physical Drawing .....             | 8  |
| 2.3.2 Bottom Side Connectors: Physical Drawing .....          | 9  |
| 2.4. Assembly Options .....                                   | 10 |
| 2.4.1 Iris Assembly Options – Top Side .....                  | 10 |
| 2.4.2 Iris Assembly Options – Bottom Side .....               | 11 |
| 3. Interface Description .....                                | 12 |
| 3.1. Colibri Computer-On-Module .....                         | 12 |
| 3.1.1 Colibri SODIMM Connector (X1) .....                     | 12 |
| 3.1.2 Boot Mode header (JP1) .....                            | 12 |
| 3.2. Power Supply .....                                       | 12 |
| 3.2.1 Terminal Block Power Supply Connector (X17) .....       | 12 |
| 3.2.2 Power Out Header (X20) .....                            | 12 |
| 3.3. Indications .....                                        | 13 |
| 3.4. Ethernet .....                                           | 13 |
| 3.4.1 Ethernet Connector (X15) .....                          | 13 |
| 3.4.2 Central Tab Jumper (JP2) .....                          | 13 |
| 3.5. USB Interface .....                                      | 14 |
| 3.5.1 USB Host (X11) .....                                    | 14 |
| 3.5.2 USB Host/Client (X12) .....                             | 14 |
| 3.6. SD/MMC Interface .....                                   | 14 |
| 3.6.1 Micro SD Card Holder (X10) .....                        | 14 |
| 3.7. Display Interface .....                                  | 15 |
| 3.7.1 DVI FFC connector (X2) .....                            | 17 |
| 3.7.2 Unified Interface Display Connector (X3) .....          | 18 |
| 3.7.3 DVI-I Connector (X4) .....                              | 19 |

|        |                                        |    |
|--------|----------------------------------------|----|
| 3.7.4  | LVDS Connector (X7).....               | 20 |
| 3.8.   | Audio Interface .....                  | 21 |
| 3.8.1  | Audio Jack (X8) .....                  | 21 |
| 3.8.2  | Audio Header (X9).....                 | 21 |
| 3.9.   | Digital and Analog I/O Interface ..... | 22 |
| 3.9.1  | UART-A RS-232 header (X13) .....       | 22 |
| 3.9.2  | UART-B/C RS-232 header (X14) .....     | 22 |
| 3.9.3  | Extension Connector (X16) .....        | 23 |
| 3.9.4  | Touch Connector (X19) .....            | 24 |
| 3.10.  | Real-Time Clock (RTC).....             | 25 |
| 3.10.1 | External RTC .....                     | 25 |
| 3.10.2 | Battery Holder (BAT1) .....            | 25 |
| 4.     | Electrical Characteristics.....        | 26 |
| 4.1.   | Electrical Specifications .....        | 26 |
| 5.     | Temperature Range.....                 | 26 |
| 5.1.   | Operating Temperature Range .....      | 26 |
| 6.     | Mechanical Data .....                  | 27 |
| 6.1.   | Iris Dimensions – Top Side .....       | 27 |
| 6.2.   | Iris Dimensions – Bottom Side.....     | 28 |
| 7.     | Design Data.....                       | 29 |
| 8.     | Product Compliance .....               | 29 |

## 1. Introduction

---

Iris is a carrier board for the Colibri family of computer-on-modules. Iris supports all modules in the Colibri product family, and includes support for the additional/enhanced functionality available on the latest products in Colibri family.

### 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:

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

#### 1.1.2 Synchronous DC/DC Buck Converter

<http://www.ti.com/product/tps51120>

#### 1.1.3 USB, Current Limiter, Power Distribution Switches

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

#### 1.1.4 LVDS Transmitter

[http://www.thine.co.jp/en/products/num\\_details/THC63LVD827.html](http://www.thine.co.jp/en/products/num_details/THC63LVD827.html)

#### 1.1.5 Video DAC, Parallel RGB to VGA

<http://www.analog.com/en/products/digital-to-analog-converters/da-converters/adv7125.html>

## 2. Features

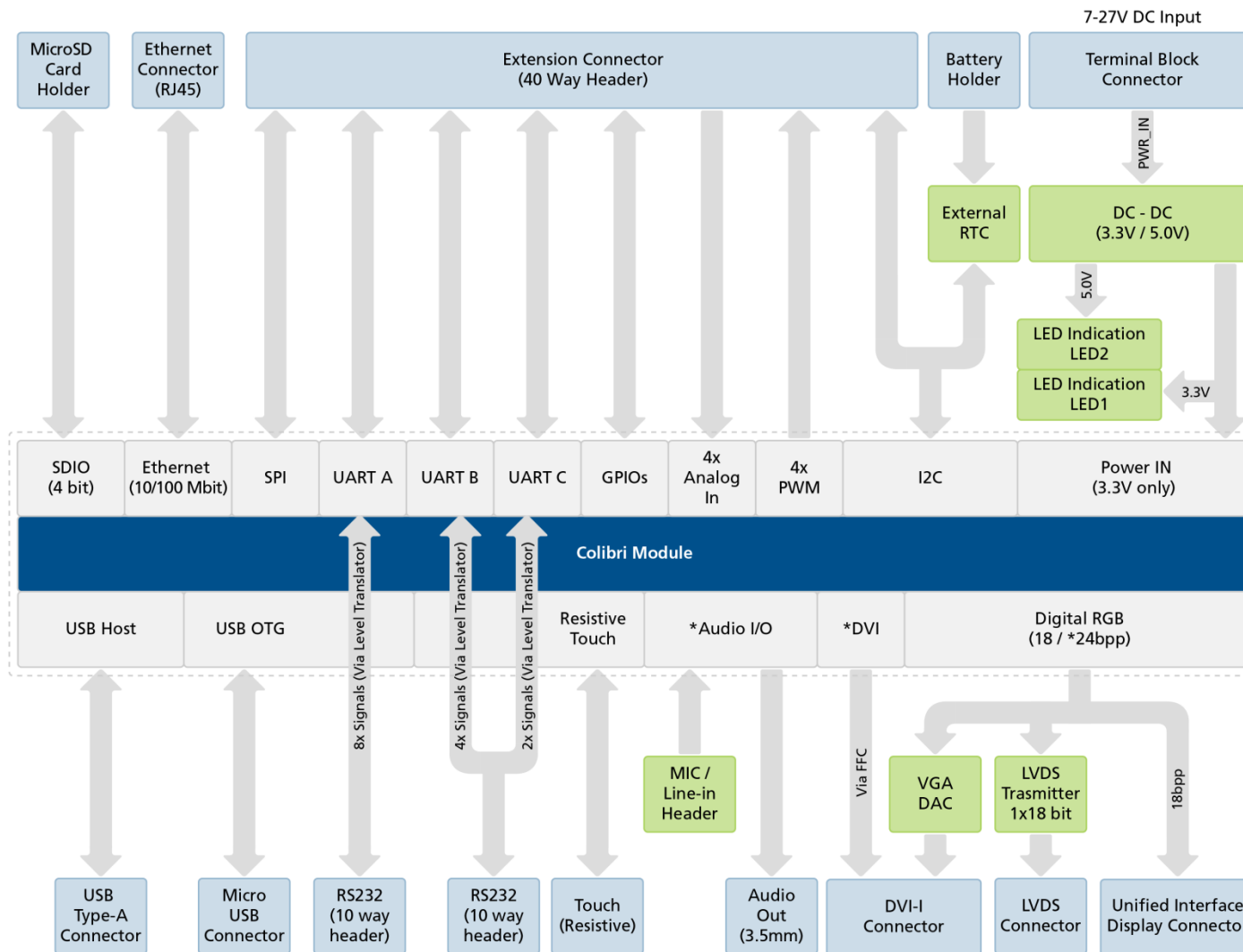
---

### 2.1. Overview

Iris carrier board provides the following features and communication interfaces:

- USB Type-A and OTG Micro-AB connectors for host and host/client
- RJ45 Ethernet
- Micro SD card slot
- Digital (TDMS) and Analog (VGA) interfaces on a single DVI-I connector
- LVDS interface
- Digital RGB interface
- Resistive touch screen connector
- Capacitive touch connector
- Audio out on 3.5mm stereo jack
- Microphone In and Line-In on audio header
- SSP, I2C, 4 ADCs, 4 PWMs and 8 GPIOs on extension header
- UART-A/B/C available with TTL and RS-232 level
- Real-time clock with battery backup
- Resistive touch screen connector

## 2.2. Hardware Architecture Block Diagram

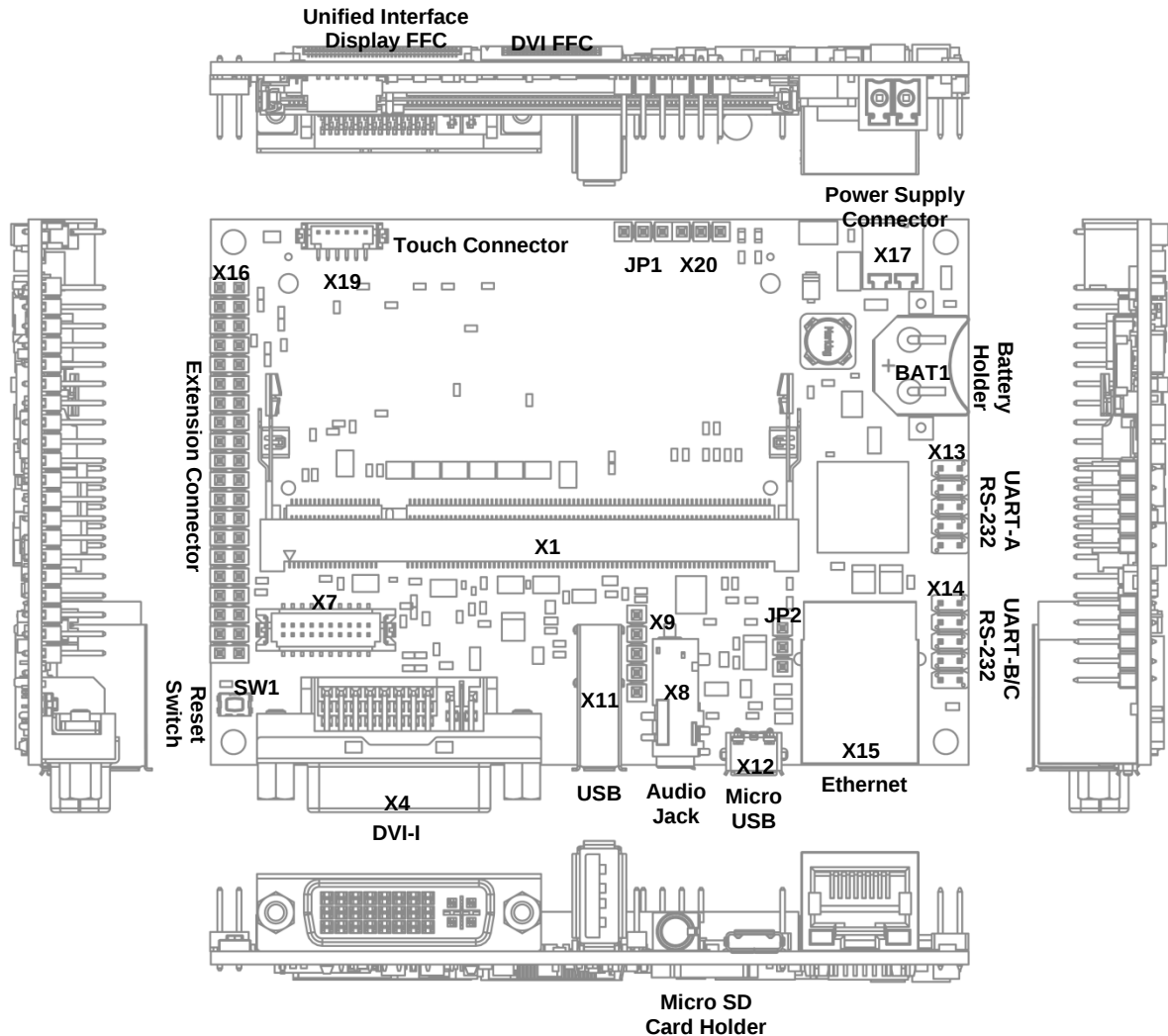


\* This is a module-specific feature and may not be supported by all the computer-on-modules in the Colibri family.  
For more details, refer to the datasheet of Colibri computer-on-modules.

**Fig.1 Iris Carrier Board Hardware Architecture**

## 2.3. Physical Drawings

### 2.3.1 Top Side Connectors: Physical Drawing

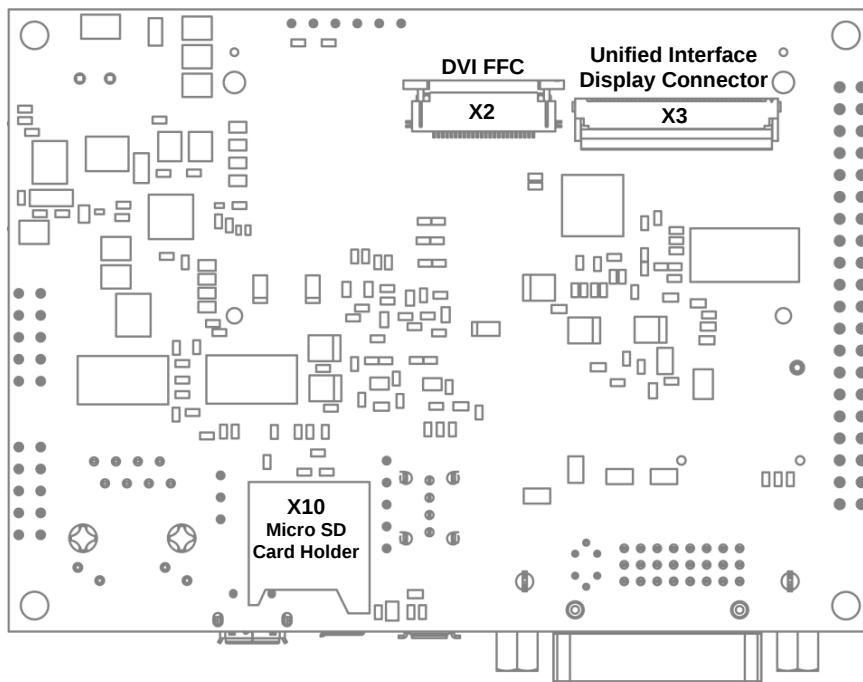


**Fig. 2 Iris Carrier Board Connectors – Top Side**

| Ref. | Description              | Remarks |
|------|--------------------------|---------|
| X1   | Colibri SODIMM connector |         |
| X4   | DVI-I connector          |         |
| X7   | LVDS connector           |         |
| X8   | Audio Jack               |         |
| X9   | Audio header             |         |
| X11  | USB Host                 |         |
| X12  | USB Host/Client          |         |
| X13  | UART-A RS-232 header     |         |
| X14  | UART-B/C RS-232 header   |         |
| X15  | Ethernet connector       |         |
| X16  | Extension connector      |         |
| X17  | Power Supply connector   |         |
| X19  | Touch connector          |         |

|      |                     |                                                                     |
|------|---------------------|---------------------------------------------------------------------|
| X20  | Power Out header    | Not populated                                                       |
| BAT1 | 12mm Battery holder | Supported batteries: BR1216, CR1216, BR1220, CL1220, CR1220, BR1225 |
| SW1  | Reset Button        |                                                                     |
| JP1  | Boot Mode header    | Not populated                                                       |
| JP2  | Central Tab jumper  |                                                                     |

### 2.3.2 Bottom Side Connectors: Physical Drawing



**Fig. 3 Iris Carrier Board Connectors – Bottom Side**

| Ref. | Description                         | Remarks |
|------|-------------------------------------|---------|
| X2   | DVI FFC connector                   |         |
| X3   | Unified Interface Display Connector |         |
| X10  | Micro SD Card Holder                |         |

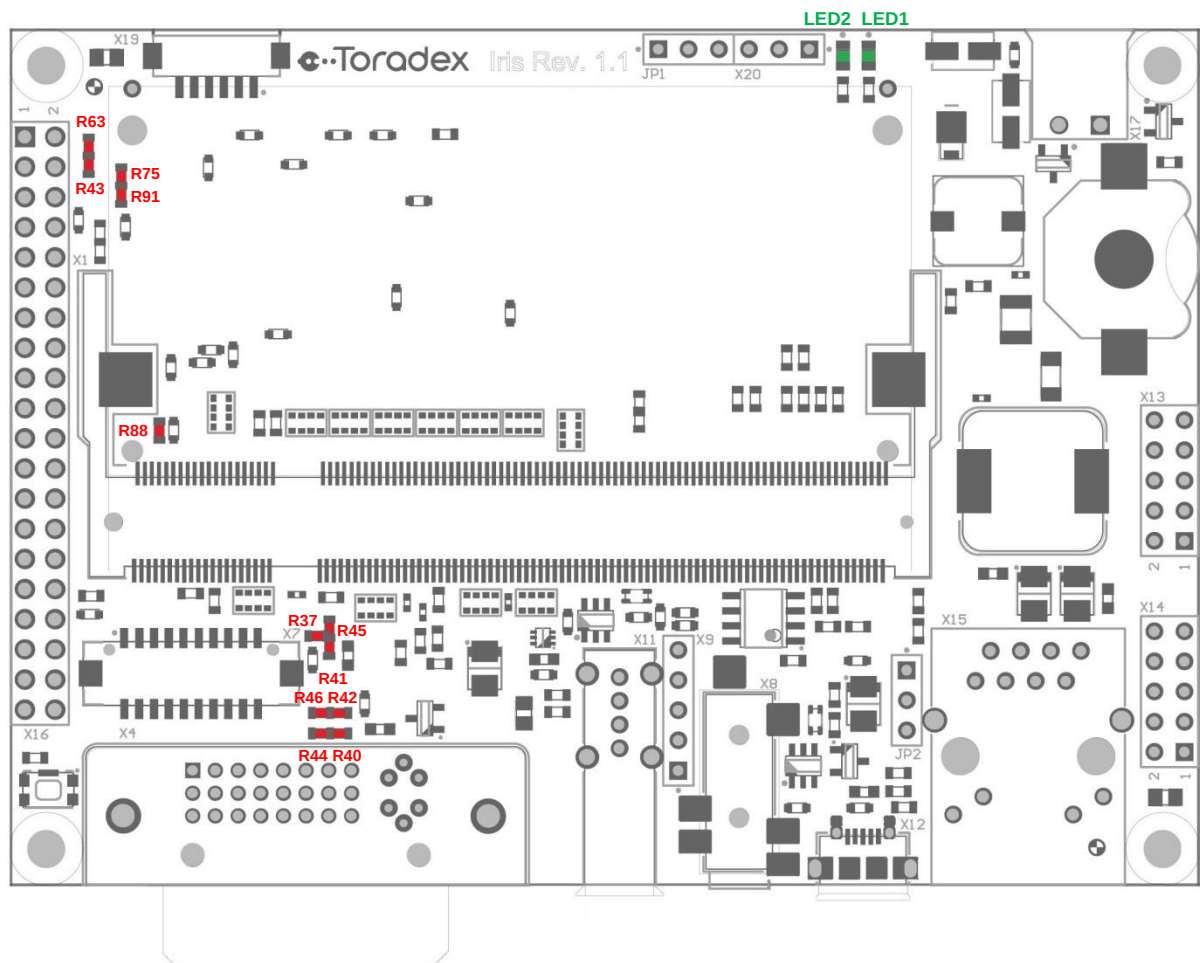
## 2.4. Assembly Options

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

### **WARNING:**

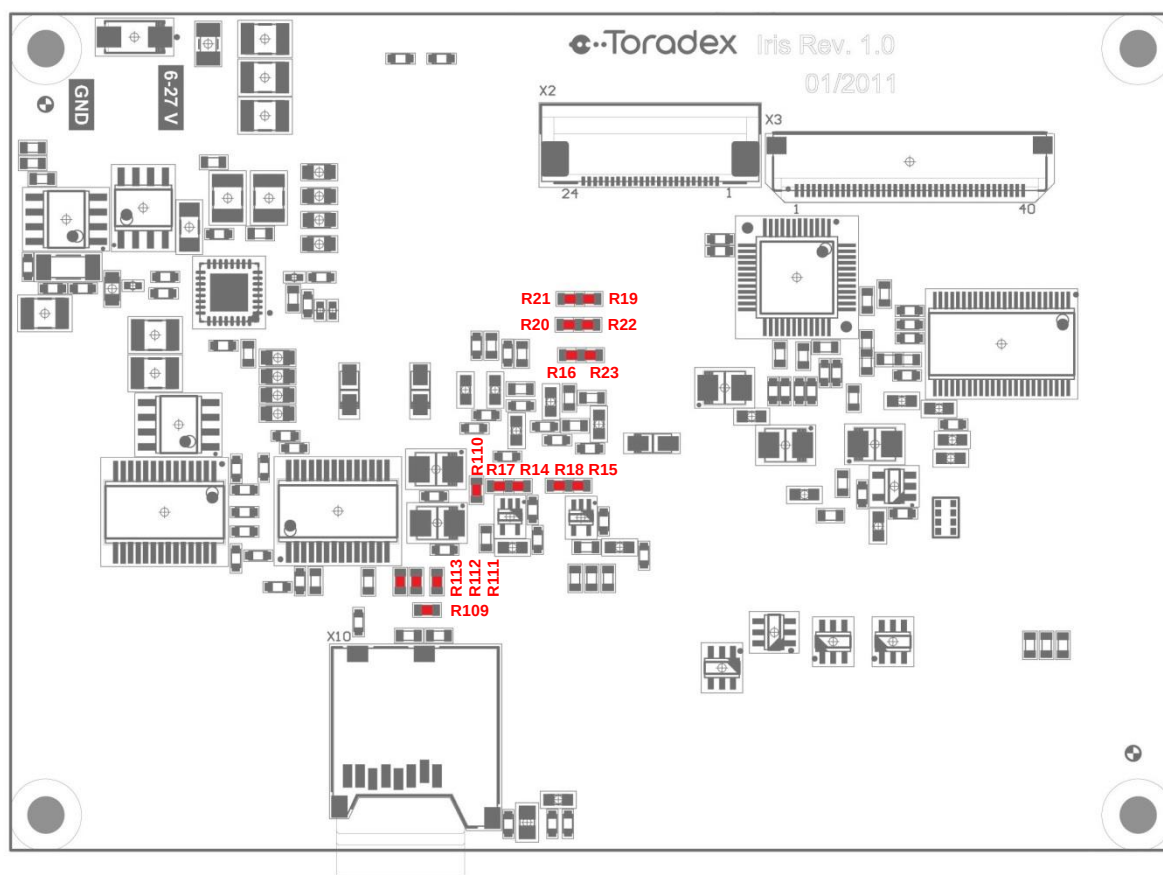
- Changing the PCB assembly voids the product warranty.
- Toradex doesn't take any responsibility for malfunction or damages caused by changing any assembly option.

### 2.4.1 Iris Assembly Options – Top Side



**Fig.4 Iris Carrier Board Assembly Options – Top Side**

## 2.4.2 Iris Assembly Options – Bottom Side



**Fig.5 Iris Carrier Board 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.

#### 3.1.2 Boot Mode header (JP1)

This is an unpopulated 2.54mm (pitch) pin which provides the signals required to boot the Colibri T20 and T30 module into recovery mode (this is not functional on all other Colibri modules e.g. PXAxxx or VFxx).

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

| Pin | Signal Name | Remarks                                                              |
|-----|-------------|----------------------------------------------------------------------|
| 1   | RECOVERY    | By shorting the pin 1-2 the Colibri will boot in Recovery boot mode. |
| 2   | GND         |                                                                      |
| 3   | SD_BOOT     | By shorting the pin 2-3 the Colibri will boot in SD boot mode.       |

The following table describes the assembly options available on the Iris carrier board with respect to the SD Boot (only with Colibri T20):

| Solution Selected | Assembly Options                                   | Assembled Components on Iris V1.1 | PCB Side |
|-------------------|----------------------------------------------------|-----------------------------------|----------|
| SD Boot Mode      | Assemble 100R resistors R109, R111, R112 and R113. |                                   | Bottom   |

Please refer to figure 5 in [Section 2.4, Assembly Options](#) for the position of the resistors.

### 3.2. Power Supply

Iris carrier board has a wide input voltage range of 6-27V DC. The supply is protected against reverse input voltage polarity and short circuits.

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

|             |         |
|-------------|---------|
| 5V / 3.5A   | (17.5W) |
| 3.3V / 2.5A | (8.25W) |

#### 3.2.1 Terminal Block Power Supply Connector (X17)

Connector type: Tyco 284512-2

| Pin | Description | Voltage / range |
|-----|-------------|-----------------|
| 1   | GND_IN      |                 |
| 2   | PWR_IN      | 6 – 27V         |

#### 3.2.2 Power Out Header (X20)

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

| Pin | Description | Voltage / range |
|-----|-------------|-----------------|
| 1   | +5V         |                 |
| 2   | GND         |                 |
| 3   | +3.3V       |                 |

### 3.3. Indications

There are two LEDs on the top side of the PCB; they are tuned on if the power supply circuit is correctly providing 3.3 and 5V power rails.

| Ref. | Description |
|------|-------------|
| LED1 | 3.3V        |
| LED2 | 5V          |

Please refer to the figure 4 in [Section 2.4, Assembly Options](#) for the position of the LEDs.

### 3.4. Ethernet

#### 3.4.1 Ethernet Connector (X15)

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

| Pin | Signal Name       | SODIMM Pin Number | 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_RXI_P         | 195               | I        | +3.3V   |                   |
| 4   | ETH_AVCC (CT_TXD) |                   | PWR      |         |                   |
| 5   | ETH_AGND (CT_RXD) |                   | PWR      |         |                   |
| 6   | ETH_RXI_N         | 193               | I        | +3.3V   |                   |
| 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 (JP2)

Jumper JP2 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 DM9000E on PXA270             |
| 2-3             | Use this configuration for DM9000A/ASIX on other modules |

Please refer to the figure 4 in [Section 2.4, Assembly Options](#) for the position of the Jumper (JP2).

### 3.5. USB Interface

#### 3.5.1 USB Host (X11)

The Iris carrier board features 1x USB 2.0 host interface using a USB 2.0 type-A connector X11. 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: FCI 73725-0110BLF

| Pin | Signal Name | SODIMM Pin Number | I/O Type | Voltage | Pull-up/Pull-down |
|-----|-------------|-------------------|----------|---------|-------------------|
| 1   | VCC_USB1    |                   | PWR      | +5V     |                   |
| 2   | USBH_N      | 141               | I/O      |         | 15K to GND        |
| 3   | USBH_P      | 139               | I/O      |         | 15K to GND        |
| 4   | GND         |                   | PWR      |         |                   |
| S1  | SHIELD      |                   |          |         |                   |
| S2  | SHIELD      |                   |          |         |                   |

#### 3.5.2 USB Host/Client (X12)

The Iris carrier board features 1x USB host/client interface using a Micro AB type USB connector X12.

Connector type: Molex 47589-0001

| Pin | Signal Name | SODIMM Pin Number | I/O Type | Voltage | Pull-up/Pull-down |
|-----|-------------|-------------------|----------|---------|-------------------|
| 1   | VCC_USB2    |                   | PWR      | +5V     |                   |
| 2   | USBC_N      | 145               | I/O      |         | 15K to GND        |
| 3   | USBC_P      | 143               | I/O      |         | 15K to GND        |
| 4   | USB ID      |                   |          |         |                   |
| 5   | GND         |                   | PWR      |         |                   |
| S1  | SHIELD      |                   |          |         |                   |
| S2  | SHIELD      |                   |          |         |                   |
| S3  | SHIELD      |                   |          |         |                   |
| S4  | SHIELD      |                   |          |         |                   |

### 3.6. SD/MMC Interface

#### 3.6.1 Micro SD Card Holder (X10)

Connector type: Amphenol 101-00581-59

| Pin   | Signal Name | SODIMM Pin 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       | 43                |          |         |                   |
| S1    | SHIELD      |                   |          |         |                   |
| S2    | SHIELD      |                   |          |         |                   |

### 3.7. Display Interface

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

- 18 bit digital RGB
- LVDS
- DVI-I (Digital TDMS and Analog VGA)

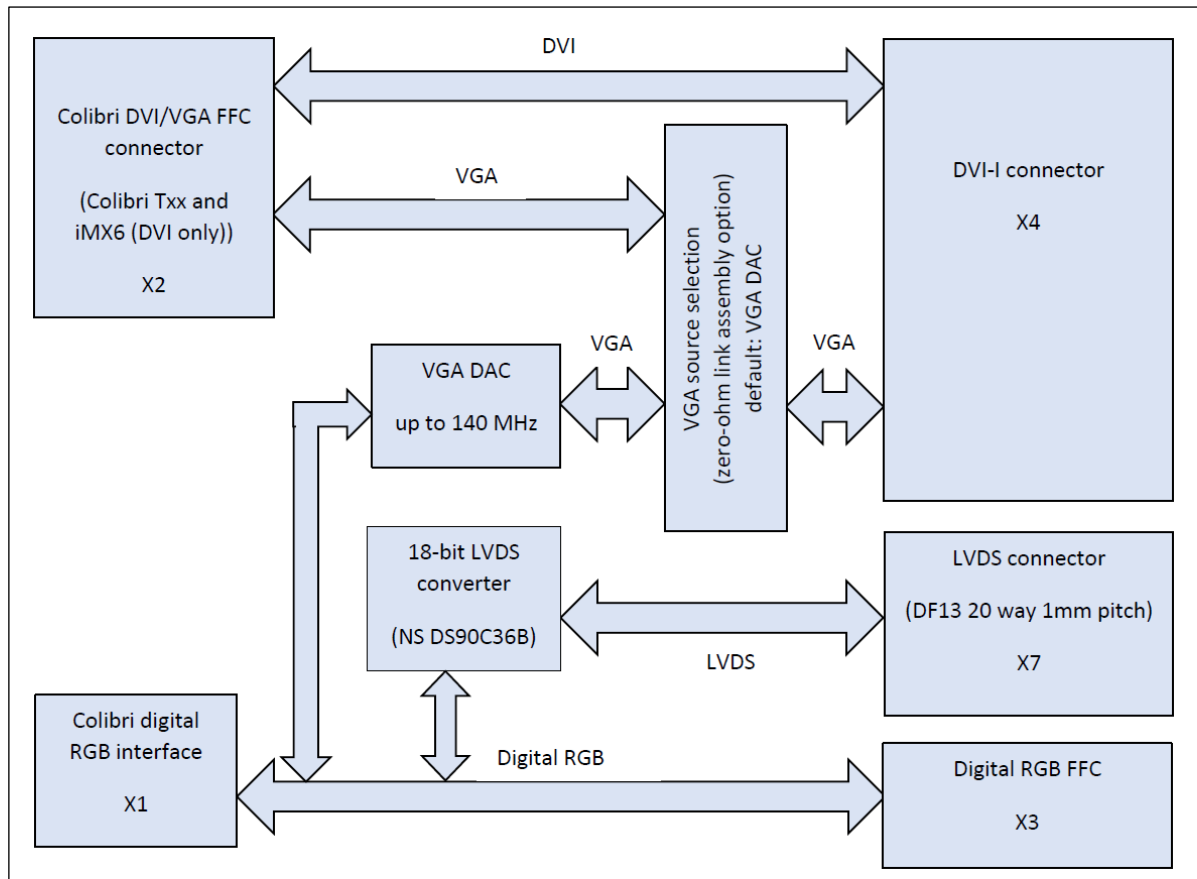


Fig.5 Display Interface Architecture

The combination of display interfaces which are available are dependent upon the Colibri module which is installed:

- The Colibri Txx can drive two independent displays on the following combination of display interfaces (A driver for VGA on X2 is only available for WinCE):

- o DVI and RGB
- o DVI and VGA (on X2)
- o RGB and VGA (on X2)

- The Colibri iMX6 can drive two independent displays on the following combination of display interfaces:

- o DVI and RGB

- The Colibri iMX6ULL, iMX7, PXAxxx, VFxx are able to drive single display on the following display interface:

- o RGB

The Iris carrier board creates LVDS and VGA signals from the Colibri's RGB signals.

It is possible to select, using an assembly option, whether the VGA output from the Colibri T20 FFC or VGA DAC (generated from the RGB interface) is connected to the analogue VGA of the DVI-I interface.

The default configuration connects the output of the on-board VGA DAC to the DVI-I connector.

The following table describes the assembly options available on the Iris carrier board with respect to the DVI-I Interface:

| Solution Selected                   | Assembly Options                                                                                      | Assembled Components on Iris V1.1 | PCB Side |
|-------------------------------------|-------------------------------------------------------------------------------------------------------|-----------------------------------|----------|
| Use the RGB to VGA DAC signals      | Assemble resistors R14, R15, R16, R19, and R20.<br>Disassemble resistors R17, R18, R21, R22, and R23. | R14, R15, R16, R19, R20           | Bottom   |
| Use the Colibri T20 FFC VGA signals | Assemble resistors R17, R18, R21, R22, and R23.<br>Disassemble resistors R14, R15, R16, R19, and R20. | R14, R15, R16, R19, R20           | Bottom   |

Please refer to figure 5 in [Section 2.4, Assembly Options](#) for the position of the resistors.

**Note:**

- Assembly options for the selection of VGA output apply only to Colibri T20 (only WinCE).

### 3.7.1 DVI FFC connector (X2)

Connector type: Molex 52435-2471

| Pin | Signal Name    | SODIMM Pin Number | I/O Type | Voltage | Pull-up/Pull-down |
|-----|----------------|-------------------|----------|---------|-------------------|
| 1   | GND            |                   | PWR      |         |                   |
| 2   | TMDS_CLK_P     |                   | I        | +3.3V   |                   |
| 3   | TMDS_CLK_N     |                   | I        | +3.3V   |                   |
| 4   | GND            |                   | PWR      |         |                   |
| 5   | TMDS_DATA0_P   |                   | I        | +3.3V   |                   |
| 6   | TMDS_DATA0_N   |                   | I        | +3.3V   |                   |
| 7   | GND            |                   | PWR      |         |                   |
| 8   | TMDS_DATA1_P   |                   | I        | +3.3V   |                   |
| 9   | TMDS_DATA1_N   |                   | I        | +3.3V   |                   |
| 10  | GND            |                   | PWR      |         |                   |
| 11  | TMDS_DATA2_P   |                   | I        | +3.3V   |                   |
| 12  | TMDS_DATA2_N   |                   | I        | +3.3V   |                   |
| 13  | NC             |                   |          |         |                   |
| 14  | HOTPLUG_DETECT |                   | O        | +3.3V   |                   |
| 15  | DDC_CLK        |                   | I        | +5V     | 1.8K to +5V       |
| 16  | DDC_DATA       |                   | I        | +5V     | 1.8K to +5V       |
| 17  | GND            |                   | PWR      |         |                   |
| 18  | CRT_RED        |                   | I        | +3.3V   |                   |
| 19  | GND            |                   | PWR      |         |                   |
| 20  | CRT_GREEN      |                   | I        | +3.3V   |                   |
| 21  | GND            |                   | PWR      |         |                   |
| 22  | CRT_BLUE       |                   | I        | +3.3V   |                   |
| 23  | CRT_VSYNC      |                   | I        | +3.3V   |                   |
| 24  | CRT_HSYNC      |                   | I        | +3.3V   |                   |

### 3.7.2 Unified Interface Display Connector (X3)

Iris carrier board provides a digital RGB interface port (18-bpp) to interface with the LCD panels using a 40-way, Unified Interface Display connector (X3). 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.

For customers looking for capacitive touch display solution, Iris 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/products/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>

Connector type: Omron XF2M-4015-1A

| Pin | Signal Name | Color Mapping<br>18bpp | SODIMM<br>Number | I/O Type | Voltage | Pull-up/<br>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   | RESET_OUT#  |                        | 87               | O        | +3.3V   |                       |
| 8   | LCD_D_5     | BLUE 5                 | 72               | O        | +3.3V   |                       |
| 9   | LCD_D_4     | BLUE 4                 | 78               | O        | +3.3V   |                       |
| 10  | LCD_D_3     | BLUE 3                 | 58               | O        | +3.3V   |                       |
| 11  | LCD_D_2     | BLUE 2                 | 60               | O        | +3.3V   |                       |
| 12  | LCD_D_1     | BLUE 1                 | 70               | O        | +3.3V   |                       |
| 13  | LCD_D_0     | BLUE 0                 | 76               | O        | +3.3V   |                       |
| 14  | GND         |                        |                  | PWR      |         |                       |
| 15  | LCD_D_11    | GREEN 5                | 50               | O        | +3.3V   |                       |
| 16  | LCD_D_10    | GREEN 4                | 74               | O        | +3.3V   |                       |
| 17  | LCD_D_9     | GREEN 3                | 48               | O        | +3.3V   |                       |
| 18  | LCD_D_8     | GREEN 2                | 62               | O        | +3.3V   |                       |
| 19  | LCD_D_7     | GREEN 1                | 46               | O        | +3.3V   |                       |
| 20  | LCD_D_6     | GREEN 0                | 80               | O        | +3.3V   |                       |
| 21  | GND         |                        |                  | PWR      |         |                       |
| 22  | LCD_D_17    | RED 5                  | 61               | O        | +3.3V   |                       |
| 23  | LCD_D_16    | RED 4                  | 57               | O        | +3.3V   |                       |
| 24  | LCD_D_15    | RED 3                  | 64               | O        | +3.3V   |                       |
| 25  | LCD_D_14    | RED 2                  | 66               | O        | +3.3V   |                       |
| 26  | LCD_D_13    | RED 1                  | 54               | O        | +3.3V   |                       |
| 27  | LCD_D_12    | RED 0                  | 52               | O        | +3.3V   |                       |
| 28  | LCD_PCLK_WR |                        | 56               | O        | +3.3V   |                       |

| Pin | Signal Name                                                               | Color Mapping<br>18bpp | SODIMM<br>Number | I/O Type | Voltage   | Pull-up/<br>Pull-down |
|-----|---------------------------------------------------------------------------|------------------------|------------------|----------|-----------|-----------------------|
| 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 |                        |                  | O        | +3.3V/GND |                       |
| 34  | Connected to 3.3V or GND via assembly option. The default assembly is GND |                        |                  | O        | +3.3V/GND |                       |
| 35  | GND                                                                       |                        |                  | PWR      |           |                       |
| 36  | +3.3V                                                                     |                        |                  | PWR      | +3.3V     |                       |
| 37  | TOUCH_TSPY                                                                |                        | 18               | O        | +3.3V     |                       |
| 38  | TOUCH_TSMX                                                                |                        | 16               | O        | +3.3V     |                       |
| 39  | TOUCH_TSMY                                                                |                        | 20               | O        | +3.3V     |                       |
| 40  | TOUCH_TSPX                                                                |                        | 14               | O        | +3.3V     |                       |

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

| Solution Selected                          | Assembly Options                                                                                                | Assembled Components on Iris V1.1 | PCB Side |
|--------------------------------------------|-----------------------------------------------------------------------------------------------------------------|-----------------------------------|----------|
| Unified Interface Display , Rotate display | Assemble appropriate 0R resistors R43, R63, R75, and R91. Refer to LCD TFT datasheet for configuration details. | R63, R91                          | Bottom   |

Please refer to figure 5 in [Section 2.4, Assembly Options](#) for the position of the resistors.

### 3.7.3 DVI-I Connector (X4)

Connector type: Molex 74320-1004

| Pin | Signal Name    | Description                      | I/O Type | Voltage | Pull-up/Pull-down |
|-----|----------------|----------------------------------|----------|---------|-------------------|
| 1   | TMDS_DATA2_N   | The negative DVI output number 2 | O        |         |                   |
| 2   | TMDS_DATA2_P   | The positive DVI output number 2 | O        |         |                   |
| 3   | GND            |                                  | PWR      |         |                   |
| 4   | NC             | Not connected                    |          |         |                   |
| 5   | NC             | Not connected                    |          |         |                   |
| 6   | DDC_CLK        | DVI EDID Clock signal            | O        | +5V     |                   |
| 7   | DDC_DATA       | DVI EDID Data signal             | I/O      | +5V     |                   |
| 8   | CRT_VSYNC      |                                  | O        | +5V     |                   |
| 9   | TMDS_DATA1_N   | The negative DVI output number 1 | O        |         |                   |
| 10  | TMDS_DATA1_P   | The positive DVI output number 1 | O        |         |                   |
| 11  | GND            |                                  |          |         |                   |
| 12  | NC             | Not connected                    |          |         |                   |
| 13  | NC             | Not connected                    |          |         |                   |
| 14  | +5V            |                                  | PWR      | +5V     |                   |
| 15  | GND            |                                  | PWR      |         |                   |
| 16  | HOTPLUG_DETECT | DVI Hot Plug signal              | I        |         |                   |
| 17  | TMDS_DATA0_N   | The negative DVI output number 0 | O        |         |                   |

| Pin | Signal Name  | Description                      | I/O Type | Voltage | Pull-up/Pull-down |
|-----|--------------|----------------------------------|----------|---------|-------------------|
| 18  | TMDS_DATA0_P | The positive DVI output number 0 | O        |         |                   |
| 19  | GND          |                                  | PWR      |         |                   |
| 20  | NC           | Not connected                    |          |         |                   |
| 21  | NC           | Not connected                    |          |         |                   |
| 22  | GND          |                                  | PWR      |         |                   |
| 23  | TMDS_CLK_P   | The positive DVI Clock signal    | O        |         |                   |
| 24  | TMDS_CLK_N   | The negative DVI Clock signal    | O        |         |                   |
| C1  | CRT_RED      |                                  | O        |         |                   |
| C2  | CRT_GREEN    |                                  | O        |         |                   |
| C3  | CRT_BLUE     |                                  | O        |         |                   |
| C4  | CRT_HSYNC    |                                  | O        |         |                   |
| C5  | AGND         |                                  | PWR      |         |                   |

### 3.7.4 LVDS Connector (X7)

Connector type: Hirose DF13A-20DP-1.25V(56)

| Pin | Signal Name | Description                                                                            | I/O Type | Voltage | Pull-up/Pull-down |
|-----|-------------|----------------------------------------------------------------------------------------|----------|---------|-------------------|
| 1   | LVDS_5V     | 5V power supply pin                                                                    | PWR      | +5V     |                   |
| 2   | LVDS_3.3V   | 3.3V power supply pin                                                                  | PWR      | +3.3V   |                   |
| 3   | GND         |                                                                                        | PWR      |         |                   |
| 4   | SEL1        | Connected to LVDS_3.3V or GND via assembly option. The default assembly is GND         |          |         |                   |
| 5   | LVDS_OUT0_N | The negative LVDS output number 0                                                      | O        |         |                   |
| 6   | GND         |                                                                                        | PWR      |         |                   |
| 7   | LVDS_OUT0_P | The positive LVDS output number 0                                                      | O        |         |                   |
| 8   | LVDS_OUT1_N | The negative LVDS output number 1                                                      | O        |         |                   |
| 9   | GND         |                                                                                        | PWR      |         |                   |
| 10  | LVDS_OUT1_P | The positive LVDS output number 1                                                      | O        |         |                   |
| 11  | LVDS_OUT2_N | The negative LVDS output number 2                                                      | O        |         |                   |
| 12  | GND         |                                                                                        | PWR      |         |                   |
| 13  | LVDS_OUT2_P | The positive LVDS output number 2                                                      | O        |         |                   |
| 14  | LVDS_CLK_N  | The negative LVDS clock signal                                                         | O        |         |                   |
| 15  | GND         |                                                                                        | PWR      |         |                   |
| 16  | LVDS_CLK_P  | The positive LVDS clock signal                                                         | O        |         |                   |
| 17  | BL_ON       | Back Light control signal                                                              | O        |         |                   |
| 18  | GND         |                                                                                        | PWR      |         |                   |
| 19  | SEL2        | Connected to LVDS_5V, LVDS_3.3V or GND via assembly option. The default assembly is 5V |          |         |                   |
| 20  | SEL3        | Connected to LVDS_3.3V or GND via assembly option. The default assembly is LVDS_3.3V   |          |         |                   |

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

| Solution Selected  | Assembly Options                                     | Assembled Components on Iris V1.1 | PCB Side |
|--------------------|------------------------------------------------------|-----------------------------------|----------|
| SEL1 Configuration | Assemble appropriate 0R resistor - R40 or R44.       | R44                               | Top      |
| SEL2 Configuration | Assemble appropriate 0R resistor - R37 or 41 or R45. | R37                               | Top      |
| SEL3 Configuration | Assemble appropriate 0R resistor - R42 or R46.       | R42                               | Top      |

Please refer to figure 4 in [Section 2.4, Assembly Options](#) for the position of the resistors.

**Note:**

- Please use the pins 1 and 2 as power supply pins (max 0.9A) and the SEL1, SEL2, SEL3 as setting pins.

## 3.8. Audio Interface

### 3.8.1 Audio Jack (X8)

Connector type: CUI SJ-43516-SMT

| Pin | Signal Name   | SODIMM Pin Number | I/O Type | Voltage | Pull-up/Pull-down |
|-----|---------------|-------------------|----------|---------|-------------------|
| 1   | Audio AGND    |                   | PWR      |         |                   |
| 2   | Headphone L   | 15                | O        |         |                   |
| 3   | Headphone R   | 17                | O        |         |                   |
| 4   | Not connected |                   |          |         |                   |
| 5   | Headphone L   | 15                | O        |         |                   |
| 6   | Headphone R   | 17                | O        |         |                   |

### 3.8.2 Audio Header (X9)

Connector type: 1x5 Pin Header Male, 2.54mm

| Pin | Signal Name   | SODIMM Pin Number | I/O Type | Voltage | Pull-up/Pull-down |
|-----|---------------|-------------------|----------|---------|-------------------|
| 1   | Audio AVCC    |                   | PWR      | +3.3V   |                   |
| 2   | Microphone In | 1                 | I        |         |                   |
| 3   | Line-In R     | 7                 | I        |         |                   |
| 4   | Line-In L     | 5                 | I        |         |                   |
| 5   | Audio AGND    |                   | PWR      |         |                   |

### 3.9. Digital and Analog I/O Interface

#### 3.9.1 UART-A RS-232 header (X13)

The Full Function (FF) UART-A RS-232 connector is a 10 way (2 rows x 5 way) 2.54mm pitch header capable of being connected to an industry standard DTK/INTEL 10 way IDC to 9 way D-type male connector.

Connector type: 2x5 Pin Header Male, 2.54mm

| Pin | Signal Name | SODIMM Pin Number | I/O Type | Voltage | Pull-up/Pull-down |
|-----|-------------|-------------------|----------|---------|-------------------|
| 1   | RS232_A_DCD |                   | I        |         |                   |
| 2   | RS232_A_DSR |                   | I        |         |                   |
| 3   | RS232_A_RXD |                   | I        |         |                   |
| 4   | RS232_A_RTS |                   | O        |         |                   |
| 5   | RS232_A_TXD |                   | O        |         |                   |
| 6   | RS232_A_CTS |                   | I        |         |                   |
| 7   | RS232_A_DTR |                   | O        |         |                   |
| 8   | RS232_A_RI  |                   | I        |         |                   |
| 9   | GND         |                   | PWR      |         |                   |
| 10  | NC          |                   |          |         |                   |

#### 3.9.2 UART-B/C RS-232 header (X14)

Connector type: 2x5 Pin Header Male, 2.54mm

| Pin | Signal Name | SODIMM Pin Number | I/O Type | Voltage | Pull-up/Pull-down |
|-----|-------------|-------------------|----------|---------|-------------------|
| 1   | RS232_C_RXD |                   | I        |         |                   |
| 2   | NC          |                   |          |         |                   |
| 3   | RS232_B_RXD |                   | I        |         |                   |
| 4   | RS232_B_RTS |                   | O        |         |                   |
| 5   | RS232_B_TXD |                   | O        |         |                   |
| 6   | RS232_B_CTS |                   | I        |         |                   |
| 7   | RS232_C_TXD |                   | O        |         |                   |
| 8   | NC          |                   |          |         |                   |
| 9   | GND         |                   | PWR      |         |                   |
| 10  | NC          |                   |          |         |                   |

#### Remarks:

- The RS232 serial transceivers can be shut down via two GPIOs which have been connected to the ForceOFF# pin. This is needed in order to use the UART signals that are on the extension connector at TTL logic level. The following table shows the SODIMM pin assignment of the GPIOs reserved for this purpose:

| SODIMM Pin Number | Header | Signal Level → Header Status | Signal Level → Header Status |
|-------------------|--------|------------------------------|------------------------------|
| 102               | X13    | Logic Low → Disabled         | Logic High → Enabled         |
| 104               | X14    | Logic Low → Disabled         | Logic High → Enabled         |

### 3.9.3 Extension Connector (X16)

Connector type: 2x20 Pin Header Male, 2.54mm

| Pin | Signal Name                                  | SODIMM Pin Number | I/O Type | Voltage | Pull-up/Pull-down |
|-----|----------------------------------------------|-------------------|----------|---------|-------------------|
| 1   | RESET_EXT#                                   | 26                | I        | +3.3V   |                   |
| 2   | GND                                          |                   | PWR      |         |                   |
| 3   | GND                                          |                   | PWR      |         |                   |
| 4   | RESET_OUT#                                   | 87                | O        | +3.3V   |                   |
| 5   | I2C_SDA                                      | 194               | I/O      | +3.3V   | 4.7K to 3.3V      |
| 6   | I2C_SCL                                      | 196               | I/O      | +3.3V   | 4.7K to 3.3V      |
| 7   | GND                                          |                   | PWR      |         |                   |
| 8   | SSPSCLK                                      | 88                | I/O      | +3.3V   |                   |
| 9   | SSPFRM                                       | 86                | I/O      | +3.3V   |                   |
| 10  | SSPRXD                                       | 90                | I        | +3.3V   |                   |
| 11  | SSPTXD                                       | 92                | O        | +3.3V   |                   |
| 12  | +5V                                          |                   | PWR      | +5V     |                   |
| 13  | SODIMM_98 (GPIO)                             | 98                | I/O      | +3.3V   |                   |
| 14  | SODIMM_133 (GPIO)                            | 133               | I/O      | +3.3V   |                   |
| 15  | SODIMM_103 (GPIO)                            | 103               | I/O      | +3.3V   |                   |
| 16  | SODIMM_101 (GPIO)                            | 101               | I/O      | +3.3V   |                   |
| 17  | SODIMM_97 (GPIO)                             | 97                | I/O      | +3.3V   |                   |
| 18  | SODIMM_85 (GPIO)                             | 85                | I/O      | +3.3V   |                   |
| 19  | SODIMM_79 (GPIO)                             | 79                | I/O      | +3.3V   |                   |
| 20  | SODIMM_45 (GPIO)                             | 45                | I/O      | +3.3V   |                   |
| 21  | GND                                          |                   | PWR      |         |                   |
| 22  | ANALOG_IN3<br><a href="#">(Refer Note 1)</a> | 2                 | I        | +3.3V   |                   |
| 23  | ANALOG_IN2                                   | 4                 | I        | +3.3V   |                   |
| 24  | ANALOG_IN1                                   | 6                 | I        | +3.3V   |                   |
| 25  | ANALOG_IN0                                   | 8                 | I        | +3.3V   |                   |
| 26  | AUDIO_AGND                                   |                   | PWR      |         |                   |
| 27  | UART_A_TXD                                   | 35                | O        | +3.3V   |                   |
| 28  | UART_A_RXD                                   | 33                | I        | +3.3V   |                   |
| 29  | UART_B_CTS                                   | 32                | I        | +3.3V   |                   |
| 30  | UART_B_RTS                                   | 34                | O        | +3.3V   |                   |
| 31  | UART_B_RXD                                   | 36                | I        | +3.3V   |                   |
| 32  | UART_B_TXD                                   | 38                | O        | +3.3V   |                   |
| 33  | +3.3V                                        |                   | PWR      | +3.3V   |                   |
| 34  | UART_C_RXD                                   | 19                | I        | +3.3V   |                   |
| 35  | UART_C_TXD                                   | 21                | O        | +3.3V   |                   |
| 36  | GND                                          |                   | PWR      |         |                   |
| 37  | PWM_A <a href="#">(Refer Note 2)</a>         | 59                | O        | +3.3V   |                   |
| 38  | PWM_B                                        | 28                | O        | +3.3V   |                   |
| 39  | PWM_C                                        | 30                | O        | +3.3V   |                   |
| 40  | PWM_D <a href="#">(Refer Note 3)</a>         | 67                | O        | +3.3V   |                   |

The following table describes the assembly options available on the Iris carrier board with respect to the Analog-In Interface:

| Solution Selected        | Assembly Options             | Assembled Components on Iris V1.1 | PCB Side |
|--------------------------|------------------------------|-----------------------------------|----------|
| ANALOG_IN3               | Disassemble the resistor R88 | R88                               | Top      |
| PWM_D for PXA3XX modules | Assemble the resistor R110   |                                   | Bottom   |

**Note 1:**

- The signal ANALOG\_IN3 is also used as the TOUCH\_WIPER signal for the Touch (X19) and the RGB connector (X3). For this reason a populated 0ohm resistor (R88) has been placed between the signals ANALOG\_IN3 and TOUCH\_WIPER. This resistor can be removed in the event the fourth analog signal is required and the TOUCH\_WIPER signal (for 5 wire resistive touch screen panels) is not.

**Note 2:**

- The PWM\_A signal has also been routed to the RGB display connector (X3) to provide backlight brightness control for connected LCD displays; for this reason a populated zero ohm resistor (R84) has been placed before connector X16.

**Note 3:**

- Since the Colibri PXA3XX does not support the PWM\_D signal, pin 152 of the SODIMM connector has been connected to the PWM\_D line through a not assembled 0ohm resistor (R110).

Please refer to figure 4 and 5 in [Section 2.4, Assembly Options](#) for the position of the resistors.

### 3.9.4 Touch Connector (X19)

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

| Pin | Signal Name | SODIMM Pin Number | I/O Type | Voltage | Remarks                                   |
|-----|-------------|-------------------|----------|---------|-------------------------------------------|
| 1   | GND         |                   | PWR      |         |                                           |
| 2   | TOUCH_TSMY  | 20                | I        | +3.3V   |                                           |
| 3   | TOUCH_TSPY  | 18                | I        | +3.3V   |                                           |
| 4   | TOUCH_TSMX  | 16                | I        | +3.3V   |                                           |
| 5   | TOUCH_TSPX  | 14                | I        | +3.3V   |                                           |
| 6   | TOUCH_WIPER | 2                 | I        | +3.3V   | Shared with ANALOG_IN3,<br>(Refer Note 1) |

**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>

### 3.10. Real-Time Clock (RTC)

#### 3.10.1 External RTC

The Iris carrier board uses the STMicroelectronics, M41T0M6 chip as external RTC.

#### 3.10.2 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 type of batteries is supported: BR1216, CR1216, BR1220, CL1220, CR1220, BR1225.

Connector type: KEYSTONE-3000

| Pin | Description | Voltage |
|-----|-------------|---------|
| 1   | VCC_BAT     | +3.0V   |
| 2   | GND         |         |

**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 thinner battery after using the thicker battery with the battery holder (BAT1).

## 4. Electrical Characteristics

### 4.1. Electrical Specifications

| Symbol     | Description                                                                                                 | Voltage | Min | Typ | Max | Unit |
|------------|-------------------------------------------------------------------------------------------------------------|---------|-----|-----|-----|------|
| PWR_IN_V   | Main power supply voltage                                                                                   |         | 6   | 24  | 27  | V    |
| PWR_IN_I   | Main power supply current                                                                                   |         | 0   |     | 6   | A    |
| V_BACKUP   | Optional RTC battery voltage                                                                                |         | 2.3 | 3   | 3.6 | V    |
| I_(+5V)    | Total current for external devices at power rail:<br>X16 Pin 12<br>X20 Pin 1<br>USB connectors / USB header | +5V     |     |     | 2.5 | A    |
| I_(+3.3V)  | Total current for external devices at power rail:<br>X16 Pin 33<br>X20 Pin 3                                | +3.3V   |     |     | 1.5 | A    |
| I_Pin(X16) | Current for the single power pin 33 of connector X16                                                        | +3.3V   |     | 0.5 | 1.5 | A    |
| I_Pin(X20) | Current for the single power pin 3 of connector X20                                                         | +3.3V   |     | 1.0 | 1.5 | A    |
| I_Pin(X11) | Current for a single power pin of connector X11                                                             | +5V     |     |     | 0.5 | A    |
| I_Pin(X12) | Current for a single power pin of connector X12                                                             | +5V     |     |     | 0.5 | A    |
| I_Pin(X16) | Current for the single power pin 12 of connector X16                                                        | +5V     |     | 1.0 | 2.5 | A    |
| I_Pin(X20) | Current for the single power pin 1 of connector X20                                                         | +5V     |     | 1.0 | 2.5 | A    |

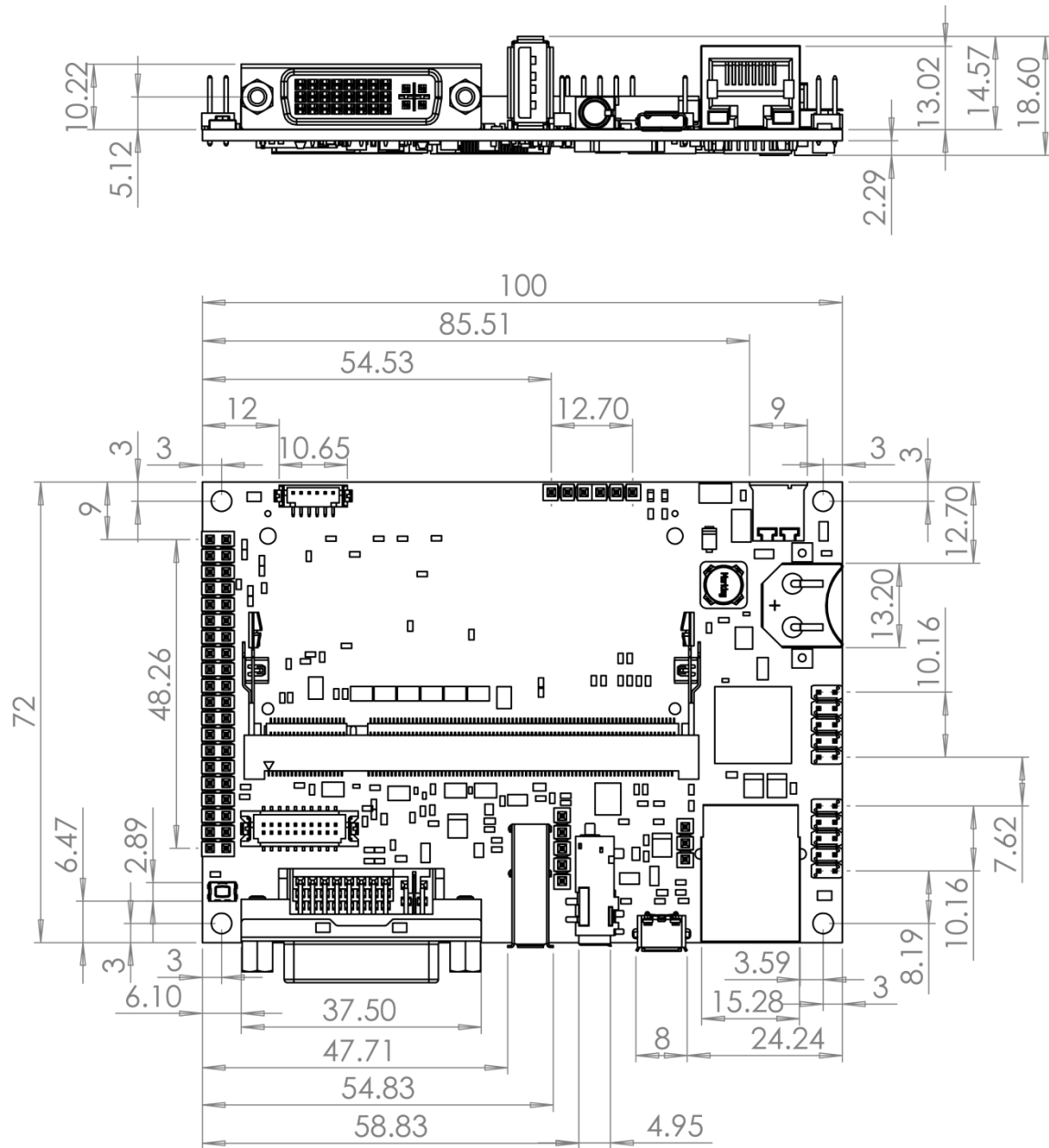
## 5. Temperature Range

### 5.1. Operating Temperature Range

- - 10 to 70 °C
- - 20 to 85 °C (the LVDS picture quality might be lower at this range)]

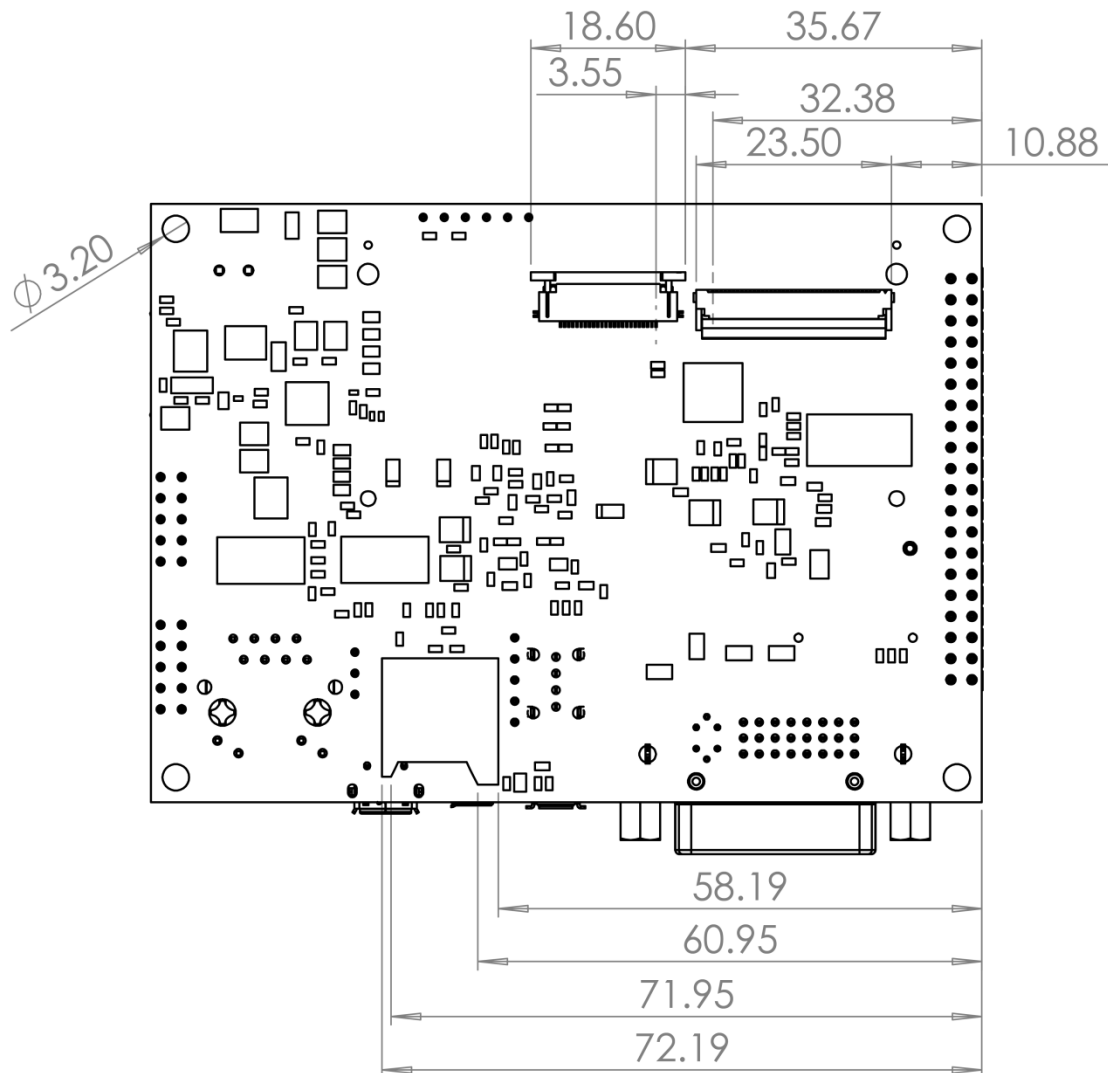
## 6. Mechanical Data

### 6.1. Iris Dimensions – Top Side



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

## 6.2. Iris Dimensions – Bottom Side



**Fig.7 Iris 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/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>

**DISCLAIMER:**

Copyright © Toradex AG. All rights are reserved. The information and content in this document are provided “as-is” with no warranties of any kind and are for informational purposes only. Data and information have been carefully checked and are believed to be accurate; however, no liability or responsibility for any errors, omissions or inaccuracies is assumed.

**Brand and product names are trademarks or registered trademarks of their respective owners. Specifications are subject to change without notice.**