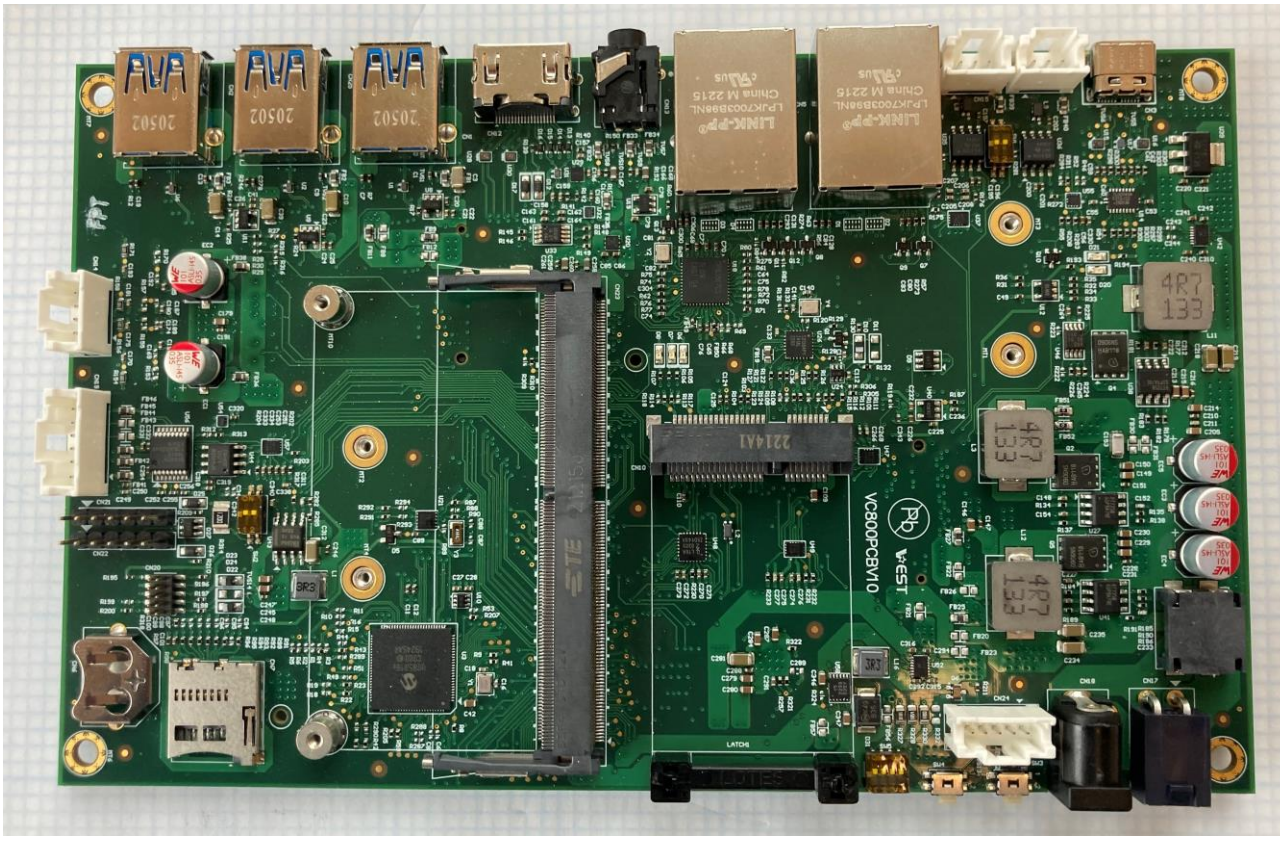
VEST i.MX8M Plus Carrier Board Hardware Reference Manual

VEST i.MX8M Plus USG 001, REV C



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LIST OF ABBREVIATIONS

Acronyms	Abbreviations
VEST	Venture Embedded Solutions Technology
APC	Advanced Products Corporation Private Limited
ISO	International Organization for Standardization
V*EST	Venture Embedded Solutions Technology “The Logo”
eMMC	embedded Multimedia Card (MMC)
ARM	Advanced RISC Machine
CAN	Controller Area Network
SOC	System-on-a-Chip
GPIO	General Purpose Input Output
I2C	Inter-Integrated Circuit
LVDS	Low Voltage Differential Signal
NC	Not Connected
PWM	Pulse Width Modulation
UART	Universal Asynchronous Receiver/Transmitter
USB	Universal Serial Bus
USB OTG	Universal Serial Bus on the Go

Table 1 List of Abbreviations

REFERENCE DOCUMENTS

- i.MX8 Plus Applications Processor Datasheet for Industrial Products
- i.MX8 Plus Applications Processor Datasheet for Consumer Products
- i.MX8 Plus Applications Processor Reference Manual
- i.MX8 Plus Hardware Developer's Guide

1 OVERVIEW

1.1 GENERAL INFORMATION

The VEST i.MX8M Plus Carrier Board was designed to use the VEST i.MX8M Plus SOM. Together they enable a smooth transition from conventional Human Machine Interface (HMI) to an advanced interactive user interfaces that support multimedia, touch, wireless connectivity, machine learning and more. Two views of the carrier board are shown below.

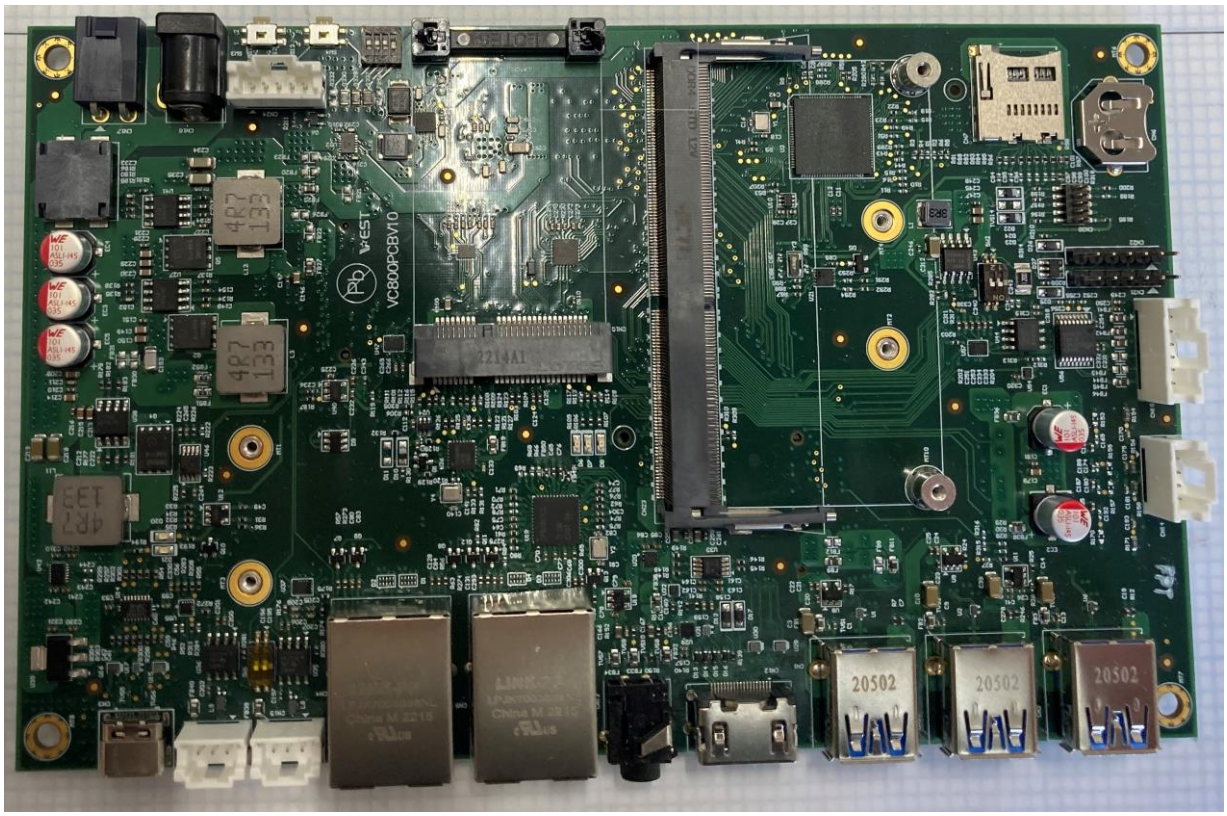


Figure 1 VEST i.MX8M Plus Carrier Board Top Side View

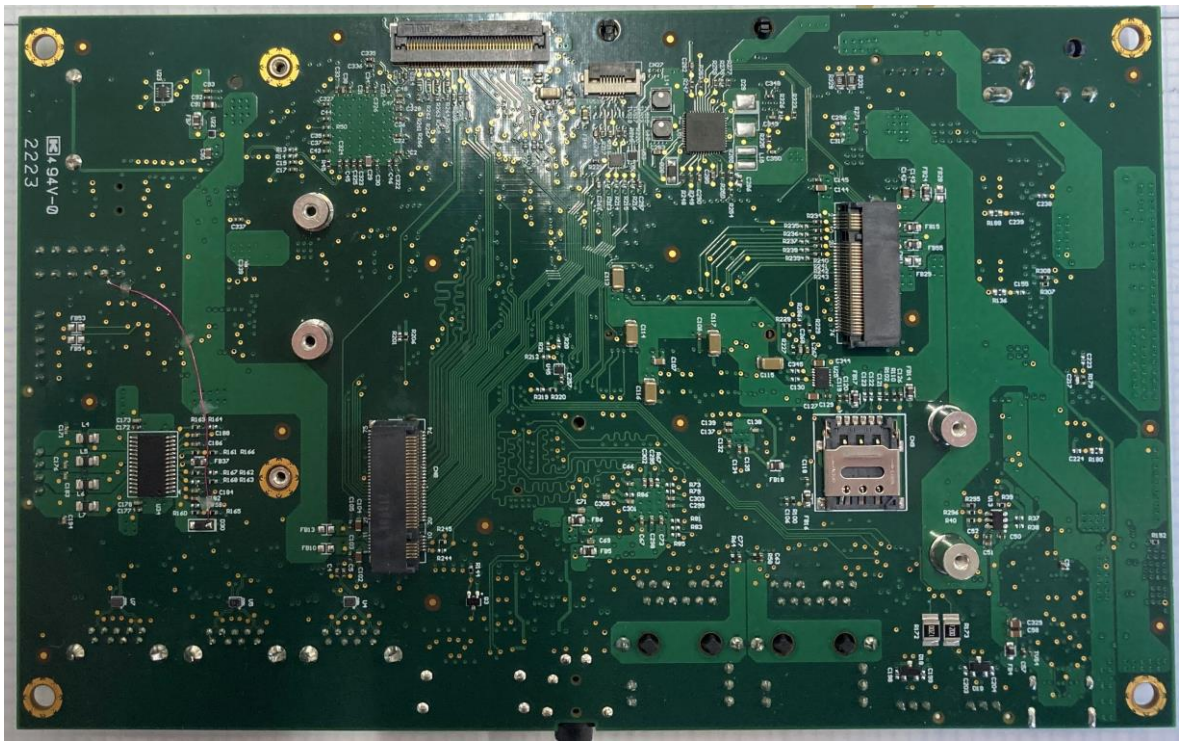


Figure 2 VEST i.MX8M Plus Carrier Board Back Side View

The VEST i.MX8M Plus Carrier Board works in conjunction with the VEST i.MX8M Plus SOM. The VEST i.MX8M Plus SOMPCB front and back are shown below.

Figure 3 VEST i.MX8M Plus SOM Front Side View

Figure 4 VEST i.MX8M Plus SOM Back Side View

The VEST i.MX8M Plus Carrier Board runs on the following Operating System:

- Embedded Linux
- Yocto

1.2 FEATURE SUMMARY

- NXP i.MX8M Plus ARM Cortex –with either dual or quad core A53, which operates at speeds of up to 1.8GHz, a general-purpose ARM Cortex – M4 400MHz core processor is for low-power processing.
- Up to 8GB of LPDDR4 SDRAM.
- The carrier board has a 260 pin SO-DIMM socket (CN23) for the VEST i.MX8M Plus SOMboard.
- Up to 128GB eMMC for boot/operating system/application/storage.
- Micro SDHC Socket (CN7)
- USB 3.0 OTG Type C (CN3)
- 3 x USB 3.0 Host Type A (CN1, CN2, CN25)
- Full size Mini PCIe Socket (CN10)
- Nano SIM card socket (CN9)
- 3 x LEDs for Mini PCIe Socket (Orange D6, Green D7 and Yellow D8)
- 2X 10/100/1000Mbps Ethernet RJ45 (CN4, CN5)
- External RTC with CR1220 Coin Battery Holder (CN6).

- Half-Duplex RS485 or RS232 Header (CN19) Default is RS485.
- RS485 Bus 120Ω Terminal Resistor Select Switch (SW2)
- 2X CAN V2.0B at 1Mb/s Bus connector (CN15, CN16)
- CAN Bus 120 Ω Terminal Resistor Select Switch (SW1)
- Stereo Speaker Output: 10W per channel into an 8Ω load (CN14)
- 3.5 mm Headphone output and Microphone input connector (CN13)
- 2 x UART Debug Pin Headers (CN21, CN22)
- Power Control Header on/off, system reset, LED Control (CN24)
- On board HDMI Type A connector (CN12)
- Dual Channel LVDS Interface with Backlight (CN26)
- I2C Touch connector (CN27)
- JTAG Header (CN20)
- Reset Button (SW4) and Power Button (SW3).
- LCD Backlight Select Dip Switch (SW5) for 7” and 10” Displays.
- Watchdog Timer
- M.2 Expansion Daughter Board Socket (CN8) with, 4-lane MIPI CSI x 2, SAI x 1, SPI x 1, I2C x 1, Up to 4 x PWM, up to 2 x UART, and GPIOs.
- M.2 Display Daughter Board Socket (CN11) with Dual Channel 4-lane LVDS, 4-lane MIPI-DSI, I2C Touch, PWM and GPOs.
- 12V – 24VDC, 2.0mmDC Jack (CN17) and a 2-pin 4.2mm pitch Mini FitJR Header for input power.
- Two Power LED Green indicators: D20 for 3V3 and D21 for 5V0.
- 180 mm x 112 mm Form Factor

1.3 BLOCK DIAGRAM

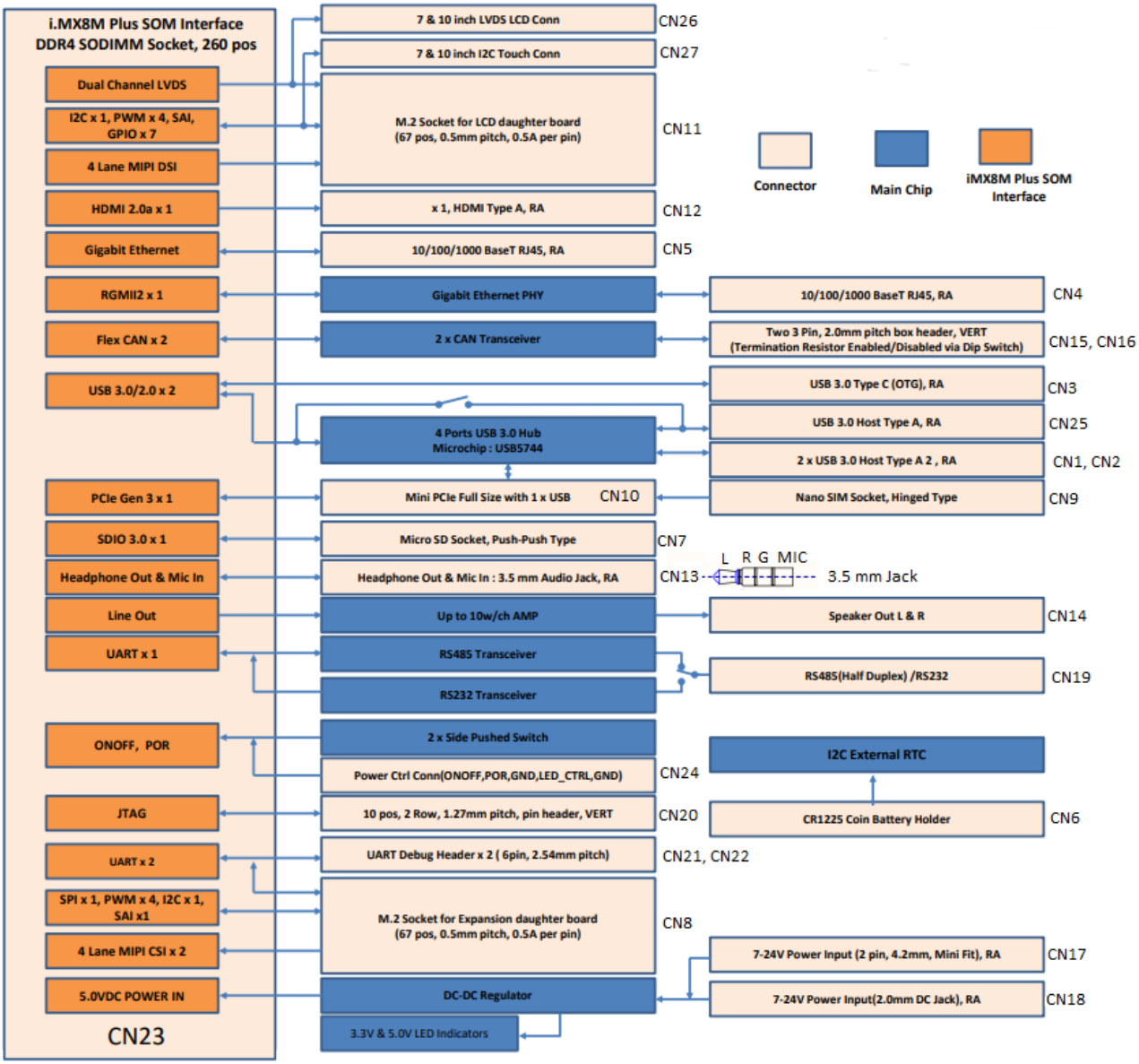


Figure 5 VEST i.MX8M Plus Carrier Board Block Diagram

1.4 VEST i.MX8M Plus Carrier Board Connector and Jumper List

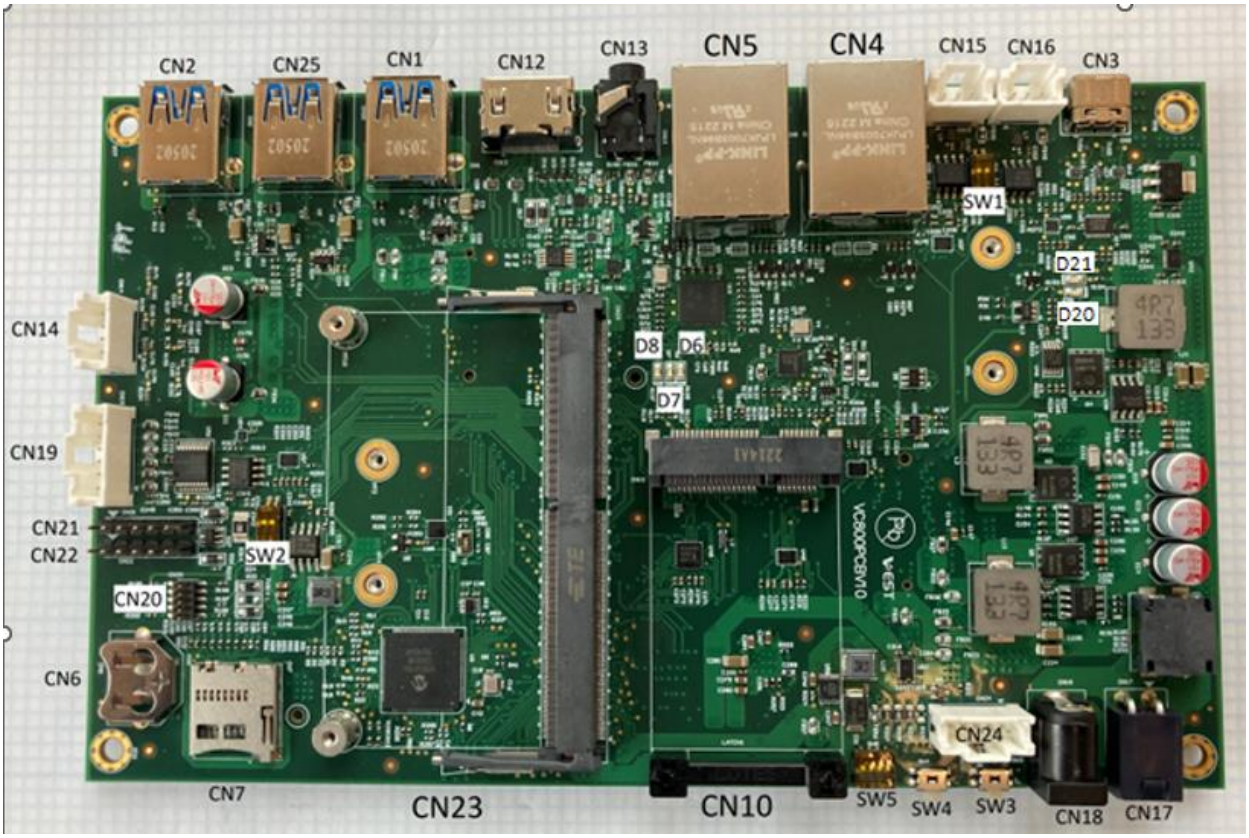


Figure 6 Connectors, Switches and Diode Locations Topside

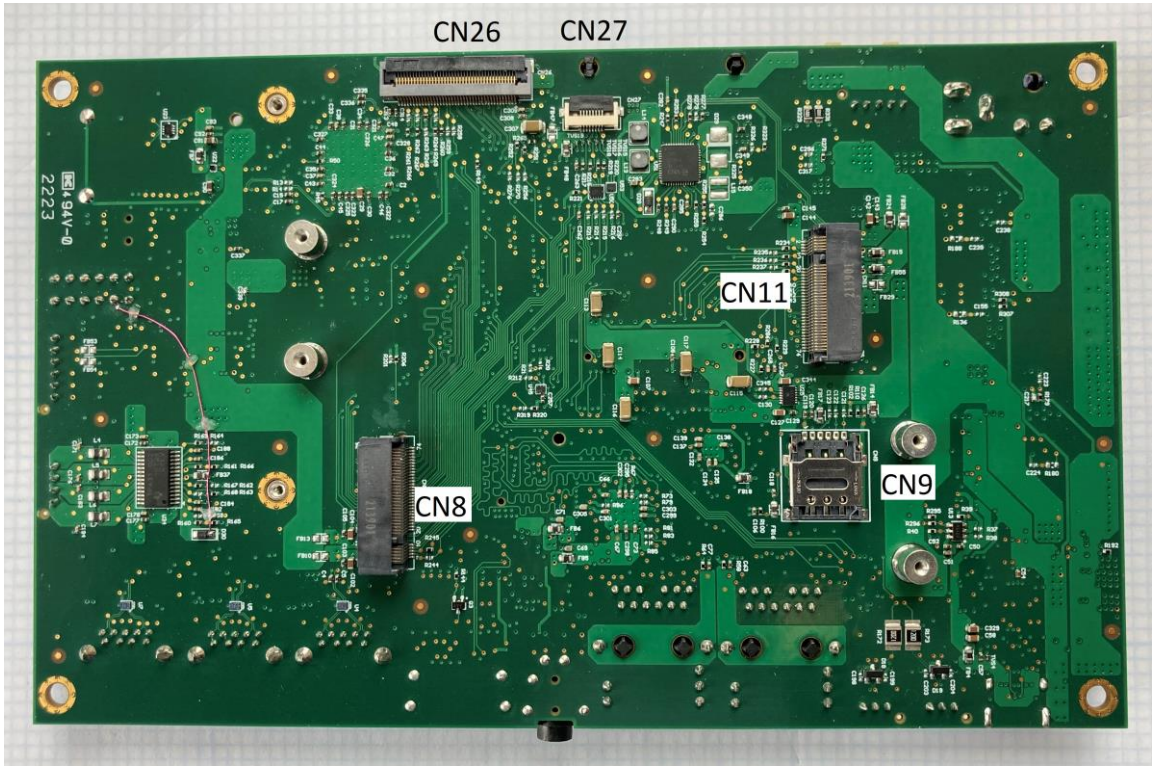
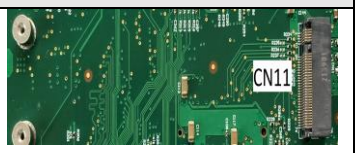
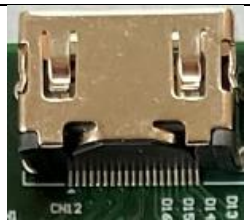
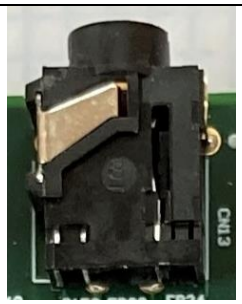
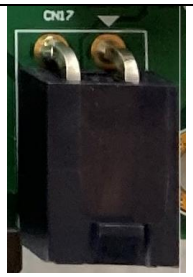
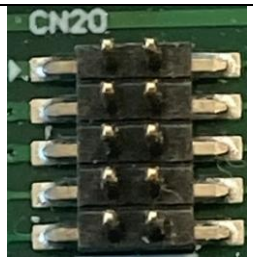
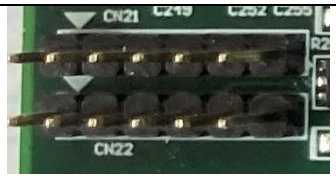
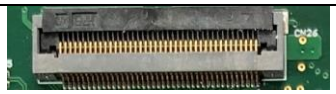


Figure 7 Connector locations backside

The table below lists the user accessible connectors, switches and LEDs on the VEST i.MX8M Plus Carrier Board.

Reference	Function	Type	Pin 1 Location
CN1, CN2, CN25	USB 3.0 Host Type A	USB 3.0 Host Type A	Standard
CN3	USB 3.0 OTG Type C	USB OTG Type C	Standard
CN4, CN5	10/100/1000Mbps Ethernet RJ45	10/100/1000Mbps Ethernet RJ45	Standard
CN6	CR1220 Coin Battery Holder	CR1220	
CN7	Micro SD socket	Micro SD Socket, Push-Push type	Standard
CN8	M.2 Expansion Daughter Board Socket: - 4-lane MIPI CSI x 2 - SAI x 1 - SPI x 1 - I2C x 1 - Up to 4 x PWM - Up to 2 x UART - GPIOs	67 position, 0.5mm pitch, 0.5A per pin	
CN9	Nano SIM Socket	Nano SIM Socket Hinged type	
CN10	Mini PCIe Full Size with 1 USB		

Reference	Function	Type	Pin 1 Location
CN11	M.2 Display Daughter Board Socket: - Dual Channel 4-lane LVDS - 4-lane MIPI-DSI - I2C Touch - PWM - GPOs	67 position, 0.5mm pitch, 0.5A per pin	
CN12	HDMI	HDMI Type A Right Angle	
CN13	Headphone out, Mic in	3.5mm Audio Jack	
CN14	Speaker output	Vertical, 4pins, 2mm pitch	
CN15, CN16	CAN Bus Header	Vertical, 3pins, 2mm pitch	
CN17	DC Power Input Header	Right Angle 4.2mm pitch Mini FitJR	

Reference	Function	Type	Pin 1 Location
CN18	DC Power Input Header	Right Angle, 2.0mm DC Jack	
CN19	RS485/RS232	RS485(default) or RS232	 
CN20	JTAG Header	Vertical, 2 x 5 pins, 1.27mm pitch	
CN21, CN22	UART Debug Pin Header	Vertical, 6pins, 2.54mm pitch	
CN23	VEST i.MX8M Plus SOMSocke	DDR4 SODIMM Socket 260 pins	Standard
CN24	Power Control, on/off POR, GND, LED Control	5 pin Vertical connector 2.0mm pitch	
CN26	Dual Channel LVDS Interface	41pins, 0.5mm pitch Right angle	
CN27	7" or 10" LCD with Touch Configurable backlight via a dipswitch	8pins, 0.5mm pitch Right angle	

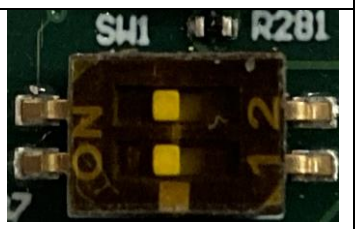
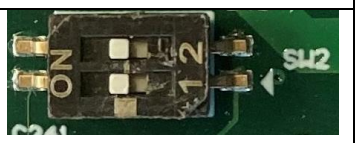
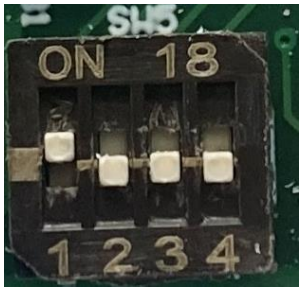
Reference	Function	Type	Pin 1 Location
D6	Mini LED Indicator for Mini PCIe Socket	Orange	
D7	Mini LED Indicator for Mini PCIe Socket	Green	
D8	Mini LED Indicator for Mini PCIe Socket	Yellow	
D20	Mini LED Indicator	Green 3V3	
D21	Mini LED Indicator	Green 5V0	
SW1	CAN Bus 120Ω Termination On is Termination on. Across CANH to CANL Pins 1, 4 CAN on CN15 Pins 2,3 CAN on CN16	Dip Switch, 2 POS, 1.27mm pitch	
SW2	RS485 120 Ω Termination On is termination on. Pins 1, 4 termination Pins 2,3 No Connection	Dip Switch, 2 POS, 1.27mm pitch	
SW3	Power Button	Side Mounted Push Button	
SW4	System Reset	Side Mounted Push Button	
SW5	Current Control for LCD VF_LED / IF_LED / Dip Switch Jenson 7" 9V5 180ma short 1-8 Jenson 1-" 9V5 260ma short 2-7 Palm 7" 9V5 400ma short 3-6	Four Position Dip Switch	

Table 2 VEST i.MX8M Plus Carrier Board User Accessible Connector and Jumper List

2 VEST i.MX8M Plus Carrier Board External Connector Information

2.1 General Information

This chapter describes the VEST i.MX8M Plus Carrier Board external interfaces in detail.

Pin No.: Pin number on the connector

Signal Name: Signal name on the connector

Signal Type: Signal type of this pin

I – Input

O – Output

I/O – Input/ Output

Voltage Level: Voltage level of this pin

Description: Short pin functionality description

2.2 USB 3.0 Host Type A (CN1, CN2, CN25)

The board provides 3 x USB 3.0 host type A connectors at locations CN1, CN2 and CN25.

Manufacturer: Molex, Manufacturer Part Number 484050001

The following table describes the pinouts of CN1, CN2, and CN25:

Pin No.	Signal Name	Signal Type	Voltage Level	Description
1	VBUS	Power	5.0V	5V power
2	USB2.0 D-	Differential	-	USB 2.0 data negative
3	USB2.0 D+	Differential	-	USB 2.0 data positive
4	GND	GND	GND	Ground
5	SSRX N	Differential	-	SuperSpeed receiver data negative
6	SSRX P	Differential	-	SuperSpeed receiver data Positive
7	GND	GND	GND	Ground
8	SSTX N	Differential	-	SuperSpeed transmitter Data negative
9	SSTX P	Differential	-	SuperSpeed transmitter Data Positive

Table 3 USB 3.0 Type A pinouts (CN1, CN2)

2.3 USB 3.0 OTG TYPE C (CN3)

The board provides support for USB OTG interface.

Manufacturer: Molex, *Manufacturer Part Number* is 2012670005.

The following table describes the pin-out of CN3:

Pin No.	Signal Name	Signal Type	Voltage Level	Description
A1	GND	GND	GND	Ground
A2	SS1TX_P	Differential	-	SuperSpeed transmitter Data positive
A3	SS1TX_N	Differential	-	SuperSpeed transmitter Data negative
A4	VBUS1	Power	+5V	Bus Power (+5V)
A5	USB1_CC1_CN	-	-	Configuration channel 1
A6	USB1_CN_D_P	Differential	-	USB 2.0 Data Positive
A7	USB1_CN_D_N	Differential	-	USB 2.0 Data Negative
A8	USB1_SBU1	-	-	Sideband Use (SBU)
A9	VBUS2	Power	+5V	Bus Power (+5V)
A10	SS2RX_N	Differential	-	SuperSpeed transmitter Data negative
A12	GND	GND	GND	Ground
B1	GND	GND	GND	Ground
B2	SS2TX_P	Differential	-	SuperSpeed transmitter Data positive
B3	SS2TX_N	Differential	-	SuperSpeed transmitter Data negative
B4	VBUS4	Power	+5V	Bus Power (+5V)
B5	USB1_CC2_CN	-		Configuration channel 2
B6	USB1_CN_D_P	Differential		USB 2.0 Data Positive
B7	USB1_CN_D_N	Differential		USB 2.0 Data Negative
B8	USB1_SBU2	-		Sideband Use (SBU)
B9	VBUS3	Power	5V	Bus Power (+5V)
B10	SS1RX_N	Differential	-	SuperSpeed transmitter Data negative

Pin No.	Signal Name	Signal Type	Voltage Level	Description
B11	SS1RX_P	Differential	-	
B12	GND	GND	GND	Ground
SH1	SHIELD	SHIELD	GND	Ground
SH2	SHIELD	SHIELD	GND	Ground
SH3	SHIELD	SHIELD	GND	Ground
SH4	SHIELD	SHIELD	GND	Ground

Table 4: USB 3.0 OTG Type C (CN3)

2.4 10/100/1000MBPS ETHERNET (CN4, CN5)

The board provides support for two 10/100/1000Mbps Ethernet interfaces.

Manufacturer: Yuan Dean Scientific, Manufacturer Part Number: 48F-26ADDDPXNL-CDV

The following table describes the pin-out of CN4:

Pin No.	Signal Name	Signal Type	Voltage Level	Description
1	GND	Ground	GND	Ground
2	ETH1_TRX2_N	Differential	-	
3	ETH1_TRX2_P	Differential	-	
4	ETH1_TRX1_P	Differential	-	
5	ETH1_TRX1_N	Differential	-	
6	GND	Ground	GND	Ground
7	GND	Ground	GND	Ground
8	ETH1_TRX3_P	Differential	-	
9	ETH1_TRX3_N	Differential		
10	ETH1_TRX0_N	Differential	-	
11	ETH1_TRX0_P	Differential	-	
12	GND	GND	GND	Ground
13	LED1_ACTn	Input	-	Yellow Activity LED, Active low
14	VDD_3V3	Power	3.3V	Yellow LED 3.3V
15	LED1_LINK1000n	Input	-	LED LINK 1000 Activity, Active low
16	VDD_3V3	Power	3.3V	Orange, and Green LED 3.3V
17	LED1_LINK10_100n	Input	-	LED LINK 10 100 Activity, Active low
SH1	Shield 1	Ground	GND	Ground
SH2	Shield 2	Ground	GND	Ground

Table 5: 10/100/1000Mbps Ethernet (CN4)

The following table describes the pin-out of CN5:

Pin No.	Signal Name	Signal Type	Voltage Level	Description
1	GND	Ground	GND	Ground
2	ETH2_TRX2_N	Differential	-	
3	ETH2_TRX2_P	Differential	-	
4	ETH2_TRX1_P	Differential	-	
5	ETH2_TRX1_N	Differential	-	
6	GND	Ground	GND	Ground
7	GND	Ground	GND	Ground
8	ETH2_TRX3_P	Differential	-	
9	ETH2_TRX3_N	Differential	-	
10	ETH2_TRX0_N	Differential	-	
11	ETH2_TRX0_P	Differential	-	
12	GND	GND	GND	Ground
13	LED1_ACTn	Input	-	Yellow Activity LED, Active low
14	VDD_3V3	Power	3.3V	Yellow LED 3.3V
15	LED1_LINK1000n	Input		LED LINK 1000 Activity, Active low
16	VDD_3V3	Power	3.3V	Orange, and Green LED 3.3V
17	LED1_LINK10_100n	Input	-	LED LINK 10, 100 Activity, Active low
SH1	Shield 1	Ground	GND	Ground
SH2	Shield 2	Ground	GND	Ground

Table 6 10/100/1000 Mbps Ethernet CN5

2.5 CR1220 Coin Battery Holder (CN6)

The board provides a CR1220 coin battery holder for external RTC power supply.

Manufacturer: Keystone Electronics, Manufacturer Part Number 3001

The following table describes the pin-out of CN6:

Pin No.	Signal Name	Signal Type	Voltage Level	Description
1	VDD	Power	3.0V	RTC power
2	VDD	Power	3.0V	RTC power
3	GND	GND	GND	Ground

Table 7: CR1220 Coin Battery Holder (CN6)

2.6 MICRO SD CONNECTOR (CN7)

This board provides a Micro SD card with a Push-Push socket.

Manufacturer: GCT, Manufacturer Part Number MEM2051-00-195-00-A

The following table describes the pinout of CN7.

Pin No.	Signal Name	Signal Type	Voltage Level	Description
1	DAT2	Data	-	Data 2
2	CD/DAT3	Data	-	Data 3
3	CMD	Control	-	Command
4	VDD	Power	3V3	Power input
5	CLK	Clock	-	Clock
6	GND	GND	GND	Ground
7	DAT0	Data		Data 0
8	DAT1	Data		Data 1
13	GND	GND	GND	Ground

Table 4 Micro SD Connector (CN7)

2.7 M.2 SOCKET FOR EXPANSION DAUGHTER BOARD (CN8)

This socket provides for an optional M.2 expansion daughter board.

Manufacturer: Lotes, Manufacturer Part Number APCI0049-P003BC

The following table describes the pinout of CN8.

Pin No.	Signal Name	Signal Type	Voltage Level	Description
1	5V0	POWER	5V0	5.0 Volt power
2	GND	GND	GND	Ground
3	5V0	POWER	5V0	5.0 Volt power
4	IO_EXP_GPIO0_2_3V3	I/O	3V3	
5	5V0	POWER	5V0	5.0 Volt power
6	IO_EXP_GPIO5_3V3	I/O	3V3	
7	3V3		3V3	3.0 Volt power
8	IO_EXP_GPIO5_3V3	I/O	3V3	

Pin No.	Signal Name	Signal Type	Voltage Level	Description
9	3V3		3V3	3.0 Volt power
10	IO_EXP_GPIO6_3V3	I/O	3V3	
11	3V3		3V3	3.0 Volt power
20	IO_EXP_GPIO3_3V3	I/O	3V3	
21	GND	GND	GND	Ground
22	PWM4_OUT_3V3	O	3V3	
23	PWM2_OUT_3V3	O	3V3	
24	PWM3_OUT_3V3	O	3V3	
25	PWM1_OUT_3V3	O	3V3	
26	SAI2_MCLK_1V8	O	1V8	
27	I2C3_SCL_3V3	O	3V3	
28	SAI2_TXFS_1V8	O	1V8	
29	I2C3_SDA_3V3	O	3V3	
30	SAI2_TXD_1V8	O	1V8	
31	GND	GND	GND	Ground
32	SAI2_RXD_1V8	I	1V8	
33	UART1_RXD_1V8	I	1V8	
34	SAI2_TXC_1V8	O	1V8	
35	UART1_TXD_1V8	O	1V8	
36	GND	GND	GND	Ground
37	UART4_RXD_1V8	I	1V8	
38	ECSPI1_SS0_1V8	O	1V8	
39	UART4_TXD_1V8	O	1V8	
40	ECSPI1_MOSI_1V8	O	1V8	
41	UART4_RTS_1V8	I	1V8	
42	ECSPI1_MISO_1V8	I	1V8	
43	UART4_CTS_1V8	O	1V8	
44	ECSPI_SCLK_1V8	O	1V8	
45	GND	GND	GND	Ground
46	GND	GND	GND	Ground
47	CSI_MCLK_1V8	O	1V8	
48	CSI1_D3_P	Differential	-	
49	GND	GND	GND	Ground
50	CSI1_D3+N	Differential	-	

Pin No.	Signal Name	Signal Type	Voltage Level	Description
51	CSI_D0_N	Differential	-	
52	CSI_D2_N	Differential	-	
53	CSI_D0_P	Differential	-	
54	CSI1_D2_N	Differential	-	
55	CSI2_D1_N	Differential	-	
56	GND	GND	GND	Ground
57	CSI2_D1_P	Differential	-	
58	CSI_CK_P	Differential	-	
59	GND	GND	GND	Ground
60	CSI1_CK_N	Differential	-	
61	CSI2_CK_N	Differential	-	
62	GND	GND	GND	Ground
63	CSI2_CK_P	Differential	-	
64	CSI_D1_P	Differential	-	
65	GND	GND	GND	Ground
66	CSI1_D1_N	Differential	-	
67	CSI2_D2_N	Differential	-	
68	CSI1_D0_P	Differential	-	
69	CSI2_D2_P	Differential	-	
70	CSI1_D0_N	Differential	-	
71	CSI2_D3_N	Differential	-	
72	GND	GND	GND	Ground
73	CSI2_D3_P	Differential	-	
75	GND	GND	GND	Ground
MT1	GND	SHIELD	GND	Ground
MT2	GND	SHIELD	GND	Ground

Table 5 M.2 Socket for Expansion Daughter Board (CN8)

2.8 NANO SIM CARD SOCKET (CON9)

The board provides an on-board Nano-SIM hinge type socket. The works with the optional PCIe Daughter card installed in CN10.

Manufacturer: GTC, Manufacturer Part Number SIM8060-6-1-14-00-A

The following table describes the pin-out of CN9:

Pin No.	Signal Name	Signal Type	Voltage Level	Description
1	USIM_PWR	Power	1.8V	1.8V Power
2	USIM_RST	I	1.8V	USIM Reset
3	USIM_CLK	I	1.8V	USIM CLK
4	SIMCARD_DET_1V8	O	1V8	SIM card-detect
5	GND	Ground	GND	Ground
6	NC	NC	NC	NC
7	USIM_DATA	I/O	1V8	USIM Data
8	GND	Ground	GND	Ground
9	GND	Ground	GND	Ground
10	GND	Ground	GND	Ground

Table 6: Micro SIM Card Socket (CN9)

2.9 MINI PCIE EXPRESS (CN10)

This socket provides for an optional Mini PCIe full size daughter card.

Manufacturer: Harwin Inc., Manufacturer Part Number M50-3600542

The following table describes the pinout of CN10.

Pin No.	Signal Name	Signal Type	Voltage Level	Description
1	WAKE#			
2	3V3	POWER	3V3	3.3 Volt power
3	PCIE_GPIO_RESERVED_3V3			
4	GND	GND	GND	Ground
5	MINI_PCIE_RSV1			
6	1V5	POWER	1V5	1.5-volt power
7	PCIe_nCLKREQ_DEV_			
8	VIM_PWR			
9	GND	GND	GND	Ground
10	VIM_DATA			
11	REFCLK-	Differential		
12	VIM_CLK			
13	REFCLK+	Differential		
14	VIM_RESET			
15	GND	GND	GND	Ground
16	NC	NC		No Connection

Pin No.	Signal Name	Signal Type	Voltage Level	Description
17	NC	NC	-	No connection
18	GND	GND	GND	Ground
19	NC	NC	-	No connection
20	PCIE_DIS_B_3V3		3V3	
21	GND	GND	GND	Ground
22	PCIE_RST_B_3V3		3V3	
23	PERn0		-	
24	3V3	GND	3V3	3.3-volt power
25	PERp0		-	
26	GND	GND	GND	Ground
27	GND	GND	GND	Ground
28	1V5	POWER	1V5	
29	GND	GND	GND	Ground
30	SMB_CLK		-	
31	PCIE_CN_TX_N	Differential	-	
32	SMB_DATA		-	
33	PCIE_CN_TX_D	Differential	-	
34	GND	GND	GND	Ground
35	GND	GND	GND	Ground
36	USB4_D_P	Differential	-	
37	GND	GND	GND	Ground
38	USB4_D_N	Differential	-	
39	USB4_D_P	Differential	-	
40	GND	GND	GND	Ground
41	3V3	POWER	GND	3.3 Volt Power
42	LED_WWAN_B		-	
43	GND	GND	GND	Ground
44	LED_WLAN_B		-	
45	MINI_PCIE_RSV2		-	
46	LED_WPAN_B		-	
47	NC	NC	-	Ground
48	1v5	POWER	1V5	1.5 Volt Power
49	NC	NC	-	No Connection
50	GND	GND	GND	Ground

Pin No.	Signal Name	Signal Type	Voltage Level	Description
51	MINI_PCIE_RSV3		-	
52	3V3	POWER	3V3	3.3 Volt Power

Table 7 Mini PCIe Express (CN10)

2.10 M.2 Socket for An LCD Daughter Card (CN11)

The socket provides for an optional LCD Daughter Card.

Manufacturer: Lotes, Manufacturer Part NumbeRAPCI0049-P003BC

The following table describes the pinout of CN11.

Pin No.	Signal Name	Signal Type	Voltage Level	Description
1	5V0	POWER	5V0	5.0 Volt Power
2	12V0	POWER	12V0	12.0 Volt Power
3	5V0	POWER	5V0	5.0 Volt Power
4	12V0	POWER	12V0	12.0 Volt Power
5	5V0	POWER	5VO	5.0 Volt Power
6	12V0	POWER	12V0	12.0 Volt Power
7	3V3	POWER	3V3	3.3 Volt Power
8	GND	GND	GND	Ground
9	3V3	POWER	3V3	3.3 Volt Power
10	IO_EXP_GPIO_3V3		3V3	
11	3V3	POWER	3V3	3.3 Volt Power
20	IO_EXP_GPIO3_3V3		3V3	
21	3V3	POWER	3V3	3.3 Volt Power
22	IO_EXP_GPIO1_3V3		3V3	
23	GND	GND	GND	Ground
24	PWM3_OUT_3V3		3V3	
25	LVDS0_TX3_N	Differential	-	
26	PWM4_OUT_3V3		3V3	
27	LVDS0_TX3_P	Differential	-	
28	GPIO_IO23_3V3		3V3	
29	LVDS0_TX2_N	Differential	-	
30	GPIO3_IO22_3V3		3V3	
31	LVDS0_TX2_P	Differential	-	
32	PWM2_OUT_3V3		3V3	

Pin No.	Signal Name	Signal Type	Voltage Level	Description
33	GND	GND	GND	Ground
34	PWM1_OUT_3V3		3V3	
35	LVDS0_CLK_N	Differential	-	
36	GND	GND	GND	Ground
37	LVDS0_CLK_P	Differential	-	
38	I2C-TOUCH_RST_3V3		3V3	
39	GND	GND	GND	Ground
40	I2C_TOUCH_INT_3V3		3V3	
41	LVDS_TX1_N	Differential	-	
42	I2C_SDA_3V3		3V3	
43	LVDS0_TX1_P	Differential	-	
44	I2C_SCL_3V3		3V3	
45	LVDS_TX0_N	Differential	-	
46	GND	GND	GND	Ground
47	LVDS0_TX0_P	Differential	-	
48	DSI_D3_N	Differential	-	
49	GND	GND	GND	Ground
50	DSI_D3_P	Differential	-	
51	LVDS_YX3_N	Differential	-	
52	DSI_D2_N	Differential	-	
53	LVDS_TX3_P	Differential	-	
54	DSI_D2_P	Differential	-	
55	LVDS_TX2_N	Differential	-	
56	GND	GND	GND	Ground
57	LSDS1_TX2_P	Differential	-	
58	DSI_CK_N	Differential	-	
59	GND	GND	GND	Ground
60	DSI_CK_P	Differential	-	
61	LVDS1_CLK_N	Differential	-	
62	GND	POWER	GND	Ground
63	LVDS1_CLK_P	Differential	-	
64	DSI_D1_N	Differential	-	
65	GND	GND	GND	Ground
66	DSI_D1_P	Differential	-	

Pin No.	Signal Name	Signal Type	Voltage Level	Description
67	LVDS_TX1_N	Differential	-	
68	DSI_D0_N	Differential	-	
69	LVDS1_TX1_P	Differential	-	
70	DSO_DO_P	Differential	-	
71	LVDS1_TX0_N	Differential	-	
72	GND	GND	GND	Ground
73	LVDS1_TX0_P	Differential	-	
75	GND	DND	GND	Ground
MT1	GND	SHIELD	GND	Ground
MT2	GND	SHIELD	GND	Ground

Table 8 M.2 Socket for an LCD Daughter Card (CN11)

2.11 HDMI TYPE A RIGHT ANGLE CONNECTOR (CN12)

The board provides and industry standard type A HDMI video output connector.

Manufacturer: Amphenol, Manufacturer Part Number 10029449-111RLF

Pin No.	Signal Name	Signal Type	Voltage Level	Description
1	HDMI TX 2P	Differential	-	HDMI Transmit lane 2 Positive
2	GND	GND	GND	Ground
3	HDMI TX 2N	Differential	-	HDMI Transmit lane 2 Negative
4	HDMI TX 1P	Differential	-	HDMI Transmit Lane 1 Positive
5	GND	GND	GND	Ground
6	HDMI TX 1N	Differential	-	HDMI Transmit Lane 1 Negative
7	HDMI TX 0P	Differential	-	HDMI Transmit Lane 0 Positive
8	GND	GND	GND	Ground
9	HDMI TX 0N	Differential	-	HDMI Transmit Lane 0 Negative
10	HDMI CLK P	Differential	-	HDMI Clock Positive
11	Ground	GND	GND	Ground
12	HDMI CLK N	Differential	-	HDMI Clock Negative
13	HDMI CEC CN	Differential	-	HDMI Consumer Electronic Control
14	HDMI Utility CN	-	-	HDMI Utility CN
15	HDMI DDC SCL CN	I	-	HDMI Display Data Channel Clock
16	HDMI DDC SDA CN	I	-	HDMI Display Data Channel Data
17	GND	GND	GND	Ground

Pin No.	Signal Name	Signal Type	Voltage Level	Description
18	HDMI 5V CN	O	5V	HDMI 5V
19	HDMI HPD	O	-	HDMI Hot Plug Detect
S1	SHIELD	GND	GND	Ground
S2	SHIELD	GND	GND	Ground
S3	SHIELD	GND	GND	Ground
S4	SHIELD	GND	GND	Ground

Table 9 HDMI Type A (CN12)

2.12 STEREO OUTPUT/MICROPHONE (CN13)

The board provides a stereo headphone output and a microphone input.

Manufacturer: CUI, Manufacturer Part Number SJ-43515TS

The following table describes the pin-out of CN13:

Pin No.	Signal Name	Signal Type	Voltage Level	Description
1	Mic	I	Mic input	Mic input
2	Left	O	Left output	Left Channel output
3	Right	O	Right output	Right channel output
4	GND	O	Ground	Ground for left, right and Mic
5	Tip switch	0		Jack insertion detection

Table 10 Stereo Output, Microphone input (CN13)

2.13 SPEAKER OUT L & R (CN14)

The board provided a vertical header for Stereo Speaker output. CN14 provide up to 10 watts per channel into 8Ω.

Molex, Manufacturer Part Number 0559320410

The following table describes the pinout of CN14.

Pin No.	Signal Name	Signal Type	Voltage Level	Description
1	OUTPR	Audio	-	Speaker output positive right.
2	OUTNR	Audio	-	Speaker output negative left.
3	OUTNL	Audio	-	Speaker output negative left
4	OUTPL	Audio	-	Speaker output positive right

Table 11 Speaker Out L & R (CN14)

2.14 CAN Bus Header (CN15, CN16)

The board provides a vertical headers for 2 CAN bus interfaces.

Manufacturer: Molex, Manufacturer Part Number 55932-0310

The following table describes the pin-out of CN15, CN16:

Pin No.	Signal Name	Signal Type	Voltage Level	Description
1	CANH	Differential	-	CAN bus data signal
2	CANL	Differential	-	CAN bus data signal
3	GND	GND	GND	Ground

Table 12: CAN Bus Header (CN15, CN16)

An optional on-board termination resistors are selectable for CN15 and CN16.

The following table describes the dip switch SW1 setting for CN15 and CN16.

SW2 Mode Setting	Description	SW1 Pin 1-4	SW1 Pin 2-3
CAN 120Ω termination resistor is connected on CN15.	A 120 Ω termination resistor is connected across CANH and CANL on CN15.	On	Don't care
A 120Ω termination resistor is open on CN15.	No termination resistor on CN15.	Off	Don't care
CAN 120Ω termination resistor is connected on CN16.	A 120 Ω termination resistor is connected across CANH and CANL on CN16.	Don't care	On
A 120Ω termination resistor is open on CN16.	No termination resistor on CN16	Don't care	OFF

Table 13 CAN BUS CN15, CN16 Termination Select Dip Switch (SW1)

2.15 DC Power Input (CN17)

The board provides a 4.2mm pitch 2pins FitJR header for a 12-24V DC power input.

Manufacturer: Molex, Manufacturer Part Number: 172648-0102

The following table describes the pin-out of CN17:

Pin No.	Signal Name	Signal Type	Voltage Level	Description
1	GND	GND	Ground	Ground
2	VDD_IN	Power	12- 24V	DC power input

Table 14: DC Power Input Header (CN17)

2.16 DC Power Input (CN18)

The board provides a 2.0mm Jack for 12-24V DC power input.

Manufacturer: Kycon Inc, Manufacturer Part Number KLDX-0202-A

The following table describes the pin-out of CN18:

Pin No.	Signal Name	Signal Type	Voltage Level	Description
1	VDD_IN	Power	12- 24V	DC power input
2	Ground	Ground	Ground	Ground
3	Ground	Ground	Ground	Ground

Table 15 DC Power Input (CN18)

2.17 Half Duplex RS485 or RS232 Header (CN19)

The board provides a Half duplex RS485 or RS232. The default is RS485.

Manufacturer: Molex, Manufacturer Part Number: 55932-0610

The following table describes the pin-out of CN19 in RS485 mode (default):

Pin No.	Signal Name	Signal Type	Voltage Level	Description
1	VDD_3V3	Power	3V3	3.3V power
2	485_B(default)	Differential	Differential	Inverting driver output/ receiver input
3	485_A(default)	Differential	Differential	Non-inverting driver output/ receiver input
4	NC (default)	NC	NC	NC
5	NC (default)	NC	NC	NC
6	GND	GND	GND	Ground

Table 16 RS485 (Default) Header (CN19)

The following table describes the pin-out of CN19 in the optional RS232 mode:

Pin No.	Signal Name	Signal Type	Voltage Level	Description
1	VDD_3V3	Power	3V3	3.3V power
2	RS232_TXD	O	RS232	RS232 TXD
3	RS232_RXD	I	RS232	RS232 RXD
4	RS232_CTS	O	RS232	RS232 CTS
5	RS232_RTS	I	RS232	RS232 TXD
6	GND	GND	GND	Ground

Table 17 RS232 (optional) Header (CN19)

Note: The default mode for CN19 is RS485, to use RS232 mode, you need to move the Ferrite Beads from the top side of the PCB locations, FB42 and FB43 to the bottom side locations FB53 and FB54.

An optional on-board RS485 termination resistor is selectable with SW2. This option must be off for RS232.

The following table describes the dip switch SW2 setting for RS485:

SW2 Mode Setting	Description	SW1 Pin 1-4	SW1 Pin 2-3
RS485 120Ω termination resistor enabled	120 Ω termination resistor from RS485+ to RS485- is connected.	On	Don't care
RS485 120Ω termination resistor open	Open	Off	Don't care

Table 18 RS485/RS232 Mode Select Dip Switch (SW2)

2.18 JTAG Header (CN20)

The board provides support for JTAG header.

Manufacturer: Harwin Inc, Manufacturer Part Number M50-3600542

The following table describes the pin-out of CN20:

Pin No.	Signal Name	Signal Type	Voltage Level	Description
1	VDD_1V8	Power	1V8	1V8 Power
2	JTAG_TMS	O	1V8	JTAG test mode select
3	GND	GND	GND	Ground
4	JTAG_TCK	O	1V8	JTAG test clock
5	GND	GND	GND	Ground
6	JTAG_TDO	O	1V8	JTAG data out
7	NC	NC	NC	NC
8	JTAG_TDI	I	1V8	JTAG data in
9	GND	GND	GND	Ground
10	POR_B_1V8	I	1V8	System Reset

Table 19: JTAG Header (CN20)

2.19 UART DEBUG HEADER (CN21, CN22)

The board provides support for 2 x UART debug headers; CN21 is for Cortex-A53 core, and CN22 is for Cortex-M4 core debug. The UART debug headers are driven by UART1 and UART4. They can mate to a TTL-232R-3V3 USB to UART cable for debug.

Manufacturer: Harwin, Manufacturer Part Number: M20-9990645

The following table describes the pin-out of UART1 (CN21)

Pin No.	Signal Name	Signal Type	Voltage Level	Description
1	GND	GND	GND	Ground
2	NC	NC	NC	No Connection
3	NC	NC	NC	No Connection
4	UART1_RXD	I	3.3V	UART1 RXD *Shared with expansion header CN8*
5	UART1_TXD	O	3.3V	UART TXD *Shared with expansion header CN8*
6	NC	NC	NC	No Connection

Table 20: UART4 Debug Header (CN21)

The following table describes the pin-out of UART4 CN22:

Pin No.	Signal Name	Signal Type	Voltage Level	Description
1	GND	GND	GND	Ground
2	NC	NC	NC	No Connect
3	NC	NC	NC	No Connect
4	UART4_RXD	I	3.3V	UART4 RXD *Shared with expansion header CN8*
5	UART4_TXD	O	3.3V	UART4 TXD *Shared with expansion header CN8*
6	NC	NC	NC	No Connect

Table 21: UART3 Debug Header (CN22)

2.20 VEST IMX8M PLUS SOM SOCKET (CN23)

The board provides support for VEST iMX8M Plus SOM Interface DDR4 SODIMM Socket, 260 Positions, 0.5 mm Pitch 5.2 H STD.

Manufacturer: TE, Manufacturer Part Number 2309411-1

The following table describes the pin-out of CN23:

Pin No.	Pin Name	iMX 8M Plus Pad Name	Signal Type	Voltage Level	Description
1	SD1_DATA3_1V8	SD1_DATA3		1.8V	
2	GND		GND	GND	Ground
3	SD1_DATA2_1V8	SD1_DATA2		1.8V	
4	PWM_4_1V8	SAI5_RXFS		1.8V	
5	SD1_DATA1_1V8	SD1_DATA1		1.8V	
6	BT_EN_1V8	SAI5_MCLK		1.8V	
7	SD1_DATA0_1V8	SD1_DATA0		1.8V	
8	WLAN_IRQ_1V8	SAI1_RXC		1.8V	
9	SD1_CMD_1V8	SD1_CMD		1.8V	
10	WLAN_EN_1V8	SAI1_RXD0		1.8V	
11	SD1_CLK_1V8	SD1_CLK		1.8V	
12	SAI5_RXD_1V8	SAI5_RXD0		1.8V	
13	GND		GND	GND	Ground
14	SAI5_TXD_1V8	SAI5_RXD3		1.8V	
15	ONOFF_1V8	ONOFF	Input (PU 100K)	1.8V	Power on/off
16	SAI5_RXFS_1V8	SAI3_RXFS		1.8V	
17	SYS_nRST_1V8	PMIC pad PMIC_RST_B	Input	1.8V	
18	SAI5_RXC_1V8	SAI3_RXC		1.8V	
19	SOM_PWR_GOOD_1V8	PMIC_ON_REQ	Output (PU 100K)	1.8V	SOM power good, active high
20	GND		GND	GND	Ground
21	UART3_RTS_1V8	SD1_RESET_B		1.8V	
22	SD2_CLK	SD2_CLK		3.3V or 1.8V Voltage selection through SD_VSEL_1V8 (pad GPIO1_IO04), 3.3V(SD_VSEL_1V8=Low) 1.8V(SD_VSEL_1V8=High)	
23	UART3_RXD_1V8	SD1_DATA7		1.8V	
24	SD2_CMD	SD2_CMD		3.3V or 1.8V Voltage selection through SD_VSEL_1V8 (pad GPIO1_IO04), 3.3V(SD_VSEL_1V8=Low) 1.8V(SD_VSEL_1V8=High)	
25	UART3_CTS_1V8	SD1_STROBE		1.8V	
26	SD2_DATA0	SD2_DATA0		3.3V or 1.8V Voltage selection through SD_VSEL_1V8 (pad GPIO1_IO04), 3.3V(SD_VSEL_1V8=Low) 1.8V(SD_VSEL_1V8=High)	
27	UART3_TXD_1V8	SD1_DATA6		1.8V	
28	SD2_DATA1	SD2_DATA1		3.3V or 1.8V Voltage selection through SD_VSEL_1V8 (pad GPIO1_IO04), 3.3V(SD_VSEL_1V8=Low) 1.8V(SD_VSEL_1V8=High)	
29	GND		GND	GND	Ground
30	SD2_DATA2	SD2_DATA2		3.3V or 1.8V Voltage selection through SD_VSEL_1V8 (pad GPIO1_IO04), 3.3V(SD_VSEL_1V8=Low) 1.8V(SD_VSEL_1V8=High)	
31	LVDS0_TX3_N	LVDS0_D3_N	Differential		LVDS0 differential pair 3 negative
32	SD2_DATA3	SD2_DATA3		3.3V or 1.8V Voltage selection through SD_VSEL_1V8 (pad GPIO1_IO04), 3.3V(SD_VSEL_1V8=Low) 1.8V(SD_VSEL_1V8=High)	
33	LVDS0_TX3_P	LVDS0_D3_P	Differential		LVDS0 differential pair 3 positive
34	SD2_WP	SD2_WP		3.3V or 1.8V Voltage selection through SD_VSEL_1V8 (pad GPIO1_IO04), 3.3V(SD_VSEL_1V8=Low) 1.8V(SD_VSEL_1V8=High)	
35	LVDS0_TX2_N	LVDS0_D2_N	Differential		LVDS0 differential pair 2 negative

Pin No.	Pin Name	iMX 8M Plus Pad Name	Signal Type	Voltage Level	Description
36	SD2_nCD	SD2_CD_B		3.3V or 1.8V Voltage selection through SD_VSEL_1V8 (pad GPIO1_IO04), 3.3V(SD_VSEL_1V8=Low) 1.8V(SD_VSEL_1V8=High)	
37	LVDS0_TX2_P	LVDS0_D2_P	Differential		LVDS0 differential pair 2 positive
38	SD2_RESET_B	SD2_RESET_B		3.3V or 1.8V Voltage selection through SD_VSEL_1V8 (pad GPIO1_IO04), 3.3V(SD_VSEL_1V8=Low) 1.8V(SD_VSEL_1V8=High)	
39	GND		GND	GND	Ground
40	GND		GND	GND	Ground
41	LVDS0_CLK_N	LVDS0_CLK_N	Differential		LVDS0 clock differential pair negative
42	GPIO4_IO03_1V8	SAI1_RXD1		1.8V	
43	LVDS0_CLK_P	LVDS0_CLK_P	Differential		LVDS0 clock differential pair positive
44	GPIO4_IO21_1V8	SAI2_RXFS		1.8V	
45	GND		Ground	0V	Ground
46	ECSPI1_SS0_1V8	ECSPI1_SS0		1.8V	
47	LVDS0_TX1_N	LVDS0_D1_N	Differential		LVDS0 differential pair 1 negative
48	ECSPI1_MOSI_1V8	ECSPI1_MOSI		1.8V	
49	LVDS0_TX1_P	LVDS0_D1_P	Differential		LVDS0 differential pair 1 positive
50	ECSPI1_MISO_1V8	ECSPI1_MISO		1.8V	
51	LVDS0_TX0_N	LVDS0_D0_N	Differential		LVDS0 differential pair 0 negative
52	ECSPI1_SCLK_1V8	ECSPI1_SCLK		1.8V	
53	LVDS0_TX0_P	LVDS0_D0_P	Differential		LVDS0 differential pair 0 positive
54	GND		GND	0V	Ground
55	GND		GND	GND	Ground
56	EARC_N_HPD	EARC_N_HPD	Output	1.8V	
57	LVDS1_TX3_N	LVDS1_D3_N	Differential		LVDS1 differential pair 3 negative
58	EARC_P_UTIL	EARC_P_UTIL	Output	1.8V	
59	LVDS1_TX3_P	LVDS1_D3_P	Differential		LVDS1 differential pair 3 positive
60	EARC_AUX	EARC_AUX	Output	1.8V	
61	LVDS1_TX2_N	LVDS1_D2_N	Differential		LVDS1 differential pair 2 negative
62	HDMI_HPD	HDMI_HPD		1.8V	
63	LVDS1_TX2_P	LVDS1_D2_P	Differential		LVDS1 differential pair 2 positive
64	HDMI_CEC	HDMI_CEC		1.8V	
65	GND		GND	GND	Ground
66	GND		GND	GND	Ground
67	LVDS1_CLK_N	LVDS1_CLK_N	Differential		LVDS1 clock differential pair negative
68	HDMI_TX2_N	HDMI_TX2_N	Differential		HDMI differential data 2 negative
69	LVDS1_CLK_P	LVDS1_CLK_P	Differential		LVDS1 clock differential pair positive
70	HDMI_TX2_P	HDMI_TX2_P	Differential		HDMI differential data 2 positive
71	GND		GND	GND	Ground
72	HDMI_TX1_N	HDMI_TX1_N	Differential		HDMI differential data 1 negative
73	LVDS1_TX1_N	LVDS1_D1_N	Differential		LVDS1 differential pair 1 negative
74	HDMI_TX1_P	HDMI_TX1_P	Differential		HDMI differential data 1 positive
75	LVDS1_TX1_P	LVDS1_D1_P	Differential		LVDS1 differential pair 1 positive
76	GND		GND	GND	Ground
77	LVDS1_TX0_N	LVDS1_D0_N	Differential		HDMI differential data 0 negative
78	HDMI_TX0_N	HDMI_TX0_N	Differential		HDMI differential data 0 negative
79	LVDS1_TX0_P	LVDS1_D0_P	Differential		LVDS1 differential pair 0 positive
80	HDMI_TX0_P	HDMI_TX0_P	Differential		HDMI differential data 0 positive
81	GND		GND	GND	Ground
82	HDMI_TXC_N	HDMI_TXC_N	Differential		HDMI clock differential negative
83	CSI2_D0_N	MIPI_CSI2_D0_N	Differential		MIPI CSI2 differential pair 0 negative
84	HDMI_TXC_P	HDMI_TXC_P	Differential		HDMI clock differential positive
85	CSI2_D0_P	MIPI_CSI2_D0_P	Differential		MIPI CSI2 differential pair 0 positive
86	GND		*GND*	*GND*	Ground
87	CSI2_D1_N	MIPI_CSI2_D1_N	Differential		MIPI CSI2 differential pair 1 negative
88	HDMI_DDC_SCL	HDMI_DDC_SCL		1.8V	
89	CSI2_D1_P	MIPI_CSI2_D1_P	Differential		MIPI CSI2 differential pair 1 positive
90	HDMI_DDC_SDA	HDMI_DDC_SDA		1.8V	
91	GND		GND	GND	Ground
92	GPIO4_IO00_1V8	SAI1_RXFS		1.8V	
93	CSI2_CK_N	MIPI_CSI2_CLK_N	Differential		MIPI CSI2 clock differential pair negative
94	GPIO4_IO22_1V8	SAI2_RXC		1.8V	
95	CSI2_CK_P	MIPI_CSI2_CLK_P	Differential		MIPI CSI2 clock differential pair positive
96	GPIO3_IO22_1V8	SAI5_RXD1		1.8V	

Pin No.	Pin Name	iMX 8M Plus Pad Name	Signal Type	Voltage Level	Description
97	GND		GND	GND	Ground
98	GPIO3_IO23_1V8	SAI5_RXD2		1.8V	
99	CSI2_D2_N	MIPI_CSI2_D2_N	Differential		MIPI CSI2 differential pair 2 negative
100	GPIO1_IO05_1V8	GPIO1_IO05		1.8V	
101	CSI2_D2_P	MIPI_CSI2_D2_P	Differential		MIPI CSI2 differential pair 2 positive
102	GND		GND	GND	Ground
103	CSI2_D3_N	MIPI_CSI2_D3_N	Differential		MIPI CSI2 differential pair 3 negative
104	CSI1_D3_P	MIPI_CSI1_D3_P	Differential		MIPI CSI1 differential pair 3 positive
105	CSI2_D3_P	MIPI_CSI2_D3_P	Differential		MIPI CSI2 differential pair 3 positive
106	CSI1_D3_N	MIPI_CSI1_D3_N	Differential		MIPI CSI1 differential pair 3 negative
107	GND		GND	GND	Ground
108	CSI1_D2_P	MIPI_CSI1_D2_P	Differential		MIPI CSI1 differential pair 2 positive
109	DSI_D3_N	MIPI_DSI1_D3_N	Differential		MIPI DSI differential pair 3 negative
110	CSI1_D2_N	MIPI_CSI1_D2_N	Differential		MIPI CSI1 differential pair 2 negative
111	DSI_D3_P	MIPI_DSI1_D3_P	Differential		MIPI DSI differential pair 3 positive
112	GND		GND	GND	Ground
113	DSI_D2_N	MIPI_DSI1_D2_N	Differential		MIPI DSI differential pair 2 negative
114	CSI1_CK_P	MIPI_CSI1_CLK_N	Differential		MIPI CSI1 clock differential pair negative
115	DSI_D2_P	MIPI_DSI1_D2_P	Differential		MIPI DSI differential pair 2 positive
116	CSI1_CK_N	MIPI_CSI1_CLK_P	Differential		MIPI CSI1 clock differential pair positive
117	GND		GND	GND	Ground
118	GND		GND	GND	Ground
119	DSI_CK_N	MIPI_DSI1_CLK_N	Differential		MIPI DSI clock differential negative
120	CSI1_D1_P	MIPI_CSI1_D1_P	Differential		MIPI CSI1 differential pair 1 positive
121	DSI_CK_P	MIPI_DSI1_CLK_P	Differential		MIPI DSI clock differential positive
122	CSI1_D1_N	MIPI_CSI1_D1_N	Differential		MIPI CSI1 differential pair 1 negative
123	GND		GND	GND	Ground
124	CSI1_D0_P	MIPI_CSI1_D0_P	Differential		MIPI CSI1 differential pair 0 negative
125	DSI_D1_N	MIPI_DSI1_D1_N	Differential		MIPI DSI differential pair 1 negative
126	CSI1_D0_N	MIPI_CSI1_D0_N	Differential		MIPI CSI1 differential pair 0 positive
127	DSI_D1_P	MIPI_DSI1_D1_P	Differential		MIPI DSI differential pair 1 positive
128	GND		GND	GND	Ground
129	DSI_D0_N	MIPI_DSI1_D0_N	Differential		MIPI DSI differential pair 0 negative
130	CSI_MCLK_1V8	GPIO1_IO15		1.8V	
131	DSI_D0_P	MIPI_DSI1_D0_P	Differential		MIPI DSI differential pair 0 positive
132	USB1_EN_1V8	GPIO1_IO12		1.8V	
133	GND		GND	GND	Ground
134	USB1_OC_1V8	GPIO1_IO13		1.8V	
135	PCIE_TX_N	PCIE_TXN_N	Differential		PCIe differential transmit negative
136	USB1_VBUS_3V3	USB1_VBUS	Input		USB1 PHY VBUS
137	PCIE_TX_P	PCIE_TXN_P	Differential		PCIe differential transmit positive
138	USB1_ID_1V8	GPIO1_IO10		1.8V	
139	PCIE_RX_N	PCIE_RXN_N	Differential		PCIe differential receive negative
140	USB1_D_N	USB1_D_N	Differential		USB1 PHY data negative
141	PCIE_RX_P	PCIE_RXN_P	Differential		PCIe differential receive positive
142	USB1_D_P	USB1_D_P	Differential		USB1 PHY data positive
143	GND		GND	GND	Ground
144	GND		GND	GND	Ground
145	PCIE_CLK_N	PCIE_REF_PAD_CLK_N	Differential		PCIe clock differential negative
146	GND		GND	GND	Ground
147	PCIE_CLK_P	PCIE_REF_PAD_CLK_P	Differential		PCIe cock differential positive
148	SAI2_MCLK_1V8	SAI2_MCLK	GND	GND	Ground
149	GND		GND	GND	Ground
150	SAI2_TXFS_1V8	SAI2_TXFS		1.8V	
151	USB2_TX_N	USB2_TX_N	Differential		USB2 PHY 3.0 transmit data negative
152	SAI2_TXD_1V8	SAI2_TXD0		1.8V	
153	USB2_TX_P	USB2_TX_P	Differential		USB2 PHY 3.0 transmit data positive
154	SAI2_RXD_1V8	SAI2_RXD0		1.8V	
155	USB2_RX_N	USB2_RX_N	Differential		USB2 PHY 3.0 receive data negative
156	SAI2_TXC_1V8	SAI2_TXC		1.8V	
157	USB2_RX_P	USB2_RX_P	Differential		USB2 PHY 3.0 receive data positive
158	GND		GND	GND	Ground
159	GND		GND	GND	Ground
160	JTAG_TDI_1V8	JTAG_TDI		1.8V	JTAG TDI
161	USB1_TX_N	USB1_TX_N	Differential		USB2 PHY 3.0 transmit data negative
162	JTAG_TDO_1V8	JTAG_TDO		1.8V	JTAG TDO
163	USB1_TX_P	USB1_TX_P	Differential		USB2 PHY 3.0 transmit data positive
164	JTAG_TMS_1V8	JTAG_TMS		1.8V	JTAG TMS
165	USB1_RX_N	USB1_RX_N	Differential		USB2 PHY 3.0 receive data negative
166	JTAG_TCK_1V8	JTAG_TCK		1.8V	JTAG TCK

Pin No.	Pin Name	iMX 8M Plus Pad Name	Signal Type	Voltage Level	Description
167	USB1_RX_P	USB1_RX_P	Differential		USB2 PHY 3.0 receive data positive
168	JTAG_MOD_1V8	JTAG_MOD		1.8V	JTAG MODE
169	GND		GND	GND	Ground
170	GPIO4_IO20_1V8	SAI1_MCLK		1.8V	
171	USB2_D_N	USB2_D_N	Differential		USB2 PHY data negative
172	GND		GND	GND	Ground
173	USB2_D_P	USB2_D_P	Differential		USB2 PHY data positive
174	UART4_RXD_1V8	ECSPI2_SCLK		1.8V	
175	USB2_EN_1V8	GPIO1_IO14		1.8V	
176	UART4_TXD_1V8	ECSPI2_MOSI		1.8V	
177	USB2_VBUS_3V3	USB2_VBUS	Input		USB2 PHY VBUS
178	UART4_RTS_1V8	ECSPI2_SS0		1.8V	
179	USB2_ID_1V8	GPIO1_IO11		1.8V	
180	UART4_CTS_1V8	ECSPI2_MISO		1.8V	
181	GND		GND	GND	Ground
182	CAN1_TX_1V8	SPDIF_TX		1.8V	
183	POR_B_1V8	POR_B	Input (PU 100K)	1.8V	Reset the entire chip
184	CAN1_RX_1V8	SPDIF_RX		1.8V	
185	I2C1_SCL_1V8	I2C1_SCL	Output	1.8V	I2C1 SCL
186	CAN2_TX_1V8	UART3_RXD		1.8V	
187	I2C1_SDA_1V8	I2C1_SDA	I/O	1.8V	I2C1 SDA
188	CAN2_RX_1V8	UART3_TXD		1.8V	
189	HP_DETECT_1V8	GPIO1_IO01		1.8V	
190	GND		GND	GND	Ground
191	GND		GND	GND	Ground
192	UART1_RXD_1V8	UART1_RXD		1.8V	
193	PWM_3_1V8	SAI5_RXC		1.8V	
194	UART1_TXD_1V8	UART1_TXD		1.8V	
195	PWM_1_1V8	SPDIF_EXT_CLK		1.8V	
196	UART2_RTS_1V8	UART4_TXD		1.8V	
197	PWM_2_1V8	GPIO1_IO09		1.8V	
198	UART2_CTS_1V8	UART4_RXD		1.8V	
199	GND		GND	GND	Ground
200	UART2_RXD_1V8	UART2_RXD		1.8V	
201	I2C4_SCL_1V8	I2C4_SCL		1.8V	
202	UART2_TXD_1V8	UART2_TXD		1.8V	
203	I2C4_SDA_1V8	I2C4_SDA		1.8V	
204	GND		GND	GND	Ground
205	I2C2_SCL_1V8	I2C2_SCL		1.8V	
206	LINE_OUTR	Codec LINEOUT_R			
207	I2C2_SDA_1V8	I2C2_SDA		1.8V	
208	LINE_OUTL	Codec LINEOUT_L			
209	I2C3_SCL_1V8	I2C3_SCL		1.8V	
210	HP_L	Codec HP_L			
211	I2C3_SDA_1V8	I2C3_SDA		1.8V	
212	HP_R	Codec HP_R			
213	GND		GND	GND	Ground
214	MIC_IN	Codec MIC			
215	ENET_nRST_1V8	SD1_DATA4		1.8V	
216	GND		GND	GND	Ground
217	ETH1_LED_ACT	Ethernet PHY LED_2		1.8V	
218	ENET2_RGMII_nINT_1V8	SAI1_TXD6		1.8V	
219	ETH1_LED_10_100	Ethernet PHY LED_0		1.8V	
220	ENET2_RGMII_MDIO__1V8	SAI1_RXD3		1.8V	
221	ETH1_LED_1000	Ethernet PHY LED_1		1.8V	
222	ENET2_RGMII_MDC_1V8	SAI1_RXD2		1.8V	
223	NC				
224	GND		GND	GND	Ground
225	NC				
226	ENET2_RGMII_RXC_1V8	SAI1_TXC		1.8V	
227	GND		GND	0V	Ground
228	ENET2_RGMII_RX_CTL_1V8	SAI1_TXFS		1.8V	
229	ETH1_TRX0_P				
230	ENET2_RGMII_RD0_1V8	SAI1_RXD4		1.8V	
231	ETH1_TRX0_N				
232	ENET2_RGMII_RD1_1V8	SAI1_RXD5		1.8V	
233	GND		GND	GND	
234	ENET2_RGMII_RD2_1V8	SAI1_RXD6		1.8V	
235	ETH1_TRX1_P				
236	ENET2_RGMII_RD3_1V8	SAI1_RXD7		1.8V	

Pin No.	Pin Name	iMX 8M Plus Pad Name	Signal Type	Voltage Level	Description
237	ETH1_TRX1_N				
238	GND		GND	GND	Ground
239	GND		GND	GND	Ground
240	ENET2_RGMII_TXC_1V8	SAI1_TXD5		1.8V	
241	ETH1_TRX2_P				
242	ENET2_RGMII_TX_CTL_1V8	SAI1_TXD4		1.8V	
243	ETH1_TRX2_N				
244	ENET2_RGMII_TD0_1V8	SAI1_TXD0		1.8V	
245	GND		GND	GND	
246	ENET2_RGMII_TD1_1V8	SAI1_TXD1		1.8V	
247	ETH1_TRX3_P				
248	ENET2_RGMII_TD2_1V8	SAI1_TXD2		1.8V	
249	ETH1_TRX3_N				
250	ENET2_RGMII_TD3_1V8	SAI1_TXD3		1.8V	
251	GND		GND	GND	Ground
252	GND		GND	GND	Ground
253	SOM_5V0		Power	5.0V	5.0V Power Input
254	SOM_5V0		Power	5.0V	5.0V Power Input
255	SOM_5V0		Power	5.0V	5.0V Power Input
256	SOM_5V0		Power	5.0V	5.0V Power Input
257	SOM_5V0		Power	5.0V	5.0V Power Input
258	SOM_5V0		Power	5.0V	5.0V Power Input
259	SOM_5V0		Power	5.0V	5.0V Power Input
260	SOM_5V0		Power	5.0V	5.0V Power Input

Table 22: Full size Mini PCIe Socket (CN23)

2.21 POWER CONTROL (CN24)

The board provides a power control header for On/Off, POR, LED Control and GND

Manufacturer: Molex, Manufacturer Part Number 55932-0510

The following table describes the pinout of CN24.

Pin No.	Signal Name	Signal Type	Voltage Level	Description
1	ONOFF	I	1V8	On Off
2	SYS_nRST	I	1V8	Reset active low
3	GND	GND	GND	Ground
4	LED Pullup LED Anode	1V8 Pull up through a 270Ω Resistor.	3.3V	LED Anode
5	LED Cathode	Led Cathode	3.3V	LED Cathode

Table 23 Power Control Header (CN24)

2.22 USB 3.0 HOST TYPE A (CN25, CN1, CN2)

The board provides 3 x USB 3.0 host type A connectors at locations CN1, CN2 and CN25.

Manufacturer: Molex Part number 484050001

The following table describes the pinout of CN1, CN2, and CN25:

Pin No.	Signal Name	Signal Type	Voltage Level	Description
1	VBUS	Power	5.0V	5V power
2	USB2.0 D-	Differential	-	USB 2.0 data negative
3	USB2.0 D+	Differential	-	USB 2.0 data positive
4	GND	GND	GND	Ground
5	SSRX N	Differential	-	SuperSpeed receiver data negative
6	SSRX P	Differential	-	SuperSpeed receiver data Positive
7	GND	GND	GND	Ground
8	SSTX N	Differential	-	SuperSpeed transmitter Data negative
9	SSTX P	Differential	-	SuperSpeed transmitter Data Positive

Table 24 USB 3.0 Type A pinouts (CN25)

2.23 DUAL CHANNEL LVDS INTERFACE WITH BACKLIGHT HEADER (CN26)

The board provides support for dual channel LVDS and backlight interface.

Manufacturer: Hirose, Manufacturer Part Number: FH28-40S-0.5SH(07)

The following table describes the pin-out of CN26:

Pin No.	Signal Name	Signal Type	Voltage Level	Description
1	LCD_VCOM	Power		VCOM Buffer output
2	LCD 3V3	POWER	3V3	LCD Power 3.3 Volts
3	LCD 3V3	POWER	3V3	LCD Power 3.3 Volts
4	NC	NC	-	No Connect
5	LCD RESET		3V3	LCD reset Active Low
6	LCD STBYB		3V3	LCD standby Active Low
7	GND	GND	GND	Ground
8	LVDS_TX0_N	Differential	-	
9	LVDS_TX0_P	Differential	-	

Pin No.	Signal Name	Signal Type	Voltage Level	Description
10	GND	GND	GND	Ground
11	LVDS_TX1_N	Differential	-	
12	LVDS_TX1_P	Differential	-	
13	GND	GND	GND	Ground
14	LVDS_TX2_N	Differential	-	
15	LVDS_TX2_P	Differential	-	
16	GND	GND	GND	Ground
17	LVDS_CLK_N	Differential	-	
18	LVDS_CLK_P	Differential	-	
19	GND	GND	GND	Ground
20	LVDS_TX3_N	Differential	-	
21	LVDS_TX3_N	Differential	-	
22	GND	GND	GND	Ground
23	NC	NC	-	No Connect
24	NC	NC	-	No Connect
25	GND	GND	GND	Ground
26	NC	NC	-	No Connect
27	PWM1_OUT_3V3			
28	LCD_SELB			
29	LCD_AVDD		-	
30	GND	GND	GND	Ground
31	LCD_LED-			Cathode Voltage sense input from The cathode of the LED Backlight
32				
33	LCD_SHLR			
34	LCD_UPDN			
35	LCD_VGL			
36	NC			No Connection
37	LCD_CABC_EN			
38	LCD_VGH			
39	LCD_LED+	POWER		LCD LED Power- Voltage depends on the LCD panel.
40	LCD_LED+	POWER		LCD LED Power- Voltage depends on

Pin No.	Signal Name	Signal Type	Voltage Level	Description
				the LCD panel.
S1	SHIELD	GND	GND	Ground
S2	SHIELD	GND	GND	Ground

Table 25: Dual Channel LVDS Interface with Backlight Header (CN26)

2.24 I2C TOUCH HEADER (CN27)

The board provides a right-angle header for I2C touch; this interface is driven by SOC I2C2 interface.

Manufacturer: Molex, Manufacturer Part Number: 505278-0833

The following table describes the pin-out of CN27:

Pin No.	Signal Name	Signal Type	Voltage Level	Description
1	GND	Ground	GND	Ground
2	RESET		3.3V	I2C Touch Reset
3	INT		3.3V	I2C Touch Interrupt
4	SDA		3.3V	I2C Serial Data
5	SCL		3.3V	I2C Clock
6	GND	Ground	GND	Ground
7	VDD	Power	3.3V	3V3 Power
8	GND	Ground	GND	Ground
S1	Shield 1	Ground	Ground	Ground
S2	Shield 2	Ground	Ground	Ground

Table 26: I2C Touch Header (CN27)

2.25 CAN BUS TERMINATION SELECTION SWITCH (SW1).

See CN15 and CN16 for details of SW1 description and operation.

2.26 RS486 TERMINATION RESISTOR SELECTION SWITCH (SW2).

See CN19 for details of SW2 description and operation.

2.27 POWER BUTTON (SW3)

The board provides a side push tactile switch for turning the board on/off.

The following table describes the function of SW3:

Reference	Description
SW3	Power button is located at the edge of the PCB to turn on/off the board, active low.

Table 27: Power Button (SW3)

2.28 RESET BUTTON (SW4)

The board provides a side push tactile switch for resetting the board.

Manufacturer: E-Switch, Manufacturer Part Number: TL1014BF160QG

The following table describes the function of SW4:

Reference	Description
SW4	Reset button is located at the edge of the PCB to reset the board, active low.

Table 28: Reset Button (SW4)

2.29 LCD CURRENT SWITCH (SW5)

The board provides a 4-position dip switch for setting the current for the LCD display.

The following table describes the function of SW5 in relation to the LCD panel used:

	VF_LED	IF_LED	SHORT PINS
Jetson 7”	9V5	180ma	1-8
Jetson 10”	9V5	260ma	2-7
Palm 7”	9V5	400ma	3-6
Don’t Care	Don’t Care	Don’t Care	4-5

Table 29 LCD Current Select Switch (SW5)

3 ELECTRICAL SPECIFICATION

VEST i.MX8M Plus Carrier Board was designed to support up to 24VDC power input.

3.1 ABSOLUTE MAXIMUM CHARACTERISTICS

Power Supply Input	Minimum	Maximum
Main Power Supply, DC-IN	-0.3	26V

Table 30: Absolute Maximum Characteristics

3.2 RECOMMENDED POWER SUPPLY CHARACTERISTICS

Power Supply Input	Minimum	Typical	Maximum	Unit
Voltage of Input Power	12		24	V
Current of Input Power			TBD	A

Table 31: Recommended Power Supply Characteristics

4 ENVIRONMENTAL SPECIFICATION

4.1 STORAGE TEMPERATURE SPECIFICATION

The VEST i.MX8M Plus Carrier Board can be stored in a temperature ranging from 5℃ to 50℃.

4.2 OPERATION TEMPERATURE SPECIFICATION

The VEST i.MX8M Plus Carrier Board can operate in a temperature ranging from 5℃ to 50℃.

4.3 HUMIDITY

- Operating: 10% to 90% (Non-condensing)
- Non-operating: 5% to 95% (Non-condensing)

5 MECHANICAL SPECIFICATION

5.1 MECHANICAL DIMENSION

- 7086.78 ± 5 mil x 4410.00 ± 5 mil

5.2 MECHANICAL DRAWING

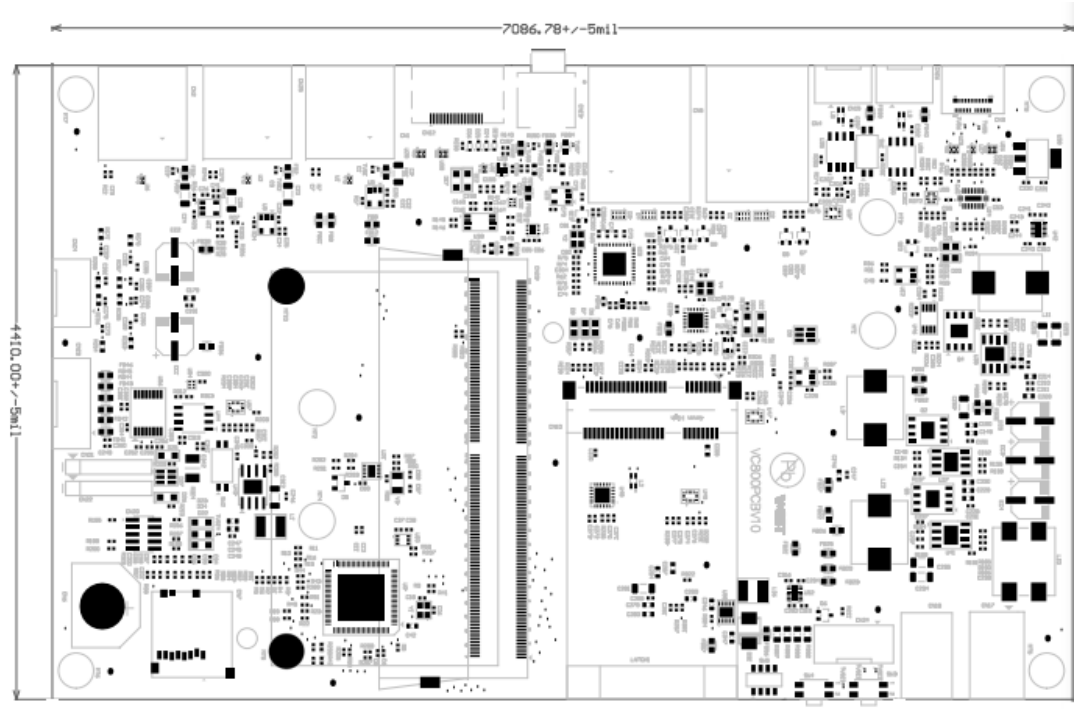


Figure 8 Topside

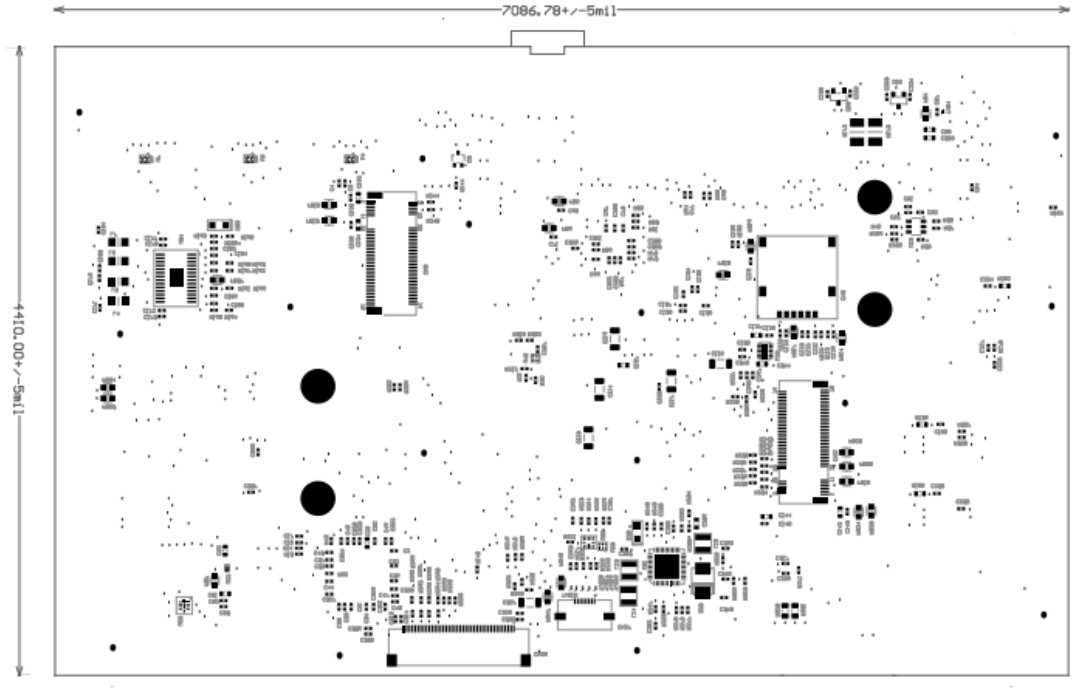


Figure 9 Backside

6 REVISION HISTORY

Version	Date Released	Changes
REV A	03/17/2023	Initial Release
REV B	04/10/2023	Updated Connector, Switch and LED Data
REV C	03/01/2004	Updated product names

7 LEGAL NOTICES

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