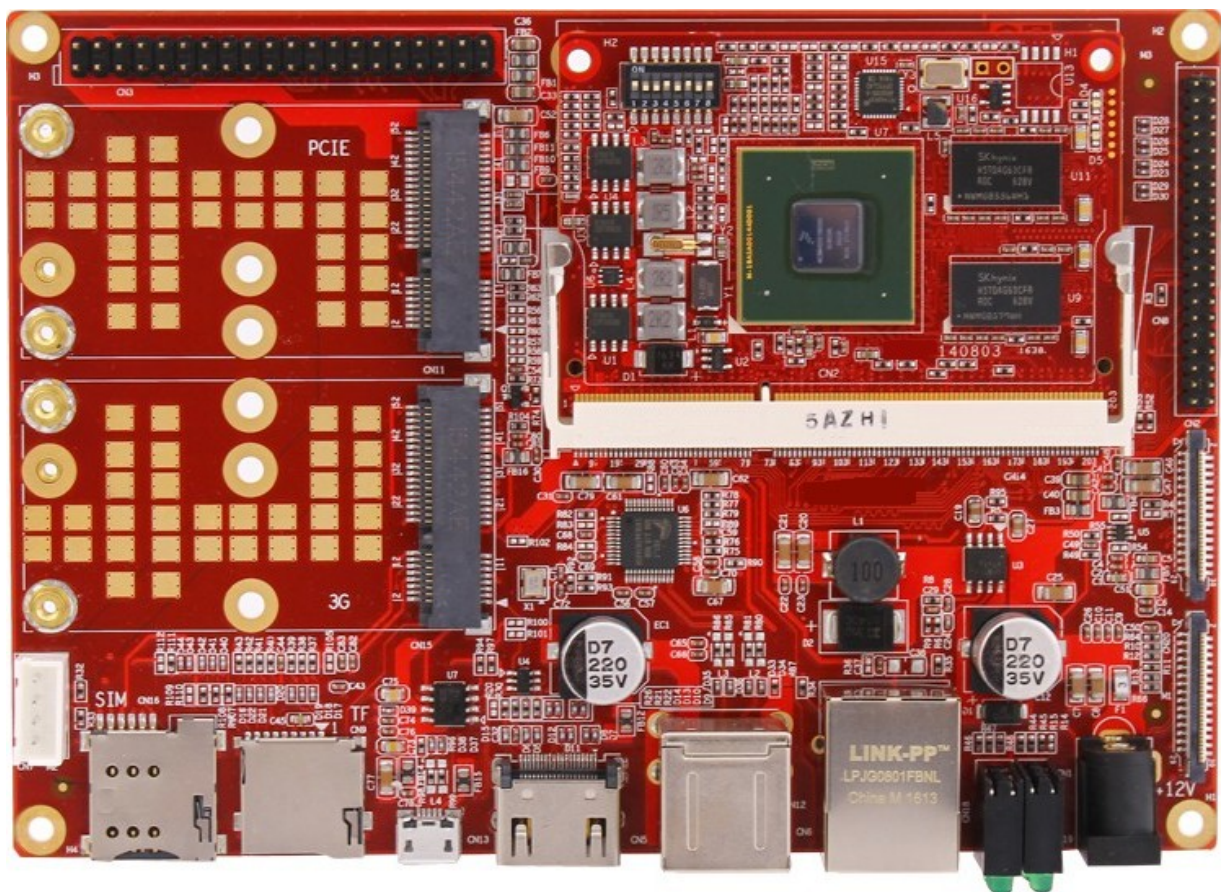


# NOVA SBC Module Hardware Manual

## Rev 1.0



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## 1 Contents

# Sommario

1	<a href="#">Contents.....</a>	<a href="#">4</a>
1	<a href="#">Chapter 1 Product Overview.....</a>	<a href="#">1</a>
	<a href="#">Introduction.....</a>	<a href="#">1</a>
	<a href="#">Hardware.....</a>	<a href="#">1</a>
	<a href="#">Software.....</a>	<a href="#">1</a>
	<a href="#">    Product Overview.....</a>	<a href="#">2</a>
2	<a href="#">Chapter 2 Hardware System.....</a>	<a href="#">3</a>
	<a href="#">Main Features.....</a>	<a href="#">4</a>
	<a href="#">    USB HOST.....</a>	<a href="#">4</a>
	<a href="#">Reference Documents.....</a>	<a href="#">4</a>
	<a href="#">    USB HUB FE1.1.....</a>	<a href="#">4</a>
	<a href="#">Hardware Interfaces.....</a>	<a href="#">5</a>
	<a href="#">    Connector Locations.....</a>	<a href="#">5</a>
	<a href="#">Technical Specifications.....</a>	<a href="#">11</a>
	<a href="#">    Electrical Characteristics.....</a>	<a href="#">11</a>
	<a href="#">    Mechanical Characteristics.....</a>	<a href="#">12</a>
	<a href="#">    Thermal Characteristics.....</a>	<a href="#">13</a>
	<a href="#">Technical Support and Warranty.....</a>	<a href="#">14</a>

# 1 Chapter 1 Product Overview

## 1.1 Introduction

## 1.2 Hardware

The single board computer NOVA which has an expansion board to carry the Vera IMX6 is one of our design of the base plate . The flexible design allows the fast and easy way of realizing and upgrading the controller's capabilities. In addition to those features offered by Vera IMX6, the NOVA features 5 serial ports (5 TTL), 1 USB Host and 1 USB OTG, 1 Ethernet ports, SDIO, SATA, PCIE, HDMI, LCD, CAN, CSI, MCASP, 2 SPI, 3 I2C, LVDS, PWM , RTC, GPIOs and more other peripherals.

The single board targets a wide range of applications, including: HMIs, Digital Signage, POS, Data Terminal, Medical Devices, Navigation, Industrial Automation, Entertainment system, Thin Clients, Robotics, Game Console and much more.

## 1.3 Software

The NOVA is a ready-to-run platform to support for Linux 4.x, Android 6.x operating systems.

If you care about other Operating System, For more information contact our support.

## 1.4 Product Overview

The following sections list out all the product features.

Series	Nova SBC Dual	Nova SBC Quad
Part Code	NVAS0020	NVAS0010
CPU Name	NXP(Freescale) IMX6 dual core	NXP(Freescale) IMX6 quad core
CPU Type	ARM Cortex™-A9	ARM Cortex™-A9
CPU Cores	2x	4x
CPU Frequency	1GHz	1GHz
RAM DDR3	Micron 1GB@16bit*4	Micron 1GB@16bit*4
Flash	eMMC 4GB@8bit*1	eMMC 4GB@8bit*1
Size	146 x 102 x 19mm	146 x 102 x 19mm
Temperature	0° to 70° C	0° to 70° C
Support OS	Linux 4.x Android 6.x	Linux 4.x Android 6.x

## 2 Chapter 2 Hardware System

### Block Diagram

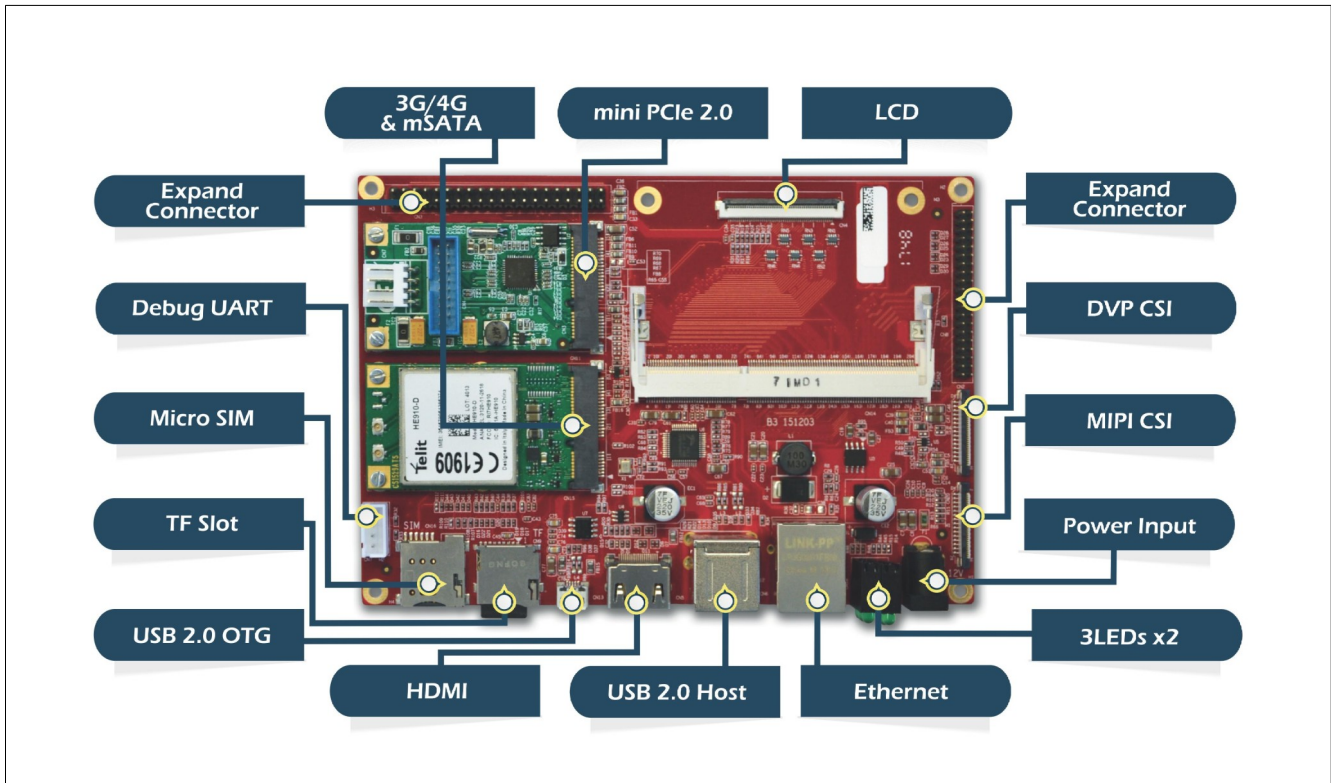


Figure 1 NOVA Block Diagram

## 2.1 Main Features

NOVA provides the following features and communication interfaces:

- 1x RJ45 Ethernet (10/100/1000Mbit)
- 4x USB 2.0 port through on board USB HUB
- 1x USB 2.0 OTG Micro-AB connector for host and host/client
- 1x TF 4-bit
- 1x Mini PCIE for USB module or PCIE LAN (The default function of PCIE)
- 1x Mini PCIE for 3G/4G module or SATA II module (The default function of SATA)
- 1x HDMI 1.4 interface
- 1x Digital RGB interface (up to 24 bit colour)
- 1x DDR3 STD connector
- 1x Expand connector for Raspberry PI
- 2x Expand connector with 1x LVDS, 2x I2C, 1x SPI, 1x CSI, 1x MCASP, GPIOs
- 1x Debug UART (3.3V TTL)
- 1x MIPI CSI connector
- 1x DC-IN jack with 9.6~14.4V
- 2x 3 LEDs

### 2.1.1 USB HOST

4x USB 2.0 port through on board USB HUB (FE1.1)

- Fully compliant with Universal Serial Bus Specification Revision 2.0
- Integrated USB 2.0 Transceivers
- Integrated upstream 1.5Kohm pull-up, downstream 15Kohm pull-down, and serial resistors
- Integrated Power-On-Reset circuit
- Integrated 12MHz Oscillator with feedback resistor, and crystal load capacitance
- Integrated 12MHz-to-480MHz Phase Lock Loop (PLL)
- Multiple Transaction Translators (MTT)
- Automatic self-power status monitoring

## 2.2 Reference Documents

### 2.2.1 USB HUB FE1.1

FE1.1 is a usb hub used on NOVA SBC.

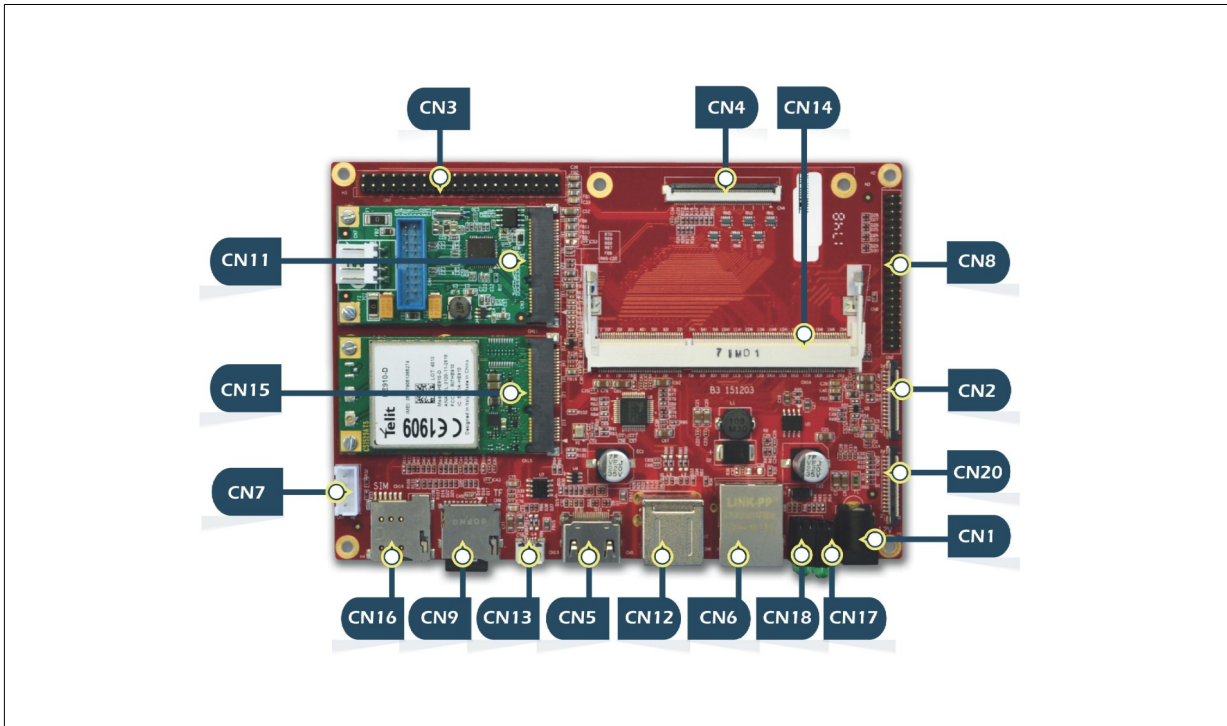
If you need more information about the USB HUB, please refer to FE1.1 from

<http://www.terminus-tech.com/>

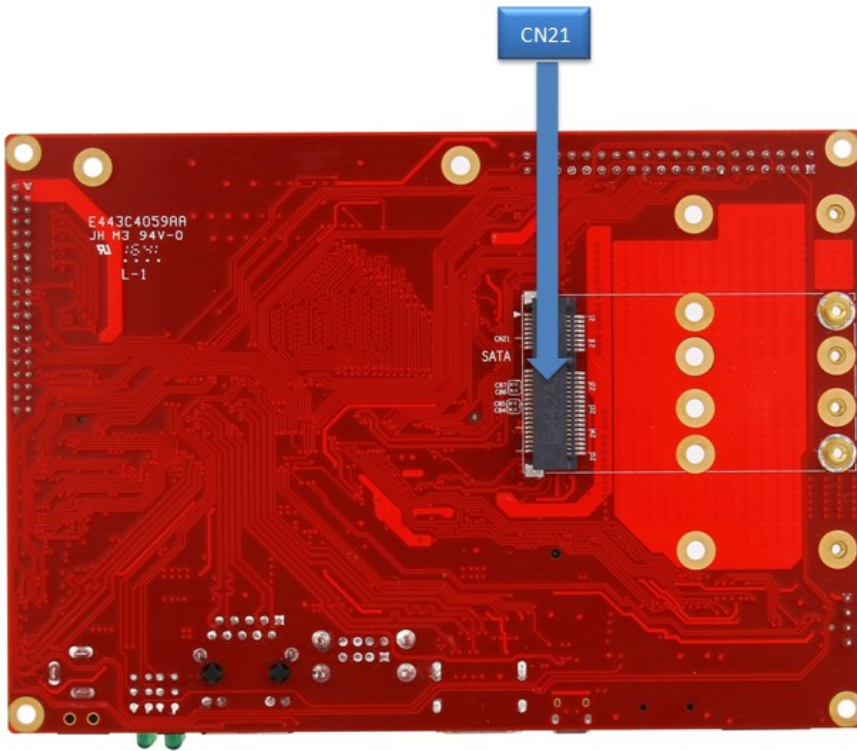


## 2.4 Hardware Interfaces

### 2.4.1 Connector Locations



**Figure Nova TOP Connections**



**Figure Nova Bottom Connections**

## 2.4.1 Core Module Interface (CN14)

Type: DDR3 SO-DIMM

Pin	Signal name	Description	I/O	Power rail	Note
1	5VIN	5V main power supply	P	5V	
2	GND	Digital ground		GND	
3	5VIN	5V main power supply	P	5V	
4	GND	Digital ground		GND	
5	5VIN	5V main power supply	P	5V	
6	GND	Digital ground		GND	
7	5V_CONTRRL	5V main power supply control	I	5V	
8	NC	Not connected			
9	3P3V	3.3V main power supply	P	3.3V	
10	2P5V	2.5V main power supply	P	2.5V	
11	3P3V	3.3V main power supply	P	3.3V	
12	RGMII_VDD2V5	2.5V lan power supply	P	2.5V	
13	3P3V	3.3V main power supply	P	3.3V	
14	OTG_VBUS	5V USB OTG power supply	P	5V	
15	VDD_RTC	RTC backup power supply	P	3V	
16	NC	Not connected			
17	POR_B	System reset	I	3.3V	
18	DISP0_DAT0	LCD data bus	I/O	3.3V	
19	GPIO1_27	GPIO	I/O	3.3V	
20	DISP0_DAT1	LCD data bus	I/O	3.3V	
21	LCD_PWR_EN	LCD power enable	O	3.3V	
22	DISP0_DAT2	LCD data bus	I/O	3.3V	
23	UART2_TXD	UART transmit data	O	3.3V	
24	DISP0_DAT3	LCD data bus	I/O	3.3V	
25	UART2_RXD	UART receive data	I	3.3V	
26	DISP0_DAT4	LCD data bus	I/O	3.3V	
27	UART2_CTS	UART clear to send	O	3.3V	
28	DISP0_DAT5	LCD data bus	I/O	3.3V	
29	UART2_RTS	UART request to send	I	3.3V	
30	DISP0_DAT6	LCD data bus	I/O	3.3V	
31	CSPI1_CLK	SPI clock	I/O	3.3V	
32	DISP0_DAT7	LCD data bus	I/O	3.3V	
33	CSPI1_MISO	SPI master input, slave output	I	3.3V	
34	DISP0_DAT8	LCD data bus	I/O	3.3V	
35	CSPI1_MOSI	SPI master output, slave input	O	3.3V	
36	DISP0_DAT9	LCD data bus	I/O	3.3V	
37	CSPI1_CS1	SPI chip select	I/O	3.3V	
38	DISP0_DAT10	LCD data bus	I/O	3.3V	
39	CSPI4_CLK	SPI clock	I/O	3.3V	

Pin	Signal name	Description	I/O	Power rail	Note
40	DISP0_DAT11	LCD data bus	I/O	3.3V	
41	CSPI4_MISO	SPI master input, slave output	I	3.3V	
42	DISP0_DAT12	LCD data bus	I/O	3.3V	
43	CSPI4_MOSI	SPI master output, slave input	O	3.3V	
44	DISP0_DAT13	LCD data bus	I/O	3.3V	
45	CSPI4_CS0	SPI chip select	I/O	3.3V	
46	DISP0_DAT14	LCD data bus	I/O	3.3V	
47	CSPI4_CS1	SPI chip select	I/O	3.3V	
48	DISP0_DAT15	LCD data bus	I/O	3.3V	
49	GND	Digital ground		GND	
50	DISP0_DAT16	LCD data bus	I/O	3.3V	
51	SD2_CLK	MMC/SD/SDIO clock	I/O	3.3V	
52	DISP0_DAT17	LCD data bus	I/O	3.3V	
53	SD2_DATA0	MMC/SD/SDIO data bus	I/O	3.3V	
54	DISP0_DAT18	LCD data bus	I/O	3.3V	
55	SD2_DATA1	MMC/SD/SDIO data bus	I/O	3.3V	
56	DISP0_DAT19	LCD data bus	I/O	3.3V	
57	SD2_DATA2	MMC/SD/SDIO data bus	I/O	3.3V	
58	DISP0_DAT20	LCD data bus	I/O	3.3V	
59	SD2_DATA3	MMC/SD/SDIO data bus	I/O	3.3V	
60	DISP0_DAT21	LCD data bus	I/O	3.3V	
61	SD2_DATA4	MMC/SD/SDIO data bus	I/O	3.3V	
62	DISP0_DAT22	LCD data bus	I/O	3.3V	
63	SD2_DATA5	MMC/SD/SDIO data bus	I/O	3.3V	
64	DISP0_DAT23	LCD data bus	I/O	3.3V	
65	SD2_DATA6	MMC/SD/SDIO data bus	I/O	3.3V	
66	DISP0_HSYNC	LCD horizontal sync	O	3.3V	
67	SD2_DATA7	MMC/SD/SDIO data bus	I/O	3.3V	
68	DISP0_VSYNC	LCD vertical sync	O	3.3V	
69	SD2_WP	MMC/SD/SDIO data write protect	O	3.3V	
70	DISP0_DRDY	LCD enable	O	3.3V	
71	SD2_CMD	MMC/SD/SDIO command	I/O	3.3V	
72	DISP0_CLK	LCD pixel clock	O	3.3V	
73	SD2_CD	SD card detect	I	3.3V	
74	UART3_CTS	UART clear to send	O	3.3V	
75	GND	Digital ground		GND	
76	UART3_RTS	UART request to send	I	3.3V	
77	SD1_CLK	MMC/SD/SDIO clock	I/O	3.3V	
78	UART3_TXD	UART transmit data	O	3.3V	
79	SD1_WP	MMC/SD/SDIO data write protect	O	3.3V	
80	UART2_RXD	UART receive data	I	3.3V	
81	SD1_CMD	MMC/SD/SDIO command	I/O	3.3V	

Pin	Signal name	Description	I/O	Power rail	Note
82	GND	Digital ground		GND	
83	SD1_CD	SD card detect	I	3.3V	
84	SATA_RXP	Positive differential SATA receive signal	I		
85	SD1_DATA0	MMC/SD/SDIO data bus	I/O	3.3V	
86	SATA_RXN	Negative differential SATA receive signal	I		
87	SD1_DATA1	MMC/SD/SDIO data bus	I/O	3.3V	
88	SATA_TXN	Negative differential SATA transmit signal	O		
89	SD1_DATA2	MMC/SD/SDIO data bus	I/O	3.3V	
90	SATA_TXP	Positive differential SATA transmit signal	O		
91	SD1_DATA3	MMC/SD/SDIO data bus	I/O	3.3V	
92	GND	Digital ground		GND	
93	SD1_DATA4	MMC/SD/SDIO data bus	I/O	3.3V	
94	PCIE_RXM	Negative differential PCIE receive signal	I		
95	SD1_DATA5	MMC/SD/SDIO data bus	I/O	3.3V	
96	PCIE_RXP	Positive differential PCIE receive signal	I		
97	SD1_DATA6	MMC/SD/SDIO data bus	I/O	3.3V	
98	PCIE_TXM	Negative differential PCIE transmit signal	O		
99	SD1_DATA7	MMC/SD/SDIO data bus	I/O	3.3V	
100	PCIE_TXP	Positive differential PCIE transmit signal	O		
101	GPIO7_6	GPIO	I/O	3.3V	
102	PCIE_WAKEn	Wake-up by PCIE	I	3.3V	
103	UART1_RXD	UART receive data	I	3.3V	
104	PRSENT2_N_X1	PCIE reset	O	3.3V	
105	UART1_TXD	UART transmit data	O	3.3V	
106	PCIE_REFCLK_DN	Negative differential PCIE reference clock signal	O		
107	uP_NMin	Touch panel interrupt	O	3.3V	
108	PCIE_REFCLK_DP	Positive differential PCIE reference clock signal	O		
109	GPIO6_9	GPIO	I/O	3.3V	
110	GND	Digital ground		GND	
111	GPIO6_16	GPIO	I/O	3.3V	
112	HDMI_D2P	Positive differential HDMI transmit signal of channel 2	O		
113	GPIO6_7	GPIO	I/O	3.3V	
114	HDMI_D2M	Negative differential HDMI transmit signal of channel 2	O		
115	GPIO6_10	GPIO	I/O	3.3V	
116	HDMI_D1P	Positive differential HDMI transmit signal of channel 1	O		
117	GPIO6_15	GPIO	I/O	3.3V	
118	HDMI_D1M	Negative differential HDMI transmit signal of channel 1	O		
119	GND	Digital ground		GND	

Pin	Signal name	Description	I/O	Power rail	Note
120	HDMI_D0P	Positive differential HDMI transmit signal of channel 0	O		
121	USB_HOST_DN	Negative differential USB signal	I/O	5V	
122	HDMI_D0M	Negative differential HDMI transmit signal of channel 0	O		
123	USB_HOST_DP	Positive differential USB signal	I/O	5V	
124	HDMI_CLKP	Positive differential HDMI clock signal	O		
125	USB_RSTn	USB reset	O		
126	HDMI_CLKM	Negative differential HDMI clock signal	O		
127	GND	Digital ground		GND	
128	HDMI_HPD	HDMI hot plug detection	I		
129	USB_OTG_DN	Negative differential USB OTG signal	I/O	5V	
130	GND	Digital ground		GND	
131	USB_OTG_DP	Positive differential USB signal	I/O	5V	
132	I2C1_SDA	I2C data	I/O	3.3V	
133	USB_OTG_ID	Use this pin to detect the ID pin if you use USB OTG.	I	5V	
134	I2C1_SCL	I2C clock	I/O	3.3V	
135	USB_H1_OC	USB host over current signal	I	3.3V	
136	CAN1_TXD	DCAN transmit data	O	3.3V	
137	USB_OTG_PWR_EN	USB OTG power enable	O	3.3V	
138	CAN1_RXD	DCAN receive data	I	3.3V	
139	USB_OTG_OC	USB OTG over current signal	I	3.3V	
140	I2C3_SCL	I2C clock	I/O	3.3V	
141	GND	Digital ground		GND	
142	I2C3_SDA	I2C data	I/O	3.3V	
143	CSI_CLK0M	Negative differential CSI clock signal			
144	UART5_TXD	UART transmit data	O	3.3V	
145	CSI_CLK0P	Positive differential CSI clock signal			
146	UART5_RXD	UART receive data	I	3.3V	
147	CSI_D0M	Negative differential CSI signal of channel 0	I		
148	I2C2_SCL	I2C clock	I/O	3.3V	
149	CSI_D0P	Positive differential CSI signal of channel 0			
150	I2C2_SDA	I2C data	I/O	3.3V	
151	CSI_D1M	Negative differential CSI signal of channel 1			
152	GPIO7_1	GPIO	I/O	3.3V	
153	CSI_D1P	Positive differential CSI signal of channel 1			
154	GPIO1_1	GPIO	I/O	3.3V	
155	GND	Digital ground		GND	
156	Touch_Int	Touch panel interrupt	O	3.3V	
157	CSI0_DAT12	CSI data bus	I/O	3.3V	
158	LED_PWR_EN	LED power enable	O	3.3V	
159	CSI0_DAT13	CSI data bus	I/O	3.3V	

Pin	Signal name	Description	I/O	Power rail	Note
160	RESET_N_B	Reset signal	O	3.3V	
161	CSI0_DAT14	CSI data bus	I/O	3.3V	
162	GND	Digital ground		GND	
163	CSI0_DAT15	CSI data bus	I/O	3.3V	
164	LVDS0_TX3_N	Negative differential LVDS transmit signal of channel 3			
165	CSI0_DAT16	CSI data bus	I/O	3.3V	
166	LVDS0_TX3_P	Positive differential LVDS transmit signal of channel 3			
167	CSI0_DAT17	CSI data bus	I/O	3.3V	
168	LVDS0_TX2_N	Negative differential LVDS transmit signal of channel 2			
169	CSI0_DAT18	CSI data bus	I/O	3.3V	
170	LVDS0_TX2_P	Positive differential LVDS transmit signal of channel 2			
171	CSI0_DAT19	CSI data bus	I/O	3.3V	
172	LVDS0_TX1_N	Negative differential LVDS transmit signal of channel 1			
173	CSI0_PIXCLK	CSI pixel clock	O	3.3V	
174	LVDS0_TX1_P	Positive differential LVDS transmit signal of channel 1			
175	CSI0_HSYNC	CSI horizontal sync	O	3.3V	
176	LVDS0_TX0_N	Negative differential LVDS transmit signal of channel 0			
177	CSI0_VSYNC	CSI vertical sync	O	3.3V	
178	LVDS0_TX0_P	Positive differential LVDS transmit signal of channel 0			
179	CAM_RST	CSI reset	O	3.3V	
180	LVDS0_CLK_P	Positive differential LVDS clock signal			
181	CAM_EN	CSI enable	O	3.3V	
182	LVDS0_CLK_N	Negative differential LVDS clock signal			
183	CAM_MCLK	CSI master clock	O	3.3V	
184	GND	Digital ground		GND	
185	GND	Digital ground		GND	
186	TRP0	Positive differential media-dependent interface 0 of Giga LAN			
187	AUD3_TXC	I2S bit clock	O	3.3V	
188	TRN0	Negative differential media-dependent interface 0 of Giga LAN			
189	AUD3_TXD	I2S transmit data	O	3.3V	
190	TRP1	Positive differential media-dependent interface 1 of Giga LAN			
191	AUD3_TXFS	I2S frame clock	O	3.3V	
192	TRN1	Negative differential media-dependent interface 1 of Giga LAN			
193	AUD3_RXD	I2S receive data	I	3.3V	

Pin	Signal name	Description	I/O	Power rail	Note
194	TRP2	Positive differential media-dependent interface 2 of Giga LAN			
195	GND	Digital ground		GND	
196	TRN2	Negative differential media-dependent interface 2 of Giga LAN			
197	GPIO1_9	GPIO	I/O	3.3V	
198	TRP3	Positive differential media-dependent interface 3 of Giga LAN			
199	TP_BUSY	Touch panel busy signal	I	3.3V	
200	TRN3	Negative differential media-dependent interface 3 of Giga LAN			
201	GPIO4_7	GPIO	I/O	3.3V	
202	LED_ACT	LAN led active blinking	I/O	3.3V	
203	GPIO4_6	GPIO	I/O	3.3V	
204	LED_LINK	LAN led linking	I/O	3.3V	

## 2.4.2 DVP CSI Interface (CN2)

Type: FPC 30PIN 1.0 mm Pitch

Pin	Signal name	Description	I/O	Power rail	Note
1	PI_3P3V	CSI 3.3V main power supply	P	3.3V	
2	PI_3P3V	CSI 3.3V main power supply	P	3.3V	
3	GND	Digital ground		GND	
4	I2C2_SDA	I2C data	I/O	3.3V	
5	I2C2_SCL	I2C clock	I/O	3.3V	
6	GND	Digital ground		GND	
7	CSI0_HSYNC	CSI horizontal sync	O	3.3V	
8	CSI0_VSYNC	CSI vertical sync	O	3.3V	
9	CAM_EN	CSI enable	O	3.3V	
10	CAM_RST	CSI reset	O	3.3V	
11	GND	Digital ground		GND	
12	CSI0_PIXCLK	CSI pixel clock	O	3.3V	
13	CAM_MCLK	CSI master clock	O	3.3V	
14	GND	Digital ground		GND	
15	GND	Digital ground		GND	
16	NC	Not connected			
17	NC	Not connected			
18	GND	Digital ground		GND	
19	CSI0_DAT12	CSI data bus	I/O	3.3V	



20	CSI0_DAT13	CSI data bus	I/O	3.3V	
21	GND	Digital ground		GND	
22	CSI0_DAT18	CSI data bus	I/O	3.3V	
23	CSI0_DAT19	CSI data bus	I/O	3.3V	
24	GND	Digital ground		GND	
25	CSI0_DAT14	CSI data bus	I/O	3.3V	
26	CSI0_DAT15	CSI data bus	I/O	3.3V	
27	GND	Digital ground		GND	
28	CSI0_DAT16	CSI data bus	I/O	3.3V	
29	CSI0_DAT17	CSI data bus	I/O	3.3V	
30	GND	Digital ground		GND	

### 2.4.3 Expansion Interface (CN3)

Type: Pin Header 2X20 2.54 mm Pitch

Pin	Signal name	Description	I/O	Power rail	Note
1	3P3V	3.3V main power supply	P	3.3V	
2	5V	5V main power supply	P	5V	
3	I2C2_SDA	I2C data	I/O	3.3V	
4	5V	5V main power supply	P	5V	
5	I2C2_SCL	I2C clock	I/O	3.3V	
6	GND	Digital ground		GND	
7	GPIO7_2	GPIO	I/O	3.3V	
8	UART2_TXD	UART transmit data	O	3.3V	
9	GND	Digital ground		GND	
10	UART2_RXD	UART receive data	I	3.3V	
11	GPIO1_16	GPIO	I/O	3.3V	
12	GPIO7_3	GPIO	I/O	3.3V	
13	GPIO1_19	GPIO	I/O	3.3V	
14	GND	Digital ground		GND	
15	GPIO1_20	GPIO	I/O	3.3V	
16	GPIO1_21	GPIO	I/O	3.3V	
17	3P3V	3.3V main power supply	P	3.3V	
18	GPIO1_26	GPIO	I/O	3.3V	
19	CSPI4_MOSI	SPI master output, slave input	O	3.3V	
20	GND	Digital ground		GND	
21	CSPI4_MISO	SPI master input, slave output	I	3.3V	
22	GPIO6_7	GPIO	I/O	3.3V	
23	CSPI4_CLK	SPI clock	I/O	3.3V	
24	CSPI4_CS0	SPI chip select	I/O	3.3V	
25	GND	Digital ground		GND	

26	CSPI4_CS1	SPI chip select	I/O	3.3V	
27	GPIO7_6	GPIO	I/O	3.3V	
28	GPIO7_7	GPIO	I/O	3.3V	
29	GPIO6_11	GPIO	I/O	3.3V	
30	GND	Digital ground		GND	
31	GPIO4_8	GPIO	I/O	3.3V	
32	GPIO3_23	GPIO	I/O	3.3V	
33	GPIO4_9	GPIO	I/O	3.3V	
34	GND	Digital ground		GND	
35	GPIO1_7	GPIO	I/O	3.3V	
36	GPIO7_8	GPIO	I/O	3.3V	
37	GPIO1_8	GPIO	I/O	3.3V	
38	GPIO3_24	GPIO	I/O	3.3V	
39	GND	Digital ground		GND	
40	GPIO3_25	GPIO	I/O	3.3V	

### 2.4.1 LCD Interface (CN4)

Type: FPC 50 Pin

Pin	Signal name	Description	I/O	Power rail	Note
1	B0	LCD Pixel data bit 0	O	3.3V	
2	B3	LCD Pixel data bit 1	O	3.3V	
3	B2	LCD Pixel data bit 2	O	3.3V	
4	B3	LCD Pixel data bit 3	O	3.3V	
5	B4	LCD Pixel data bit 4	O	3.3V	
6	B5	LCD Pixel data bit 5	O	3.3V	
7	B6	LCD Pixel data bit 6	O	3.3V	
8	B7	LCD Pixel data bit 7	O	3.3V	
9	GND	Digital ground		GND	
10	G0	LCD Pixel data bit 8	O	3.3V	
11	G1	LCD Pixel data bit 9	O	3.3V	
12	G2	LCD Pixel data bit 10	O	3.3V	
13	G3	LCD Pixel data bit 11	O	3.3V	
14	G4	LCD Pixel data bit 12	O	3.3V	
15	G5	LCD Pixel data bit 13	O	3.3V	
16	G6	LCD Pixel data bit 14	O	3.3V	
17	G7	LCD Pixel data bit 15	O	3.3V	
18	GND	Digital ground		GND	
19	R0	LCD Pixel data bit 16	O	3.3V	
20	R1	LCD Pixel data bit 17	O	3.3V	
21	R2	LCD Pixel data bit 18	O	3.3V	

22	R3	LCD Pixel data bit 19	O	3.3V	
23	R4	LCD Pixel data bit 20	O	3.3V	
24	R5	LCD Pixel data bit 21	O	3.3V	
25	R6	LCD Pixel data bit 22	O	3.3V	
26	R7	LCD Pixel data bit 23	O	3.3V	
27	GND	Digital ground		GND	
28	DEN	AC bias control (STN) or pixel data enable (TFT)	O	3.3V	
29	HSYNC	LCD Horizontal Sync	O	3.3V	
30	VSYNC	LCD Vertical Sync	O	3.3V	
31	GND	Digital ground		GND	
32	CLK	LCD Pixel Clock		3.3V	
33	GND	Digital ground		GND	
34	X+	X+ Position Input		3.3V	
35	X-	X- Position Input		3.3V	
36	Y+	Y+ Position Input		3.3V	
37	Y-	Y- Position Input		3.3V	
38	SPI_CLK/GPIO	SPI Clock/GPIO	I/O	3.3V	
39	SPI_MOSI/GPIO	SPI data 0/GPIO	I/O	3.3V	
40	SPI_MISO/GPIO	SPI data1/GPIO	I/O	3.3V	
41	SPI_CS/GPIO	SPI chip select/GPIO	I/O	3.3V	
42	GND	Digital ground		GND	
43	I2C_CLK	I2C master serial clock	O	3.3V	
44	I2C_DAT	I2C serial bidirectional data	I/O	3.3V	
45	VDD1	3.3V power supply	P	3.3V	
46	VDD2	3.3V power supply	P	3.3V	
47	RESET	Reset	O	3.3V	
48	PWREN	Backlight enable	O	3.3V	
49	VDD3	5V power supply	P	5V	
50	VDD4	5V power supply	P	5V	

## 2.4.2 HDMI Interface (CN5)

Pin	Signal name	Description	I/O	Power rail	Note
1	HDMI_D2P	Positive differential HDMI transmit signal of channel 2	O		
2	GND	Analog ground		GND	
3	HDMI_D2M	Negative differential HDMI transmit signal of channel 2	O		
4	HDMI_D1P	Positive differential HDMI transmit signal of channel 1	O		
5	GND	Analog ground		GND	
6	HDMI_D1M	Negative differential HDMI transmit signal of	O		

		channel 1			
7	HDMI_D0P	Positive differential HDMI transmit signal of channel 0	O		
8	GND	Analog ground		GND	
9	HDMI_D0M	Negative differential HDMI transmit signal of channel 0	O		
10	HDMI_CLKP	Positive differential HDMI clock signal	O		
11	GND	Analog ground		GND	
12	HDMI_CLKM	Negative differential HDMI clock signal	O		
13	NC	Not connected			
14	NC	Not connected			
15	SCL	HDMI I2C clock	I/O	5V	
16	SDA	HDMI I2C data	I/O	5V	
17	GND	Analog ground		GND	
18	5VIN	5V power supply	P	5V	
19	HDMI_HPD	HDMI hot plug detection	I	3.3V	

### 2.4.3 Ethernet Interface (CN6)

Type: RJ45

Pin	Signal name	Description	I/O	Power rail	Note
1	TD1+	Transmit Data1+	I/O		
2	TD1-	Transmit Data1-	I/O		
3	TD2+	Transmit Data2+	I/O		
4	TXD2-	Transmit Data2-	I/O		
5	TCT	Transmit common terminal			
6	RCT	Receive common terminal			
7	RD1+	Receive Data1+	I/O		
8	RD1-	Receive Data1-	I/O		
9	RD2+	Receive Data2+	I/O		
10	RD2-	Receive Data2-	I/O		
11	GRLA	2.5V Power Supply	P	2.5V	
12	GRLC	Link active LED			
13	YELC	100M linked LED			
14	YELA	2.5V Power Supply	P	2.5V	
15	GND	Digital ground		GND	
16	GND	Digital ground		GND	

### 2.4.4 Debug Interface (CN7)

Type: Header Male 1x4 2.54mm pitch

Pin	Signal name	Description	I/O	Power rail	Note
1	VIO_3V3	3.3V main power supply	P	3.3V	
2	UART0_TX	UART transmit data	O	3.3V	
3	UART0_RX	UART receive data	I	3.3V	
4	GND	Digital ground		GND	

### 2.4.5 Expansion Interface (CN8)

Type: Pin Header 2X20 2.0 mm Pitch

Pin	Signal name	Description	I/O	Power rail	Note
1	3P3V	3.3V main power supply	P	3.3V	
2	3P3V	3.3V main power supply	P	3.3V	
3	3P3V	3.3V main power supply	P	3.3V	
4	NC	Not connected			
5	GND	Digital ground		GND	
6	GND	Digital ground		GND	
7	LVDS0_TX0_N	Negative differential LVDS transmit signal of channel 0			
8	LVDS0_TX0_P	Positive differential LVDS transmit signal of channel 0			
9	LVDS0_TX1_N	Negative differential LVDS transmit signal of channel 0			
10	LVDS0_TX1_P	Positive differential LVDS transmit signal of channel 0			
11	LVDS0_TX2_N	Negative differential LVDS transmit signal of channel 0			
12	LVDS0_TX2_P	Positive differential LVDS transmit signal of channel 0			
13	GND	Digital ground		GND	
14	GND	Digital ground		GND	
15	LVDS0_CLK_N	Negative differential LVDS clock signal			
16	LVDS0_CLK_P	Positive differential LVDS clock signal			
17	LVDS0_TX3_N	Negative differential LVDS transmit signal of channel 0			
18	LVDS0_TX3_P	Positive differential LVDS transmit signal of channel 0	LVDS0_TX2_P		
19	I2C3_SDA	I2C data	I/O	3.3V	
20	I2C3_SCL	I2C clock	I/O	3.3V	
21	POR_B	System reset	I	3.3V	

22	Touch_Int	Touch panel interrupt	O	3.3V	
23	ADJ	LVDS adjust	I/O	3.3V	
24	ENA	LED power enable	O	3.3V	
25	AGND	Analog ground		AGND	
26	12V	12V main power supply	P	12V	
27	AUD3_TXD	I2S transmit data	O	3.3V	
28	SD1_DATA4	MMC/SD/SDIO data bus	I/O	3.3V	
29	AUD3_RXD	I2S receive data	I	3.3V	
30	SD1_DATA5	MMC/SD/SDIO data bus	I/O	3.3V	
31	AUD3_TXC	I2S bit clock	O	3.3V	
32	SD1_DATA6	MMC/SD/SDIO data bus	I/O	3.3V	
33	AUD3_TXFS	I2S frame clock	O	3.3V	
34	SD1_DATA7	MMC/SD/SDIO data bus	I/O	3.3V	
35	GPIO1_29	GPIO	I/O	3.3V	
36	SD2_WP	MMC/SD/SDIO data write protect	O	3.3V	
37	SD2_DATA4	MMC/SD/SDIO data bus	I/O	3.3V	
38	SD2_DATA6	MMC/SD/SDIO data bus	I/O	3.3V	
39	SD2_DATA5	MMC/SD/SDIO data bus	I/O	3.3V	
40	SD2_DATA7	MMC/SD/SDIO data bus	I/O	3.3V	

## 2.4.6 TF Interface (CN9)

Type: TF Card Connector

Pin	Signal name	Description	I/O	Power rail	Note
1	DAT2	MMC/SD/SDIO data bus	I/O	3.3V	
2	CD/DAT3	MMC/SD/SDIO data bus	I/O	3.3V	
3	CMD	MMC/SD/SDIO command	I/O	3.3V	
4	VDD	3.3V power supply	P	3.3V	
5	CLOCK	MMC/SD/SDIO clock	I/O	3.3V	
6	VSS	Digital ground		GND	
7	DAT0	MMC/SD/SDIO data bus	I/O	3.3V	
8	DAT1	MMC/SD/SDIO data bus	I/O	3.3V	
9	CD	SD card detect	I	3.3V	

## 2.4.7 MIPI CSI Interface (CN20)

Type: FPC 30 PIN, 1.0mm Pitch

Pin	Signal name	Description	I/O	Power rail	Note
1	PI_3V3	CSI 3.3V main power supply	P	3.3V	
2	PI_3V3	CSI 3.3V main power supply	P	3.3V	
3	GND	Digital ground		GND	
4	I2C2_SDA	I2C serial bidirectional data	I/O	3.3V	
5	I2C2_SCL	I2C master serial clock	O	3.3V	
6	GND	Digital ground		GND	
7	CSPI1_MOSI	SPI master output, slave input	O	3.3V	
8	CSPI1_MISO	SPI master input, slave output	I	3.3V	
9	CSPI1_CS1	SPI chip select	I/O	3.3V	
10	CSPI1_CLK	SPI clock	I/O	3.3V	
11	GND	Digital ground		GND	
12	CAM_GPIO	Camera gpio	I/O	3.3V	
13	CAM_CLK	Camera clock	O	3.3V	
14	GND	Digital ground		GND	
15	GND	Digital ground		GND	
16	NC	Not connect			
17	NC	Not connect			
18	GND	Digital ground		GND	
19	NC	Not connect			
20	NC	Not connect			
21	GND	Digital ground		GND	
22	CSI_D1M	Negative differential CSI signal of channel 1			
23	CSI_D1P	Positive differential CSI signal of channel 1			
24	GND	Digital ground		GND	
25	CSI_D0M	Negative differential CSI signal of channel 0			
26	CSI_D0P	Positive differential CSI signal of channel 0			
27	GND	Digital ground		GND	
28	CSI_CLK0M	Negative differential CSI clock signal			
29	CSI_CLK0P	Positive differential CSI clock signal			
30	GND	Digital ground		GND	

## 2.4.8 PCIe+USB Interface (CN11)

Pin	Signal name	Description	I/O	Power rail	Note
1	WAKE#	Wake up	O	3.3V	
2	3.3V_1	3.3V power supply	P	3.3V	
3	COEX1	GPIO	I/O	3.3V	
4	GND	Digital ground		GND	
5	COEX2	GPIO	I/O	3.3V	
6	1.5V	1.5V power supply	P	1.5V	
7	CLKREQ#	Clock request	I	3.3V	
8	UIM_PWR	SIM card power supply	P	3.3V	
9	GND	Digital ground		GND	
10	UIM_DATA	SIM card data	I/O	3.3V	
11	REFCLK-	Negative differential reference clock	I/O		
12	UIM_CLK	SIM card clock	O	3.3V	
13	REFCLK+	Positive differential reference clock	I/O		
14	UIM_RESET	SIM card reset	O	3.3V	
15	GND	Digital ground		GND	
16	UIM_VPP	SIM card power supply	P	3.3V	
17	RESERVED	Reserved			
18	GND	Digital ground		GND	
19	RESERVED	Reserved			
20	W_DISABLE	WLAN disable	O	3.3V	
21	GND	Digital ground		GND	
22	PERST#	Functional reset to the card	I	3.3V	
23	PERN0	Negative differential receive signal	I		
24	3.3VAUX	3.3V power supply	P	3.3V	
25	PERP0	Positive differential receive signal	I		
26	GND	Digital ground		GND	
27	GND	Digital ground		GND	
28	1.5V	1.5V power supply	P	1.5V	
29	GND	Digital ground		GND	
30	SMB_CLK	SMBus clock signal	I	3.3V	
31	PETN0	Negative differential transmit signal	O		
32	SMB_DATA	SMBus data signal	I/O	3.3V	
33	PETP0	Positive differential transmit signal	O		
34	GND	Digital ground		GND	
35	GND	Digital ground		GND	
36	USB_D-	Negative differential USB signal	I/O		
37	GND	Digital ground		GND	



38	USB_D+	Positive differential USB signal	I/O		
39	3.3VAUX	3.3V power supply	P	3.3V	
40	GND	Digital ground		GND	
41	3.3VAUX	3.3V power supply	P	3.3V	
42	LED_WWAN#	WWAN LED status signal	O	3.3V	
43	GND	Digital ground		GND	
44	LED_WLAN#	WLAN LED status signal	O	3.3V	
45	RESERVED	Reserved			
46	LED_WPAN#	WPAN LED status signal	O	3.3V	
47	RESERVED	Reserved			
48	1.5V	1.5V power supply	P	1.5V	
49	RESERVED	Reserved			
50	GND	Digital ground		GND	
51	RESERVED	Reserved			
52	3.3V	3.3V power supply	P	3.3V	

### 2.4.9 USB HOST Interface (CN12)

Type: Double USB Host Connector

Pin	Signal name	Description	I/O	Power rail	Note
1	APV	5V power supply	P	5V	
2	AD-	Negative differential USB signal	I/O	5V	
3	AD+	Positive differential USB signal	I/O	5V	
4	GND	Digital ground		GND	
5	BPV	5V power supply	P	5V	
6	BD-	Negative differential USB signal	I/O	5V	
7	BD+	Positive differential USB signal	I/O	5V	
8	GND	Digital ground		GND	

### 2.4.10 USB OTG Interface (CN13)

Type: Micro USB AB Connector

Pin	Signal name	Description	I/O	Power rail	Note
1	VB	5V power supply	P	5V	
2	D-	Negative differential USB signal	I/O	5V	
3	D+	Positive differential USB signal	I/O	5V	
4	ID	Use this pin to detect the ID pin if you use USB OTG.	I	5V	
5	GND	Digital ground		GND	

## 2.4.11 3G/4G Interface (CN15)

Type: Mini PCIe Connector

Pin	Signal name	Description	I/O	Power rail	Note
1	WAKE#	Wake up	O	3.3V	
2	3.3V_1	3.3V power supply	P	3.3V	
3	NC	Not connected			
4	GND	Digital ground		GND	
5	NC	Not connected			
6	NC	Not connected			
7	NC	Not connected			
8	UIM_PWR	SIM card power supply	P	3.3V	
9	GND	Digital ground		GND	
10	UIM_DATA	SIM card data	I/O	3.3V	
11	NC	Not connected			
12	UIM_CLK	SIM card clock	O	3.3V	
13	NC	Not connected			
14	UIM_RESET	SIM card reset	O	3.3V	
15	GND	Digital ground		GND	
16	UIM_VPP	SIM card power supply	P	3.3V	
17	NC	Not connected			
18	GND	Digital ground		GND	
19	NC	Not connected			
20	W_DISABLE	WLAN disable	O	3.3V	
21	GND	Digital ground		GND	
22	PERST#	Functional reset to the card	I	3.3V	
23	NC	Not connected			
24	3.3VAUX	3.3V power supply	P	3.3V	
25	NC	Not connected			
26	GND	Digital ground		GND	
27	GND	Digital ground		GND	
28	NC	Not connected			
29	GND	Digital ground		GND	
30	NC	Not connected			
31	NC	Not connected			
32	NC	Not connected			
33	NC	Not connected			
34	GND	Digital ground		GND	
35	GND	Digital ground		GND	
36	USB_D-	Negative differential USB signal	I/O		
37	GND	Digital ground		GND	
38	USB_D+	Positive differential USB signal	I/O		

39	3.3VAUX	3.3V power supply	P	3.3V	
40	GND	Digital ground		GND	
41	3.3VAUX	3.3V power supply	P	3.3V	
42	LED_WWAN#	WWAN LED status signal	O	3.3V	
43	GND	Digital ground		GND	
44	NC	Not connected			
45	NC	Not connected			
46	NC	Not connected			
47	NC	Not connected			
48	NC	Not connected			
49	NC	Not connected			
50	GND	Digital ground		GND	
51	NC	Not connected			
52	3.3V	3.3V power supply	P	3.3V	

## 2.4.12 SATA Interface (CN21)

Type: Mini PCIe Connector

Pin	Signal name	Description	I/O	Power rail	Note
1	NC	Not connected			
2	3.3V_1	3.3V power supply	P	3.3V	
3	NC	Not connected			
4	GND	Digital ground		GND	
5	NC	Not connected			
6	NC	Not connected			
7	NC	Not connected			
8	NC	Not connected			
9	GND	Digital ground		GND	
10	NC	Not connected			
11	NC	Not connected			
12	NC	Not connected			
13	NC	Not connected			
14	NC	Not connected			
15	GND	Digital ground		GND	
16	NC	Not connected			
17	NC	Not connected			
18	GND	Digital ground		GND	
19	NC	Not connected			
20	NC	Not connected			
21	GND	Digital ground		GND	
22	NC	Not connected			

23	SATA_RXP	Positive differential SATA receive signal	I		
24	3.3VAUX	3.3V power supply	P	3.3V	
25	SATA_RXN	Negative differential SATA receive signal	I		
26	GND	Digital ground		GND	
27	GND	Digital ground		GND	
28	NC	Not connected			
29	GND	Digital ground		GND	
30	NC	Not connected			
31	SATA_TXN	Negative differential SATA transmit signal	O		
32	NC	Not connected			
33	SATA_TXP	Positive differential SATA transmit signal	O		
34	GND	Digital ground		GND	
35	GND	Digital ground		GND	
36	NC	Not connected			
37	GND	Digital ground		GND	
38	NC	Not connected			
39	3.3VAUX	3.3V power supply	P	3.3V	
40	GND	Digital ground		GND	
41	3.3VAUX	3.3V power supply	P	3.3V	
42	NC	Not connected			
43	GND	Digital ground		GND	
44	NC	Not connected			
45	NC	Not connected			
46	NC	Not connected			
47	NC	Not connected			
48	NC	Not connected			
49	NC	Not connected			
50	GND	Digital ground		GND	
51	NC	Not connected			
52	3.3V	3.3V power supply	P	3.3V	

### 2.4.13 SIM Card Interface (CN16)

Type: SIM Card Connector

Pin	Signal name	Description	I/O	Power rail	Note
1	UIM_PWR	SIM card power supply	P	3.3V	
2	UIM_RESET	SIM card reset	O	3.3V	
3	UIM_CLK	SIM card clock	O	3.3V	
4	GND	Digital ground		GND	
5	UIM_VPP	SIM card power supply	P	3.3V	
6	UIM_DATA	SIM card data	I/O	3.3V	

### 2.4.14 LED Interface (CN17)

Type: LED 1x3 Connector

Pin	Signal name	Description	I/O	Power rail	Note
1	PCIE_LED/USB_LED	PCIE active led	I	3.3V	
2	SATA_LED	SATA active led	I	3.3V	
3	LED_3G	3G/4G active led	I	3.3V	

### 2.4.15 LED Interface (CN18)

Type: LED 1x3 Connector

Pin	Signal name	Description	I/O	Power rail	Note
1	SYSTEM_LED	System active led	I	3.3V	
2	USER_LED	User define	I	3.3V	
3	POWER_LED	Power led	I	3.3V	

### 2.4.16 Power In Interface (CN1)

Type: Power DC JACK

Pin	Signal name	Description	I/O	Power rail	Note
1	DC IN	Power DC In	I	9~15V	
2	GND	Digital ground		GND	
3	GND	Digital ground		GND	

## 2.5 Technical Specifications

### 2.2.2 Electrical Characteristics

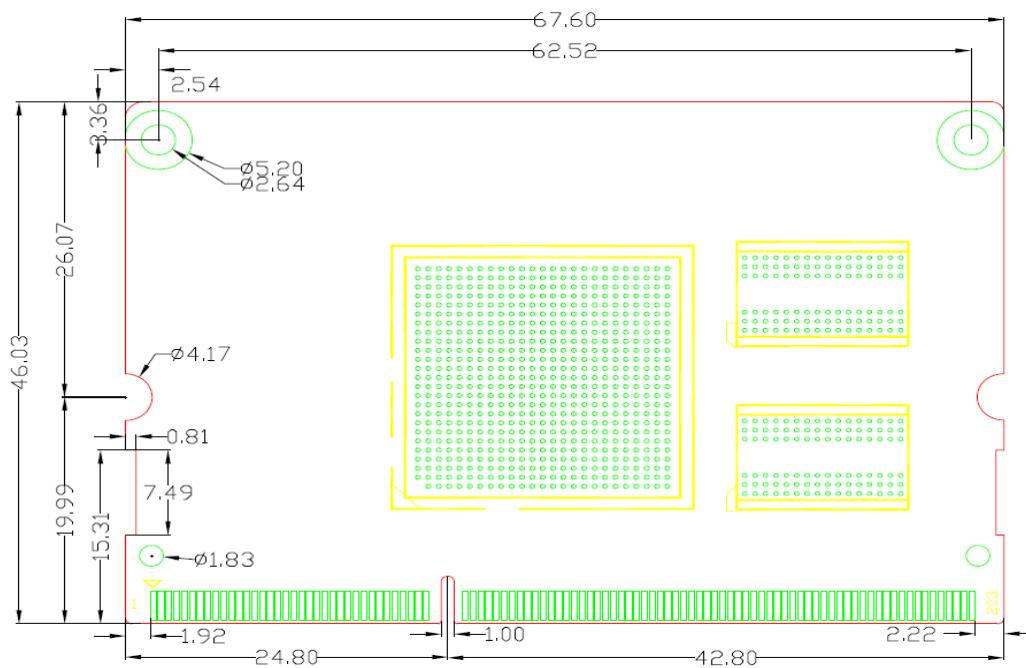
Table 2.5.1-1 Absolute Maximum Ratings

Symbol	Description	Input/Output	Min	Type	Max	Unit
12VIN	Main power supply	Input	-0.3	12	12.6	V
Ivsystem	Main power current	Input	180	400	3000	mA
5VIN	Main power supply	Input	-0.3	5	5.5	V

3P3V	Digital power supply	Input	-0.3	3.3	3.6	V
VDDIO	Camera power supply	Input	-0.3	1.8	1.98	V
CAM_2.8V	Camera power supply	Input	-0.5	2.8	3.1	V
OTG_VBUS	USB OTG power supply	Input	-0.5	5.0	5.25	V
CAM_1.5V	Digital power supply	Output	-0.3	1.5	1.65	V
RGMII_VDD2V5	LAN power supply	Output	-0.3	2.5	2.75	V

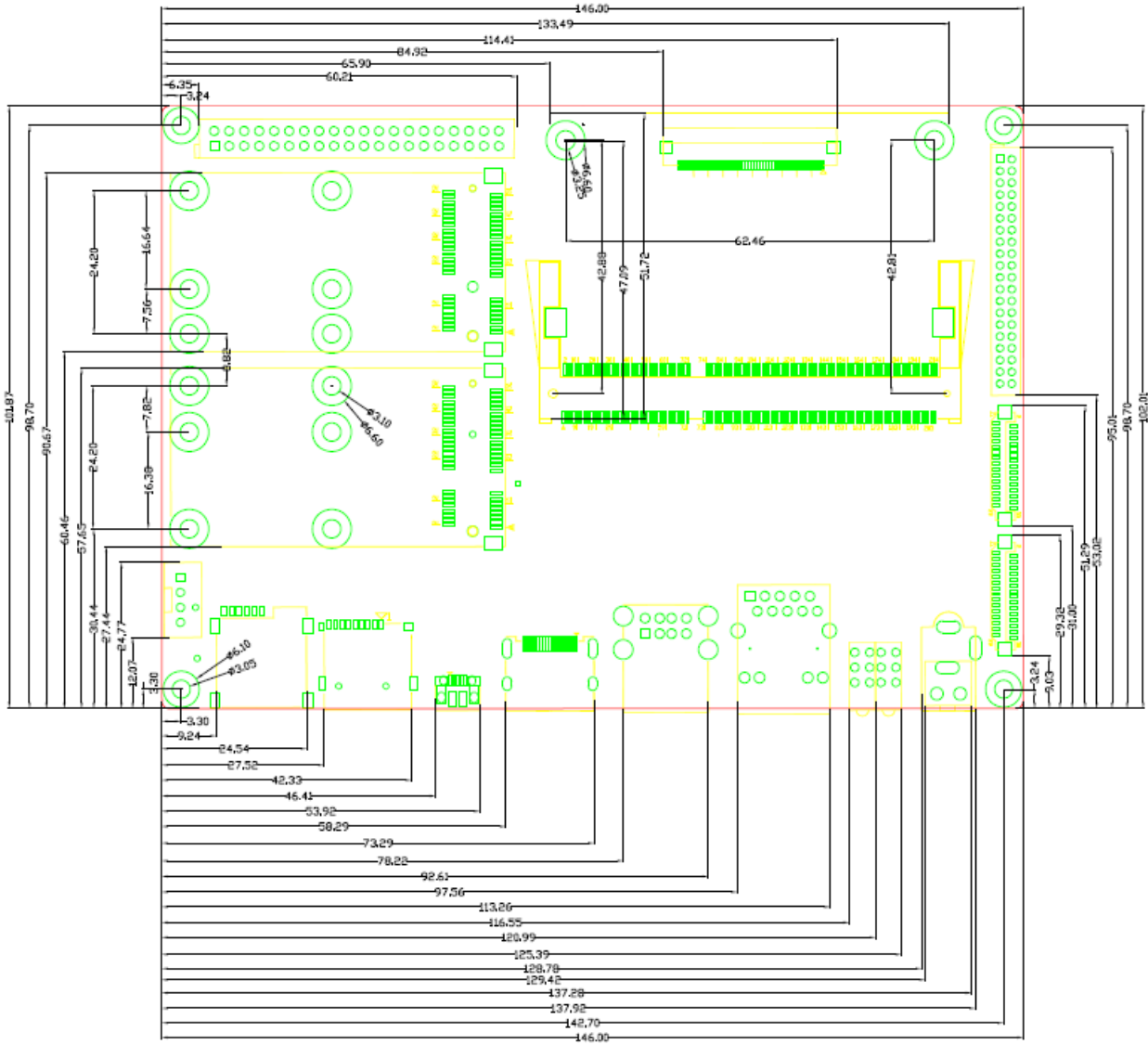
## 2.2.3 Mechanical Characteristics

### 2.2.3.1 Vera IMX6 Module Dimensions:



Unit : mm

### 2.2.3.2 NOVA SBC Dimentions:



## 2.2.4 Thermal Characteristics

Series	Nova Quad	Nova Dual	Nova Quad	Nova Dual
Part Code	NVAS0010	NVAS0020	NVAS0030	NVAS0040
Operating temperature	0° to 70° C	0° to 70° C	-40° to 85° C	-40° to 85° C



# Technical Support and Warranty

## Technical Support

MAS Elettronica provides its product with one-year free technical support including:

- Providing software and hardware resources related to the embedded products of MAS Elettronica;
- Helping customers properly compile and run the source code provided by MAS Elettronica;
- Providing technical support service if the embedded hardware products do not function properly under the circumstance that customers operate according to the instructions in the documents provided by MAS Elettronica;
- Helping customers troubleshoot the products.

⊘ The following conditions will not be covered by our technical support service. We will take appropriate measures accordingly:


- Customers encounter issues related to software or hardware during their development process;
- Customers encounter issues caused by any unauthorized alter to the embedded operating system;
- Customers encounter issues related to their own applications;
- Customers encounter issues caused by any unauthorized alter to the source code provided by MAS Elettronica;

## Warranty Conditions

- 1) 12-month free warranty on the PCB under normal conditions of use since the sales of the product;
- 2) The following conditions are not covered by free services; MAS Elettronica will charge accordingly:
  - A. Customers fail to provide valid purchase vouchers or the product identification tag is damaged, unreadable, altered or inconsistent with the products.
  - B. Products are damaged caused by operations inconsistent with the user manual;
  - C. Products are damaged in appearance or function caused by natural disasters (flood, fire, earthquake, lightning strike or typhoon) or natural aging of components or other force majeure;
  - D. Products are damaged in appearance or function caused by power failure, external forces, water, animals or foreign materials;
  - E. Products malfunction caused by disassembly or alter of components by customers or, products disassembled or repaired by persons or organizations unauthorized by MAS Elettronica, or altered in factory specifications, or configured or expanded with the components that are not provided or recognized by MAS Elettronica and the resulted damage in appearance or function;
  - F. Product failures caused by the software or system installed by customers or inappropriate settings of software or computer viruses;
  - G. Products purchased from unauthorized sales;

- H. Warranty (including verbal and written) that is not made by MAS Elettronica and not included in the scope of our warranty should be fulfilled by the party who committed. MAS Elettronica has no any responsibility;
- 3) Within the period of warranty, the freight for sending products from customers to MAS Elettronica should be paid by customers; the freight from MAS Elettronica to customers should be paid by us. The freight in any direction occurs after warranty period should be paid by customers.
- 4) Please contact technical support if there is any repair request.

**Note:**

 MAS Elettronica will not take any responsibility on the products sent back without the permission of the company.

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