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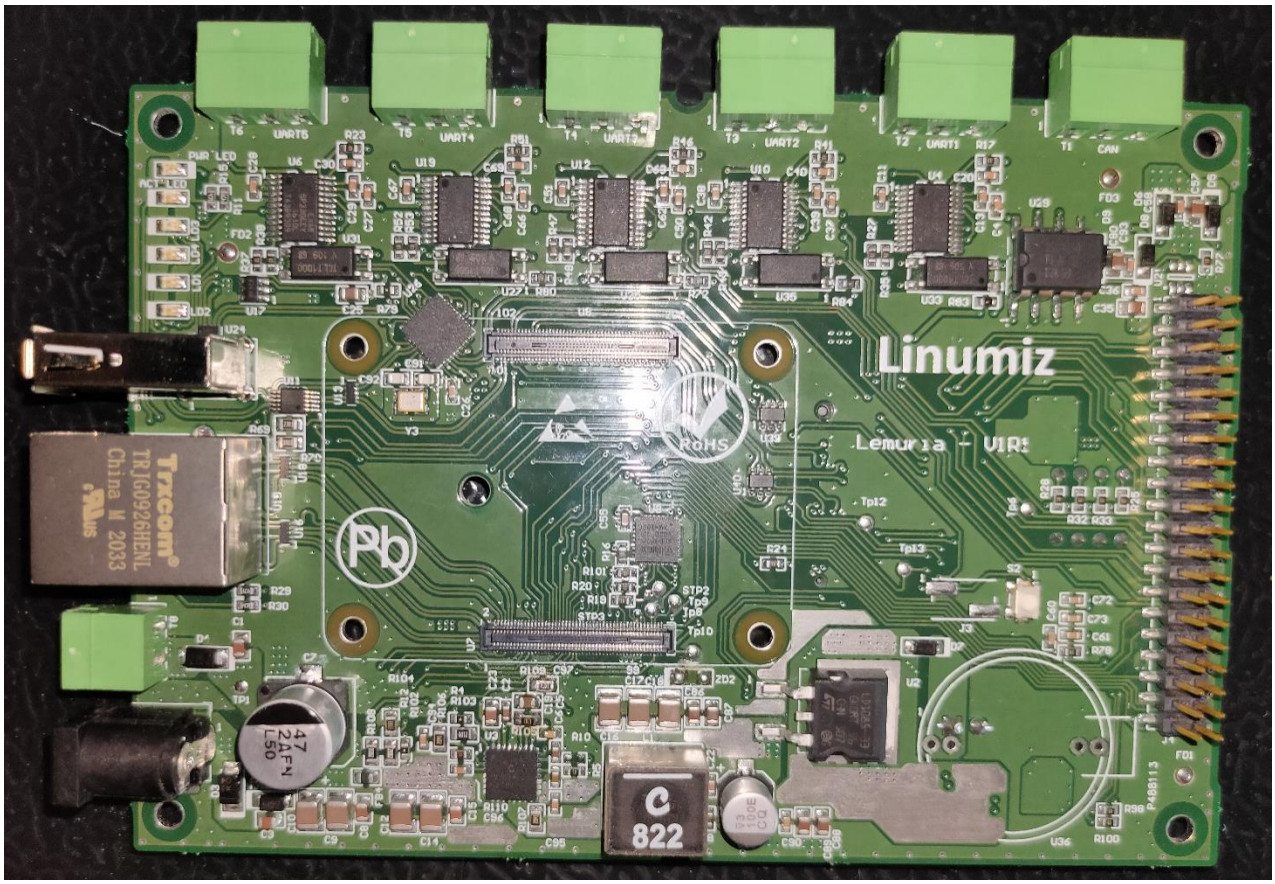
Lemuria Datasheet

Carrier-board for the Compute Module 4



Revision History

Revision	Date	Notes
1.00	Dec 10, 2021	Initial

1 Overview

1.1 General Information

1.2 Lemuria features summary

1.3 Block Diagram

1.4 Board Layout

1.5 Lemuria -Board connectors

The below table lists all available connectors on the Lemuria-Board, Refer to chapter 2 for a more detailed description and Pin-out of each connector.

2 Detailed Description

2.1 Overview

This chapter details the Lemuria-Board features and external interfaces, some of which are driven directly by the Compute Module 4 SOM.

Please refer to the SOM data sheet for more information.

Table 2-1 describes this chapter table header and acronyms used.

Table 2-1: Acronyms used on tables column header

Column		Meaning
Pin#	x	Pin number on a connector
Type		Pin type & direction
	I	**INPUT**
	O	**OUTPUT**
	DS	**Differential Signal**
	A	**Analog**
	P	**Power**
Signal		Concerto-Board schematic signal name
Description		Pin functionality description

2.2 Lemuria-Board Interfaces

2.2.1 SOM

The Lemuria-Board features 100-pin connector (socket) to connect with the Compute Module 4 System-on-module. Please refer to the used SOM module data sheet for a complete signal description and pin-out of U7 and U8.

2.3 Standard External Interfaces

2.3.1 USB

The Lemuria-Board exposes the two USB 2.0 ports of the Compute Module 4 SOM. The ports are named J2 and J5. See Lemuria-Board compatibility properties list for mapping of interfaces to each SOM.

2.3.1.1 Micro USB OTG Connector Pin-out (J5)

<TBD>

2.3.1.2 USB 2.0 HOST Connector Pin-out (J2)

USB Host - J2 routing is by default to the USB Type-A host connector. See USB schematics for more details.

Pin #	Custom Board Signal	Type	Description
1	VBUS	P	+5V power supply. 500ma max
2	USB Recp N	DISO	USB Data Negative
3	USB Recp P	DISO	USB Data Positive
4	GND	P	Digital ground
5	GND	P	SHIELD pin reference
6	GND	P	SHIELD pin reference

2.3.2 PCIe

Compute Module 4 System-on-module PCI Express interface is exposed by the Lemuria-Board through a standard PCI Express connector M.2 Key B, supporting connection of PCI Express expansion M.2 Key B card

2.3.2.1 PCIe Connector Pin-out (U20)

Pin #	customBoard Signal	Type	DESCRIPTION
1	CONFIG 3		
2	3.3V_Main		
3	GND		
4	3.3V_Main		
5	GND		
6	3.3V M		
7	USB _M2_IP		
8			
9	USB_M2_1N		
10			
11	GND		
12			
13			
14			
15			
16			
17			

18			
19			
20			
21	CONFIG_0		
22			
23			
24			
25			
26			
27	GND		
28			
29			
30	SIM RST		
31			
32	SIM CLK		
33	GND		
34	SIM DATA		
35			
36	SIM PWR		
37			
38			
39	GND		
40			
41	PCIE_RX_N		
42			
43	PCIE_RX_P		
42			
43	GND		
44			
45	GND		
46			
47	PCIE_TX_N		
48	PCIE_TX_P		
49			
50	PCIE_nRST		
51	GND		
52	PCIE_CLK_nREQ		
53	PCIE_CLK_N		
554			
55	PCIE_CLK_K		
56			

57	GND		
58			
59			
60			
61			
62			
63			
64			
65			
66	SIM_SW		
67			
68			
69	CON_FIG_1		
70	3.3V Main		
71	GND		
72	3.3V Main		
73	GND		
74	3.3VMain		
75	CONFIG 2		

2.3.3 Ethernet

The Lemuria-Board exports the SOM's Ethernet interface, provided by its' on SOM PHY (Internal), to a standard RJ45 Ethernet jack connector with integrated magnetics. Please refer to the SOM datasheet for more information.

The Lemuria-Board has an additional on-board 10/100 Ethernet PHY (External) routed to a second RJ45 Ethernet jack connector with integrated magnetics for exposing the 2nd 10/100 Ethernet interface through Hi-Speed USB 2.0 hub with a 10/100 Ethernet controller (SMSC LAN9513/LAN9513i).

2.3.3.1 Internal PHY 10/100/1000BaseT RJ45 Connector Pin-out (U15)

Pin #	Custom Board Signal	Type	Description
1	TRD0 P		
2	TRD0 P		
3	TRD1 P		
4	GND		
5	GND		
6	TRD1 N		
7	TRD2 P		

8	TRD2 N		
9	TRD3 N		
10	TR0 TAP		
11	TR1 TAP		
12	TR1 TAP		
13	TR2 TAP		
14	TR3 TAP		
15	+3.3V RPI		
16	ETH LEDG		
17	+3.3V RPI		
18	ETH LEDY		
19	GND		
20	GND		

2.3.3.2 External PHY 10/100BaseT RJ45 Connector Pin-out (U58)

PIN #	CUSTOM BOARD SIGNAL	*TYPE*	DESCRIPTIOPN
1			
2			
3			
4			
5	3.3V_Main_LAN		
6			
7			
8			
9			
10	3.3V_Main_LAN		
11			
12	LAN_RST		
13			
14			
15	VDD 18 Core		
16			
17			
18			
19	3.3V_Main_LAN		
20	nFDX LED GPIO 0		
21	nLNKA LED GPIO 1		
22	nSPD LED GPIO 2		

23			
24			
25			
26			
27	3.3V_Main_LAN (Via resistance)		
28	3.3V_Main_LAN (Via resistance)		
29	3.3V_Main_LAN (Via resistance)		
30	3.3V_Main_LAN (Via resistance)		
31	3.3V_Main_LAN (Via resistance)		
32			
33			
34			
35			
36	3.3V_Main_LAN		
37			
38			
39			
40			
50	GND		
51	3.3V_Main_LAN		
52	RXP		
53	RXP		
54	3.3V_Main_LAN		
55	TX P		
56	TX N		
57	3.3V_Main_LAN		
58	USB_LAN_DM		
59	USB_LAN_DD		
60	GND		
61	GND		
62	VDD18USBPLL		
63	GND		
64	3.3V_Main_LAN		
65	GND		

2.3.4 DSI Display

The lemuria-board exports a Dual channel DSI available on the Compute Module 4 System-on-module. On other pins DSI_54548_2271 interface can be used.

2.3.4.1 DSI Display Connector Pin-out (U59)

PIN #	CUSTOM BOARD SIGNAL	TYPE	DISCRIPTION
1	GND		
2	DSI1_D0_N		
3	DSI1_D0_P		
4	GND		
5	DSI1_D1_N		
6	DSI1_D1_P		
7	GND		
8	DSI1_C_N		
9	DSI1_C_P		
10	GND		
11	DSI1_D2_N		
12	DSI1_D2_P		
13	GND		
14	DSI1_D3_N		
15	DSI1_D3_P		
16	GND		
17			
18			
19	GND		
20	12C_SCL_0		
21	12C_SDA_0		
22	3.3V_Main		

2.3.5 CANBUS Connector

Lemuria uses the Analog Devices ISO1050DUBR signal and power CAN transceiver to implement two CAN 2.0b interfaces in conjunction with the two CAN interfaces on the CM4 module. The CAN ports are electrically isolated from the system power supply. On Lemuria V2 it is possible to enable/disable CAN1 and CAN2 transceiver. Please refer to the Lemuria carrier board schematics for more details. The CAN interfaces are available on the Header X8

2.3.5.1 CANBUS Connector Pin-out (U29)

PIN #	CUSTOMBOARD SIGNAL	TYPE	DISCRIPTION
1	+3.3V RP1		
2	CAN RX1		
3	CAN TX 1		
4	GND		
5	ISO_GND		
6	ISO_GND		
7	ISO_GND		
8	ISO_5V		

2.3.5.2. CANBUS Connector Pin-out (U31)

PIN #	CUSTOMBOARD SIGNAL	TYPE	DESCRIPTION
1	+3.3V_RP1		
2	CAN RX2		
3	CAN TX2		
4	GND		
5	ISO_GND		
6	ISO_GND		
7	ISO_GND		
8	ISO_5V		

2.4 TPM SECURITY

Trusted Platform Module (TPM) is used in Lemuria-board as standard in cm4 module SLB 9670VQ2.0

2.4.1 TPM Security pin-out (U22)

PIN #	CUSTOM BOARD SIGNAL	TYPE	DISCRIPTION
1	3.3V Main		
2	GND		
3	3.3V_Main		
4			
5			
6			
7			

8	3.3V_Main		
9	GND		
10			
11			
12			
13			
14			
15			
16	GND		
17	3.3V Main		
18	3.3V_Main		
19	GPIO 21		
20	3.3V_Main		
21	GPIO20		
22	3.3V_Main		
23	GND		
24	GPIO 9		
25			
26			
27			
28			
29			
30			
31			
32	GND		

2.4.2 MICRO SIM MODULE

Connector type: 5039600696(U5)

PIN #	CUSTOM BOARD SIGNAL	TYPE	DISCRIPTION
1	SIM PWR		
2	SIM RST		
3	SIM CLK		
4			
5	GND		
6			
7	SIM DATA		
8	SIM SW		

9	GND		
10			
11	GND		
12	GND		
13	GND		
14	GND		

2.4.3 ADC MODULE

PIN #	CUSTOM BOARD SIGNAL	TYPE	DISCRIPTION
1	AN0 P		
2	AN1 P		
3	AN2 P		
4	AN3 P		
5			
6			
7	GND		
8	GPIO 16		
9	GPIO 20		
10	GPIO 19		
11	GPIO		
12	GND		
13	+5V		
14	+5V		

2.5 UART

Lemuria features 5 UART interfaces that are connected to the following connectors:
- UART 1 to the connector U4 through an RS-485/RS-232 transceiver.
- UART 2 to the connector U10 through an RS-485/RS-232 transceiver.
- UART 3 to the connector U12 through an RS-485/RS-232 transceiver.
- UART 4 to the connector U19 through an RS-485/RS-232 transceiver
- UART 5 to the connector U6 through an RS-485/RS-232 transceiver.

It is possible to disconnect the signal UART3_RXD from the RS232 SP330E (TSS0P24) transceiver by disassembling the jumper u12 In addition, it is possible to put the transceiver SP330E in high impedance status by forcing to zero, the value of the GPIO connected to pin 180 of the MXM3 connector. One of these two configurations is required when the interface UART3 need to be used at the TTL level on the connector.

2.5.1 UART-1

PIN #	CUSTOMBOARD SIGNAL	TYPE	DESCRIPTION
1	GND		
2	ISO_GND		
3	ISO_3.3V		
4	ISO_GND		
5	ISO_GND		
6	GND(via resistence)		
7	GND		
8			
9			
10			
11	ISO_ 3.3V(Via resistance)		
12	ISO _3.3V(Via resistance)		
13	ISO_GND(via resistence)		
14	ISO_3.3V(via resistence)		
15	ISO_GND		
16			
17	GND(via resistence)		
18	ISO_GND(via resistence)		
19	ISO_GND		
20			
21	ISO_GND		
22	ISO_GND		
23	ISO_GND		
24	ISO_GND		

2.5.2 UART-2

PIN #	CUSTOMBOARD SIGNAL	TYPE	DESCRIPTION
1	ISO_GND		
2	ISO_3.3V		
3	ISO_GND		
4	ISO_GND		
5	ISO_GND		
6	GND(via resistence)		
7	GND(via resistence)		
8	ISO_3.3V(via resistence)		

9	DI 2(via resistence)		
10			
11	ISO_3.3V(via resistence)		
12	ISO_3.3V(via resistence)		
13	ISO_GND(via resistence)		
14	ISO_3.3V(via resistence)		
15	ISO_GND		
16			
17	GND(via resistence)		
18	ISO_GND		
19	ISO_GND		
20	ISO_GND		
21	ISO_GND		
22	ISO_GND		
23	ISO_GND		
24	ISO_GND		

2.5.3 UART-3

PIN #	CUSTOM BOARD SIGNAL	TYPE	DESCRIPTION
1	ISO_GND		
2	ISO_GND		
3	ISO_GND		
4	ISO_GND		
5	ISO_GND		
6	GND(via resistence)		
7	GND(via resistence)		
8	ISO_3.3V		
9	ISO_GND		
10			
11	ISO_3.3V(via resistence)		
12	ISO_3.3V(via resistence)		
13	ISO_GND(via resistence)		
14	ISO_3.3V		
15	ISO_GND		
16			
17	GND(via resistence)		
18	ISO_GND		
19	ISO_GND(via resistence)		

20			
21	ISO_GND		
22	ISO_GND		
23	ISO_GND		
24	ISO_GND		

2.5.4 UART-4

PIN #	CUSTOMBOARD SIGNAL	TYPE	DESCRIPTION
1	ISO_GND		
2	ISO_GND		
3	ISO_3.3V		
4	ISO_GND		
5	ISO_GND		
6	GND (via resistance)		
7	GND (via resistance)		
8	ISO_3.3V		
9	ISO_3.3V		
10			
11	ISO_3.3V (via resistance)		
12	ISO_3.3V (via resistance)		
13	ISO_GND		
14	ISO_3.3V (via resistance)		
15	ISO_GND		
16			
17	ISO_GND		
18	ISO_GND		
19	ISO_GND		
20	ISO_GND		
21	ISO_GND		
22	ISO_GND		
23	ISO_GND		
24	ISO_GND		

2.5.5 UART-5

PIN #	CUSTOMBOARD SIGNAL	TYPE	DESCRIPTION
1	ISO_GND		
2	ISO_3.3V		
3	ISO_GND		
4	ISO_GND		
5	ISO_GND		
6	GND		
7	GND		
8	ISO_3.3V		
9	ISO_3.3V		
10			
11	ISO_3.3V (via resistance)		
12	ISO_3.3V (via resistance)		
13	ISO_GND		
14	ISO_3.3V (via resistance)		
15	ISO_GND		
16			
17	GND		
18	ISO_GND		
19	ISO_GND		
20	GND		
21	ISO_GND		
22	ISO_GND		
23	ISO_GND		
24	ISO_GND		

2.5.6 Control Buttons

2.4.1.1 Boot Select (SW2)

2.5.7 LED Indica

2.4.1.2 Power-On LEDs

2.5.8 Power

2.4.1.3 DC-in Jack Pin-out (J10)

2.4.1.4 DC-in Terminal Block Pin-out (J100)

2.4.1.5 RTC Backup Battery (JBT1)