

## TX Family Computer On Module

- Processor 1.4 GHz ARM® Cortex®-A55  
based NXP i.MX 91
- RAM 512 MB LPDDR4 SDRAM (inline ECC)
- ROM 4 GB eMMC
- Power supply 3.3V to 5V
- Size 26 mm SO-DIMM
- Grade Industrial
- Temperature -25°C to 85°C

## Key Features

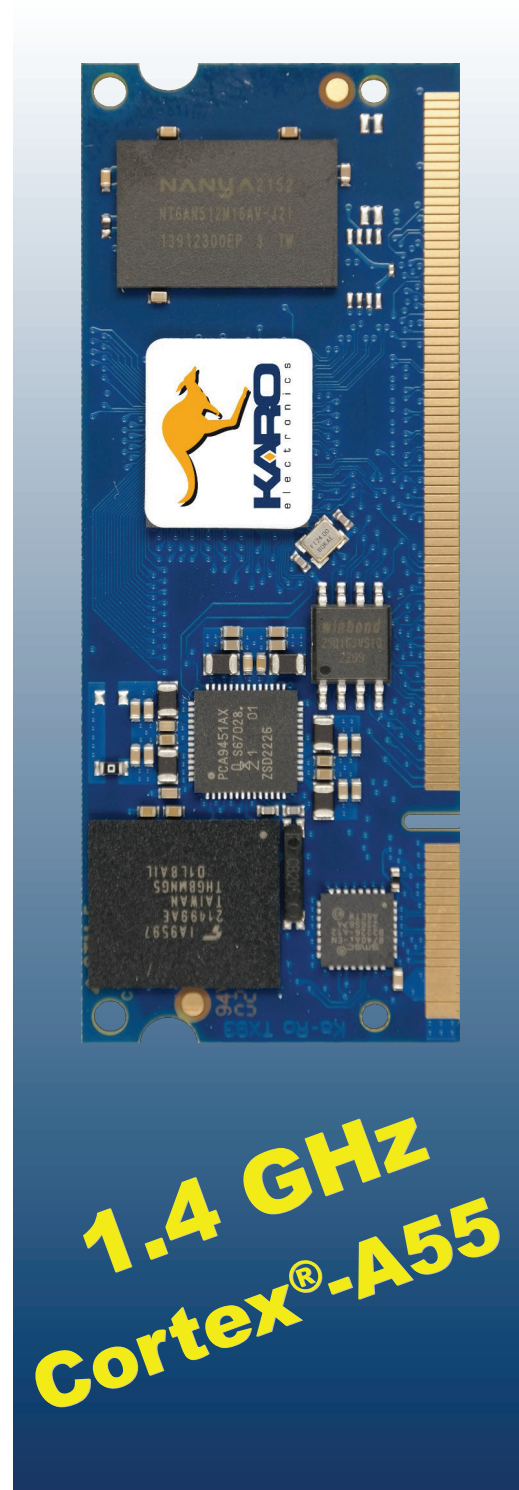
- ARM® Cortex®-A55, 1.4 GHz
- NXP's EdgeLock® secure enclave
- 24-bit RGB Display support

## Connectivity

- Ethernet
  - 10/100 Ethernet with PHY
  - 10/100/1000 Ethernet RGMII/RMII
- 2x USB 2.0
- 8x UART, 7x I²C, 8x SPI, 2x CAN-FD, 1x eMMC/SD
- 3.3V I/O

## OS Support

- Linux



## i.MX 91

The i.MX 91 family delivers an optimized blend of security, features, and energy-efficient performance required for the next generation of Linux-based IoT and industrial applications. The i.MX 91 family enables developers to quickly create new Linux-based edge devices. As the entry point into the i.MX 9 series, the i.MX 91 family provides the extensibility and ease of programming that developers need for applications to evolve over time. Hardware and software commonality with the NXP i.MX 93 family provides additional platform options for scaling product lines that maximize re-use of development investments and decreases time to market.

### HIGH-PERFORMANCE COMPUTE

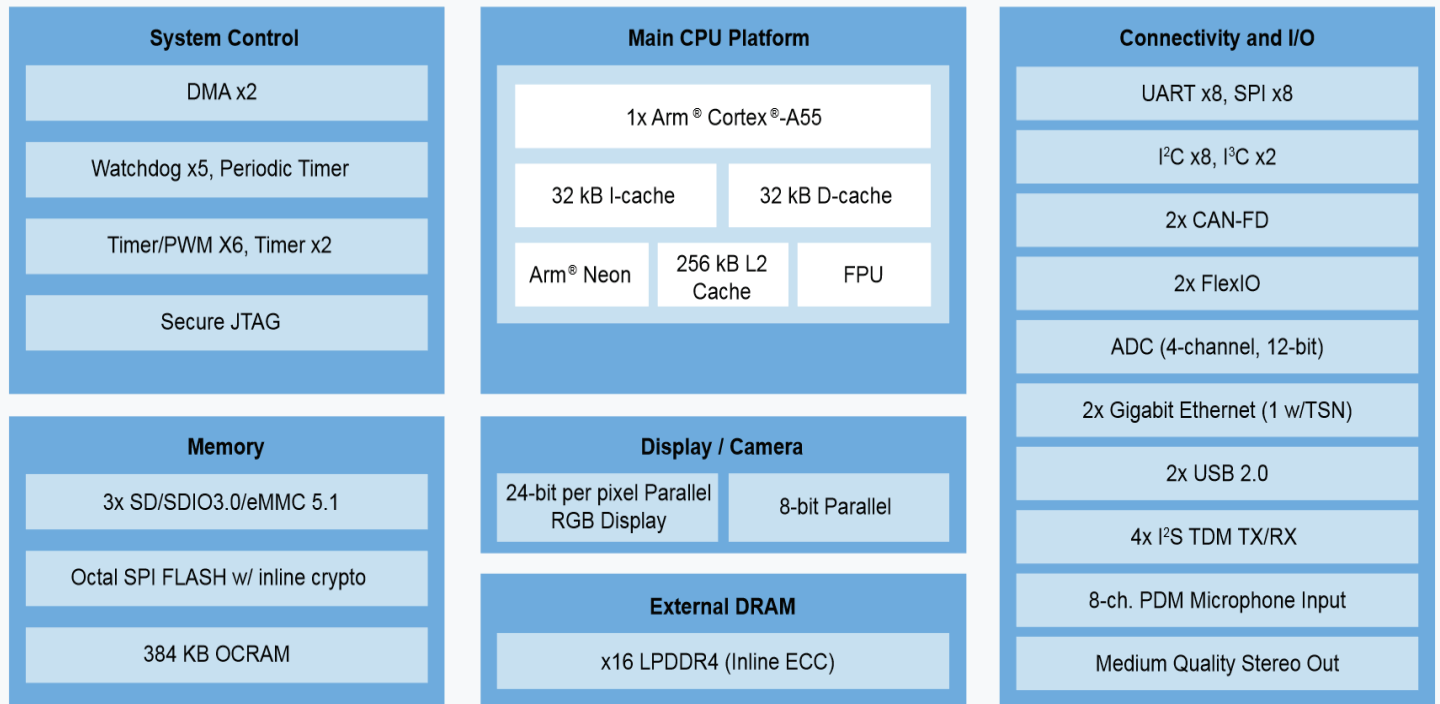
The i.MX 91 applications processors feature an Arm® Cortex®-A55 running at up to 1.4 GHz, 256 KB of L2 cache, and support for the Armv8.2 instruction set including virtualized host extensions, and two-level branch prediction, for optimal performance, security, and efficiency when running Linux and RTOS operating systems.

### MACHINE LEARNING SUPPORT

The Arm Cortex-A55 processor core includes dual 64-bit Arm NEON floating-point units and supports the Armv8.2 instruction set with Arm DynamIQ technology, with dot product, half-precision float, cache stashing, and atomic operations for CPU-based machine learning applications.

## i.MX 91 BLOCK DIAGRAM

### i.MX 91XX Performance Acceleration and IO Domain



### EdgeLock® Secure Enclave



## TX Computer on Module

- NXP i.MX 91
- 512MB LPDDR4 SDRAM
- 4GB eMMC
- DIMM200-module (67,6mm x 26 mm x 4mm)

### Standard TXCOM pinout:

Highly scalable design options allow a single platform to cover multiple products. Pin-compatible TX modules allow a single PCB as a platform for different features as product needs dictate.

- 4-wire UARTs (x3)
- I2C / PWM
- Serial Audio Interface
- 4-wire SD-Card/SDIO

High-Speed communication interfaces incl. onboard Ethernet PHY / on-chip USB PHY allows direct use of connectors/magnetics on the baseboard without the need for additional logic:

- 10/100 Mbps Ethernet
- USB 2.0 OTG (Host or Device)

### Read more in our TX-Guide:

[www.karo-electronics.com/tx-guide](http://www.karo-electronics.com/tx-guide)

**PINOUT**

| PIN                             | Type          | TX Standard    | i.MX91 Pad Name | Alternate functions                                                                | GPIO             | Description (refer to i.MX 91 manuals for details)                                                                                                               |
|---------------------------------|---------------|----------------|-----------------|------------------------------------------------------------------------------------|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>POWER SUPPLY &amp; RESET</b> |               |                |                 |                                                                                    |                  |                                                                                                                                                                  |
| 1-4                             | power         | VIN            |                 |                                                                                    |                  | Module power supply input.                                                                                                                                       |
| 5-7, 9-12                       | power         | VOUT           |                 |                                                                                    |                  | 3.3V power supply output. Supplied by Buck 4                                                                                                                     |
| 8                               | 3V3           | BOOTMODE       |                 |                                                                                    |                  | Boot mode select H: Boot from eMMC / L: Boot from UART/USB                                                                                                       |
| 13                              | Not connected |                |                 |                                                                                    |                  |                                                                                                                                                                  |
| 14                              | 3V3           |                |                 | Connected to PMIC IRQ_B                                                            |                  |                                                                                                                                                                  |
| 15                              | 3V3           | #RESET_OUT     | SD2_RESET_B     | USDHC2_RESET_B, LPTMR2_ALT2 FLEXIO1_FLEXIO07, GPIO3_IO07 CCMSRCGPCMIX_SYSTEM_RESET | GPIO3[07]        | #RESET_OUT may be used to reset peripherals on the carrier board. This signal can be controlled by a GPIO function during runtime.                               |
| 16                              | 5V            | #POR           |                 | Connected to PMIC_RST_B                                                            | 10K-PU           | PMIC reset input pin.                                                                                                                                            |
| 17                              | 5V            | #RESET_IN      | POR_B           | Connected to PMIC POR_B                                                            | 10K-PU           |                                                                                                                                                                  |
| 18                              | GND           | GND            |                 |                                                                                    |                  |                                                                                                                                                                  |
| <b>Ethernet</b>                 |               |                |                 |                                                                                    |                  |                                                                                                                                                                  |
| 19                              | analog        | ETN_TXN        |                 |                                                                                    |                  | Transmit Data Negative: 100Base-TX or 10Base-T differential transmit output to magnetics.                                                                        |
| 20                              | 3V3           | #ETN_LED2      |                 |                                                                                    |                  | Active low - output is driven active when the operating speed is 100Mbps. This LED will go inactive when the operating speed is 10Mbps or during line isolation. |
| 21                              | analog        | ETN_TXP        |                 |                                                                                    |                  | Transmit Data Positive: 100Base-TX or 10Base-T differential transmit output to magnetics.                                                                        |
| 22                              | power         | ETN_3V3        |                 |                                                                                    |                  | +3.3V analog power supply output to magnetics                                                                                                                    |
| 23                              | analog        | ETN_RXN        |                 |                                                                                    |                  | Receive Data Negative: 100Base-TX or 10Base-T differential receive input from magnetics.                                                                         |
| 24                              | 3V3           | #ETN_LED1      |                 |                                                                                    |                  | Active low - output is driven active whenever the device detects a valid link, and blinks indicating activity.                                                   |
| 25                              | analog        | ETN_RXP        |                 |                                                                                    |                  | Receive Data Positive: 100Base-TX or 10Base-T differential receive input from magnetics.                                                                         |
| 26                              | GND           | GND            |                 |                                                                                    |                  |                                                                                                                                                                  |
| <b>USB-HOST</b>                 |               |                |                 |                                                                                    |                  |                                                                                                                                                                  |
| 27                              | 3V3           | USBH_VBUSEN    | SD3_DATA0       | USDHC3_DATA0 FLEXSPI1_A_DATA00 FLEXIO1_FLEXIO22                                    | GPIO3[22] 10K-PU | Active high VBUS supply enable. This pin can be used to enable a VBUS power supply switch.                                                                       |
| 28                              | 3V3           | #USBH_OC       | SD3_DATA1       | USDHC3_DATA1 FLEXSPI1_A_DATA01 FLEXIO1_FLEXIO23                                    | GPIO3[23] 10K-PU | Active low over-current indicator input                                                                                                                          |
| 29                              | analog        | USBH_DM        | USB2_D_N        |                                                                                    |                  | D- pin of the USB cable                                                                                                                                          |
| 30                              | 5V            | USBH_VBUS      | USB2_VBUS       |                                                                                    |                  | USB supply voltage input                                                                                                                                         |
| 31                              | analog        | USBH_DP        | USB2_D_P        |                                                                                    |                  | D+ pin of the USB cable                                                                                                                                          |
| 32                              | GND           | GND            |                 |                                                                                    |                  |                                                                                                                                                                  |
| <b>USB-OTG</b>                  |               |                |                 |                                                                                    |                  |                                                                                                                                                                  |
| 33                              | 3V3           | USBOTG_ID      | USB1_ID         |                                                                                    |                  | USB PHY ID Detect, no muxing                                                                                                                                     |
| 34                              | 3V3           | USBOTG_VBUS EN | SD3_CLK         | USDHC3_CLK FLEXSPI1_A_SCLK FLEXIO1_FLEXIO20                                        | GPIO3[20] 10K-PU | Active high VBUS supply enable. This pin can be used to enable a VBUS power supply switch.                                                                       |
| 35                              | analog        | USBOTG_DM      | USB1_D_N        |                                                                                    |                  | D- pin of the USB cable                                                                                                                                          |
| 36                              | 3V3           | #USBOTG_OC     | SD3_CMD         | USDHC3_CMD FLEXSPI1_A_SS0_B FLEXIO1_FLEXIO21                                       | GPIO3[21] 10K-PU | Active low over-current indicator input connected to a GPIO.                                                                                                     |
| 37                              | analog        | USBOTG_DP      | USB1_D_P        |                                                                                    |                  | D+ pin of the USB cable                                                                                                                                          |
| 38                              | 5V            | USBOTG_VBUS    | USB1_VBUS       |                                                                                    |                  | USB supply voltage input                                                                                                                                         |
| 39                              | GND           | GND            |                 |                                                                                    |                  |                                                                                                                                                                  |

| PIN                                             | Type          | TX Standard | i.MX91 Pad Name | Alternate functions                                                                                     | GPIO      | Description (refer to i.MX 91 manuals for details)                          |
|-------------------------------------------------|---------------|-------------|-----------------|---------------------------------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------|
| I2C                                             |               |             |                 |                                                                                                         |           |                                                                             |
| 40                                              | 3V3           | I2C_DATA    | GPIO_IO28       | LPI2C3_SDA<br>FLEXIO1_FLEXIO28                                                                          | GPIO2[28] | I2C Data                                                                    |
| 41                                              | 3V3           | I2C_CLK     | GPIO_IO29       | LPI2C3_SCL<br>FLEXIO1_FLEXIO29                                                                          | GPIO2[29] | I2C Clock                                                                   |
| PWM                                             |               |             |                 |                                                                                                         |           |                                                                             |
| 42                                              | 3V3           | PWM         | I2C2_SCL        | LPI2C2_SCL, I3C1_PUR<br>LPUART2_DCB_B, I3C1_PUR_B<br>TPM2_CH2, SAI1_RX_SYNC                             | GPIO1[2]  | PWM Output                                                                  |
| 13                                              | Not connected |             |                 |                                                                                                         |           |                                                                             |
| CSPI – Configurable Serial Peripheral Interface |               |             |                 |                                                                                                         |           |                                                                             |
| 44                                              | 3V3           | CSPI_SS     | SAI1_TXFS       | SAI1_TX_SYNC<br>SAI1_TX_DATA01, LPSP11_PCS0<br>LPUART2_DTR_B, MQS1_LEFT                                 | GPIO1[11] | Slave Select (Selectable polarity) signal                                   |
| 45                                              | 3V3           | CSPI_SS     | SD3_DATA3       | USDHC3_DATA3<br>FLEXSPI1_A_DATA03<br>FLEXIO1_FLEXIO25                                                   | GPIO3[25] | Slave Select (Selectable polarity) signal                                   |
| 46                                              | 3V3           | CSPI_MOSI   | SAI1_RXD0       | SAI1_RX_DATA00<br>SAI1_MCLK, LPSP11_SOUT<br>LPUART2_DSR_B, MQS1_RIGHT                                   | GPIO1[14] | Master Out/Slave In signal                                                  |
| 47                                              | 3V3           | CSPI_MISO   | SAI1_TXC        | SAI1_TX_BCLK<br>LPUART2_CTS_B, LPSP11_SIN<br>LPUART1_DSR_B, CAN1_RX                                     | GPIO1[12] | Master In/Slave Out signal                                                  |
| 48                                              | 3V3           | CSPI_SCLK   | SAI1_TXD0       | SAI1_TX_DATA00<br>LPUART2_RTS_B, LPSP11_SCK<br>LPUART1_DTR_B, CAN1_TX                                   | GPIO1[13] | Serial Clock signal                                                         |
| 49                                              | Not connected |             |                 |                                                                                                         |           |                                                                             |
| 50                                              | GND           | GND         |                 |                                                                                                         |           |                                                                             |
| 1 <sup>st</sup> SD – Secure Digital Interface   |               |             |                 |                                                                                                         |           |                                                                             |
| 51                                              | 3V3           | SD1_CD      | SD2_CD_B        | USDHC2_CD_B<br>ENET_QOS_1588_EVENT0_IN<br>I3C2_SCL, FLEXIO1_FLEXIO00                                    | GPIO3[0]  | SD Card Detect                                                              |
| 52                                              | 3V3           | SD1_D[0]    | SD2_DATA0       | USDHC2_DATA0<br>ENET1_1588_EVENT0_OUT<br>CAN2_TX, FLEXIO1_FLEXIO03<br>CCMSRCGPCMIX_OBSERVE2             | GPIO3[3]  |                                                                             |
| 53                                              | 3V3           | SD1_D[1]    | SD2_DATA1       | USDHC2_DATA1<br>ENET1_1588_EVENT1_IN<br>CAN2_RX, FLEXIO1_FLEXIO04<br>CCMSRCGPCMIX_WAIT                  | GPIO3[4]  |                                                                             |
| 54                                              | 3V3           | SD1_D[2]    | SD2_DATA2       | USDHC2_DATA2<br>ENET1_1588_EVENT1_OUT<br>MQS2_RIGHT, FLEXIO1_FLEXIO05<br>CCMSRCGPCMIX_STOP              | GPIO3[5]  |                                                                             |
| 55                                              | 3V3           | SD1_D[3]    | SD2_DATA3       | USDHC2_DATA3<br>LPTMR2_ALT1, MQS2_LEFT<br>FLEXIO1_FLEXIO06<br>CCMSRCGPCMIX_EARLY_RESET                  | GPIO3[6]  |                                                                             |
| 56                                              | 3V3           | SD1_CMD     | SD2_CMD         | USDHC2_CMD<br>ENET1_1588_EVENT0_IN<br>I3C2_PUR, I3C2_PUR_B<br>FLEXIO1_FLEXIO02<br>CCMSRCGPCMIX_OBSERVE1 | GPIO3[2]  | SD Command bidirectional signal                                             |
| 57                                              | 3V3           | SD1_CLK     | SD2_CLK         | USDHC2_CLK<br>ENET_QOS_1588_EVENT0_OUT<br>I3C2_SDA, FLEXIO1_FLEXIO01<br>CCMSRCGPCMIX_OBSERVE0           | GPIO3[1]  | SD Output Clock.                                                            |
| 58                                              | GND           | GND         |                 |                                                                                                         |           |                                                                             |
| 1 <sup>st</sup> UART                            |               |             |                 |                                                                                                         |           |                                                                             |
| 59                                              | 3V3           | TXD         | UART1_TXD       | LPUART1_TX, S400_UART_TX<br>LPSP12_PCS0, TPM1_CH1                                                       | GPIO1[5]  | 1 <sup>st</sup> UART Transmit Data output signal                            |
| 60                                              | 3V3           | RXD         | UART1_RXD       | LPUART1_RX, S400_UART_RX<br>LPSP12_SIN, TPM1_CH0                                                        | GPIO1[4]  | 1 <sup>st</sup> UART Receive Data input signal                              |
| 61                                              | 3V3           | RTS/CTS IN  | UART2_TXD       | LPUART2_TX, LPUART1_RTS_B<br>LPSP12_SCK, TPM1_CH3                                                       | GPIO1[6]  | 1 <sup>st</sup> UART Request to Send<br>no TX standard <b>output</b> signal |
| 62                                              | 3V3           | CTS/RTS OUT | UART2_RXD       | LPUART2_RX, LPUART1_CTS_B<br>LPSP12_SOUT, TPM1_CH2<br>SAI1_MCLK                                         | GPIO1[7]  | 1 <sup>st</sup> UART Clear to Send<br>no TX standard <b>input</b> signal    |

| PIN                            | Type | TX Standard | i.MX91 Pad Name  | Alternate functions                                                                     | GPIO      | Description (refer to i.MX 91 manuals for details)                          |
|--------------------------------|------|-------------|------------------|-----------------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------|
| <b>2<sup>nd</sup> UART</b>     |      |             |                  |                                                                                         |           |                                                                             |
| 63                             | 3V3  | TXD         | ENET2_TD0        | ENET1_RGMII_TD0<br><b>LPUART4_TX</b> , SAI2_RX_DATA03<br>FLEXIO2_FLEXIO19               | GPIO4[19] | 2 <sup>nd</sup> UART Transmit Data output signal                            |
| 64                             | 3V3  | RXD         | ENET2_RD0        | ENET1_RGMII_RD0<br><b>LPUART4_RX</b> , SAI2_TX_DATA02<br>FLEXIO2_FLEXIO24               | GPIO4[24] | 2 <sup>nd</sup> UART Receive Data input signal                              |
| 65                             | 3V3  | RTS/CTS IN  | ENET2_TD1        | ENET1_RGMII_TD1<br><b>LPUART4_RTS_B</b> , SAI2_RX_DATA02<br>FLEXIO2_FLEXIO18            | GPIO4[18] | 2 <sup>nd</sup> UART Request to Send<br>no TX standard <b>output</b> signal |
| 66                             | 3V3  | CTS/RTS OUT | ENET2_RD2        | ENET1_RGMII_RD2<br><b>LPUART4_CTS_B</b> , SAI2_MCLK<br>MQS2_RIGHT, FLEXIO2_FLEXIO26     | GPIO4[26] | 2 <sup>nd</sup> UART Clear to Send<br>no TX standard <b>input</b> signal    |
| <b>3<sup>rd</sup> UART</b>     |      |             |                  |                                                                                         |           |                                                                             |
| 67                             | 3V3  | TXD         | DAP_TDO_TRACESWO | JTAG_MUX_TDO<br>MQS2_RIGHT, CAN2_RX<br>FLEXIO1_FLEXIO31, <b>LPUART5_TX</b>              | GPIO3[31] | 3 <sup>rd</sup> UART Transmit Data output signal                            |
| 68                             | 3V3  | RXD         | DAP_TDI          | JTAG_MUX_TDI<br>MQS2_LEFT, CAN2_TX<br>FLEXIO2_FLEXIO30<br><b>LPUART5_RX</b>             | GPIO3[28] | 3 <sup>rd</sup> UART Receive Data input signal                              |
| 69                             | 3V3  | RTS/CTS IN  | DAP_TMS_SWDIO    | JTAG_MUX_TMS<br>FLEXIO2_FLEXIO31<br><b>LPUART5_RTS_B</b>                                | GPIO3[29] | 3 <sup>rd</sup> UART Request to Send<br>no TX standard <b>output</b> signal |
| 70                             | 3V3  | CTS/RTS OUT | DAP_TCLK_SWCLK   | JTAG_MUX_TCK<br>FLEXIO1_FLEXIO30<br><b>LPUART5_CTS_B</b>                                | GPIO3[30] | 3 <sup>rd</sup> UART Clear to Send<br>no TX standard <b>input</b> signal    |
| 71                             | GND  | GND         |                  |                                                                                         |           |                                                                             |
| <b>Module Specific Signals</b> |      |             |                  |                                                                                         |           |                                                                             |
| 72                             | 3V3  |             | SD1_DATA4        | USDHC1_DATA4<br>FLEXSPI1_A_DATA04<br>FLEXIO1_FLEXIO14                                   | GPIO3[14] |                                                                             |
| 73                             | 3V3  |             | SD1_DATA5        | USDHC1_DATA5<br>FLEXSPI1_A_DATA05<br>USDHC1_RESET_B<br>FLEXIO1_FLEXIO15                 | GPIO3[15] |                                                                             |
| 74                             | 3V3  |             | SD1_DATA6        | USDHC1_DATA6<br>FLEXSPI1_A_DATA06<br>USDHC1_CD_B<br>FLEXIO1_FLEXIO16                    | GPIO3[16] |                                                                             |
| 75                             | 3V3  |             | SD1_DATA7        | USDHC1_DATA7<br>FLEXSPI1_A_DATA07<br>USDHC1_WP<br>FLEXIO1_FLEXIO17                      | GPIO3[17] |                                                                             |
| 76                             | 3V3  | TXCAN       | PDM_CLK          | PDM_CLK, MQS1_LEFT<br>LPTMR1_ALT1, <b>CAN1_TX</b>                                       | GPIO1[8]  |                                                                             |
| 77                             | 3V3  |             | CCM_CLK01        | CCMSRCGPCMIX_CLK01<br>FLEXIO1_FLEXIO26                                                  | GPIO3[26] |                                                                             |
| 78                             | 3V3  |             | CCM_CLK02        | CCMSRCGPCMIX_CLK02<br>FLEXIO1_FLEXIO27                                                  | GPIO3[27] |                                                                             |
| 79                             | 3V3  |             | CCM_CLK03        | CCMSRCGPCMIX_CLK03<br>FLEXIO2_FLEXIO28                                                  | GPIO4[28] |                                                                             |
| 80                             | 3V3  |             | CCM_CLK04        | CCMSRCGPCMIX_CLK04<br>FLEXIO2_FLEXIO29                                                  | GPIO4[29] |                                                                             |
| 81                             | 3V3  | RXCAN       | PDM_BIT_STREAM0  | PDM_BIT_STREAM00, MQS1_RIGHT<br>LPSP11_PCS1, TPM1_EXTCLK<br>LPTMR1_ALT2, <b>CAN1_RX</b> | GPIO1[9]  |                                                                             |
| 82                             | GND  | GND         |                  |                                                                                         |           |                                                                             |
| 83                             |      |             |                  |                                                                                         |           | Not connected                                                               |
| 84                             |      |             |                  |                                                                                         |           | Not connected                                                               |
| 85                             |      |             |                  |                                                                                         |           | Not connected                                                               |
| 86                             |      |             |                  |                                                                                         |           | Not connected                                                               |
| 87                             |      |             |                  |                                                                                         |           | Not connected                                                               |
| 88                             | GND  | GND         |                  |                                                                                         |           |                                                                             |

| PIN | Type | TX Standard | i.MX91 Pad Name | Alternate functions | GPIO | Description (refer to i.MX 91 manuals for details) |
|-----|------|-------------|-----------------|---------------------|------|----------------------------------------------------|
| 89  |      |             |                 | Not connected       |      |                                                    |
| 90  |      |             |                 | Not connected       |      |                                                    |
| 91  |      |             |                 | Not connected       |      |                                                    |
| 92  |      |             |                 | Not connected       |      |                                                    |
| 93  |      |             |                 | Not connected       |      |                                                    |
| 94  | GND  | GND         |                 |                     |      |                                                    |
| 95  |      |             |                 | Not connected       |      |                                                    |
| 96  |      |             |                 | Not connected       |      |                                                    |
| 97  |      |             |                 | Not connected       |      |                                                    |
| 98  |      |             |                 | Not connected       |      |                                                    |
| 99  |      |             |                 | Not connected       |      |                                                    |
| 100 |      |             |                 | Not connected       |      |                                                    |
| 101 |      |             |                 | Not connected       |      |                                                    |
| 102 | GND  | GND         |                 |                     |      |                                                    |

## MISC

|     |     |     |              |                                                                         |           |  |
|-----|-----|-----|--------------|-------------------------------------------------------------------------|-----------|--|
| 103 | 3V3 |     | ENET2_RXC    | ENET1_RGMII_RXC, ENET1_RX_ER<br>SAI2_TX_DATA01, FLEXIO2_FLEXIO23        | GPIO4[23] |  |
| 104 | 3V3 |     | ENET2_RX_CTL | ENET1_RGMII_RX_CTL<br>LPUART4_DSR_B, SAI2_TX_DATA00<br>FLEXIO2_FLEXIO22 | GPIO4[22] |  |
| 105 | 3V3 |     | ENET2_TX_CTL | ENET1_RGMII_TX_CTL<br>LPUART4_DTR_B, SAI2_TX_SYNC<br>FLEXIO2_FLEXIO20   | GPIO4[20] |  |
| 106 | 3V3 |     | ENET2_RD1    | ENET1_RGMII_RD1<br>SPDIF_IN, SAI2_TX_DATA03<br>FLEXIO2_FLEXIO25 of      | GPIO4[25] |  |
| 107 | 3V3 |     | ENET1_TD3    | ENET_QOS_RGMII_TD3<br>CAN2_TX, HSIOMIX_OTG_ID2<br>FLEXIO2_FLEXIO02      | GPIO4[2]  |  |
| 108 | 3V3 |     | ENET2_TD2    | ENET1_RGMII_TD2<br>ENET1_TX_CLK, SAI2_RX_DATA01<br>FLEXIO2_FLEXIO17     | GPIO4[17] |  |
| 109 | 3V3 |     | ENET2_TD3    | ENET1_RGMII_TD3<br>SAI2_RX_DATA00<br>FLEXIO2_FLEXIO16                   | GPIO4[16] |  |
| 110 | 3V3 |     | ENET2_TXC    | ENET1_RGMII_TXC<br>ENET1_TX_ER, SAI2_TX_BCLK<br>FLEXIO2_FLEXIO21        | GPIO4[21] |  |
| 111 | GND | GND |              |                                                                         |           |  |
| 112 | 3V3 |     | SD3_DATA2    | USDHC3_DATA2<br>FLEXSPI1_A_DATA02<br>FLEXIO1_FLEXIO24                   | GPIO3[24] |  |
| 113 | 3V3 |     | ENET2_RD3    | ENET1_RGMII_RD3<br>SPDIF_OUT, SPDIF_IN<br>MQS2_LEFT, FLEXIO2_FLEXIO27   | GPIO4[27] |  |
| 114 | 3V3 |     | I2C2_SDA     | LPI2C2_SDA, LPUART2_RIN_B<br>TPM2_CH3, SAI1_RX_BCLK                     | GPIO1[3]  |  |
| 115 | 3V3 |     | SD1_STROBE   | USDHC1_STROBE<br>FLEXSPI1_A_DQS<br>FLEXIO1_FLEXIO18                     | GPIO3[18] |  |
| 116 | GND | GND |              |                                                                         |           |  |

## Display

|     |     |  |           |                                                                                                                           |          |  |
|-----|-----|--|-----------|---------------------------------------------------------------------------------------------------------------------------|----------|--|
| 117 | 3V3 |  | GPIO_IO04 | TPM3_CH0, PDM_CLK<br><b>MEDIAMIX_DISP_DATA00</b><br>LPSPI7_PCS0, LPUART6_TX<br>LPI2C6_SDA, FLEXIO1_FLEXIO04               | GPIO2[4] |  |
| 118 | 3V3 |  | GPIO_IO05 | TPM4_CH0<br>PDM_BIT_STREAM00<br><b>MEDIAMIX_DISP_DATA01</b><br>LPSPI7_SIN, LPUART6_RX<br>LPI2C6_SCL, FLEXIO1_FLEXIO05     | GPIO2[5] |  |
| 119 | 3V3 |  | GPIO_IO06 | TPM5_CH0<br>PDM_BIT_STREAM01<br><b>MEDIAMIX_DISP_DATA02</b><br>LPSPI7_SOUT, LPUART6_CTS_B<br>LPI2C7_SDA, FLEXIO1_FLEXIO06 | GPIO2[6] |  |

| PIN | Type | TX Standard | i.MX91 Pad Name | Alternate functions                                                                                                                            | GPIO      | Description (refer to i.MX 91 manuals for details) |
|-----|------|-------------|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------|-----------|----------------------------------------------------|
| 120 | 3V3  |             | GPIO_IO07       | LPSP13_PCS1<br>MEDIAMIX_CAM_DATA01<br><b>MEDIAMIX_DISP_DATA03</b><br>LPSP17_SCK, LPUART6_RTS_B<br>LPI2C7_SCL, FLEXIO1_FLEXIO07                 | GPIO2[7]  |                                                    |
| 121 | 3V3  |             | GPIO_IO08       | LPSP13_PCS0<br>MEDIAMIX_CAM_DATA02<br><b>MEDIAMIX_DISP_DATA04</b><br>TPM6_CH0, LPUART7_TX<br>LPI2C7_SDA, FLEXIO1_FLEXIO08                      | GPIO2[8]  |                                                    |
| 122 | 3V3  |             | GPIO_IO09       | LPSP13_SIN<br>MEDIAMIX_CAM_DATA03<br><b>MEDIAMIX_DISP_DATA05</b><br>TPM3_EXTCLK, LPUART7_RX<br>LPI2C7_SCL, FLEXIO1_FLEXIO09                    | GPIO2[9]  |                                                    |
| 123 | 3V3  |             | GPIO_IO10       | LPSP13_SOUT<br>MEDIAMIX_CAM_DATA04<br><b>MEDIAMIX_DISP_DATA06</b><br>TPM4_EXTCLK, LPUART7_CTS_B<br>LPI2C8_SDA, FLEXIO1_FLEXIO10                | GPIO2[10] |                                                    |
| 124 | 3V3  |             | GPIO_IO11       | LPSP13_SCK<br>MEDIAMIX_CAM_DATA05<br><b>MEDIAMIX_DISP_DATA07</b><br>TPM5_EXTCLK, LPUART7_RTS_B<br>LPI2C8_SCL, FLEXIO1_FLEXIO11                 | GPIO2[11] |                                                    |
| 125 | 3V3  |             | GPIO_IO12       | TPM3_CH2<br>PDM_BIT_STREAM02<br><b>MEDIAMIX_DISP_DATA08</b><br>LPSP18_PCS0, LPUART8_TX<br>LPI2C8_SDA, SAI3_RX_SYNC                             | GPIO2[12] |                                                    |
| 126 | 3V3  |             | GPIO_IO13       | TPM4_CH2<br>PDM_BIT_STREAM03<br><b>MEDIAMIX_DISP_DATA09</b><br>LPSP18_SIN, LPUART8_RX<br>LPI2C8_SCL, FLEXIO1_FLEXIO13                          | GPIO2[13] |                                                    |
| 127 | 3V3  |             | GPIO_IO14       | LPUART3_TX<br>MEDIAMIX_CAM_DATA06<br><b>MEDIAMIX_DISP_DATA10</b><br>LPSP18_SOUT, LPUART8_CTS_B<br>LPUART4_TX, FLEXIO1_FLEXIO14                 | GPIO2[14] |                                                    |
| 128 | 3V3  |             | GPIO_IO15       | LPUART3_RX<br>MEDIAMIX_CAM_DATA07<br><b>MEDIAMIX_DISP_DATA11</b><br>LPSP18_SCK, LPUART8_RTS_B<br>LPUART4_RX, FLEXIO1_FLEXIO15                  | GPIO2[15] |                                                    |
| 129 | GND  | GND         |                 |                                                                                                                                                |           |                                                    |
| 130 | 3V3  |             | GPIO_IO16       | GPIO2_IO16, SAI3_TX_BCLK<br>PDM_BIT_STREAM02<br><b>MEDIAMIX_DISP_DATA12</b><br>LPUART3_CTS_B<br>LPSP14_PCS2, LPUART4_CTS_B<br>FLEXIO1_FLEXIO16 | GPIO2[16] |                                                    |
| 131 | 3V3  |             | GPIO_IO17       | SAI3_MCLK<br>MEDIAMIX_CAM_DATA08<br><b>MEDIAMIX_DISP_DATA13</b><br>LPUART3_RTS_B, LPSP14_PCS1<br>LPUART4_RTS_B, FLEXIO1_FLEXIO17               | GPIO2[17] |                                                    |
| 132 | 3V3  |             | GPIO_IO18       | SAI3_RX_BCLK<br>MEDIAMIX_CAM_DATA09<br><b>MEDIAMIX_DISP_DATA14</b><br>LPSP15_PCS0, LPSP14_PCS0<br>TPM5_CH2, FLEXIO1_FLEXIO18                   | GPIO2[18] |                                                    |
| 133 | 3V3  |             | GPIO_IO19       | SAI3_RX_SYNC<br>PDM_BIT_STREAM03<br><b>MEDIAMIX_DISP_DATA15</b><br>LPSP15_SIN, LPSP14_SIN<br>TPM6_CH2, SAI3_TX_DATA00                          | GPIO2[19] |                                                    |
| 134 | 3V3  |             | GPIO_IO20       | SAI3_RX_DATA00<br>PDM_BIT_STREAM00<br><b>MEDIAMIX_DISP_DATA16</b><br>LPSP15_SOUT, LPSP14_SOUT<br>TPM3_CH1, FLEXIO1_FLEXIO20                    | GPIO2[20] |                                                    |
| 135 | 3V3  |             | GPIO_IO21       | SAI3_TX_DATA00, PDM_CLK<br><b>MEDIAMIX_DISP_DATA17</b><br>LPSP15_SCK, LPSP14_SCK<br>TPM4_CH1, SAI3_RX_BCLK                                     | GPIO2[21] |                                                    |
| 136 | 3V3  |             | GPIO_IO22       | USDHC3_CLK, SPDIF_IN<br><b>MEDIAMIX_DISP_DATA18</b><br>TPM5_CH1, TPM6_EXTCLK<br>LPI2C5_SDA FLEXIO1_FLEXIO22                                    | GPIO2[22] |                                                    |
| 137 | 3V3  |             | GPIO_IO23       | USDHC3_CMD, SPDIF_OUT<br><b>MEDIAMIX_DISP_DATA19</b>                                                                                           | GPIO2[23] |                                                    |

| PIN                            | Type       | TX Standard | i.MX91 Pad Name | Alternate functions                                                                                                                                | GPIO                | Description (refer to i.MX 91 manuals for details) |
|--------------------------------|------------|-------------|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|----------------------------------------------------|
| 138                            | 3V3        |             | GPIO_IO24       | TPM6_CH1, LPI2C5_SCL<br>FLEXIO1_FLEXIO23<br>USDHC3_DATA0<br><b>MEDIAMIX_DISP_DATA20</b><br>TPM3_CH3, JTAG_MUX_TDO<br>LPSPI6_PCS1, FLEXIO1_FLEXIO24 | GPIO2[24]           |                                                    |
| 139                            | 3V3        |             | GPIO_IO25       | USDHC3_DATA1, CAN2_TX<br><b>MEDIAMIX_DISP_DATA21</b><br>TPM4_CH3, JTAG_MUX_TCK<br>LPSPI7_PCS1, FLEXIO1_FLEXIO25                                    | GPIO2[25]           |                                                    |
| 140                            | 3V3        |             | GPIO_IO26       | USDHC3_DATA2<br>PDM_BIT_STREAM01<br><b>MEDIAMIX_DISP_DATA22</b><br>TPM5_CH3, JTAG_MUX_TDI<br>LPSPI8_PCS1, SAI3_TX_SYNC                             | GPIO2[26]           |                                                    |
| 141                            | 3V3        |             | GPIO_IO27       | USDHC3_DATA3, CAN2_RX<br><b>MEDIAMIX_DISP_DATA23</b><br>TPM6_CH3, JTAG_MUX_TMS<br>LPSPI5_PCS1, FLEXIO1_FLEXIO27                                    | GPIO2[27]           |                                                    |
| 142                            | GND        | GND         |                 |                                                                                                                                                    |                     |                                                    |
| 143                            | 3V3        |             | GPIO_IO03       | LPI2C4_SCL<br>MEDIAMIX_CAM_HSYNC<br><b>MEDIAMIX_DISP_HSYNC</b><br>LPSPI6_SCK, LPUART5_RTS_B<br>LPI2C6_SCL, FLEXIO1_FLEXIO03                        | GPIO2[3]            |                                                    |
| 144                            | 3V3        |             | GPIO_IO02       | LPI2C4_SDA<br>MEDIAMIX_CAM_VSYNC<br><b>MEDIAMIX_DISP_VSYNC</b><br>LPSPI6_SOUT, LPUART5_CTS_B<br>LPI2C6_SDA, FLEXIO1_FLEXIO02                       | GPIO2[2]            |                                                    |
| 145                            | 3V3        |             | GPIO_IO01       | LPI2C3_SCL<br>MEDIAMIX_CAM_DATA00<br><b>MEDIAMIX_DISP_DE</b><br>LPSPI6_SIN, LPUART5_RX<br>LPI2C5_SCL, FLEXIO1_FLEXIO01                             | GPIO2[1]            |                                                    |
| 146                            | 3V3        |             | GPIO_IO00       | LPI2C3_SDA<br>MEDIAMIX_CAM_CLK<br><b>MEDIAMIX_DISP_CLK</b><br>LPSPI6_PCS0, LPUART5_TX<br>LPI2C5_SDA, FLEXIO1_FLEXIO00                              | GPIO2[0]            |                                                    |
| 147                            | GND        | GND         |                 |                                                                                                                                                    |                     |                                                    |
| <b>Module Specific Signals</b> |            |             |                 |                                                                                                                                                    |                     |                                                    |
| 148                            | 3V3        |             | ENET1_TXC       | CCM_ENET_QOS_CLOCK_GENERATE_TX_CLK<br>ENET_QOS_TX_ER<br>FLEXIO2_FLEXIO07                                                                           | GPIO4[7]            |                                                    |
| 149                            | 3V3        |             | PDM_BIT_STREAM1 | PDM_BIT_STREAM01<br>NMI_GLUE_NMI, LPSPI2_PCS1<br>TPM2_EXTCLK, LPTMR1_ALT3<br>CCMSRCGPCMIX_EXT_CLK1                                                 | GPIO1[10]           |                                                    |
| 150                            | 3V3        |             | ENET2_MDC       | ENET1_MDC, LPUART4_DCB_B<br>SAI2_RX_SYNC, FLEXIO2_FLEXIO14                                                                                         | GPIO4[14]           |                                                    |
| 151                            | 3V3        |             | ENET2_MDIO      | ENET1_MDIO, LPUART4_RIN_B<br>SAI2_RX_BCLK, FLEXIO2_FLEXIO15                                                                                        | GPIO4[15]           |                                                    |
| 152                            | 3V3        |             | SD2_VSELECT     | USDHC2_VSELECT, USDHC2_WP<br>LPTMR2_ALT3, FLEXIO1_FLEXIO19<br>CCMSRCGPCMIX_EXT_CLK1                                                                | GPIO3[19]           |                                                    |
| 153                            | 3V3        |             | WDOG_ANY        | WDOG1_WDOG_ANY                                                                                                                                     | GPIO1[15]<br>10K-PU | Connected to PMIC WDOG_B                           |
| 154                            |            |             |                 | Not connected                                                                                                                                      |                     |                                                    |
| 155                            |            |             |                 | Not connected                                                                                                                                      |                     |                                                    |
| 156                            |            |             |                 | Not connected                                                                                                                                      |                     |                                                    |
| 157                            |            |             |                 | Not connected                                                                                                                                      |                     |                                                    |
| 158                            | 1V8 analog |             | CLKIN1          |                                                                                                                                                    | 10K-PD              |                                                    |
| 159                            | 1V8 analog |             | CLKIN2          |                                                                                                                                                    | 10K-PD              |                                                    |
| 160                            | GND        | GND         |                 |                                                                                                                                                    |                     |                                                    |
| 161                            | 1V8 analog |             | ADCIN0          |                                                                                                                                                    |                     |                                                    |
| 162                            | 1V8 analog |             | ADCIN1          |                                                                                                                                                    |                     |                                                    |
| 163                            | 1V8 analog |             | ADCIN2          |                                                                                                                                                    |                     |                                                    |
| 164                            | 1V8        |             | ADCIN3          |                                                                                                                                                    |                     |                                                    |



| PIN      | Type          | TX Standard | i.MX91<br>Pad Name | Alternate functions | GPIO | Description (refer to i.MX 91 manuals for details) |
|----------|---------------|-------------|--------------------|---------------------|------|----------------------------------------------------|
|          | analog        |             |                    |                     |      |                                                    |
| 165      | Not connected |             |                    |                     |      |                                                    |
| MIPI CSI |               |             |                    |                     |      |                                                    |
| 166      | MIPI          |             | MIPI_CSI1_CLK_N    |                     |      |                                                    |
| 167      | MIPI          |             | MIPI_CSI1_DATA1_N  |                     |      |                                                    |
| 168      | MIPI          |             | MIPI_CSI1_CLK_P    |                     |      |                                                    |
| 169      | MIPI          |             | MIPI_CSI1_DATA1_P  |                     |      |                                                    |
| 170      | MIPI          |             | MIPI_CSI1_DATA0_N  |                     |      |                                                    |
| 171      | GND           |             |                    |                     |      |                                                    |
| 172      | MIPI          |             | MIPI_CSI1_DATA0_P  |                     |      |                                                    |
| 173      | 1V8           |             | TAMPER0            |                     |      |                                                    |
| 174      | 1V8           |             | TAMPER1            |                     |      |                                                    |
| 175      | Not connected |             |                    |                     |      |                                                    |
| 176      | Not connected |             |                    |                     |      |                                                    |
| 177      | Not connected |             |                    |                     |      |                                                    |
| 178      | Not connected |             |                    |                     |      |                                                    |
| 179      | Not connected |             |                    |                     |      |                                                    |
| 180      | Not connected |             |                    |                     |      |                                                    |
| 181      | Not connected |             |                    |                     |      |                                                    |
| 182      | Not connected |             |                    |                     |      |                                                    |
| 183      | GND           |             |                    |                     |      |                                                    |
| 184      | Not connected |             |                    |                     |      |                                                    |
| 185      | Not connected |             |                    |                     |      |                                                    |
| 186      | Not connected |             |                    |                     |      |                                                    |
| 187      | Not connected |             |                    |                     |      |                                                    |
| 188      | Not connected |             |                    |                     |      |                                                    |
| 189      | Not connected |             |                    |                     |      |                                                    |
| 190      | Not connected |             |                    |                     |      |                                                    |
| 191      | Not connected |             |                    |                     |      |                                                    |
| 192      | Not connected |             |                    |                     |      |                                                    |
| 193      | Not connected |             |                    |                     |      |                                                    |
| 194      | Not connected |             |                    |                     |      |                                                    |
| 195      | Not connected |             |                    |                     |      |                                                    |
| 196      | Not connected |             |                    |                     |      |                                                    |
| 197      | Not connected |             |                    |                     |      |                                                    |
| 198      | Not connected |             |                    |                     |      |                                                    |
| 199      | Not connected |             |                    |                     |      |                                                    |
| 200      | GND           |             |                    |                     |      |                                                    |

## Onboard peripherals wiring

| USED FOR                    |               | i.MX 91 Pad Name                      | Alternate functions                 | GPIO      | Description |
|-----------------------------|---------------|---------------------------------------|-------------------------------------|-----------|-------------|
|                             |               | Refer to i.MX 91 manuals for details! |                                     |           |             |
| eMMC                        | CMD           | SD1_CMD                               | USDHC1_CMD                          | GPIO3[9]  |             |
|                             | CLK           | SD1_CLK                               | USDHC1_CLK                          | GPIO3[8]  |             |
|                             | DAT0          | SD1_DATA0                             | USDHC1_DATA0                        | GPIO3[10] |             |
|                             | DAT1          | SD1_DATA1                             | USDHC1_DATA1                        | GPIO3[11] |             |
|                             | DAT2          | SD1_DATA2                             | USDHC1_DATA2                        | GPIO3[12] |             |
|                             | DAT3          | SD1_DATA3                             | USDHC1_DATA3                        | GPIO3[13] |             |
| PMIC                        | SDA           | I2C1_SDA                              | I2C1_SDA                            | GPIO1[1]  | 10K-PU      |
|                             | SCL           | I2C1_SCL                              | I2C1_SCL                            | GPIO1[0]  | 1K-PU       |
|                             | PMIC_ON_REQ   | PMIC_ON_REQ                           |                                     |           |             |
|                             | PMIC_STBY_REQ | PMIC_STBY_REQ                         |                                     |           |             |
|                             | CLK_32K_OUT   | RTC_XTALI                             |                                     |           |             |
| ETHERNET<br>LAN8710<br>RMII | MDC           | ENET1_MDC                             | ENET_QOS_MDC                        | GPIO4[0]  |             |
|                             | MDIO          | ENET1_MDIO                            | ENET_QOS_MDIO                       | GPIO4[1]  | 1K-PU       |
|                             | RXD0          | ENET1_RD0                             | ENET_QOS_RGMII_RD0                  | GPIO4[10] |             |
|                             | RXD1          | ENET1_RD1                             | ENET_QOS_RGMII_RD1                  | GPIO4[11] |             |
|                             | RXER          | ENET1_RXC                             | ENET_QOS_RX_ER                      | GPIO4[9]  |             |
|                             | TXEN          | ENET1_TX_CTL                          | ENET_QOS_RGMII_TX_CTL               | GPIO4[6]  |             |
|                             | TXD0          | ENET1_TD0                             | ENET_QOS_RGMII_TD0                  | GPIO4[5]  |             |
|                             | TXD1          | ENET1_TD1                             | ENET_QOS_RGMII_TD1                  | GPIO4[4]  |             |
|                             | COL/CRS_DV    | ENET1_RX_CTL                          | ENET_QOS_RGMII_RX_CTL               | GPIO4[8]  | 10K-PU      |
|                             | nRST          | ENET1_RD3                             |                                     | GPIO4[13] | 10K-PU      |
|                             | nINT          | ENET1_RD2                             |                                     | GPIO4[12] | 10K-PU      |
|                             | XTAL1/CLKIN   | ENET1_TD2                             | CCM_ENET_QOS_CLOCK_GENERATE_REF_CLK | GPIO4[3]  |             |