Industrial Core Boards Specification

Model:SOM-iMX93-OSM

REVISION HISTORY					
Version	**Date**	**Board ID**	**Page**	**Descriptive**	
V1.0	2024/7/2	RND240606_V1.0	18	Initial version	

CONTENTS

1. Product Introduction

The SOM-iMX93-OSM is based on NXP' low-power, powerful and efficient i.MX93 SoC. Equipped with a 64-bit dual-core ARM Cortex-A55 processor, as well as an ARM Cortex-M33 real-time kernel, and Neural Network performance (256 MACs operating up to 1.0 GHz and 2 OPS/MAC), the SOM- iMX93-OSM is ideal for applications such as industrial control, data gateway and edge computing. industrial control, Industrial human machine interface (HMI), data gateway, edge computing and other application scenarios.

- 64-bit dual-core ARM Cortex-A55 processor with ARM Cortex-M33 real-time core
- Neural Network performance (256 MACs operating up to 1.0 GHz and 2 OPS/MAC)
- References OSM-S standard pinout IO, LGA package, 30 x 30 mm size saves more valuable space
- 2GB RAM, 16GB eMMC flash memory
- Support MIPI-DSI output interface, dual Gigabit network interface
- Provides other interfaces such as I2C UART SPI SDIO3.0 USB2.0 PWM I2S, etc.
- Support Linux Yocto system, stable and reliable performance.
- Industrial standard design, 7X24 hours long time stable operation.

2. Product Pictures

The following images are for reference only：

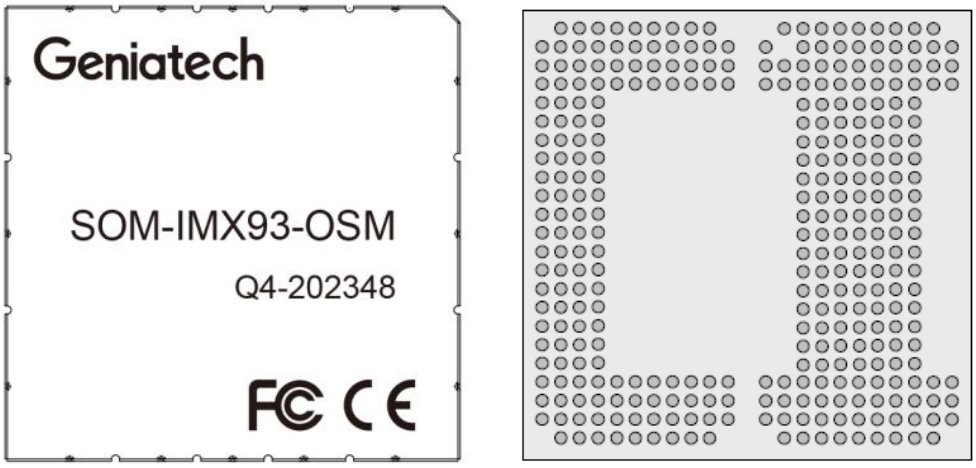

Figure 1 Core board front and back view

3. Hardware Block Diagram

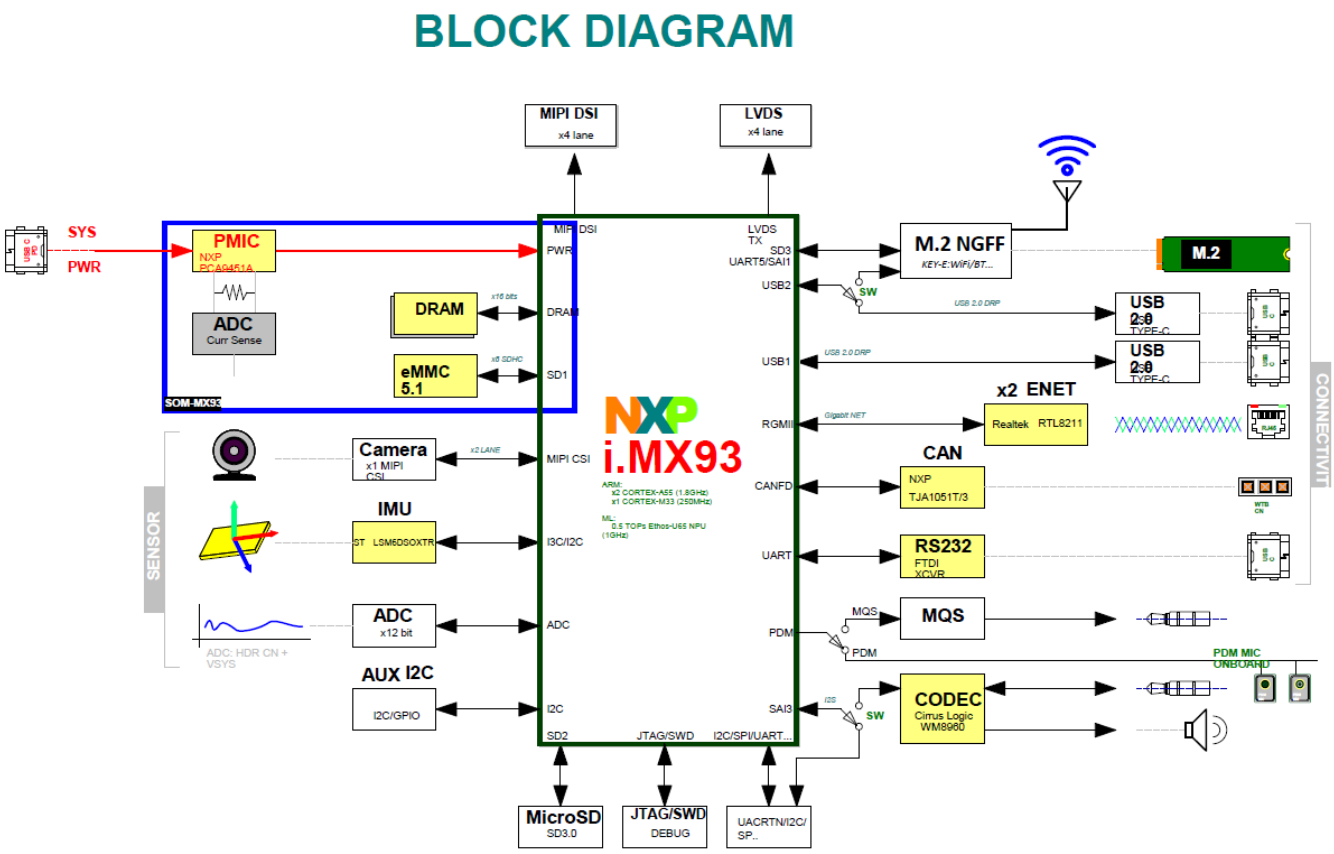

Figure 2 Core board hardware block diagram

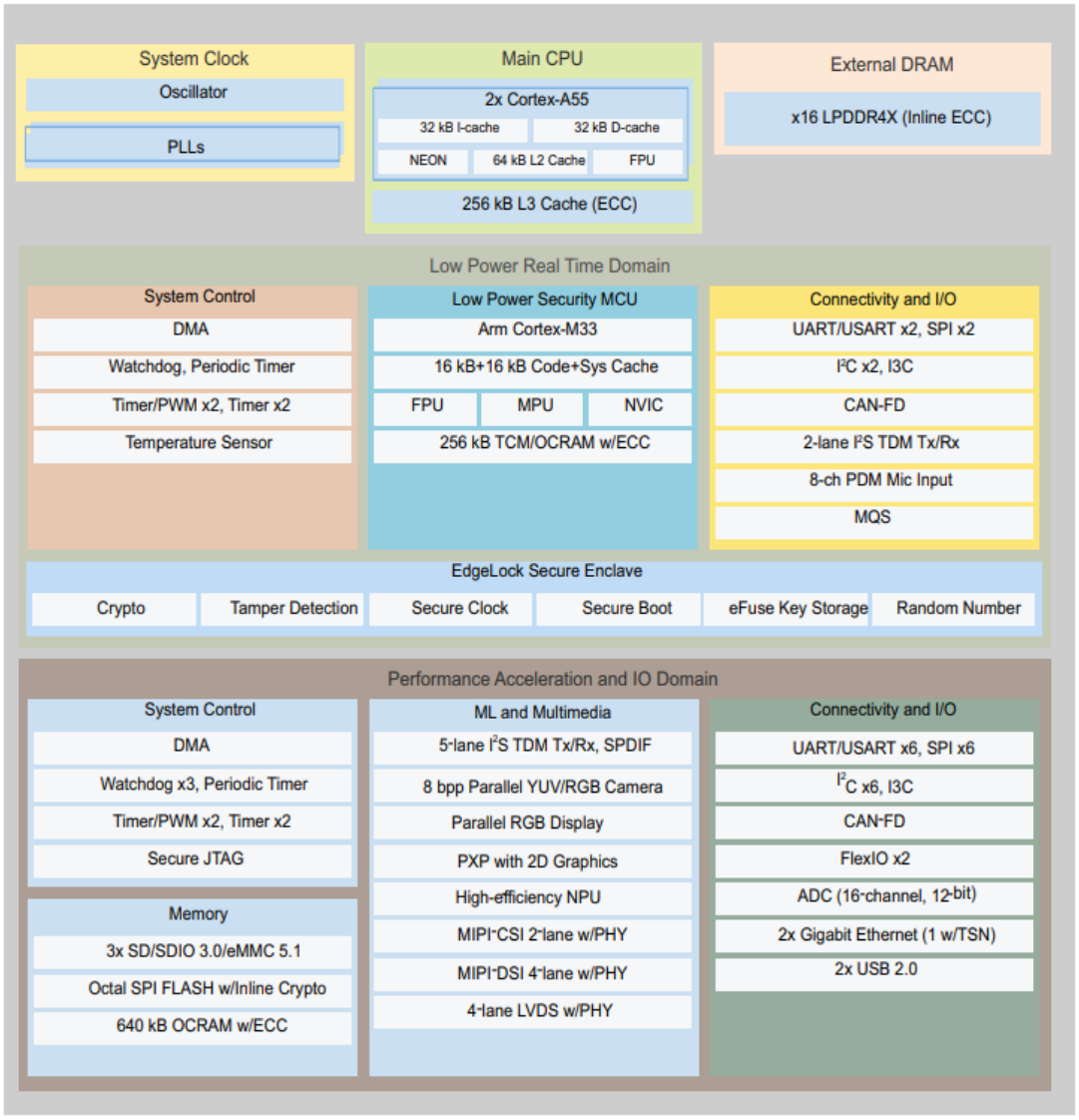

Figure 3 i.MX93 processor architecture diagram

4. Hardware Parameters

Processor		Chip model	NXP i.MX93
		CPU	Dual-Core ARM Cortex-A55+ARM Cotex-M33
		NPU	Neural Network performance (256 MACs operating up to 1.0 GHz and 2 OPS/MAC)
Storage		RAM	2GB
		ROM	16GB（optional 8G/32G）eMMC
Hardware Source	MIPI CSI	1	One 2-lane MIPI CSI-2 camera input
	MIPI DSI	1	One 4-lane MIPI DSI display with data supplied by the LCDIF

	USB	2	USB 2.0 controllers and PHYs interfaces
	Ethernet	2	One Gigabit Ethernet controller with support for Energy Efficient Ethernet (EEE), Ethernet AVB, and IEEE 1588 One Gigabit Ethernet controller with support for TSN in addition to EEE, Ethernet AVB, and IEEE 1588
	SD	1	Supports 1-bit / 4-bit SD bus Channel 0 supports SDHI / e-MMC (boot supported) Channel 1 supports SDHI Compliant with SD 3.0 Supports default, high-speed, UHS-I/SDR50, SDR104 transfer modes supported
	CAN	1	One Controller Area Network (FlexCAN) modules, each optionally supporting flexible data-rate (FD)
	SPI	2	Supports master and slave modes
	UART	4	Supports hardware or software flow control;
	I2C	2	
	PWM	2	Has a 16-bit time base counter;
	Watchdog	1	Watchdog Timer;
	Audio	1	Three SAI interfaces
	GPIO	24	
Package		LGA package，OSM 1.1 standard	
Size		30mm × 30mm	
Power supply		5V	

Note: Some of the pin resources have a multiplexing relationship

5. Electrical Characteristics

5.1 Working Environment

Environmental parameters	Minimum	Typical	Maximum
Operating temperature	-40°C	/	85°C
Storage temperature	-50°C	/	90°C
Operating humidity	35%（no condensation）	/	75%（no condensation）
Storage humidity	35%（no condensation）	/	75%（no condensation）
Operating voltage	/	5.0V	/

5.2 Power Consumption Parameters（SOC）

Operating state	Voltage Typical	Current Typical	Power Consumption Typical
Free state	5.0V	0.24A	1.24W
Fully loaded state	5.0V	0.482A	2.41W

Note: Power consumption is measured based on the evaluation board. The test data is related to specific application scenarios and is for reference only.

Free state: the system starts up, the evaluation board is not connected to other external modules, and the program is not executed.

Fully loaded state: the system is booted, the evaluation board is not connected to other external modules, and the DDR pressure read/write test program is running, the resource utilization of the two ARM Cortex-A53 cores is about 100%.

6. Mechanical Dimensions

The main hardware-related parameters of the core board are shown below for reference only.

PCB Size	30mm*30mm
PCB Layers	10 层
PCB Board Thickness	1.2mm
Maximum component height	2.8mm
Weights	10.0g

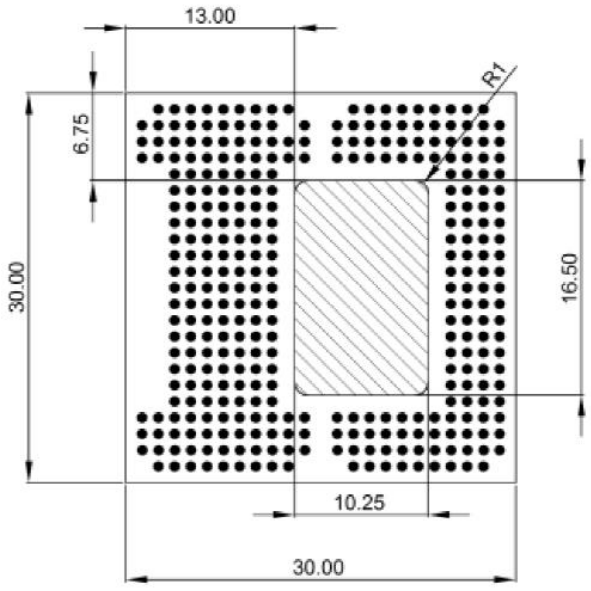

Figure 4 Core board mechanical dimensions

Maximum component height: the height difference between the highest component level of the core board and the level of the PCB front side. The highest component of the core board is the shield cover.

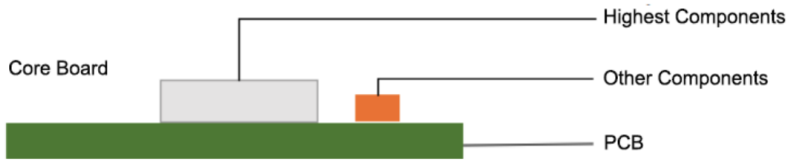

Figure 5 Schematic diagram of the highest devices on the core board

PIN	Default function	PIN	Default function
A2	CSI_DATA1_N	A3	CSI_DATA1_P
A4	GND	A5	NC
A6	NC	A7	GND
A8	NC	A9	NC
A10	GND	A11	NC_A11
A12	NC_A12	A13	NC_A13
A14	NC_A14	A15	COM_AREA_01
A16	COM_AREA_02	A17	NC
A18	COM_AREA_04	A19	COM_AREA_05
A20	NC	A21	NC
A22	NC	B1	CSI_DATA0_P
B2	GND	B3	CSI_CLOCK_N
B4	CSI_CLOCK_P	B5	GND
B6	NC	B7	NC
B8	GND	B9	GND
B10	NC	B11	NC
B12	NC_B12	B13	NC
B14	NC_B14	B15	NC
B16	COM_AREA_09	B17	COM_AREA_10
B18	NC	B19	COM_AREA_12
B20	COM_AREA_13	B21	NC
B22	Vendor Defined1	B23	NC
C1	CSI_DATA0_N	C2	CAM_MCK
C3	I2C_CAM_SDA / CSI_TX_N	C4	I2C_CAM_SCL / CSI_TX_P
C5	VCC_6_TEST	C6	ETH_B_MDC
C7	ETH_B_MDIO C7	C8	NC

C9	NC	C10	NC
C11	GND	C12	NC_C12
C13	NC	C14	NC
C15	COM_AREA_15	C16	NC
C17	COM_AREA_16	C18	NC
C19	NC	C20	SDIO_A_IOPWR
C21	NC	C22	NC
C23	NC	D1	GND
D2	NC	D3	GPIO_C_0
D4	GPIO_C_1	D5	GND
D6	NC	D7	NC
D8	GND	D9	NC
D10	NC	D11	NC
D12	NC_D12	D13	NC
D14	NC	D15	NC
D16	NC	D17	GPIO_A_0
D18	GND	D19	GPIO_B_0
D20	NC	D21	SDIO_A_PWR_ EN
D22	UART_CON_RX	D23	UART_CON_TX
E1	NC	E2	GND
E3	GPIO_C_2	E4	GPIO_C_3
E5	NC_E5	E6	NC
E7	NC	E8	NC
E9	NC	E10	NC
E11	NC	E12	NC
E13	NC	E14	NC
E15	GND	E16	NC
E17	GPIO_A_1	E18	DISP_BL_PWM/PWM_0
E19	GPIO_B_1	E20	SDIO_A_CMD
E21	GND		
F1	ETH_B_(S)(R)(G)MII_TXD1	F2	ETH_B_(S)(R)(G)MII_TXD3
F3	NC_F3	F4	GPIO_C_5 / DISP_BL_EN
F5	NC	F6	NC
F7	NC	F8	NC
F9	NC	F10	NC
F11	NC	F12	NC
F13	NC	F14	NC

F15	NC	F16	GND
F17	GPIO_A_2	F18	PWM_1
F19	GPIO_B_2	F20	GND
F21	SDIO_A_CLK	G1	ETH_B_(S)(R)(G)MII_TXD0
G2	ETH_B_(S)(R)(G)MII_TXD2	G3	CAM_PWR / GPIO_C_6
G4	CAM_RST# / GPIO_C_7	G5	NC
G6	NC	G7	NC
G8	NC	G9	NC
G10	NC	G11	NC
G12	NC	G13	NC
G14	NC	G15	ETH_A_(S)(R)(G)MII_TXD1
G16	ETH_A_(S)(R)(G)MII_TXD3	G17	GPIO_A_3
G18	PWM_2	G20	SDIO_A_D0
G21	SDIO_A_D1	H1	ETH_B_(R)(G)MII_TX_CLK
H2	GND	H3	NC
H4	GND	H5	NC
H6	NC	H7	NC
H8	NC	H9	NC
H10	NC	H11	NC
H12	NC	H13	NC
H14	NC	H15	ETH_A_(S)(R)(G)MII_TXD0
H16	ETH_A_(S)(R)(G)MII_TXD2	H17	GPIO_A_4
H18	PWM_3	H19	GPIO_B_4
H20	SDIO_A_D2	H21	SDIO_A_D3
J1	ETH_B_(S)(R)(G)MII_RXD0	J2	ETH_B_(R)(G)MII_TX_EN(_ER)
J3	NC	J4	NC
J5	NC	J6	NC
J7	NC	J8	NC
J9	NC	J10	NC
J11	NC	J12	NC
J13	NC	J14	NC
J15	ETH_A_(R)(G)MII_TX_CLK	H16	ETH_A_(S)(R)(G)MII_TXD2
J17	GPIO_A_5	J18	PWM_4
J19	GPIO_B_5	J20	GND
J21	SDIO_A_CD#	K1	ETH_B_(S)(R)(G)MII_RXD1
K2	NC	K3	NC

K4	NC	K5	NC
K6	NC	K7	NC
K8	NC	K9	NC
K10	NC	K11	NC
K12	NC	K13	NC
K14	NC	K15	ETH_A_(S)(R)(G)MII_RXD0
K16	ETH_A_(S)(R)(G)MII_TXD3	K17	GPIO_A_6/ SPI_ A_ CS1#
K18	PWM_5	K19	GPIO_B_6
K20	SDIO_B_CLK	K21	SDIO_B_CMD
L1	ETH_B_(R)(G)MII_RX_DV(_ER)	L2	GND
L3	NC	L4	GND
L5	NC	L6	NC
L7	NC	L8	NC
L9	NC	L10	NC
L11	NC	L12	NC
L13	NC	L14	NC
L15	ETH_A_(S)(R)(G)MII_RXD1	L16	NC
L17	GPIO_A_7/ SPI_ B_ CS1#	L18	GND
L19	GPIO_B_7	L20	SDIO_B_D0
L21	SDIO_B_D1	M1	ETH_B_(R)(G)MII_RXD2
M2	NC	M3	NC
M4	NC	M5	NC
M6	NC	M7	NC
M8	NC	M9	NC
M10	NC	M11	NC
M12	NC	M13	NC
M14	NC	M15	ETH_A_(R)(G)MII_RX_DV(_ER)
M16	GND	M17	NC
M18	ADC_0	M19	VCC_2_TEST
M20	GND	M21	SDIO_B_D2
N1	ETH_B_(R)(G)MII_RXD3	N2	NC
N3	NC	N4	NC
N5	NC	N6	NC
N7	NC	N8	NC
N9	NC	N10	NC
N11	NC	N12	NC

N13	NC	N14	NC
N15	ETH_A_(R)(G)MII_RXD2	N16	NC
N17	JTAG_TCK(SWCLK	N18	ADC_1
N19	JTAG_TMS(SWDIO)	N20	SDIO_B_D3
N21	NC	P1	ETH_B_(R)(G)MII_RX_CLK
P2	GND	P3	NC
P4	GND	P5	NC
P6	NC	P7	NC
P8	NC	P9	NC
P10	NC	P11	NC
P12	NC	P13	NC
P14	NC	P15	ETH_A_(R)(G)MII_RXD3
P16	NC	P17	JTAG_TDI
P18	GND	P19	NC
P20	NC	P21	NC
R1	GND	R2	NC
R3	NC	R4	NC
R5	NC	R6	NC
R7	NC	R8	NC
R9	NC	R10	NC
R11	NC	R12	NC
R13	NC	R14	NC
R15	ETH_A_(R)(G)MII_RX_CLK	R16	GND
R17	JTAG_TDO(SWO)	R18	NC
R19	JTAG_nTRST	R20	GND
R21	NC	T1	NC
T2	NC	T3	NC
T4	NC	T5	NC
T6	NC	T7	NC
T8	NC	T9	NC
T10	NC	T11	NC
T12	NC	T13	NC
T14	NC	T15	ETH_MDIO
T16	ETH_MDC	T17	NC
T18	RESERVED-03	T19	RESERVED-04
T20	NC	T21	NC

U1	NC	U2	GND
U3	NC	U4	GND
U5	NC	U6	NC
U7	NC	U8	NC
U9	NC	U10	NC
U11	NC	U12	NC
U13	NC	U14	NC
U15	NC	U16	NC
U17	SYS_RST#	U18	NC
U19	NC	U20	NC
U21	NC	V1	GND
V2	NC	V3	NC
V4	NC	V5	NC
V6	NC	V7	NC
V8	NC	V9	NC
V10	NC	V11	NC
V12	NC	V13	NC
V14	NC	V15	NC
V16	GND	V17	CARRIER_PWR_EN
V18	I2S_MCLK	V19	NC
V20	GND	V21	I2S_A_DATA_IN
W1	PCIe_REFCLK_P	W2	NC
W3	GND	W4	NC
W5	NC	W6	NC
W7	NC	W8	NC
W9	NC	W10	NC
W11	NC	W12	NC
W13	NC	W14	NC
W15	NC	W16	NC
W17	NC	W18	I2S_LRCLK
W19	NC	W20	I2S_BITCLK
W21	I2S_A_DATA_OUT	Y1	NC
Y2	GND	Y3	VCC_5_TEST
Y4	NC	Y5	NC
Y6	NC	Y7	NC
Y8	VCC_IN_5V	Y9	VCC_IN_5V

Y10	VCC_IN_5V	Y11	VCC_IN_5V
Y12	NC	Y13	NC
Y14	NC	Y15	NC
Y16	VCC_3_TEST	Y17	VCC_IN_5V
Y18	GND	Y19	NC
Y20	VCC_4_TEST	Y21	NC
Y22	NC	Y23	NC
AA1	GND	AA2	NC
AA3	NC	AA4	GND
AA5	NC	AA6	NC
AA7	GND	AA8	GND
AA9	PWR_BTN#	AA10	GND
AA11	GND	AA12	NC
AA13	NC	AA14	GND
AA15	I2C_A_SCL	AA16	I2C_A_SDA
AA17	GND	AA18	V_BAT1
AA19	GND	AA20	I2C_B_SCL
AA21	I2C_B_SDA	AA22	GND
AA23	NC		
AB1	NC	AB2	NC
AB3	GND	AB4	DSI_DATA3_P
AB5	DSI_DATA3_N	AB6	GND
AB7	DSI_CLOCK_P	AB8	DSI_CLOCK_N
AB9	GND	AB10	DSI_DATA0_P
AB11	DSI_DATA0_N	AB12	NC
AB13	USB_A_D_N	AB14	USB_A_ID
AB15	GND	AB16	USB_A_VBUS
AB17	NC	AB18	V_BAT2
AB19	NC	AB20	USB_B_VBUS
AB21	GND	AB22	USB_B_ID
AB23	USB_B_D_N	AC2	NC
AC3	NC	AC4	GND
AC5	DSI_DATA2_P	AC6	DSI_DATA2_N
AC7	GND	AC8	DSI_DATA1_P
AC9	DSI_DATA1_N	AC10	GND
AC11	NC	AC12	NC
AC13	NC	AC14	USB_A_D_P

AC15	NC	AC16	USB_A_EN
AC17	NC	AC18	NC
AC19	NC	AC20	USB_B_EN
AC21	NC	AC22	USB_B_D_P

7. Precautions For Use

1. Do not squeeze, bend, or disassemble the board.
2. Keep circuit boards away from static electricity.
3. Do not allow water or other liquids to come into contact with the board
4. Clean the board with a soft, dry towel or brush.
5. Do not use long connection cables, which may affect performance and image quality

More Help

Sales E-mail：sales@geniatech.com
Technical E-mail：support@geniatech.com
Technical Hotline：(+86)0755-8602-8588
Official Website：www.geniatech.com
Official Mall：https://shop.geniatech.com