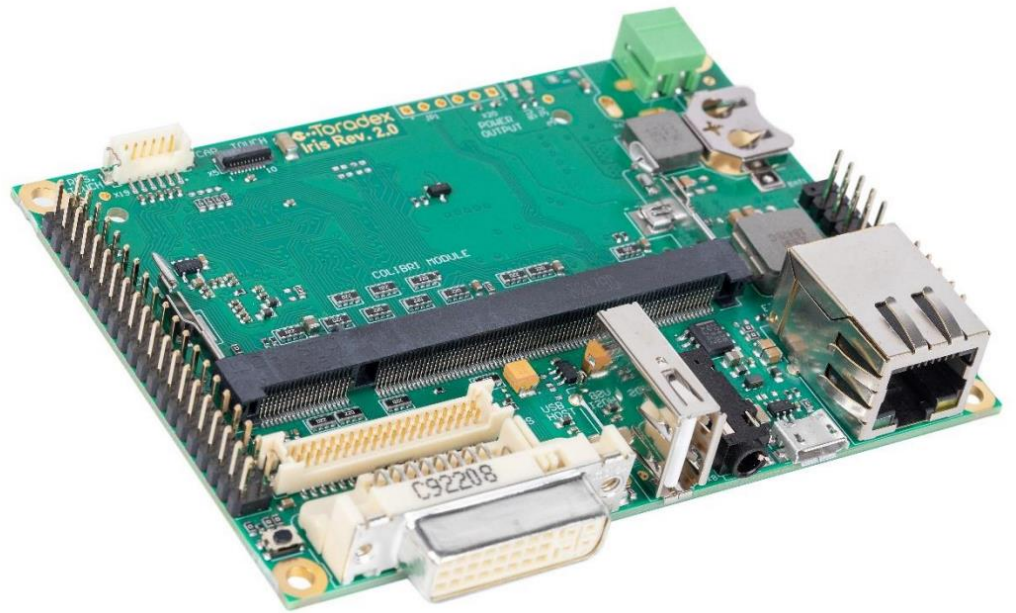


# Iris V2.0

## Datasheet



## Revision History

Date	Doc. Rev.	Iris Version	Changes
30-October-19	Rev. 1.0	V2.0	Initial Release
20-January-20	Rev. 1.1	V2.0	Section 3.6: added the information about unpopulated SDIO pull-up resistors. Several cosmetic optimizations on the document

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## 1. Introduction

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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 the 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

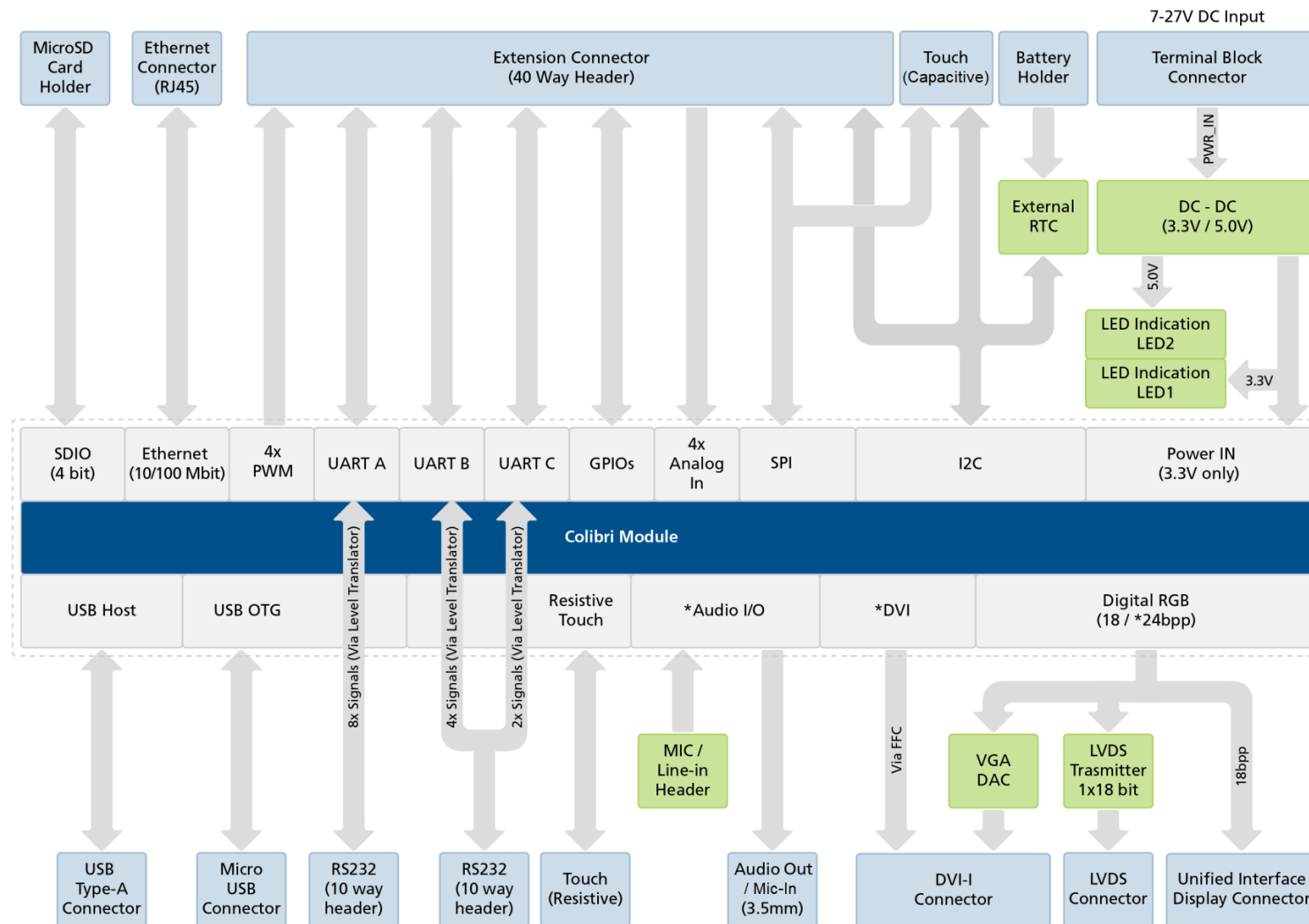
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### 2.1. Overview

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 with resistive touch input signals
- Resistive touch screen connector
- Capacitive touch connector
- Audio Out / Microphone In 3.5mm stereo jack
- Microphone In and Line-In on the 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

## 2.2. Hardware Architecture Block Diagram

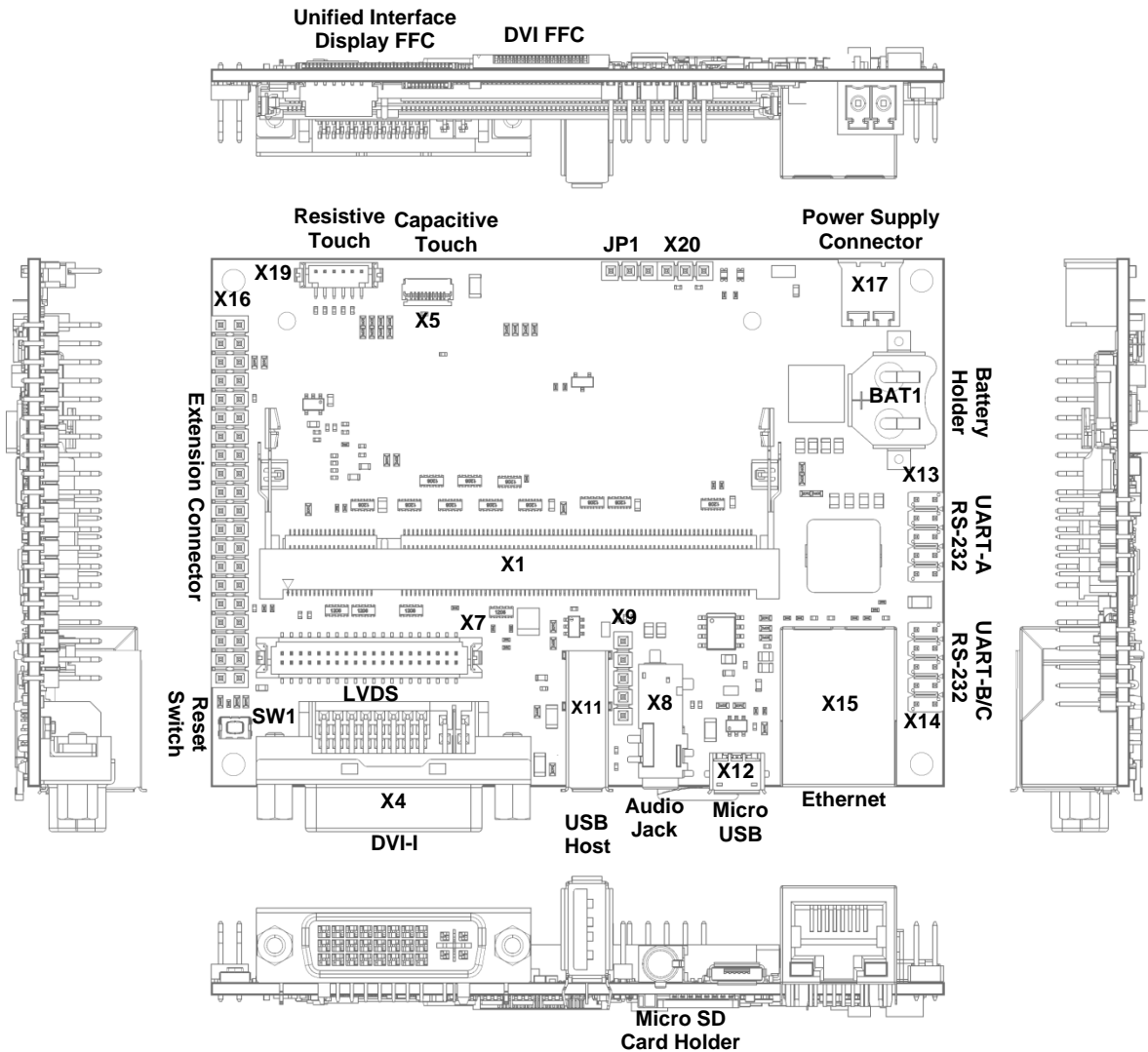


\* This is a module-specific feature and may not be supported by all the computer-on-modules in the Colibri family. For more details, refer to the datasheet of Colibri computer-on-modules.

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

## 2.3. Physical Drawings

### 2.3.1 Top Side Connectors: Physical Drawing



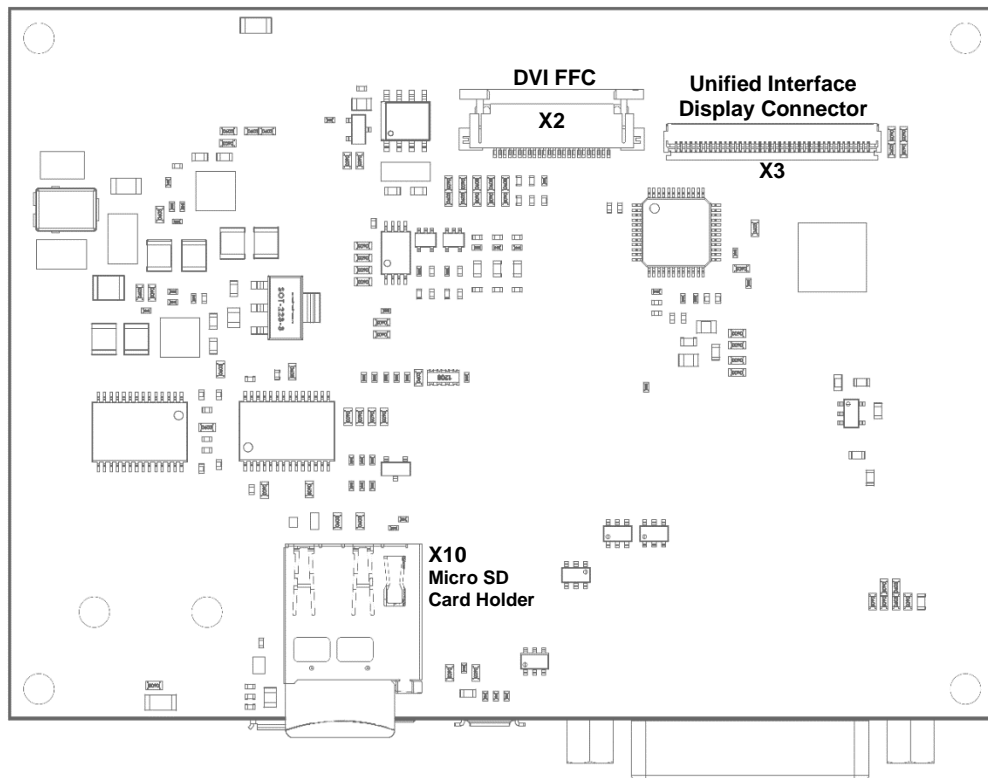
**Fig. 2 Iris Carrier Board Connectors – Top Side**

Ref.	Description	Remarks
X1	Colibri SODIMM connector	
X4	DVI-I connector	
X5	Capacitive Touch 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	Resistive Touch connector	
X20	Power Out header	Not assembled by default
BAT1	12mm Battery holder	Supported batteries: BR1216, CR1216, BR1220, CL1220, CR1220, BR1225
SW1	Reset Button	
JP1	Boot Mode header	Not assembled by default

### 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	

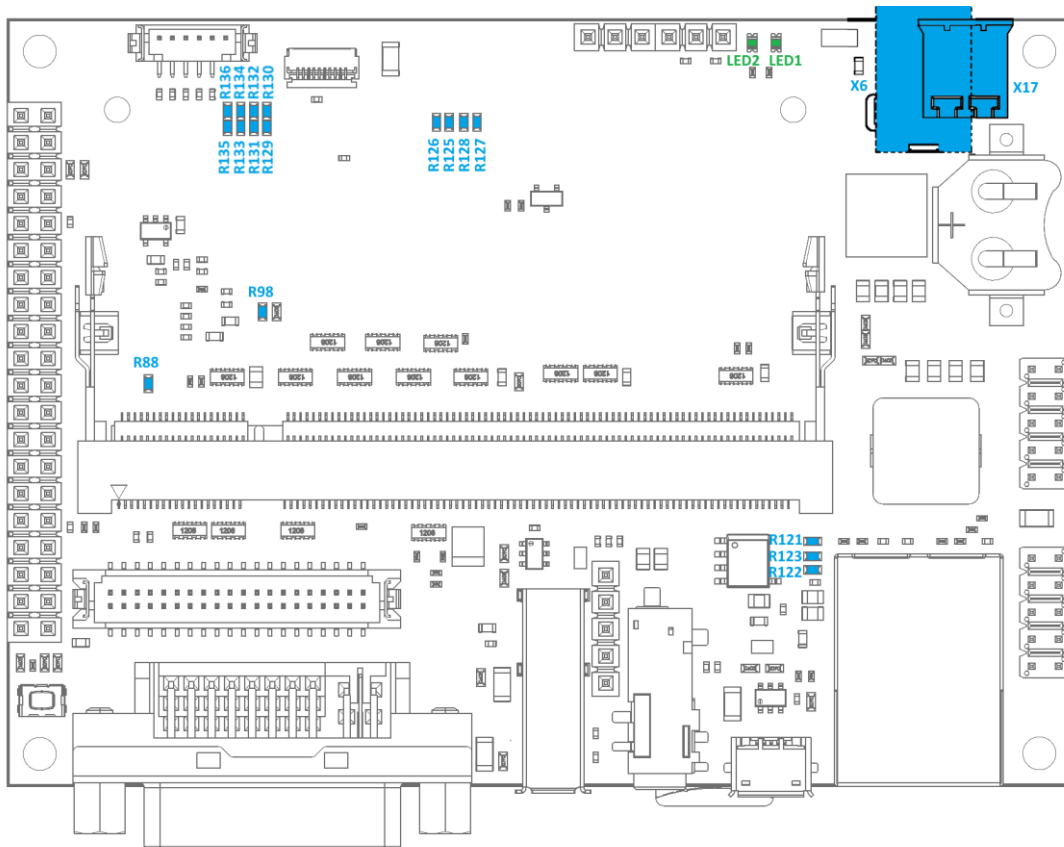
## 2.4. Assembly Options

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

**WARNING:**

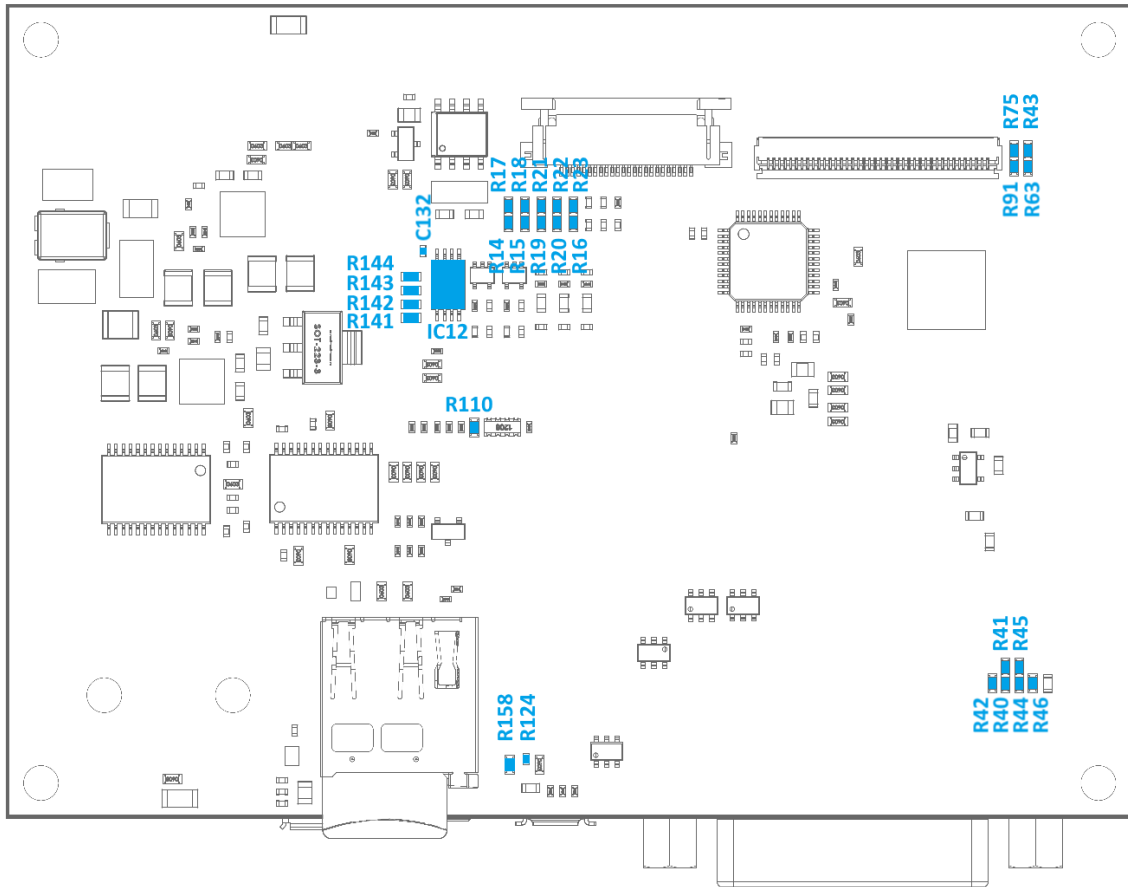
- Changing the PCB assembly voids the product warranty.
- Toradex doesn't take any responsibility for malfunction or damages caused by changing any assembly option.

### 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 that provides the signals required to boot the Colibri 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	SD boot mode (only with T20 module, not supported) Please contact Toradex Support for more details.

### 3.2. Power Supply

Iris carrier board provides two methods of supplying power to the board. One of the following can be used:

- The connector X17 is a pluggable, dual-pin male screw type Phoenix terminal block widely used in industrial applications. This connector is assembled by default.
- The connector X6, which is a standard 5.5mm power jack barrel connector that is widely used in consumer electronic devices. This connector is not assembled by default.

Both the connectors have a wide input voltage range of 6-27V DC.

The onboard power supply provides the following supplies (maximum power).

5V / 6A (30W)

3.3V / 6A (19.8W)

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

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

Connector type: Tyco 284512-2

Pin	Description	Voltage / range
1	GND_IN	
2	PWR_IN	+6V to +27V

By default, the Terminal Block Power Supply Connector (X17) is assembled on the Iris carrier board. Please refer to figure 4 in [Section 2.4, Assembly Options](#) for the position of the Terminal Block Power Supply Connector (X17).

#### 3.2.2 Barrel Power Supply Connector (X6)

Connector type: RAPC722X, Not assembled

Pin	Description	Voltage / range
1	PWR_IN	+6V to +27V
2	GND	

The Terminal Block Power Supply Connector (X17) has to be disassembled in order to assemble the Barrel Power Supply Connector (X6). Please refer to figure 4 in [Section 2.4, Assembly Options](#) for

the position of the Terminal Block Power Supply Connector (X17) and Barrel Power Supply Connector (X6).

### 3.2.3 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 turned 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 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 JX0011D21BNL

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_RX1_P	195	I	+3.3V	
4	ETH_AVCC (CT_TXD)		PWR		
5	ETH_AGND (CT_RXD)		PWR		
6	ETH_RX1_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				

Resistors R121, R122, and R123 can be used to configure the Ethernet controller, which is present on the installed Colibri module.

The following table describes the assembly options available on the Iris carrier board with respect to the Ethernet connector (X15):

Solution Selected	Assembly Options	Assembled Components on Iris V2.0	PCB Side
All modules except PXA270	Assemble resistors 122, R123 Disassemble resistor R121	R122, R123	Top
For Colibri PXA270	Assemble resistors 122, R123 Disassemble resistor R121	R122, R123	Top
Reserved for future module	Disassemble resistors R121, R122, R123	R122, R123	Top

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

### 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		
3	USBH_P	139	I/O		
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: Hirose ZX62-AB-5PA(31)

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		
3	USBC_P	143	I/O		
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)

Iris features a 4bit SDIO interface through a micro SD cardholder. The hardware supports the card detect function.

On Iris V2.0, it is possible to enable/disable SD Card / MMC power by using SODIMM\_100. Please refer to the Iris carrier board schematics for more details.

To allow for higher bus speed modes requiring 1.8V voltage signaling, the Iris V2.0 pull-up resistors have been left unpopulated. These pull-ups are available on the computer module. Colibri modules might be capable of switching the voltages of the SD card interface pins to a 1.8V, but it is not mandatory. Please check the related section of the Colibri module datasheet.

Connector type: Wurth 693071010811

Pin	Signal Name	SODIMM Pin Number	I/O Type	Voltage
1	MM_DAT_2	51	I/O	+1.8V/+3.3V (depending on module)
2	MM_DAT_3	53	I/O	+1.8V/+3.3V (depending on module)
3	MM_CMD	190	I	+1.8V/+3.3V (depending on module)
4	+3.3V		PWR	+3.3V
5	MM_CLK	47	I	+1.8V/+3.3V (depending on module)
6	GND		PWR	
7	MM_DAT_0	192	I/O	+1.8V/+3.3V (depending on module)
8	MM_DAT_1	49	I/O	+1.8V/+3.3V (depending on module)
CD1/2	MM_CD	43		





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 V2.0	PCB Side
Use the RGB to VGA DAC signals	Assemble resistors R14, R15, R16, R19, and R20. 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. 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 (X3) 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 a 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:

- <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 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: Hirose FH34SRJ-40S-0.5SH

Pin	Signal Name	Color Mapping 18bpp	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	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	

Pin	Signal Name	Color Mapping 18bpp	SODIMM Number	I/O Type	Voltage	Pull-up/ Pull-down
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			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 V2.0	PCB Side
Unified Interface Display, Rotate the 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				

Pin	Signal Name	Description	I/O Type	Voltage	Pull-up/Pull-down
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		
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-40DP-1.25V(55)

Pin	Signal Name	SODIMM Pin	I/O Type	Voltage	Pull-up/Pull-down
1	LVDS_A_TX3_P		O		
2	GND		PWR		
3	LVDS_A_TX3_N		O		
4	LVDS_B_CLK_N		O		
5	GND		PWR		
6	LVDS_B_CLK_P		O		
7	LVDS_A_TX2_P		O		
8	GND		PWR		
9	LVDS_A_TX2_N		O		
10	LVDS_B_TX0_N		O		
11	GND		PWR		
12	LVDS_B_TX0_P		O		
13	LVDS_A_TX1_P		O		
14	GND		PWR		
15	LVDS_A_TX1_N		O		
16	LVDS_B_TX1_N		O		

17	GND		PWR	
18	LVDS_B_TX1_P		O	
19	LVDS_A_TX0_P		O	
20	GND		PWR	
21	LVDS_A_TX0_N		O	
22	LVDS_B_TX2_N		O	
23	GND		PWR	
24	LVDS_B_TX2_P		O	
25	LVDS_A_CLK_P		O	
26	GND		PWR	
27	LVDS_A_CLK_N		O	
28	LVDS_B_TX3_N		O	
29	GND		PWR	
30	LVDS_B_TX3_P		O	
31	LVDS_SEL_1: Can be connected to 5V or 3.3V or GND via assembly option. The default assembly is 3.3V.			
32	LVDS_3.3V		PWR	+3.3V
33	LVDS_SEL_2: Can be connected to 5V or 3.3V or GND via assembly option. The default assembly is 3.3V.			
34	LVDS_5V		PWR	+5V
35	LVDS_BL_CTRL	59 (via R35)	O	
36	LVDS_I2C_SDA	194(via R89)	I/O	
37	LVDS_BL_ON	71 (via R36)	O	
38	LVDS_I2C_SCL	196 (via R90)	O	
39	LVDS_PWR_IN_UNREG		PWR	V_SUPPLY_FILT
40	LVDS_PWR_IN_UNREG		PWR	V_SUPPLY_FILT

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 pins 31 and 33 of the connector X7. 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 V2.0	PCB Side
LVDS_SEL_1 to LVDS_3.3V	Assemble resistor R40 Disassemble resistors R41 and R42	R40	Bottom
LVDS_SEL_1 to LVDS_5V	Assemble resistor R41 Disassemble resistors R40 and R42	R40	Bottom
LVDS_SEL_1 to GND	Assemble resistor R42 Disassemble resistors R40 and R41	R40	Bottom
LVDS_SEL_2 to LVDS_3.3V	Assemble resistor R44 Disassemble resistors R45 and R46	R44	Bottom
LVDS_SEL_2 to LVDS_5V	Assemble resistor R45 Disassemble resistors R44 and R46	R44	Bottom
LVDS_SEL_2 to GND	Assemble resistor R46 Disassemble resistors R44 and R45	R44	Bottom

The following table describes the control functions of the LVDS transmitter (IC9) available on Iris:

SODIMM Pin Number	IC9 Control Signal Name	Iris Signal Name	Description	High State Functionality	Low State Functionality
	R/F	LVDS_RF#	Input Clock Triggering Edge	Rising edge	Falling edge
	RS	LVDS_RS	LVDS Swing Mode	350mV	200mV
	DDRN	LVDS_DDRN#	DDR function	DDR disable	DDR enable
	O/E	LVDS_OE	Output enable	Output enable	Output disable
55	MODE	SODIMM_55	Pixel data mode	Single-In/Single-Out	Single-In/Dual-Out
63	6B/8B	SODIMM_63	6bit/8bit mode	18-bit RGB	24-bit RGB
95	MAP	SODIMM_95	LVDS mapping table	Mapping MODE1	Mapping MODE2
99	/PWRDN	SODIMM_99	Power down	Normal operation	Power down

Control signals of the transmitter (IC9) can be controlled in different ways with an appropriate assembly option, as described in the table below. Control signals R/F, RS, and DDRN, are available for fixed configuration. MODE, 6B/8B, MAP, and /PWRDN can be controlled via pins on the installed Colibri Module. At the same time, the O/E control signal can be controlled either with a fixed configuration or in combination with the SODIMM\_99 signal. For more information about control signals, please refer to the [THC63LV827 documentation](#).

The following table describes the assembly options available on the Iris carrier board to configure the LVDS transmitter (IC9):

Solution Selected	Assembly Options	Assembled Components on Iris V2.0	PCB Side
LVDS_RF# to +3.3V	Assemble resistor R129 Disassemble resistor R130	R129	Top
LVDS_RF# to GND	Assemble resistor R130 Disassemble resistor R129	R129	Top
LVDS_RS to +3.3V	Assemble resistor R131 Disassemble resistor R132	R131	Top
LVDS_RS to GND	Assemble resistor R132 Disassemble resistor R131	R131	Top
LVDS_DDRN# to +3.3V	Assemble resistor R133 Disassemble resistor R134	R133	Top
LVDS_DDRN# to GND	Assemble resistor R134 Disassemble resistor R133	R133	Top
LVDS_OE to +3.3V	Assemble resistor R135 Disassemble resistors R136 and R98	R135	Top
LVDS_OE to GND	Assemble resistor R136 Disassemble resistors R135 and R98	R135	Top
LVDS_OE to SODIMM_99	Assemble resistor R98 Disassemble resistors R135 and R136	R135	Top

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

### 3.7.5 Capacitive Touch Connector (X5)

Connector type: Hirose FH34SRJ-10S-0.5SH

Pin	Signal Name	SODIMM Pin Number	I/O Type	Voltage	Pull-up/Pull-down
1	I2C_SDA	194	I/O	+3.3V	4.7K to +3.3V
2	I2C_SCL	196	O	+3.3V	4.7K to +3.3V
3	GND		PWR		
4	SODIMM_107/ TOUCH_INT#	107	I/O	+3.3V	
5	SODIMM_106/ TOUCH_RESET#	106	I/O	+3.3V	
6	3.3V_SW		PWR	+3.3V	
7	SSPSCLK / TOUCH_SSP_CLK	88 (via R125)	O	+3.3V	
8	SSPFRM / TOUCH_SSP_CS	86 (via R126)	O	+3.3V	
9	SSPTXD / TOUCH_SSP_TX	92 (via R127)	O	+3.3V	
10	SSP_RXD / TOUCH_SSP_RX	90 (via R128)	I	+3.3V	

Resistors R125, R126, R127, and R128 are not assembled by default. Please refer to figure 4 in [Section 2.4, Assembly Options](#), for the position of the resistors.

### 3.7.6 Resistive 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, <a href="#">(Refer Note 1)</a>

**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>



### 3.8. Audio Interface

Iris offers one analog audio interface, which is provided by the Colibri Module. It is available on the connector (X8). This connector is a standard audio jack for headphones and microphone input. AHJ/CTIA and OMTP audio jacks are supported on the Iris carrier board. Iris fully supports the AHJ/CTIA type, but special care must be taken when using OMTP. The microphone input is not supported for the TRRS type of OMTP audio jack, which needs the assembly change. Please refer to the table below for additional information about assembly options for the Audio Jack (X8).

In addition, the Iris carrier board features the Line IN and MIC IN interfaces on an assembled 5-pin header (X9).

#### 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	MIC_IN	1	I		
2	HEADPHONE_CON_L	15	O		
3	HEADPHONE_CON_R	17	O		
4	AUDIO_AGND		PWR		
5	HEADPHONE_CON_L	15	O		
6	HEADPHONE_CON_R	17	O		

The following table describes the assembly options available on the Iris carrier board to configure the Audio Jack (X8):

Solution Selected	Assembly Options	Assembled Components on Iris V2.0	PCB Side
AHJ/CTIA pin-out	Assemble resistor R124 Disassemble resistor R158	R124	Bottom
OMTP pin-out (without MIC_IN)	Assemble resistor R158 Disassemble resistor R124	R124	Bottom

Please refer to figure 5 for the positions of the resistors [Section 2.4, Assembly Options](#). By default, AHJ/CTIA Pinout is used. TS and TSR types of OMTP cable are compatible with the default pin-out. Use OMTP pin-out when connecting TSSR OMTP cable. The microphone input is not supported for the OMTP type of audio jack. Please refer to the [Wikipedia](#) link for further information about the different types of audio cables.

#### 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	MIC_IN	1	I		
3	LINEIN_R	7	I		
4	LINEIN_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 that have been connected to the ForceOFF# pin. This is needed in order to use the UART signals that are on the extension connector at the 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	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 V2.0	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.

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

#### 3.10.1 External RTC

The Iris carrier board uses the STMicroelectronics, M41T0M6 chip as an 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 back up to the external RTC circuits when an 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 not to use a thinner battery after using the thicker battery with the battery holder (BAT1).

### 3.11. EEPROM

#### 3.11.1 EEPROM (IC12)

The Iris carrier board also features an assembly option for I2C compatible EEPROM. The Atmel AT34C02D-XHM-B (IC12) EEPROM and its assembly options are not assembled by default.

By using the assembly options, it is possible to configure the address and write protection of the (IC12). The following tables show how this can be achieved.

The configurable control signals of AT34C02D-XHM-B (IC12):

Pin Number	Iris Signal Name	Description	High State Functionality	Low State or Floating Functionality
1	EEPROM_A0	A0 Address input	Logic 1	Logic 0
2	EEPROM_A1	A1 Address input	Logic 1	Logic 0
3	EEPROM_A2	A2 Address input	Logic 1	Logic 0
7	EEPROM_WP	Write protect	Write protection	Normal operation

The following table describes the assembly options for the EEPROM (IC12):

Solution Selected	Assembly Options	Assembled Components on Iris V2.0	PCB Side
EEPROM with address configuration	Assemble IC12 and capacitor C132. Assemble appropriate R141, R142, R143 in order to configure the desired I2C address. Optionally assemble R144 for write protection.		Bottom

Please refer to figure 5 in [Section 2.4, Assembly Options](#), for the position of the components. For more details about control signals of the (IC12) please refer to the [AT34C02D-XHM-B datasheet](#).

## 4. Electrical Characteristics

### 4.1. Electrical Specifications

Symbol	Description	Voltage	Min	Typ	Max	Unit
PWR_IN_V	Main power supply voltage		6		27	V
PWR_IN_I	Main power supply current		0		10	A
V_BACKUP	Optional RTC battery voltage		2.3	3	3.6	V
I_(+5V)	Total current for external devices at power rail: X16 Pin 12 X20 Pin 1 USB connectors / USB header	+5V			2.5	A
I_(+3.3V)	Total current for external devices at power rail: X16 Pin 33 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

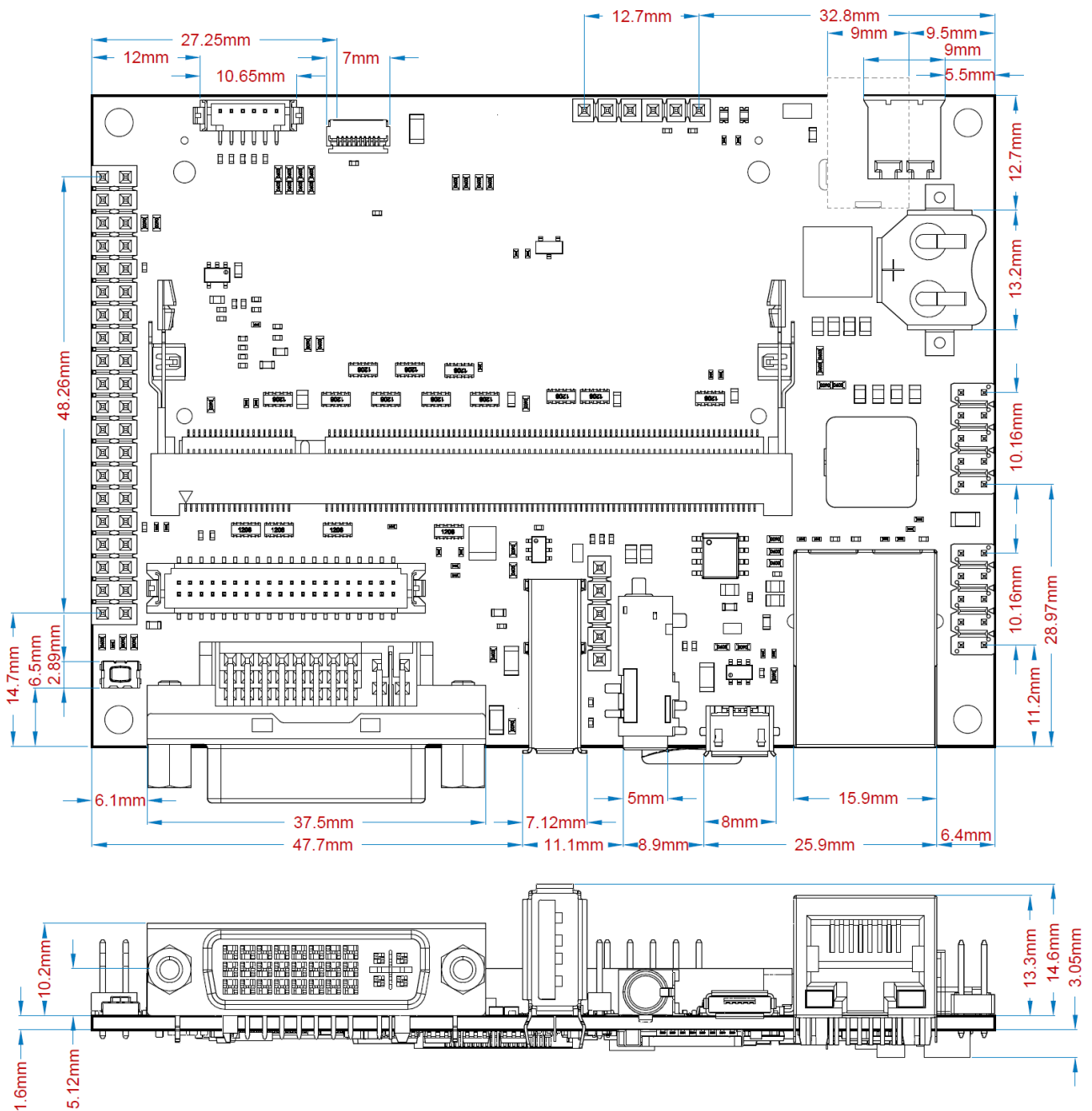
## 5. Temperature Range

### 5.1. Operating Temperature Range

- - 20 °C to +85 °C
- Following components doesn't meet the -40°C to +85°C temperature range
  - DVI Connector X4: - 20 °C to 85 °C
  - LVDS Connector X7: - 35 °C to 85 °C
  - Audio Jack X8: - 25 °C to 85 °C
  - Micro SD card holder X10: - 25 °C to 85 °C
  - Micro USB Connector X12: - 30 °C to 85 °C

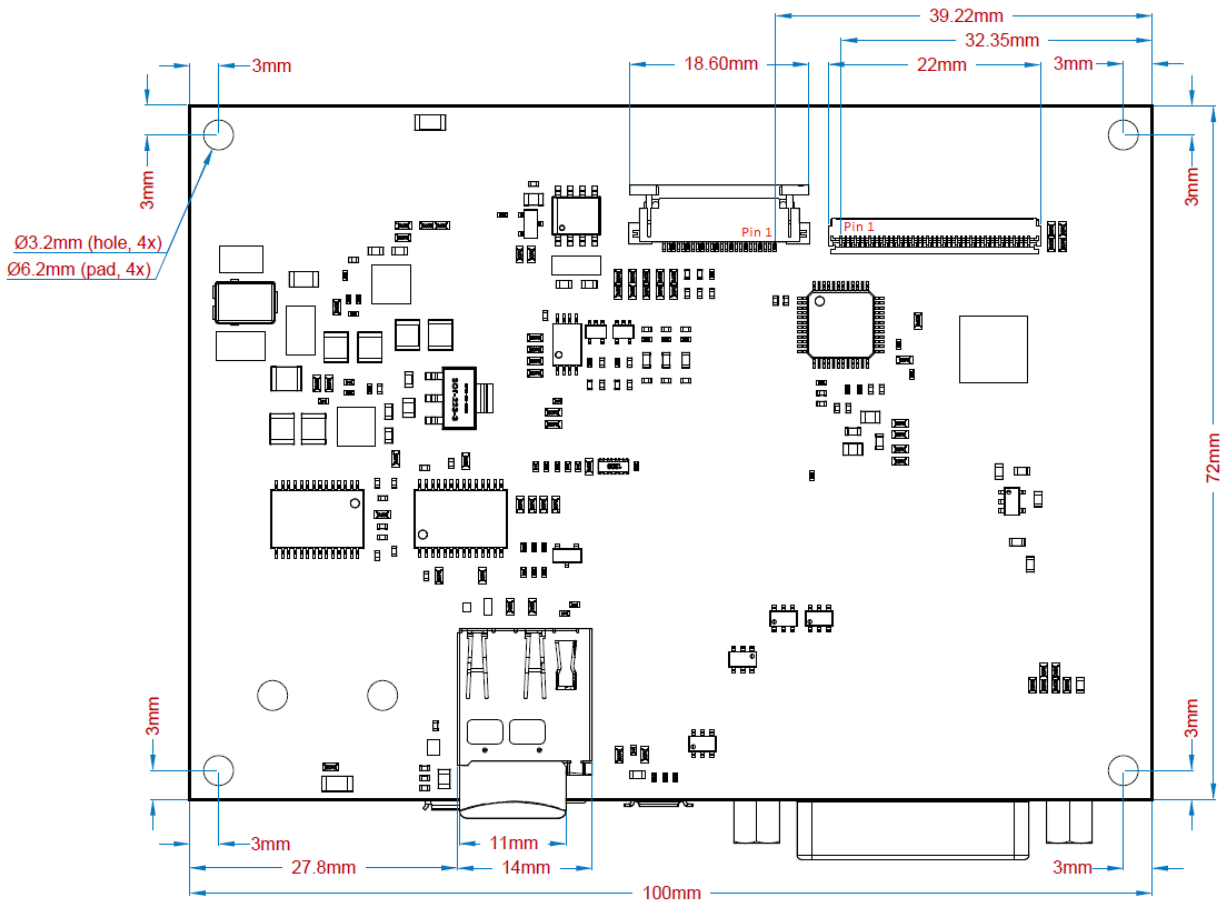
## 6. Mechanical Data

### 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 millimeters (mm)**



## 7. Design Data

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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 weblink below:

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

## 8. Product Compliance

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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>

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