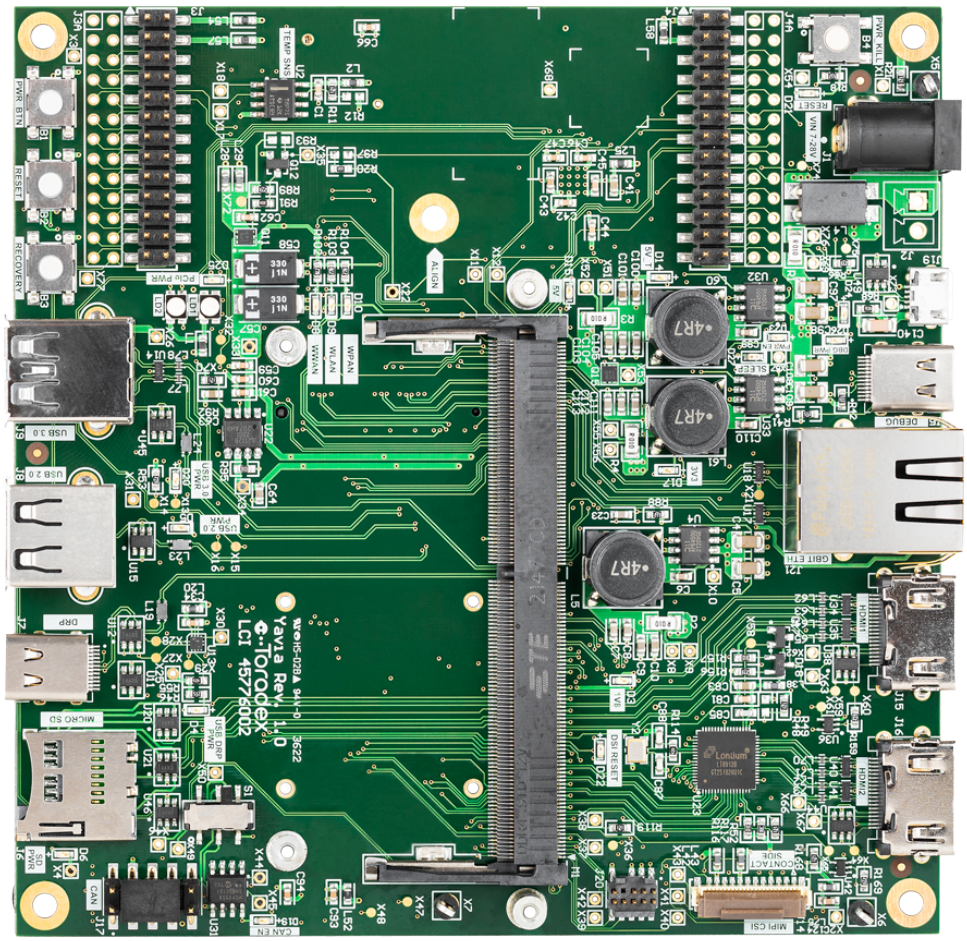
Toradex
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Yavia

Datasheet



Document Version 1.0

Linear Computing Inc.

progressive design

Yavia V1.0 Datasheet

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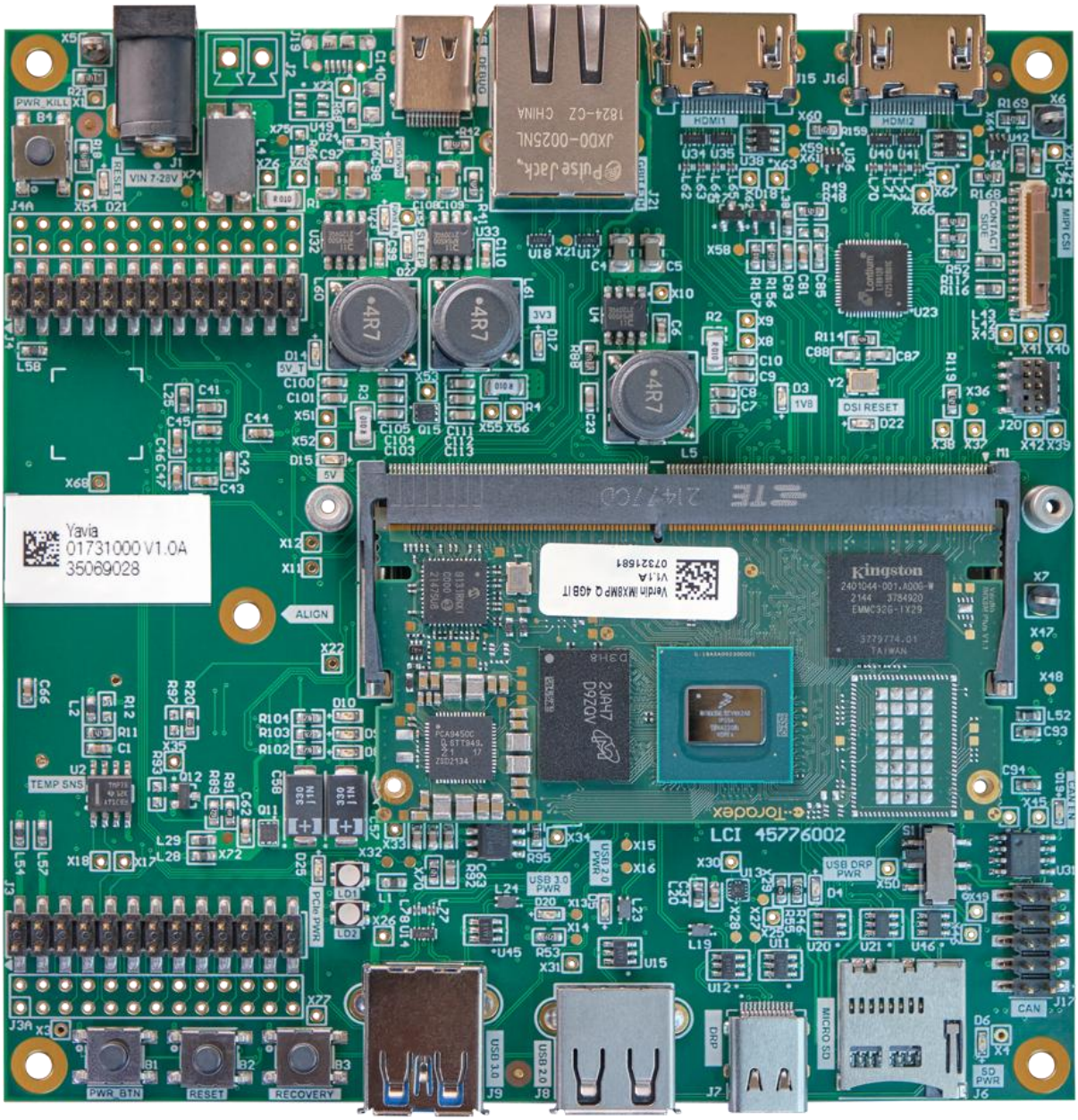
PRODUCT COMPLIANCE **40**

Document History

Version	Date	Who	Change Description
1.0	Oct 16, 2022	BB	Initial version for Yavia V1.0, LCI PN 45771002

Overview

This document describes the features of the Yavia V1.0.



Reference Documents

Verdin Family Specification

https://docs.toradex.com/109262-verdin-family-specification.pdf

Verdin Carrier Board Design Guide

https://docs.toradex.com/108140-verdin-carrier-board-design-guide.pdf

Carrier Board Layout Guide

https://docs.toradex.com/102492-layout-design-guide.pdf

Yavia – Product Pages

https://www.toradex.com/products/carrier-board/yavia

https://developer.toradex.com/hardware/verdin-som-family/carrier-boards/yavia

Verdin Computer on Module Family Overview

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

https://developer.toradex.com/products/verdin-som-family/modules

Step-down Converter AP64500SP-13

https://www.diodes.com/assets/Datasheets/AP64500.pdf

Low Dropout Regulator AP2132

https://www.diodes.com/assets/Datasheets/AP2132.pdf

USB Hub USB2514

https://ww1.microchip.com/downloads/aemDocuments/documents/OTH/ProductDocuments/DataSheets/00001692C.pdf

USB Type-C CC Logic and Port Controller TUSB320

https://www.ti.com/lit/gpn/TUSB320LI

USB to UART Bridge CP2105

https://www.silabs.com/documents/public/data-sheets/CP2105.pdf

Temperature Sensor TMP75

https://www.ti.com/lit/gpn/TMP75

EEPROM M24C02

https://www.st.com/resource/en/datasheet/m24c01-r.pdf

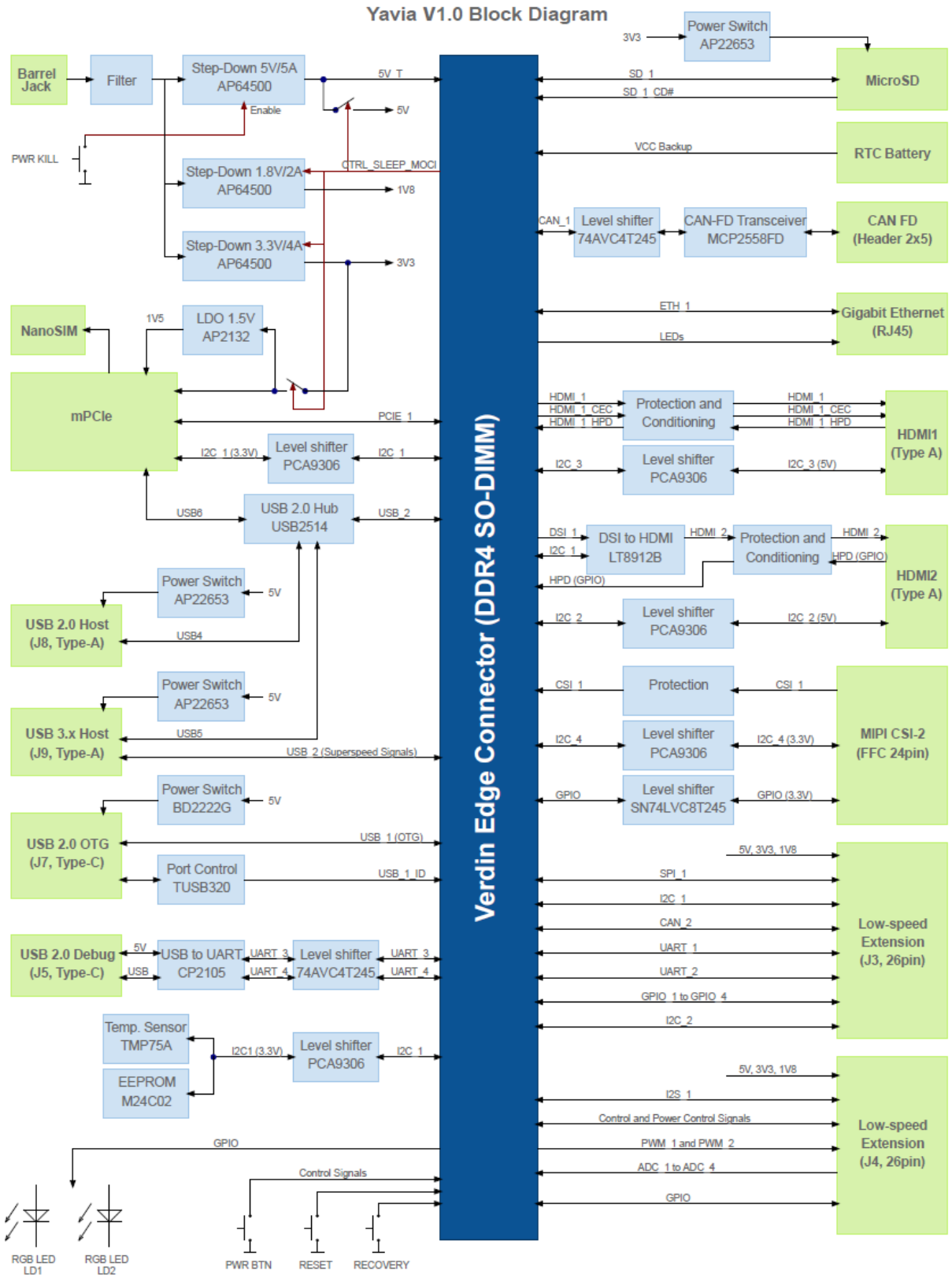
DSI to HDMI Converter LT8912B

http://www.lontiumsemi.com/product/View_86.html

CAN FD Transceiver MCP2558FD

https://ww1.microchip.com/downloads/aemDocuments/documents/OTH/ProductDocuments/DataSheets/20005533A.pdf

Block Diagram



Main Features

The Yavia provides the following interfaces:

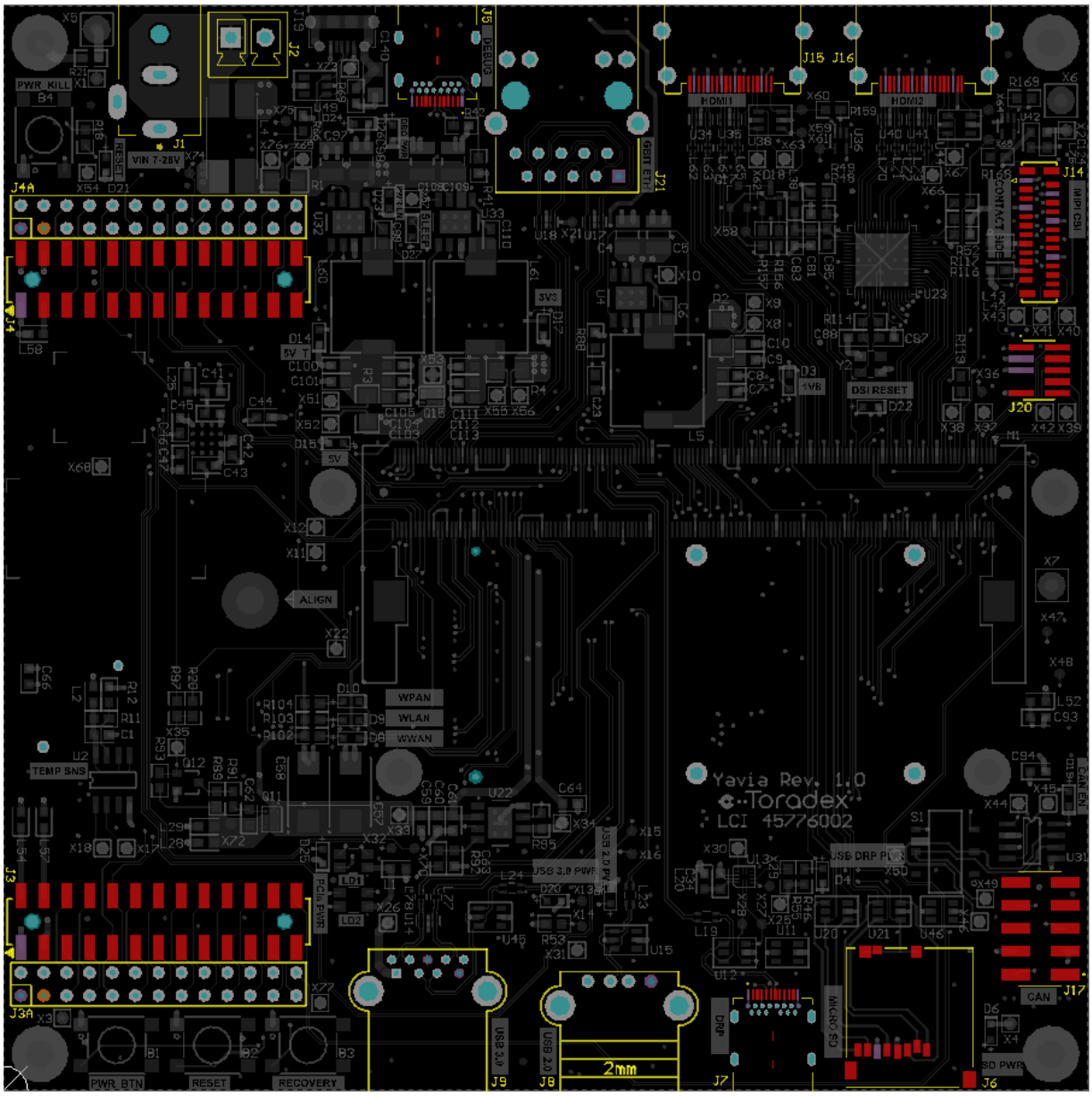
- 1x Gigabit Ethernet (RJ45 connector with integrated magnetics)
- 1x USB 2.0 Dual Role (USB Type-C connector)
- 1x USB 3.x host (USB Type-A connector)
- 1x USB 2.0 host (USB Type-A connector)
- 1x USB 2.0 debug (USB Type-C connector)
- 1x microSD card slot
- 1x PCIe (mPCIe connector):
  - 1x PCIe (1x lane)
  - 1x USB 2.0
  - 1x SIM Card support
  - 3x LEDs (LED_WWAN, LED_WLAN, LED_WPAN)
  - 1x SMBus (optional, connected to general-purpose I2C bus)
  - 1x NanoSIM slot
- 1x CAN header (via CAN FD transceiver)
- 2x HDMI:
  - 1x native Verdin interface
  - 1x converted from the Verdin MIPI DSI interface
- 1x Quad Lane MIPI CSI Camera Interface (connector defined by the Toradex MIPI CSI-2 Interface Standard)
- 2x Low-speed extension headers with the following interfaces:
  - 2x I2C
  - 1x I2S
  - 1x SPI
  - 2x PWM
  - 4x dedicated GPIOs
  - 4x ADC
  - 2x UART (with flow control)
  - 1x CAN
  - Control signals
  - Power pins:
    - 1x 1.8V
    - 1x 3.3V
    - 1x 5V
    - 2x Grounds
- 1x JTAG (Cortex debug connector)

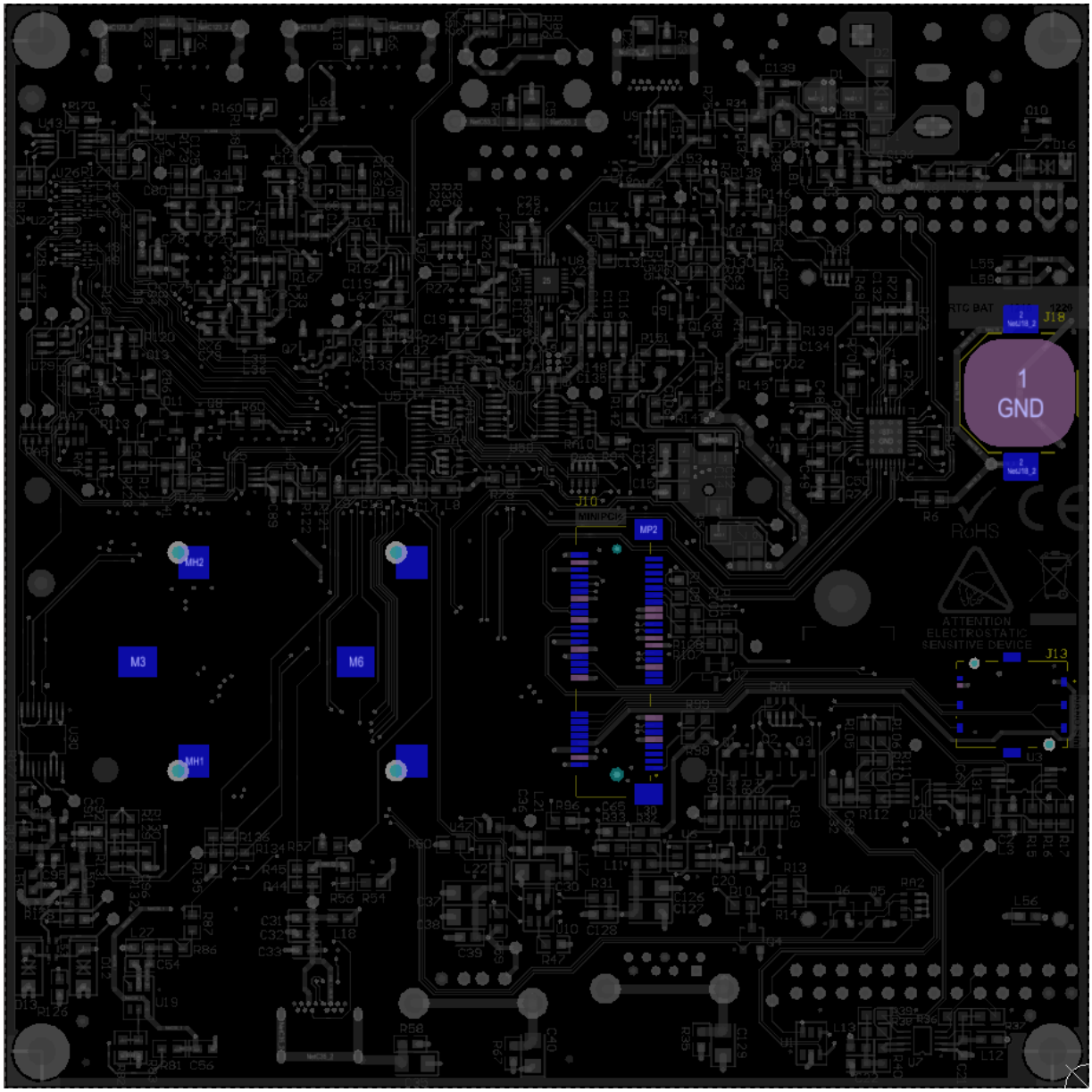
- 1x RTC backup battery holder

The Yavia provides the following additional features:

- PCB temperature sensor
- 256Kb EEPROM
- Push-buttons:
  - On/Off
  - Reset
  - Recovery mode
  - Power disable
- LEDs:
  - 2x RGB (user-controllable)
  - Status and activity indicators

Connectors


Yavia Rev. 1.0
Toradex
LCI 45776002
J1
J2
J3
J4
J4A
J6
J7
J8
J9
J13
J14
J15 J16
J17
J20
J21
HDMI1
HDMI2
CAN
DSI RESET
WPAN
WLAN
WWAN
TEMP SNS
ALIGN
PWR_KILL
VIN 7-28V
PWR BTN
RESET
RECOVERY
MICRO SD
2mm


RTC BAT
J18
1
GND
J10
MINIPCIE
MP2
MH2
M3
M6
MH1
ATTENTION
ELECTROSTATIC
SENSITIVE DEVICE
J13
RoHS

Designator	Side	Description
M1	Top	Verdin SoM connector
J1	Top	Main power connector
J2	Top	Alternative power connector (not assembled)
J3, J3A	Top	Extension connector
J4, J4A	Top	Extension connector
J5	Top	USB 2.0 debug, Type-C connector
J6	Top	microSD card slot
J7	Top	USB 2.0 Dual Role, Type-C connector
J8	Top	USB 2.0 Host, Type-A connector
J9	Top	USB 3.x Host, Type-A connector
J10	Bottom	mPCIe card slot
J13	Bottom	NanoSIM card slot
J14	Top	Toradex MIPI CSI-2 connector
J15	Top	HDMI1 connector (native)
J16	Top	HDMI2 connector (via DSI to HDM converter)
J17	Top	CAN FD connector (via transceiver)
J18	Bottom	RTC backup battery holder
J20	Top	JTAG connector
J21	Top	Gigabit Ethernet, RJ45 connector

Interface Description

M1 – Verdin SoM Connector

Type: SODIMM-DDR4 260 pin Socket

Manufacturer: TE Connectivity

Manufacturer PN: 2309409-2

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

Standoffs are available on the Yavia for fixing the Verdin module to the carrier board.

J1 – Main Power Connector

The board operates with 7V to 28V DC power (absolute). A jack with a positive center pin is required; the outside diameter is 5.5mm, and the inside pin diameter is 2.1mm or 2.2mm. The board includes reverse polarity protection.

The power consumption varies with the type of SoM and connected peripherals (especially the type and number of connected USB devices). With no external devices connected, the board and SoM typically use between 3 and 5 Watts.

A 12V / 1A (or higher-rated) power supply should work well if no external devices are connected.

Connect the power supply to J1.

Board includes button B4 marked “PWR_KILL” installed near the power connector. The button will disable internal DC/DC converters when pressed. This will power-cycle the SoM and all peripherals on the board and has a similar effect as turning the power supply off and on.

Fuse F1 is installed on the power input line, located on the bottom side of the PCB near the power connector with rating 5A, Part number Vishay MFU0603FF05000P100.

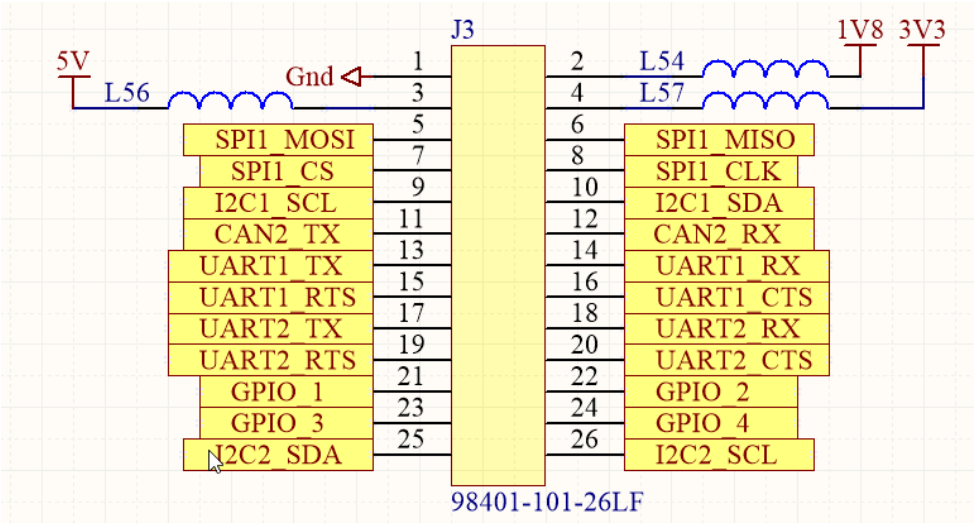
Pin	Signal Name	Function
1 - center pin	V+	positive side of power supply 7 - 28V
2 - barrel	V-	negative side of the power supply

Manufacturer: CUI Inc.
Manufacturer PN: PJ-059A

J3 and J4 – Extension Connectors

Expansion connectors include signals to be used with external circuits or daughter cards. Signals are connected directly to SoM, so most signals use 1.8V logic levels. There is no protection implemented. Connectors J3A/J4A include the same signals as J3/J4 and are meant to be used as test points. Pin one of the connectors is marked with a triangle mark and is located near the PCB edge. Connectors include 5V, 3.3V, and 1.8V power rails that can power external circuits and daughter cards. The current of 0.5A is allocated in the power budget of each power rail for external courses.

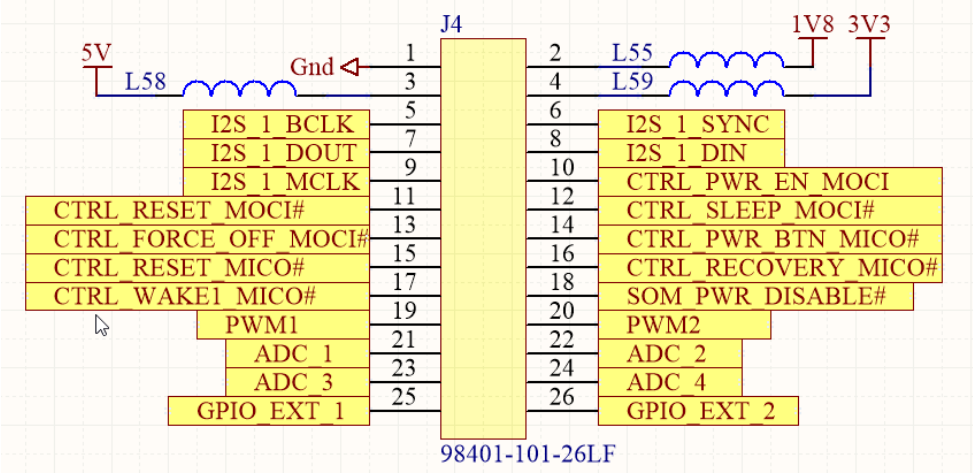
Manufacturer: Amphenol
Manufacturer PN: 98401-101-26LF



J3 Connector

Pin	SoM Pin	Logic Level	Function
1		PWR	GND connection
2		PWR	1.8V power supply
3		PWR	5V power supply
4		PWR	3.3V power supply
5	200	1.8V	SPI1_MOSI
6	198	1.8V	SPI1_MISO
7	202	1.8V	SPI1_CS
8	196	1.8V	SPI1_CLK
9	14	1.8V	I2C1_SCL (5.1K pull up to 1.8V on board)
10	12	1.8V	I2C1_SDA (5.1K pull up to 1.8V on board)
11	24	1.8V	CAN2_TX
12	26	1.8V	CAN2_RX
13	131	1.8V	UART1_TX
14	129	1.8V	UART1_RX
15	133	1.8V	UART1_RTS
16	135	1.8V	UART1_CTS
17	139	1.8V	UART2_TX
18	137	1.8V	UART2_RX
19	141	1.8V	UART2_RTS
20	143	1.8V	UART2_CTS
21	206	1.8V	GPIO1 (10K pull down on board)
22	208	1.8V	GPIO2 (10K pull down on board)
23	210	1.8V	GPIO3 (10K pull down on board)
24	212	1.8V	GPIO4 (10K pull down on board)
25	53	1.8V	I2C2_SDA (5.1K pull up to 1.8V on

			board)
26	55	1.8V	I2C2_SCL (5.1K pull up to 1.8V on board)



J4 Connector

Pin	SoM Pin	Logic Level	Function
1		PWR	GND connection
2		PWR	1.8V power supply
3		PWR	5V power supply
4		PWR	3.3V power supply
5	30	1.8V	I2S1_BCLK
6	32	1.8V	I2S1_SYNC
7	34	1.8V	I2S1_DOUT
8	36	1.8V	I2S1_DIN
9	38	1.8V	I2S1_MCLK
10	254	1.8V	CTRL_PWR_EN_MOCI
11	258	1.8V	CTRL_RESET_MOCI#
12	256	1.8V	CTRL_SLEEP_MOCI#
13	250	1.8V	CTRL_FORCE_OFF_MOCI#
14	248	1.8V	CTRL_PWR_BTN_MICO#
15	260	1.8V	CTRL_RESET_MICO#
16	246	1.8V	CTRL_RECOVERY_MICO#
17	252	1.8V	CTRL_WAKE1_MICO#
18			SOM_PWR_DISABLE# shorting this signal to GND will turn off all DC/DC power supplies on board. Same function as pressing button B4.
19	15	1.8V	PWM1
20	16	1.8V	PWM2
21	2		ADC1
22	4		ADC2
23	6		ADC3

24	8		ADC4
25	64	1.8V	GPIO_EXT_1 (10K pull down on board)
26	66	1.8V	GPIO_EXT_2 (10K pull down on board)

J5 – USB 2.0 Debug, Type-C Connector

The board includes dual USB to UART bridge CP2105 connected to USB Type-C connector J5. One bridge port is connected to SoM UART3 (Linux console), and the other is to SoM UART4 (Cortex-M debug).

Pin	Signal Name	Function
A1	GND	
A2		
A3		
A4	VBUS	+5V Power
A5	CC1	5.1K pull down on board
A6	DP	USB 2.0 Data +
A7	DM	USB 2.0 Data -
A8		
A9	VBUS	+5V Power
A10		
A11		
A12	GND	
B1	GND	
B2		
B3		
B4	VBUS	+5V Power
B5	CC2	5.1K pull down on board
B6	DP	USB 2.0 Data +
B7	DM	USB 2.0 Data -
B8		
B9	VBUS	+5V Power
B10		
B11		
B12	GND	

Manufacturer: Bel
Manufacturer PN: SS-52400-003

J6 – microSD Card Slot

The Yavia features a 4-bit SDIO interface and supports the hardware-based card detection function. The Verdin family supports SD Card Low Voltage Signaling mode. If the MicroSD card

supports this mode, the communication will start at 3.3V and switch to 1.8V after it has been initialized.

The SD1_PWR_EN (SoM pin 76) signal allows for switching the SD card supply.

Pin	Signal Name	SoM Pin	I/O Type	Logic Level	Function
1	SD1_D2	70	I/O	+1.8/3.3V	serial data 2
2	SD1_3	72	I/O	+1.8/3.3V	serial data 3
3	SD1_CMD	74	O	+1.8/3.3V	command
4	Vcc		PWR	+3.3V	SD card power
5	SD1_CLK	78	O	+1.8/3.3V	clock
6	GND		PWR		
7	SD1_D0	80	I/O	+1.8/3.3V	serial data 0
8	SD1_D1	82	I/O	+1.8/3.3V	serial data 1
CD	SD1_CD#	84	I	+3.3V	card detect, shorted to GND when the card is inserted

Manufacturer: Global Connector Technology
Manufacturer PN: MEM2051-00-195-00-A

J7 – USB 2.0 Dual Role, Type-C Connector

The Yavia integrates a USB-C connector J7, connected to the Verdin USB_1 port (USB 2.0 interface only). This port is usually used in the recovery mode to load new software onto the module and works as a dual-role-port (DRP), which means host or client. This behavior is similar to the On-The-Go (OTG) functionality, but the term USB OTG is only used in conjunction with the USB Micro-AB or the obsolete USB Mini-AB receptacle. ID pin is absent on the USB Type-C receptacle. The determination of host or client functionality is handled differently in Type-C using the configuration channel (CC) pins. The CC pins perform the same functions that the ID pin previously served: they indicate the role of equipment as host, client, or both. The CC pins also detect if the connection is being made or broken.

To handle all the operations required for the USB dual-role-port, a TUSB320 chip has been used. It can function as an upstream-facing port (UFP), downstream-facing port (DFP), or dual-role port (DRP) product based on a pin configuration. The device handles all aspects of the USB Type-C connection process (including the CC pins that mirror the micro-A/B ID pin behavior) to determine the port role. When connected as a peripheral (UFP), the TUSB320 indicates the VBUS current provided by the attached host through the general-purpose input/output (GPIO) pins. When connected as a DFP, these devices advertise VBUS current to the attached peripheral. On the Yavia, this port is configured as a dual-role port (DRP) by default, and its output current is limited to 0.77A. For the details, please check the TUSB320 datasheet.

https://www.ti.com/lit/gpn/TUSB320LI

Pin	Signal Name	Function
A1	GND	
A2		
A3		
A4	VBUS	+5V Power
A5	CC1	5.1K pull down on board
A6	DP	USB 2.0 Data +
A7	DM	USB 2.0 Data -
A8		
A9	VBUS	+5V Power
A10		
A11		
A12	GND	
B1	GND	
B2		
B3		
B4	VBUS	+5V Power
B5	CC2	5.1K pull down on board

B6	DP	USB 2.0 Data +
B7	DM	USB 2.0 Data -
B8		
B9	VBUS	+5V Power
B10		
B11		
B12	GND	

Manufacturer: Bel
Manufacturer PN: SS-52400-003

J8 – USB 2.0 Host, Type-A Connector

The Yavia board includes a USB 2.0 Type-A connector connected to the USB 2.0 hub. This port features a host function and can be used to connect standard USB 2.0 peripherals, for example, a USB thumb drive, keyboard, or mouse. The carrier board provides 5V/0.65A supply for connected devices.

Pin	Signal Name	Function
1	VBUS	+5V Power
2	DM	USB 2.0 Data -
3	DP	USB 2.0 Data +
4	GND	

Manufacturer: Amphenol
Manufacturer PN: UE27AC54100

J9 – USB 3.x Host, Type-A Connector

The Yavia board includes a USB 3.x Type-A connector connected to the USB 2.0 hub. SuperSpeed USB 3.x signals from the SoM USB_2 port are also connected to the connector to form a complete USB 3.x port.

This port features a host function and can be used to connect a standard USB 3.x peripheral, for example, a USB thumb drive or USB Camera. The carrier board provides 5V/1.3A supply for the connected device.

Pin	Signal Name	Function
1	VBUS	+5V Power
2	DM	USB 2.0 Data -
3	DP	USB 2.0 Data +
4	GND	
5	SSRX-	SuperSpeed RX Data -
6	SSRX+	SuperSpeed RX Data +
7	GND Drain	
8	SSTX-	SuperSpeed TX Data -
0	SSTX+	SuperSpeed TX Data +

Manufacturer: Bel
Manufacturer PN: SS-52000-001

J10 – mPCIe Card Slot

The Yavia makes the standard PCIe interface on the Verdin module available on a mini-PCIe slot. PCI Express Mini Card edge connector provides multiple connections and buses, such as listed below:

- PCI Express 1 lane (with SMBus)
- USB 2.0
- Indication LEDs for wireless network status
- SIM card for cellular applications (UIM signals)
- I2C1 signals at 3.3V

Pin	Signal Name	SoM Pin	I/O Type	Logic Level	Function
1	PCIE_1_WAKE#	252	O (OD)	1.8V	Wake-up to SoM
3					
5					
7					
9	GND				
11	PCIE_1_CLK_N	226	I		Negative differential PCIe reference clock signal
13	PCIE_1_CLK_P	228	I		Positive differential PCIe reference clock signal
15	GND				
17					
19					
21	GND				
23	PCIE_1_L0_RX_N	232	O		Negative differential PCIe receive signal
25	PCIE_1_L0_RX_P	234	O		Positive differential PCIe receive signal
27	GND				
29	GND				
31	PCIE_1_L0_TX_N	238	I		Negative differential PCIe transmit signal
33	PCIE_1_L0_TX_P	240	I		Positive differential PCIe transmit signal
35	GND				
37	GND				
39	MPCI1_3V3			3.3V	3.3V power for the card
41	MPCI1_3V3			3.3V	3.3V power for the

					card
43	GND				
45					
47					
49					
51					
2	MPCI1_3V3			3.3V	3.3V power for the card
4	GND				
6	MPCI1_1V5			1.5V	1.5V power for the card
8	SIM_PWR				SIM Card Power
10	SIM_DATA		I/O		SIM Card Data
12	SIM_CLK		O		SIM Card Clock
14	SIM_RESET		O		SIM Card Reset
16	SIM_VPP				SIM Card Programming voltage
18	GND				
20	WDISABLE		I	3.3V	PCIe wireless interface disable
22	PERST#	244	I	3.3V	PCIe Power Enable/RESET
24	MPCI1_3V3			3.3V	3.3V power for the card
26	GND				
28	MPCI1_1V5			1.5V	1.5V power for the card
30	SMCLK		I	3.3V	SMBUs clock - connected to I2C1_SCL
32	SMDAT		I/O	3.3V	SMBUs data - connected to I2C1_SDA
34	GND				
36	USB6_N		I/O		USB 2.0 Data - signal connected to USB 2.0 hub
38	USB6_P		I/O		USB 2.0 Data + signal connected to USB 2.0 hub
40	GND				
42	WWLAN		O (OD)		WWLAN LED
44	WLAN		O (OD)		WLAN LED
46	WPAN		O (OD)		WPAN LED
48	MPCI1_1V5			1.5V	1.5V power for the

					card
50	GND				
52	MPCI1_3V3			3.3V	3.3V power for the card

Manufacturer: TE Connectivity
Manufacturer PN: 1775862-2

J13 – NanoSIM Card Slot

Pin	Signal Name	I/O Type	Function
C1	SIM_PWR		SIM Card Power
C2	SIM_RESET	O	SIM Card Reset
C3	SIM_CLK	O	SIM Card Clock
C5	GND		
C6	SIM_VPP		SIM Card Programming voltage
C7	SIM_DATA	I/O	SIM Card Data

Manufacturer: Global Connector Technology
Manufacturer PN: SIM8055-6-1-14-00-A

J14 – Toradex MIPI CSI-2 Connector

The MIPI CSI Camera Interface on connector X16 is intended for applications requiring image capturing from CMOS or CDD image sensors. For details, please see the Verdin module datasheet.

Pin	Signal Name	SoM Pin	I/O Type	Logic Level	Function
1	GND				
2	CSI_1_D0_CON_N	125			Negative differential MIPI CSI data signal, lane 0
3	CSI_1_D0_CON_P	123			Positive differential MIPI CSI data signal, lane 0
4	GND				
5	CSI_1_D1_CON_N	119			Negative differential MIPI CSI data signal, lane 1
6	CSI_1_D1_CON_P	117			Positive differential MIPI CSI data signal, lane 1
7	GND				
8	CSI_1_CLK_CON_N	113			Negative differential MIPI CSI data signal, clock
9	CSI_1_CLK_CON_P	111			Positive differential MIPI CSI data signal, clock
10	GND				
11	CAM_1_CON_RST	216	O	3.3V	MIPI CSI camera reset
12	SCI_1_MCLK	91	O		MIPI CSI camera master clock
13	I²C_4_CSI_CON_SCL	95	O	3.3V	MIPI CSI camera I2c bus clock
14	I²C_4_CSI_CON_SDA	93	I/O	3.3V	MIPI CSI camera I2c bus data
15	3V3			3.3V	3.3V power for the camera
16	CSI_1_D2_CON_N	107			Negative differential MIPI CSI data signal, lane 2
17	CSI_1_D2_CON_P	105			Positive differential MIPI CSI data signal, lane 2
18	GND				
19	CSI_1_D3_CON_N	101			Negative differential MIPI CSI data signal, lane 3
20	CSI_1_D3_CON_P	99			Positive differential MIPI CSI data signal, lane 3
21	5V			5V	5V power for the camera
22	CAM_1_CON_PWRDWN	218	O	3.3V	MIPI CSI camera power down
23	CAM_1_CON_IC_DETECT	220	I	3.3V	MIPI CSI camera identification
24	CAM_1_CON_PWRCTRL	222	O	3.3V	MIPI CSI power supply control

Manufacturer: Hirose
Manufacturer PN: FH12-24S-0.5SVA(54)

J15 – HDMI1 Connector (native)

J15 connector allows connecting HDMI display to the native Verdin HDMI interface. Please consult the SoM datasheet to check if this interface is supported.

Pin	Signal Name	SoM Pin	I/O Type	Logic Level	Function
1	HDMI_1_TXD2_CON_P	87	O		Positive differential HDMI data signal, lane 2
2	GND				
3	HDMI_1_TXD2_CON_N	85	O		Negative differential HDMI data signal, lane 2
4	HDMI_1_TXD1_CON_P	81	O		Positive differential HDMI data signal, lane 1
5	GND				
6	HDMI_1_TXD1_CON_N	79	O		Negative differential HDMI data signal, lane 1
7	HDMI_1_TXD0_CON_P	75	O		Positive differential HDMI data signal, lane 0
8	GND				
9	HDMI_1_TXD0_CON_N	73	O		Negative differential HDMI data signal, lane 0
10	HDMI_1_TXC_CON_P	69	O		Positive differential HDMI data signal, clock
11	GND				
12	HDMI_1_TXC_CON_N	67	O		Negative differential HDMI data signal, clock
13	HDMI_1_CEC_CON	63	I/O	3.3V	HDMI Consumer Electronic Control
14					
15	HDMI_1_DDC_SCL	59	O	5V	DDC Interface clock
16	HDMI_1_DDC_SDA	57	I/O	5V	DDC Interface data
17	GND				
18	5V_HDMI			5V	HDMI power out
19	HDMI_1_HPD_CON	61	I	5V	HDMI hot plug detect

Manufacturer: FCI
Manufacturer PN: 10029449-111RLF

J16 – HDMI2 Connector (Via DSI to HDM Converter)

The J16 connector allows connecting the HDMI display to the SoM HDMI interface. Signals are generated by bridge LT8912B which converts SoM DSI port signals to HDMI signals. DSI interface is implemented on all current Verdin modules. Consumer Electronic Control (CEC) function is not implemented on this interface.

Pin	Signal Name	SoM Pin	I/O Type	Logic Level	Function
1	HDMI_1_TXD2_CON_P		O		Positive differential HDMI data signal, lane 2
2	GND				
3	HDMI_1_TXD2_CON_N		O		Negative differential HDMI data signal, lane 2
4	HDMI_1_TXD1_CON_P		O		Positive differential HDMI data signal, lane 1
5	GND				
6	HDMI_1_TXD1_CON_N		O		Negative differential HDMI data signal, lane 1
7	HDMI_1_TXD0_CON_P		O		Positive differential HDMI data signal, lane 0
8	GND				
9	HDMI_1_TXD0_CON_N		O		Negative differential HDMI data signal, lane 0
10	HDMI_1_TXC_CON_P		O		Positive differential HDMI data signal, clock
11	GND				
12	HDMI_1_TXC_CON_N		O		Negative differential HDMI data signal, clock
13					
14					
15	HDMI_1_DDC_SCL	55	O	5V	DDC Interface clock
16	HDMI_1_DDC_SDA	53	I/O	5V	DDC Interface data
17	GND				
18	5V_HDMI			5V	HDMI power out
19	HDMI_1_HPD_CON	19	I	5V	HDMI hot plug detect

Manufacturer: FCI
Manufacturer PN: 10029449-111RLF

DSI to HDMI Bridge datasheet: http://www.lontiumsemi.com/product/View_86.html

J17 – CAN FD Connector (Via Transceiver)

The connector J17 provides signals from CAN FD transceiver MCP2558FD connected to the CAN1 interface on SoM. The CAN port is not electrically isolated from the system power supply.

Signal CTRL_PWR_EN_MOCI is connected to the transceiver SLEEP input. Switch S1 can be used to connect or disconnect the 120Ohm termination resistor installed on the carrier board. In the default position, the resistor is connected.

Pin	Signal Name	Logic Level	Function
1			
2	GND		
3	CAN_1_L		Low-level CAN_1 bus line
4	CAN_1_H		High-level CAN_1 bus line
5	GND		
6			
7			
8	5V	5V	5V power out
9			
10			

Manufacturer: Amphenol
Manufacturer PN: 10129383-910001ALF

MCP2558FD transceiver datasheet:
https://ww1.microchip.com/downloads/aemDocuments/documents/OTH/ProductDocuments/DataSheets/20005533A.pdf

J18 – RTC Backup Battery Holder

A backup battery holder J18 is available on the Yavia to provide backup power to the VCC_BACKUP power input of a Verdin module when the main power is switched off.

A 12 mm (diameter) coin cell/battery should be used with the Battery Holder (BAT1). The following types of battery series are compatible: BR1216, CR1216, BR1220, CL1220, CR1220, and BR1225.

The spring contact on the top side of the battery holder sets/bends based on the battery thickness. Inserting a thicker battery (like the BR1225, 2.5mm thickness) expands the battery holder's spring contacts. A thinner battery (like the BR1220, 2.0mm thickness) will not be held firmly. Customers are advised not to use a thinner battery after using the thicker battery with the battery holder (BAT1).

Pin	Signal Name	Function
1	VCC_BACKUP	+3V
2	GND	

Manufacturer: Keystone Electronics
Manufacturer PN: 3000

J20 – JTAG Connector

The Yavia features a JTAG port connected to the JTAG interface available on Verdin modules. The J20 connector connects to an external JTAG device via a Cortex Debug Connector (a 10-pin 1.27mm header).

Pin	Signal Name	SoM Pin	I/O Type	Logic Level	Function
1	JTAG_1_VREF	7		1.8V	1.8V reference output for JTAG adapter
2	JTAG_1_TMS	13	I	1.8V	Test Mode Select
3	GND				
4	JTAG_1_TCK	9	I	1.8V	Test Clock
5	GND				
6	JTAG_1_TDO	5	O	1.8V	Test Data Out
7					
8	JTAG_1_TDI	1	I	1.8V	Test Data In
9					
10	JTAG_1_TRST#	3	I (OD)	1.8V	Test Reset

Manufacturer: Samtec
Manufacturer PN: FTSH-105-01-L-DV-007-K

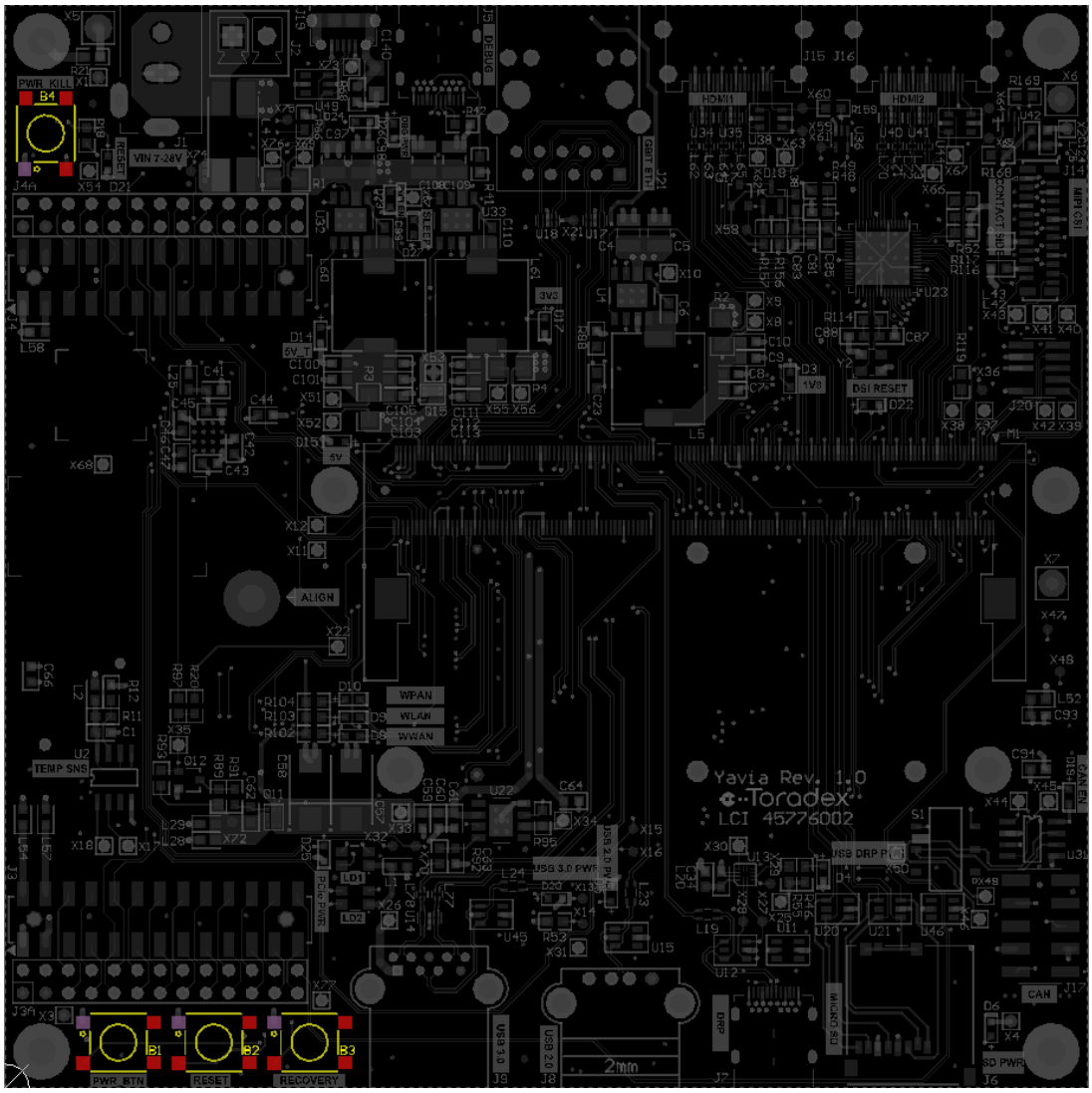
J21 – Gigabit Ethernet, RJ45 Connector

The Yavia provides a 1x RJ45 connector with integrated magnetics for 10/100/1000Mb Ethernet.

Pin	Signal Name	SoM Pin	I/O Type	Logic Level	Function
1	GND				
2	ETH1_D3_N	245	I/O		Negative MDI signal, lane 3
3	ETH1_D3_P	247	I/O		Positive MDI signal, lane 3
4	ETH1_D2_N	241	I/O		Negative MDI signal, lane 2
5	ETH1_D2_P	239	I/O		Positive MDI signal, lane 2
6	ETH1_D1_N	231	I/O		Negative MDI signal, lane 1
7	ETH1_D1_P	233	I/O		Positive MDI signal, lane 1
8	ETH1_D0_N	227	I/O		Negative MDI signal, lane 0
9	ETH1_D0_P	225	I/O		Positive MDI signal, lane 0
10					
11	G+			3.3V	Green LED +
12	G-	235	O (OD)		Green LED -
13	Y+			3.3V	Yellow LED +
14	Y-	237	O (OD)		Yellow LED -

Manufacturer: Pulse
Manufacturer PN: JXD0-0025NL

Push-buttons



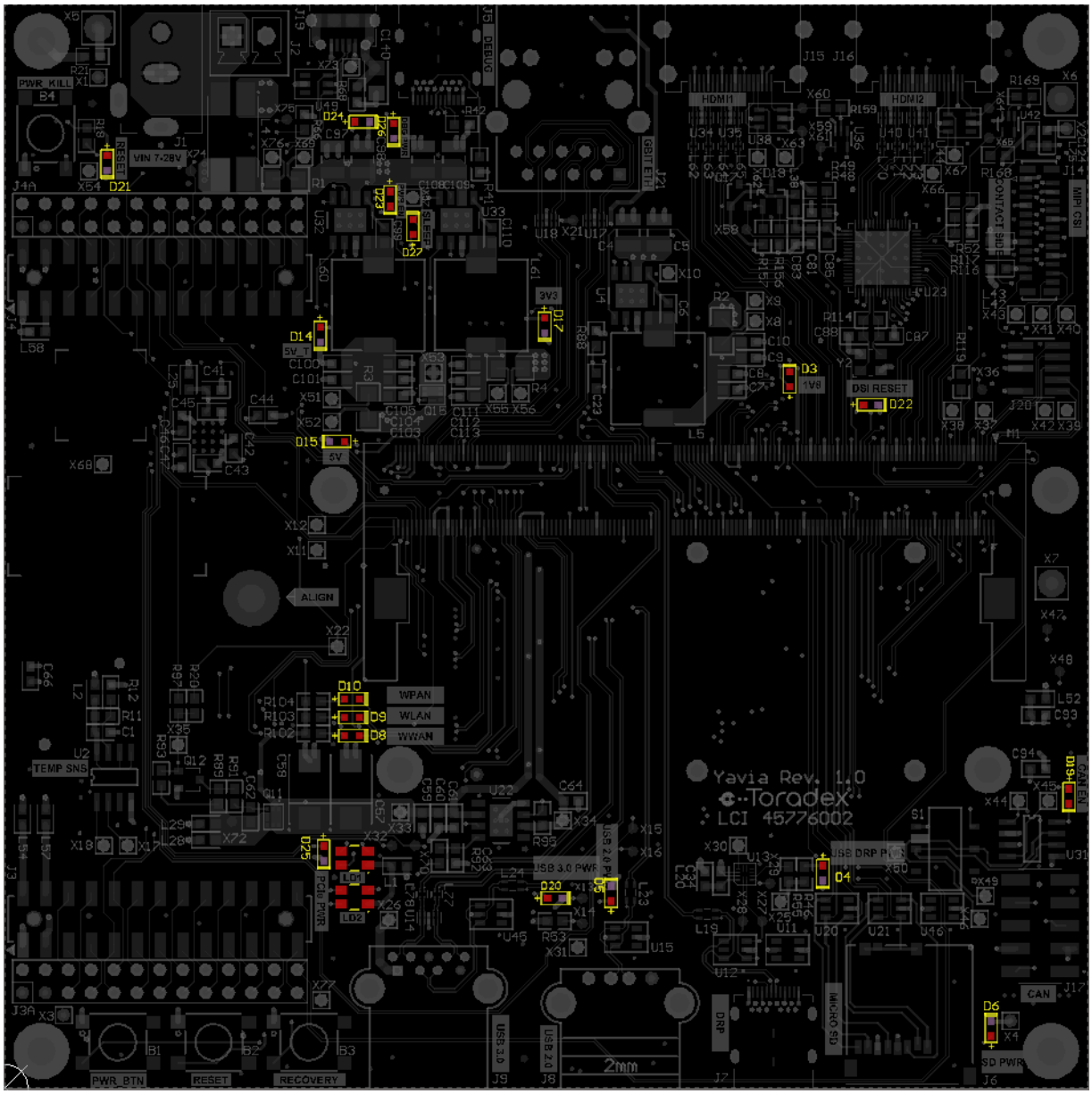
B1 – PWR_BTN. If the system is running, pressing it will cause Linux to enter sleep mode. In sleep mode, a long press will wake up the system.

B2 – RESET. Pressing B2 will issue a reset to the SoM module.

B3 – RECOVERY – used to enter recovery mode for Linux image re-flash.

B4 – PWR_KILL. When pressed, it will disable internal DC/DC converters. This will power-cycle SoM and all peripherals on the board and has a similar effect to turning the power supply off and on.

LEDs


D14
5V_T
D15
5V
3V3
D17
D3
1V8
DSI RESET
D22
D10
WPAN
D9
WLAN
D8
WWAN
D25
PCIe PWR
D20
USB 3.0 PWR
D4
D19
CAN EN
D6
SD PWR
Yavia Rev. 1.0
Toradex
LCI 45776002
PWR_BTN
RESET
RECOVERY
ALIGN
TEMP SNS
VIN 7-28V
DEBUG
HDMI1
HDMI2
MIPI CSI
CONTACT SNS
CAN
MICRO SD
DRP
2mm

Designator	Color	Function (LED Is Lit When...)
D3	green	1.8V internal power rail is enabled
D4	green	5V power is present on USB-OTG connector J7
D5	green	5V power is present on USB 2.0 connector J8
D6	green	Power for Micro SD card is enabled
D8	green	When the mPCIe device enabled the WWAN LED signal
D9	green	When the mPCIe device enabled the WLAN LED signal
D10	green	When the mPCIe device enabled the WPAN LED signal
D14	green	5V power rail that feeds SoM is enabled
D15	green	5V power rail that feeds the peripherals is enabled
D17	green	3.3V internal power rail is enabled
D19	green	CAN transceiver is in a normal (not in sleep) state
D20	green	5V power is present on USB 3.x connector J9
D21	red	The module is in the reset state (CTRL_RESET_MOCI is low)
D22	red	DSI to HDMI bridge is in the reset state
D23	green	SoM CTRL_SLEEP_MOCI signal is in a normal (running) state
D24	green	5V is present on the expansion USB 2.0 connector J19
D25	green	3.3V is present on miniPCIe connector
D26	green	The external device provides power to the J5 USB-C connector
D27	red	SoM CTRL_SLEEP_MOCI signal is in low power (sleep) state
LD1	RGB	User LED controlled by SoM GPIO pins 52, 54, 56
LD2	RGB	User LED controlled by SoM GPIO pins 58, 60, 62

Peripherals

Temperature Sensor

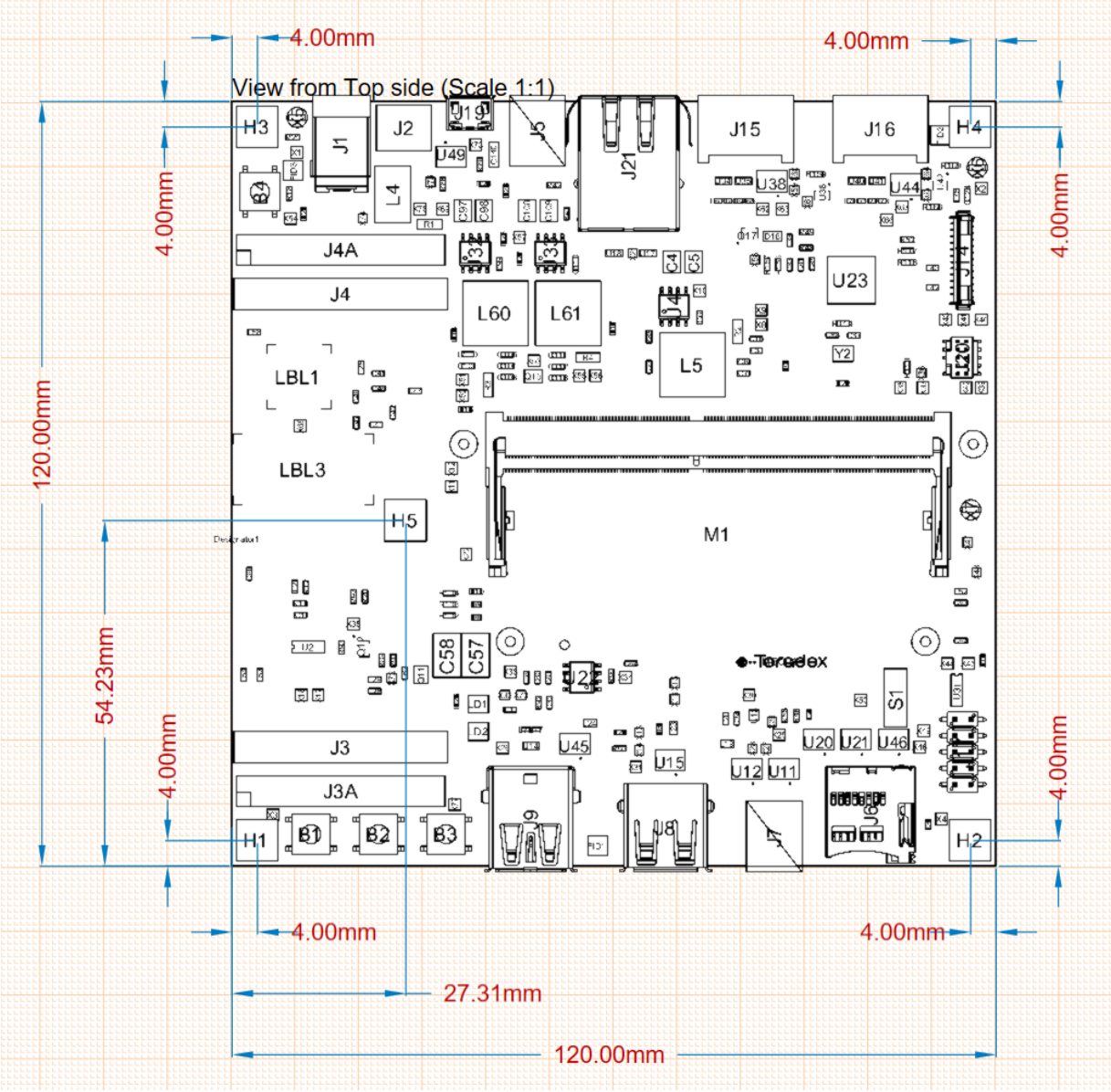
The Yavia features a digital temperature sensor TMP75AIDR (U2) with an I²C interface. The sensor is connected to the I2C_1 bus. The default I²C address is 0x4F. For details, please check the TMP75AIDR datasheet: https://www.ti.com/lit/gpn/TMP75.

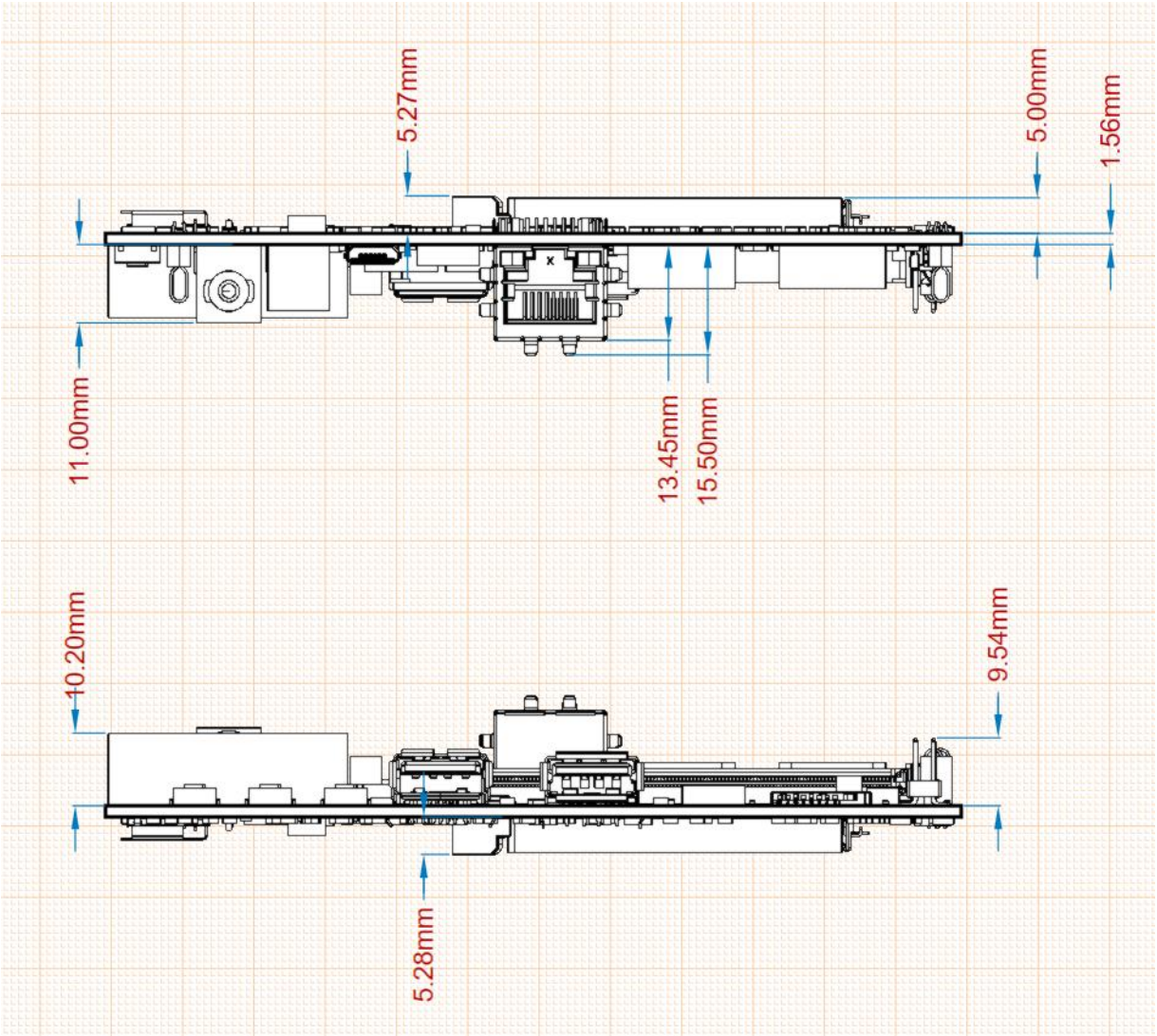
EEPROM

The Yavia features a 2Kb M24C02-FDW6TP I²C EEPROM (U3) connected through the I²C_1 bus. The default I²C address is 0x57. The default configuration allows normal write operations. Datasheet: https://www.st.com/resource/en/datasheet/m24c01-r.pdf.

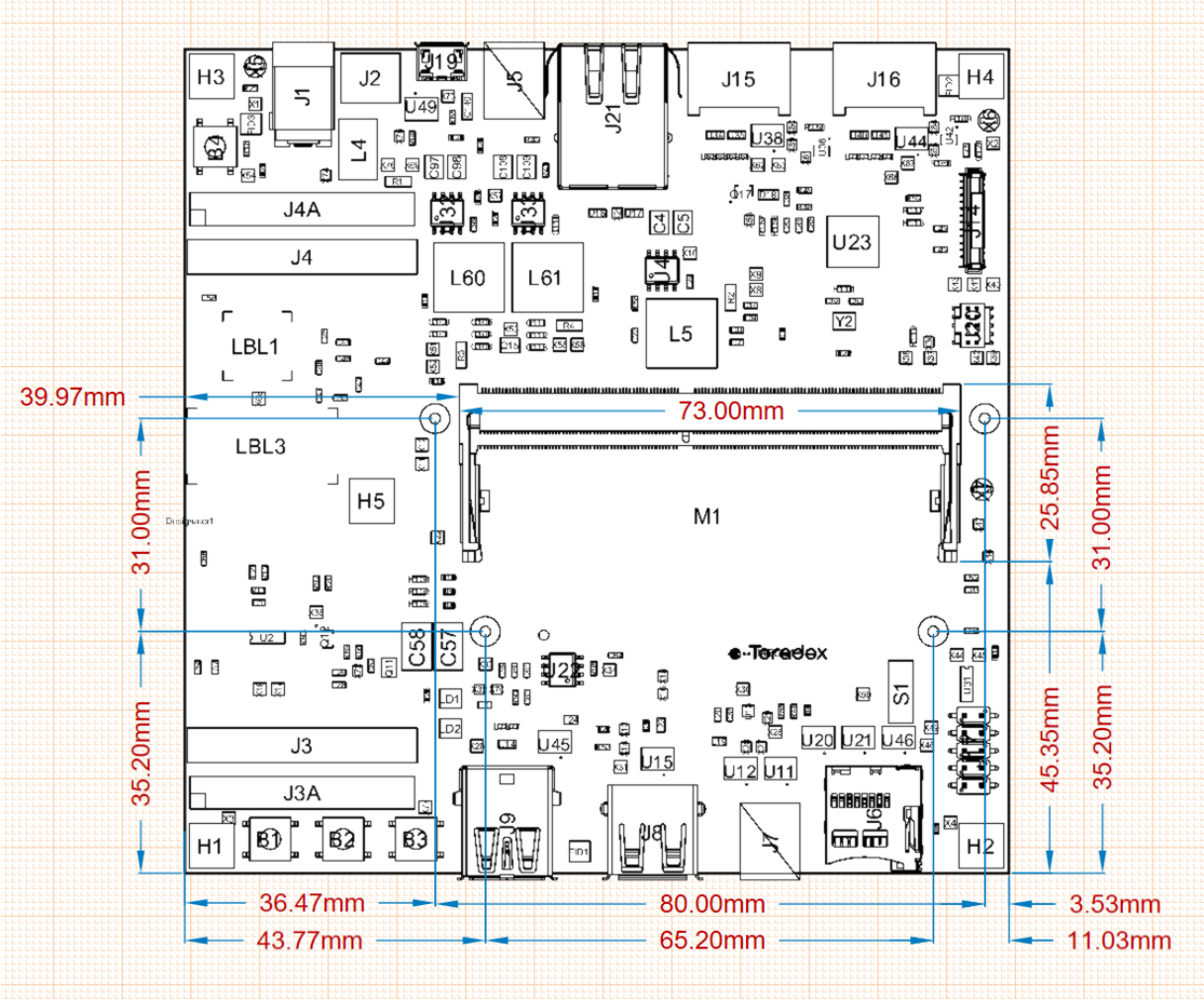
Mechanical Data

Board Dimensions




5.27mm
5.00mm
1.56mm
11.00mm
13.45mm
15.50mm
10.20mm
9.54mm
5.28mm

SoM Position



Environmental Conditions

Operating temperature range: 0°C to 60°C.

Design Data

The schematics and the BOM are publicly available on the Toradex Developer Website. The Altium project, the PCB layout, and the component libraries can be made available on request.

https://developer.toradex.com/hardware/verdin-som-family/carrier-boards/yavia

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

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