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	
V1.2	2024/8/12	RND240606_V1.0	11	Update	

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：

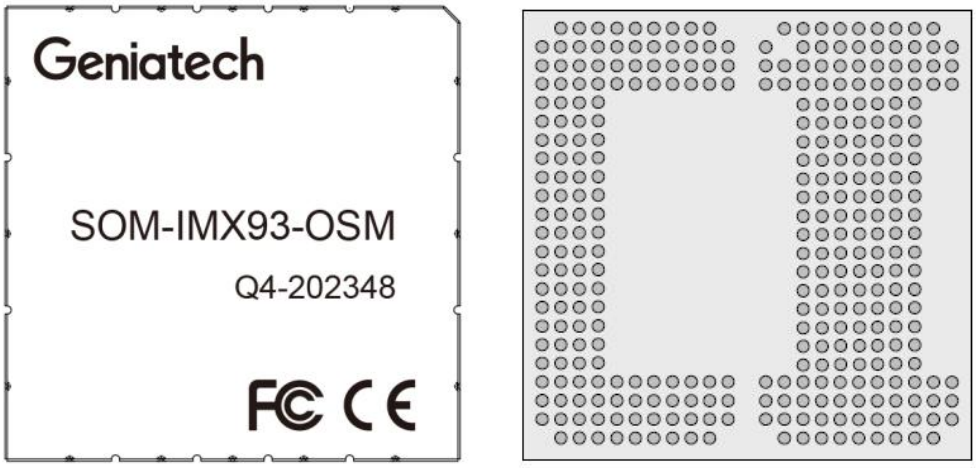

Figure 1 Core board front and back view

3. Hardware Block Diagram

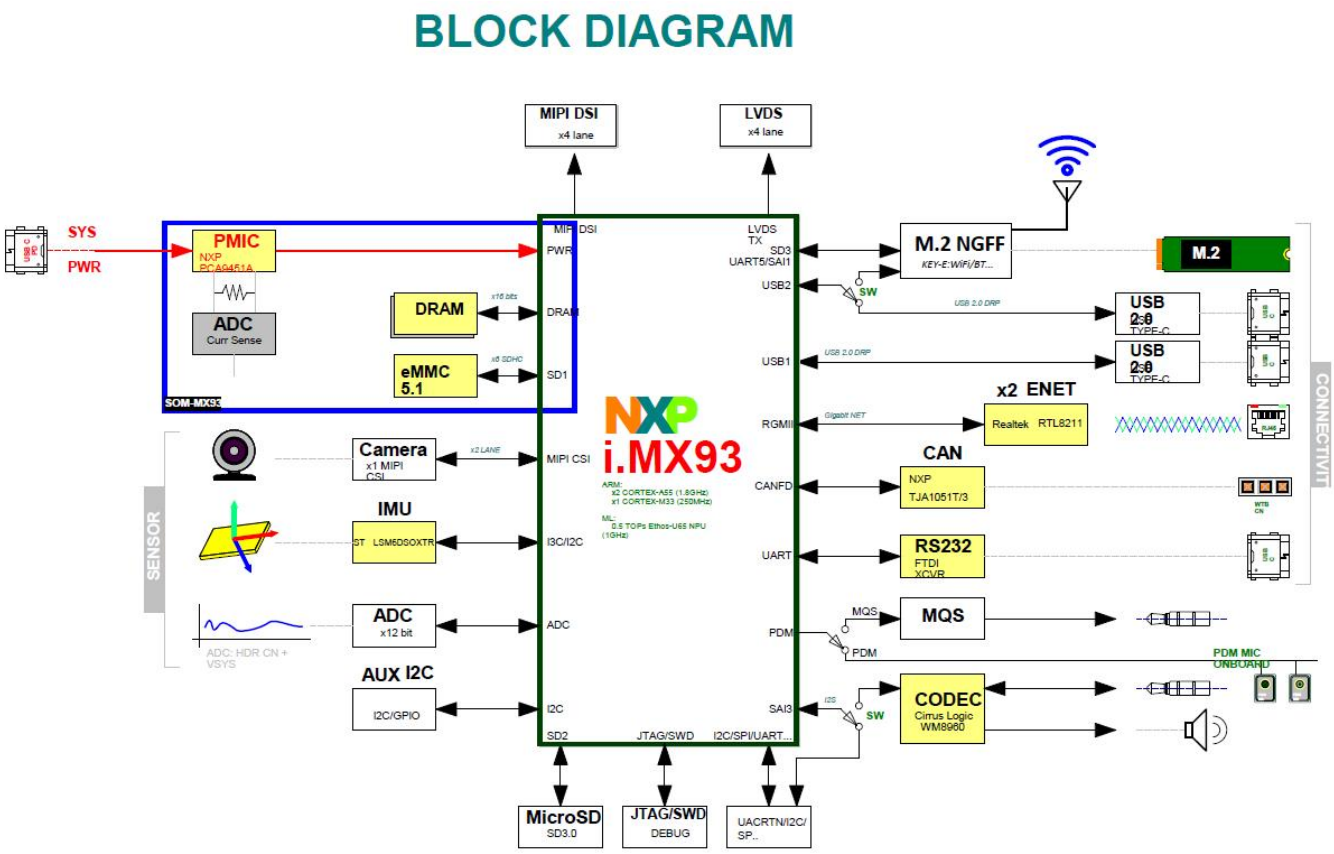

Figure 2 Core board hardware block diagram

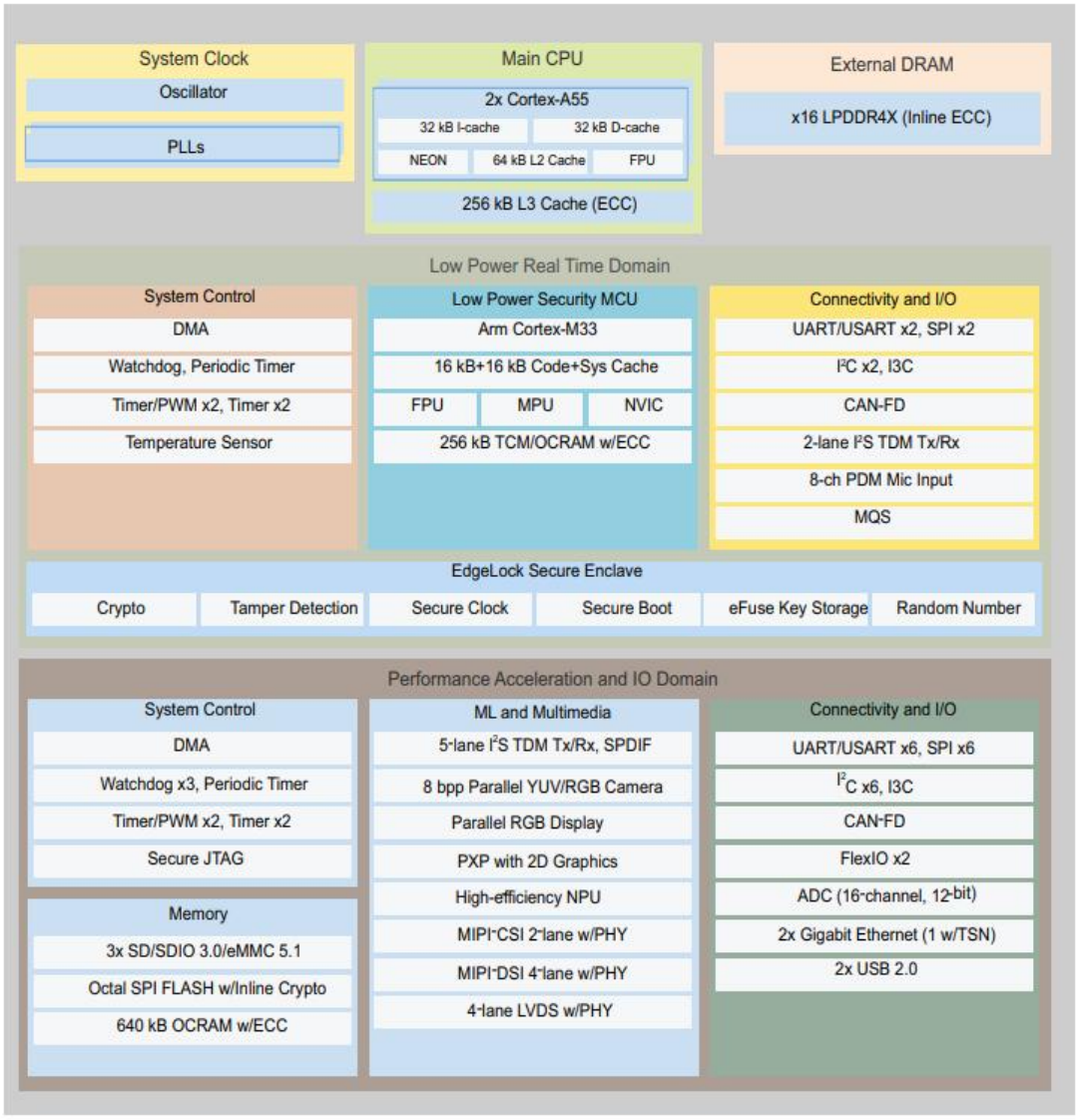

Figure 3 i.MX93 processor architecture diagram

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

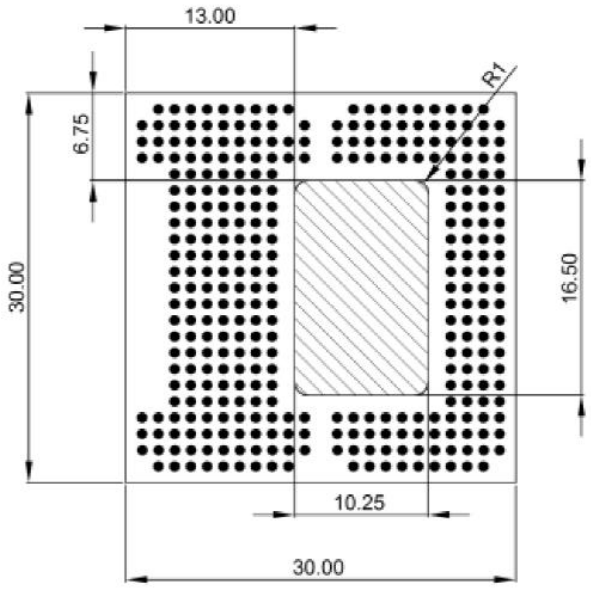

Figure 4 Core board mechanical dimensions

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.

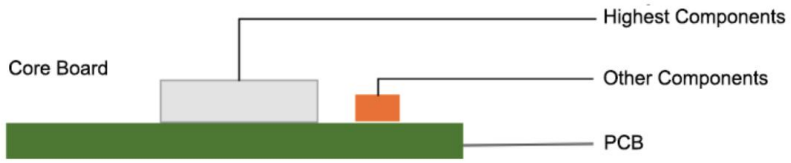

Figure 5 Schematic diagram of the highest devices on the core board

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	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	B13	NC
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
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
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	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
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	G15	ETH_A_(S)(R)(G)MII_TXD1
G16	ETH_A_(S)(R)(G)MII_TXD3	G17	GPIO_A_3
G18	PWM_2	G19	GPIO_B_3
G20	SDIO_A_D0	G21	SDIO_A_D1
H1	ETH_B_(R)(G)MII_TX_CLK	H2	GND
H3	NC	H4	GND
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	RGB_D	J15	ETH_A_(R)(G)MII_TX_CLK
J16	GND	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	RGB_DISP
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	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	RGB_(M4 PIXEL)CLK
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	RGB_B4	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
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	RGB_B0	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	RGB_G5
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	U15	NC
U16	NC	U17	SYS_RST#
U18	NC	U19	NC
U20	NC	U21	NC
V1	GND	V2	NC
V3	NC	V4	RGB_G2
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	RGB_G0	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	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	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	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	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