

## Computer On Module

- Processor i.MX257, 400 MHz
- RAM 64 MB SDRAM
- ROM 128MB NAND Flash
- Power supply Single 3.0V to 5.5V
- Size 26mm SO-DIMM
- Temp.-Range -40°C..85°C

## Key Features

- 10/100Mbps Ethernet
- High-Speed USB 2.0 OTG
- Full-Speed USB 2.0 Host
- LCD controller
- Still-picture camera interface
- Several peripheral interfaces:
  - UART, SD-CARD, I2C, PWM, 1-wire,
  - Keypad, Digital Audio (AC97/I2S),
  - Configurable serial peripheral interface,
  - 4/5 wire Touchscreen, CAN

## OS Support

- Windows Embedded CE
- Linux 2.6
- RedBoot Bootloader

## Development System

- Starter-Kit V



**400 MHz  
ARM9**

### Board highlights:

- Lowest cost 400MHz ARM9
- Industrial temperature range
- Standard TX-DIMM pinout
- as small as possible - only 26mm

The TX25 is a member of a module series, specially designed for Freescales i.MX25 multimedia processors. TX modules are complete computers, implemented on a board smaller than a credit card, and ready to be designed into your embedded system. TX modules includes a Freescale® i.MX processor, SDRAM and Flash memory. The integrated LCD-controller enables direct connection of an LCD screen. The TX25 is specifically targeted at embedded applications where size, high cpu-performance and cost are critical factors.

### Computer on module

- Freescale® i.MX257, 400 MHz
- 64 MByte SDRAM (16bit)
- 128 MByte NAND Flash memory
- DIMM200-module (67,6mm x 26 mm x 3,6mm)
- Operating temperature range -40..85°C

### Processor

The i.MX257 processor introduces several key new features such as 3.3V I/O support, three general-purpose 12-bit ADCs, a touch screen controller and integrated 128K SRAM to improve system performance or low-power LCD refresh.

### Standard TX-DIMM pinout:

- 4-wire UARTs (x3)
- LCD
- CSI (CMOS Sensor Interface)
- I2C / 1-wire / PWM
- SSI/AC97/I2S (x2)
- 4-wire SD-Card/SDIO
- Keypad 4x4
- CSPI (Configurable serial peripheral interface)

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
- 480 Mbps USB OTG
- 12 Mbps USB Host

Additional interfaces like CAN, 4/5-wire resistive touch-screen, 2 UARTs and external memory interface are available on TX25 specific pins. Some interfaces are multiplexed with other functions.

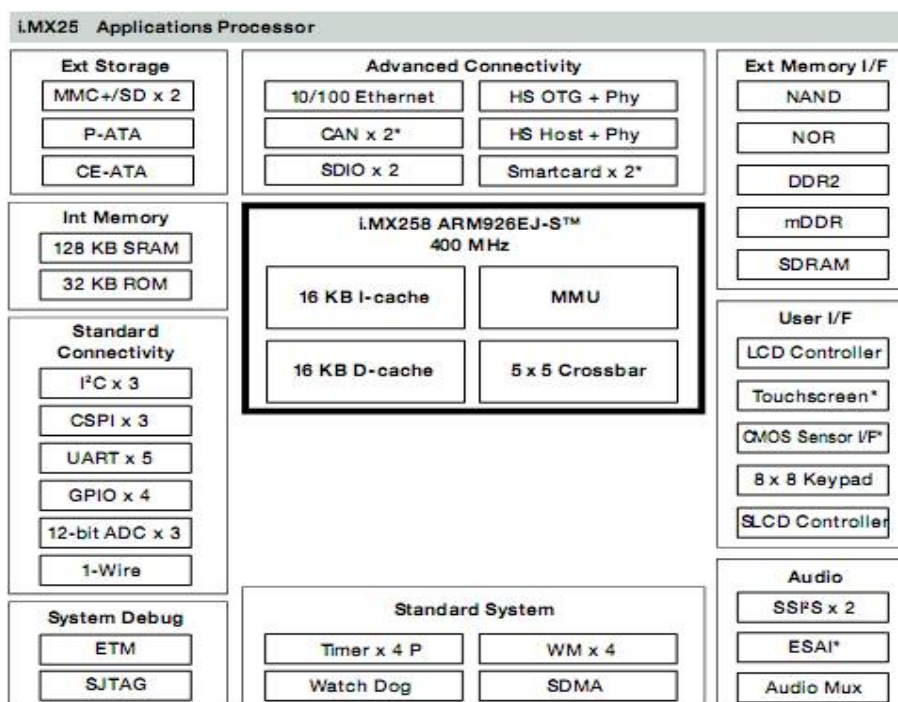
### Power Supply

The TX25 accepts an input voltage from various sources:

- 1-cell Li-Ion/Polymer (3.0V to 4.2V)
- 5.0V USB supply or AC wall adapter
- 3.3V

### Read more in our TX-Guide:

[www.karo-electronics.com/TX-Guide](http://www.karo-electronics.com/TX-Guide)



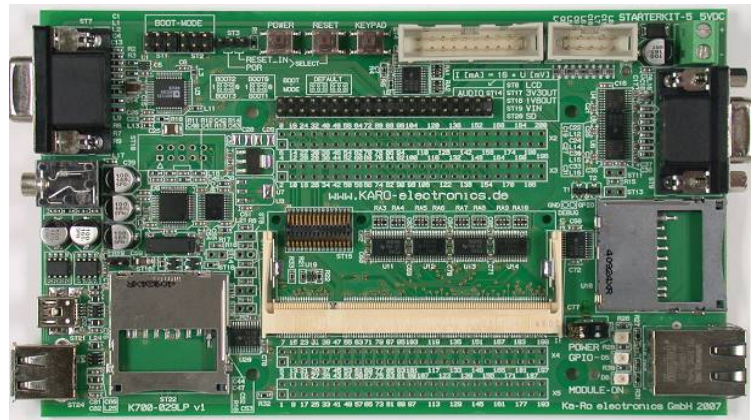
### Ordering Information

| Order Number        | CPU            | SDRAM | Flash | Temp.       |
|---------------------|----------------|-------|-------|-------------|
| TX25/400/64S/128F/I | 400MHz i.MX257 | 64MB  | 128MB | -40°C..85°C |

## STARTER-KIT V

The Starter-Kit V is a ready-to-use development system for building applications based on the TX embedded processor boards.

- DIMM200 TX socket
- Two SD-card sockets
- USB 2.0 OTG and USB 2.0 Host connector
- D-SUB 15 VGA connector
- 40pin LCD flat cable header
- 3.5mm headphone connector
- JTAG interface
- SGTL5000 audio codec
- TSC2007 touchscreen controller
- RS232 on 10pin flat cable and SUB-D header
- All pins of the TX socket are connected to daughter board slot for easy application design-in
- 10/100 Mbit/s Ethernet
- 5VDC Power Supply by USB-OTG or power jack.
- 100mm x 160mm
- Schematics of the base board are included for reference.



## DISPLAY OPTIONS

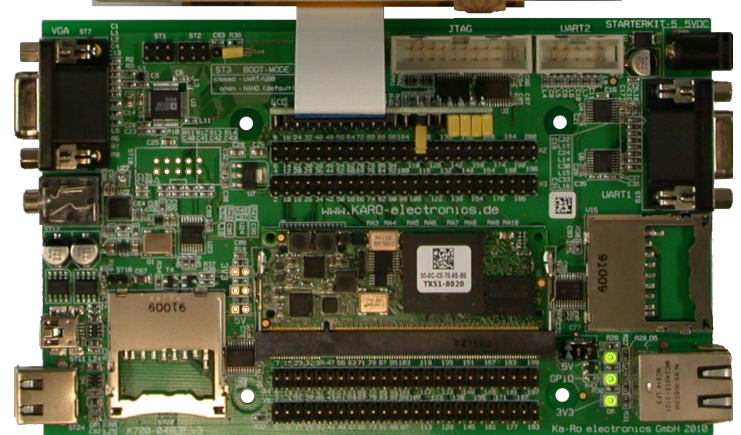
The optional display comes with an FFC cable and a small adapter PCB which can be plugged directly onto the Starter-Kit 40pin LCD header.

### Option 1: 5,7" VGA Resistive Touch

- 5,7 inch TFT display
- 640 x 480 dots
- White LED backlight
- Resistive Touchscreen

### Option 2: 5,7" VGA PolyTouch™

- 5,7 inch TFT display
- 640 x 480 dots
- White LED backlight
- Capacitive Touchscreen



| PINOUT                          |        |               |                     | Marked yellow: Not connected                                     |                     |                                                                                                                                                                                              |
|---------------------------------|--------|---------------|---------------------|------------------------------------------------------------------|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PIN                             | Type   | Function      | i.MX25 Pad Name     | Alternate functions                                              | GPIO                | Description (refer to I.MX25 manuals for details)                                                                                                                                            |
| <b>POWER SUPPLY &amp; RESET</b> |        |               |                     |                                                                  |                     |                                                                                                                                                                                              |
| 1-4                             | power  | VIN           |                     |                                                                  |                     | Module power supply input (3.0V-5.5V)                                                                                                                                                        |
| 5-7, 9-12                       | power  | VOUT          |                     |                                                                  |                     | 3.3V power supply output ( <b>up to 0.2A</b> )                                                                                                                                               |
| 8                               | 3V3    | BOOTMODE      |                     |                                                                  | 10K-PU              | Boot mode select H: Boot from NAND / L: Boot from UART/USB                                                                                                                                   |
| 13                              | power  |               | BAT_VDD             |                                                                  |                     | DRYICE backup power supply input ( <b>max. 1.55V</b> )                                                                                                                                       |
| 14                              | NC     |               |                     |                                                                  |                     | not connected                                                                                                                                                                                |
| 15                              | 3V3    |               | VSTBY_ACK           | HRESET_B<br>SS3<br>EPITO                                         | GPIO3[18]           | "Pulse" indication on finish of internal system reset, by visibility of "hreset_b" signal. After reset, this pin can be used for other purposes.                                             |
| 16                              | 3V3    | #POR          |                     |                                                                  |                     | Power On Reset - active low input signal. Typically a push button reset. Pull low to force a reset. Leave unconnected or connect to 3V3 if unused. 63.5kΩ pull-up resistor.                  |
| 17                              | 3V3    | RESET_IN_B    | RESET_IN_B          |                                                                  |                     | Master Reset - external active low Schmitt trigger input signal. When this signal goes active, all modules (except the reset module, SDRAMC module, and the clock control module) are reset. |
| 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_LINKLED  |                     |                                                                  |                     | Active low LINK ON indication: Active indicates that the link is on.                                                                                                                         |
| 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_ACTLED   |                     |                                                                  |                     | Active low ACTIVITY indication: Active indicates that there is Carrier sense (CRS) from the active PMD.                                                                                      |
| 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   | D9                  | LCDC_LD[22]<br><b>USBH2_PWR</b>                                  | GPIO4[11]           | Active high external 5V supply enable. This pin is used to enable the external VBUS power supply.                                                                                            |
| 28                              | 3V3    | #USBH_OC      | D8                  | LCDC_LD[23]<br><b>USBH2_OC</b>                                   | GPIO4[12]<br>10K-PU | Active low over-current indicator input connected to a GPIO. This signal can be used as an input only. 10kΩ pull-up resistor.                                                                |
| 29                              | analog | USBH_DM       | <b>USBPHY2_DM</b>   |                                                                  |                     | D- pin of the USB cable                                                                                                                                                                      |
| 30                              | NC     |               |                     |                                                                  |                     | not connected                                                                                                                                                                                |
| 31                              | analog | USBH_DP       | <b>USBPHY2_DP</b>   |                                                                  |                     | D+ pin of the USB cable                                                                                                                                                                      |
| 32                              | GND    | GND           |                     |                                                                  |                     |                                                                                                                                                                                              |
| <b>USB-OTG</b>                  |        |               |                     |                                                                  |                     |                                                                                                                                                                                              |
| 33                              | 3V3    | USBOTG_ID     | <b>USBPHY1_UID</b>  |                                                                  |                     | ID pin of the USB cable. For an A-Device ID is grounded. For a B-Device ID is floated.                                                                                                       |
| 34                              | 3V3    | USBOTG_VBUSEN | GPIO_A              | <b>USBOTG_PWR</b><br>ROW[4] / SCL<br>TXCAN / PWM0<br>INT_MUX_OUT | GPIO1[0]            | Active high external 5V supply enable. This pin is used to enable the external VBUS power supply.                                                                                            |
| 35                              | analog | USBOTG_DM     | <b>USBPHY1_DP</b>   |                                                                  |                     | D- pin of the USB cable                                                                                                                                                                      |
| 36                              | 3V3    | #USBOTG_OC    | GPIO_B              | <b>USBOTG_OC</b><br>ROW[5] / SDA<br>RXCAN / PWM0                 | GPIO1[1]<br>10K-PU  | Active low over-current indicator input connected to a GPIO. 10kΩ pull-up resistor.                                                                                                          |
| 37                              | analog | USBOTG_DP     | <b>USBPHY1_DP</b>   |                                                                  |                     | D+ pin of the USB cable                                                                                                                                                                      |
| 38                              | analog | USBOTG_VBUS   | <b>USBPHY1_VBUS</b> |                                                                  |                     | VBUS pin of the USB cable. This pin is used for the VBUS comparator inputs.                                                                                                                  |
| 39                              | GND    | GND           | -                   |                                                                  |                     |                                                                                                                                                                                              |
| <b>I2C</b>                      |        |               |                     |                                                                  |                     |                                                                                                                                                                                              |
| 40                              | 3V3    | I2C_DATA      | <b>I2C1_DAT</b>     | SLCDC_DATA[7]                                                    | GPIO1[13]           | I2C Data                                                                                                                                                                                     |

| PIN                                                    | Type | Function  | i.MX25 Pad Name | Alternate functions                                                           | GPIO                | Description (refer to I.MX25 manuals for details)                                                                                                                                             |
|--------------------------------------------------------|------|-----------|-----------------|-------------------------------------------------------------------------------|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 41                                                     | 3V3  | I2C_CLK   | I2C1_CLK        | SLCDC_DATA[6]                                                                 | GPIO1[12]           | I2C Clock                                                                                                                                                                                     |
| <b>PWM</b>                                             |      |           |                 |                                                                               |                     |                                                                                                                                                                                               |
| 42                                                     | 3V3  | PWM       | PWM             | PWMO<br>CMPOUT1<br>USBH2_OC<br>BT_LPB_FREQ[2]                                 | GPIO1[26]<br>47K-PU | PWM Output                                                                                                                                                                                    |
| <b>1-WIRE</b>                                          |      |           |                 |                                                                               |                     |                                                                                                                                                                                               |
| 43                                                     | 3V3  | OWDAT     | RTCK            | LINE<br>DAT7<br>SDMA_DBG_PC_13                                                | GPIO3[14]           | 1-Wire bus. Requires an external pull-up resistor. The recommended resistor is specified by the generic 1-Wire device used in a given system.                                                 |
| <b>CSPI – Configurable Serial Peripheral Interface</b> |      |           |                 |                                                                               |                     |                                                                                                                                                                                               |
| 44                                                     | 3V3  | CSPI_SS0  | CSPI1_SS0       | LCDC_LD[16]<br>PWMO<br>SDMA_DBG_EVT_2<br>SLCDC_CS<br>TRACE[6]                 | GPIO1[16]           | Slave Select (Selectable polarity) signal                                                                                                                                                     |
| 45                                                     | 3V3  | CSPI_SS1  | CSPI1_SS1       | SDA / UART3_RTS<br>SDMA_DBG_EVT_3<br>SLCDC_RS<br>TRACE[7]                     | GPIO1[17]           | Slave Select (Selectable polarity) signal                                                                                                                                                     |
| 46                                                     | 3V3  | CSPI_MOSI | CSPI1_MOSI      | UART3_RXD_MUX<br>SDMA_DBG_EVT_0<br>SLCDC_DATA[12]<br>TRACE[4]                 | GPIO1[14]           | Master Out/Slave In signal                                                                                                                                                                    |
| 47                                                     | 3V3  | CSPI_MISO | CSPI1_MISO      | UART3_TXD_MUX<br>SDMA_DBG_EVT_1<br>SLCDC_DATA[13]<br>TRACE[5]                 | GPIO1[15]           | Master In/Slave Out signal                                                                                                                                                                    |
| 48                                                     | 3V3  | CSPI_SCLK | CSPI1_SCLK      | UART3_CTS<br>SDMA_DBG_EVT_4<br>SLCDC_DATA[14]<br>TRACE[8]                     | GPIO1[18]           | Serial Clock signal                                                                                                                                                                           |
| 49                                                     | 3V3  | CSPI_RDY  | CSPI1_RDY       | SDMA_DBG_EVT_5<br>SLCDC_DATA[15]<br>TRACE[9]                                  | GPIO2[22]           | Serial Data Ready signal                                                                                                                                                                      |
| 50                                                     | GND  | GND       |                 |                                                                               |                     |                                                                                                                                                                                               |
| <b>SD – Secure Digital Interface 1</b>                 |      |           |                 |                                                                               |                     |                                                                                                                                                                                               |
| 51                                                     | 3V3  | SD1_CD    | BCLK            | EIM_BCLK                                                                      | GPIO4[4]            | SD Card Detect – connected to a GPIO                                                                                                                                                          |
| 52                                                     | 3V3  | SD1_D[0]  | SD1_DATA0       | SLCK / TDATA[2]<br>AUD7_TXFS<br>SDMA_DBG_STAT_1<br>SLCDC_DATA[2]<br>TRACE[12] | GPIO2[25]           | SD Data bidirectional signals—If the system designer does not want to make use of the internal pull-up, via the Pull-up enable register, a 50 K–69 K external pull up resistor must be added. |
| 53                                                     | 3V3  | SD1_D[1]  | SD1_DATA1       | RDY / TDATA[3]<br>AUD7_RXD<br>SDMA_DBG_STAT_2<br>SLCDC_DATA[3]<br>TRACE[13]   | GPIO2[26]           |                                                                                                                                                                                               |
| 54                                                     | 3V3  | SD1_D[2]  | SD1_DATA2       | SS0 / RX_CLK<br>AUD7_RXC<br>SDMA_DBG_STAT_3<br>SLCDC_DATA[4]<br>TRACE[14]     | GPIO2[27]           |                                                                                                                                                                                               |
| 55                                                     | 3V3  | SD1_D[3]  | SD1_DATA3       | SS1 / CRS<br>AUD7_RXFS<br>SLCDC_DATA[5]<br>TRACE[15]                          | GPIO2[28]           |                                                                                                                                                                                               |
| 56                                                     | 3V3  | SD1_CMD   | SD1_CMD         | MOSI / RDATA[2]<br>SDMA_DBG_EVT_SEL<br>SLCDC_DATA[0]<br>TRACE[10]             | GPIO2[23]           | SD Command bidirectional signal                                                                                                                                                               |
| 57                                                     | 3V3  | SD1_CLK   | SD1_CLK         | MISO / RDATA[3]<br>SDMA_DBG_STAT_0<br>SLCDC_DATA[1]<br>TRACE[11]              | GPIO2[24]           | SD Output Clock.                                                                                                                                                                              |
| 58                                                     | GND  | GND       |                 |                                                                               |                     |                                                                                                                                                                                               |
| <b>1<sup>st</sup> UART</b>                             |      |           |                 |                                                                               |                     |                                                                                                                                                                                               |
| 59                                                     | 3V3  | UART1_TXD | UART1_TXD       | UART2_DSR<br>LCDC_SPL<br>SLCDC_DATA[9]                                        | GPIO4[23]           | Transmit Data output signal                                                                                                                                                                   |

| PIN | Type | Function  | i.MX25 Pad Name  | Alternate functions                                     | GPIO      | Description (refer to I.MX25 manuals for details) |
|-----|------|-----------|------------------|---------------------------------------------------------|-----------|---------------------------------------------------|
| 60  | 3V3  | UART1_RXD | <b>UART1_RXD</b> | UART2_DTR<br>LCD_CLS<br>SLCDC_DATA[8]                   | GPIO4[22] | Receive Data input signal                         |
| 61  | 3V3  | UART1_RTS | <b>UART1_RTS</b> | CSI_D[0] / CAPIN1<br>DCD_2 / LCD_CPS<br>SLCDC_DATA[10]  | GPIO4[24] | Request to Send input signal                      |
| 62  | 3V3  | UART1_CTS | <b>UART1_CTS</b> | CSI_D[1] / CMPOUT1<br>RI_2 / LCD_CREV<br>SLCDC_DATA[11] | GPIO4[25] | Clear to Send output signal                       |

**2<sup>nd</sup> UART**

|    |     |           |                  |                                               |           |                              |
|----|-----|-----------|------------------|-----------------------------------------------|-----------|------------------------------|
| 63 | 3V3 | UART2_TXD | <b>UART2_TXD</b> | UART2_TXD_MUX<br>DAT6 / TX_ERR<br>EXTDMA_0    | GPIO4[27] | Transmit Data output signal  |
| 64 | 3V3 | UART2_RXD | <b>UART2_RXD</b> | UART2_RXD_MUX<br>DAT7                         | GPIO4[26] | Receive Data input signal    |
| 65 | 3V3 | UART2_RTS | <b>UART2_RTS</b> | DAT5 / COL / CAPIN1<br>EPITO / SS3 / EXTDMA_1 | GPIO4[28] | Request to Send input signal |
| 66 | 3V3 | UART2_CTS | <b>UART2_CTS</b> | DAT4 / RX_ERR<br>CMPOUT1 / SS3<br>EXTDMA_2    | GPIO4[29] | Clear to Send output signal  |

**3<sup>rd</sup> UART**

|    |     |           |     |                                                                             |           |                              |
|----|-----|-----------|-----|-----------------------------------------------------------------------------|-----------|------------------------------|
| 67 | 3V3 | UART5_TXD | ECB | EIM_ECB<br><b>UART5_TXD_MUX</b><br>SCLK                                     | GPIO3[23] | Transmit Data output signal  |
| 68 | 3V3 | UART5_RXD | LBA | EIM_LBA<br><b>UART5_RXD_MUX</b><br>RDY                                      | GPIO3[24] | Receive Data input signal    |
| 69 | 3V3 | UART5_RTS | CS5 | EIM_CS5<br>NANDF_CE2<br>DTACK_B / <b>RTS_5</b><br>AUD4_RXFS<br>MISO / TRCLK | GPIO3[21] | Request to Send input signal |
| 70 | 3V3 | UART5_CTS | CS4 | EIM_CS4<br>NANDF_CE1<br><b>CTS_5</b> / AUD4_RXC<br>MOSI / TRSYNC            | GPIO3[20] | Clear to Send output signal  |
| 71 | GND | GND       |     |                                                                             |           |                              |

**KEYPAD**

|    |     |           |                 |                                                                 |           |                                  |
|----|-----|-----------|-----------------|-----------------------------------------------------------------|-----------|----------------------------------|
| 72 | 3V3 | KP_COL[0] | <b>KPP_COLO</b> | UART4_RXD_MUX<br>AUD5_TXD<br>SDMA_DBG_PC_4                      | GPIO3[1]  | Keypad Column selection signals. |
| 73 | 3V3 | KP_COL[1] | <b>KPP_COL1</b> | UART4_TXD_MUX<br>AUD5_RXD<br>SDMA_DBG_PC_5                      | GPIO3[2]  |                                  |
| 74 | 3V3 | KP_COL[2] | <b>KPP_COL2</b> | RTS_4 / AUD5_TXC<br>SDMA_DBG_PC_6<br>M3IF_CHOSEN_1<br>MASTER_1  | GPIO3[3]  |                                  |
| 75 | 3V3 | KP_COL[3] | <b>KPP_COL3</b> | CTS_4 / AUD5_TXFS<br>SDMA_DBG_PC_7<br>M3IF_CHOSEN_2<br>MASTER_2 | GPIO3[4]  |                                  |
| 76 | 3V3 | TXCAN     | GPIO_C          | PWMO / SCL CAPIN1 /<br>SS2<br>TXCAN                             | GPIO1[2]  | Module specific function         |
| 77 | 3V3 | KP_ROW[0] | <b>KPP_ROW0</b> | UART3_RXD / DTR_1<br>SDMA_DBG_PC_0                              | GPIO2[29] | Keypad Row selection signals.    |
| 78 | 3V3 | KP_ROW[1] | <b>KPP_ROW1</b> | UART3_TXD / DSR_1<br>SDMA_DBG_PC_1                              | GPIO2[30] |                                  |
| 79 | 3V3 | KP_ROW[2] | <b>KPP_ROW2</b> | RTS_3 / AUD5_RXC<br>CSI_D[0] / DCD_1<br>SDMA_DBG_PC_2           | GPIO2[31] |                                  |
| 80 | 3V3 | KP_ROW[3] | <b>KPP_ROW3</b> | CTS_3 / AUD5_RXFS<br>CSI_D[1] / RI_1<br>SDMA_DBG_PC_3           | GPIO3[0]  |                                  |
| 81 | 3V3 | RXCAN     | GPIO_D          | WDOG_B / SDA<br>COL[5] / CMPOUT1<br>RXCAN / SS2                 | GPIO1[3]  | Module specific function         |
| 82 | GND | GND       |                 |                                                                 |           |                                  |

**SSI 1 - Serial Audio Port 1 (Configurable to I2S Protocol and AC97)**

|    |     |          |            |                                    |                   |                     |
|----|-----|----------|------------|------------------------------------|-------------------|---------------------|
| 83 | 3V3 | SSI1_INT | EXT_ARMCLK |                                    | <b>GPIO3 [15]</b> | GPIO                |
| 84 | 3V3 | SSI1_RXD | EB1        | EIM_EB1_B<br><b>AUD4_RXD</b> / SS1 | GPIO2[13]         | Receive serial data |

| PIN | Type | Function | i.MX25 Pad Name | Alternate functions                | GPIO      | Description (refer to I.MX25 manuals for details) |
|-----|------|----------|-----------------|------------------------------------|-----------|---------------------------------------------------|
| 85  | 3V3  | SSI1_TXD | EB0             | EIM_EB0_B<br><b>AUD4_TXD</b> / SS0 | GPIO2[12] | Transmit serial data                              |
| 86  | 3V3  | SSI1_CLK | OE              | EIM_OE<br><b>AUD4_TXC</b>          | GPIO2[14] | Serial clock                                      |
| 87  | 3V3  | SSI1_FS  | RW              | EIM_RW<br><b>AUD4_TXFS</b>         | GPIO3[25] | Frame Sync                                        |
| 88  | GND  | GND      |                 |                                    |           |                                                   |

## SSI 2 - Serial Audio Port 2 (Configurable to I2S Protocol and AC97)

|    |     |          |              |                                                                            |                   |                      |
|----|-----|----------|--------------|----------------------------------------------------------------------------|-------------------|----------------------|
| 89 | 3V3 | SSI2_INT | UPLL_BYPCCLK |                                                                            | <b>GPIO3 [16]</b> | GPIO                 |
| 90 | 3V3 | SSI2_RXD | POWER_FAIL   | POWER_FAIL_INT<br><b>AUD7_RXD</b> / CTS_4                                  | GPIO3[19]         | Receive serial data  |
| 91 | 3V3 | SSI2_TXD | GPIO_E       | SCL / LCDC_LD[16]<br><b>AUD7_TXD</b><br>UART4_RXD_MUX<br>CTI_TRIG_IN0_6    | GPIO1[4]          | Transmit serial data |
| 92 | 3V3 | SSI2_CLK | GPIO_F       | LCDC_LD[17]<br>EPITO / <b>AUD7_TXC</b><br>UART4_TXD_MUX<br>CTI_TRIG_OUT0_6 | GPIO1[5]          | Serial clock         |
| 93 | 3V3 | SSI2_FS  | VSTBY_REQ    | <b>AUD7_TXFS</b><br>UART4_RTS                                              | GPIO3[17]         | Frame Sync           |
| 94 | GND | GND      |              |                                                                            |                   |                      |

## Secure Digital Interface 2

|     |     |     |  |  |  |               |
|-----|-----|-----|--|--|--|---------------|
| 95  | NC  |     |  |  |  | not connected |
| 96  | NC  |     |  |  |  | not connected |
| 97  | NC  |     |  |  |  | not connected |
| 98  | NC  |     |  |  |  | not connected |
| 99  | NC  |     |  |  |  | not connected |
| 100 | NC  |     |  |  |  | not connected |
| 101 | NC  |     |  |  |  | not connected |
| 102 | GND | GND |  |  |  |               |

## CMOS Sensor Interface

|     |     |           |                  |                                                             |           |                             |
|-----|-----|-----------|------------------|-------------------------------------------------------------|-----------|-----------------------------|
| 103 | 3V3 | CSI_D0    | <b>CSI_D2</b>    | UART5_RXD / DAT4<br>SCKR / CLK0 / MOSI<br>USBOTG_DATA[0]    | GPIO1[27] | Sensor port data            |
| 104 | 3V3 | CSI_D1    | <b>CSI_D3</b>    | UART5_TXD / DAT5<br>FSR / RST0 / MISO<br>USBOTG_DATA[1]     | GPIO1[28] | Sensor port data            |
| 105 | 3V3 | CSI_D2    | <b>CSI_D4</b>    | RTS_5 / DAT6 / HCKR<br>VEN0 / SCLK<br>USBOTG_DATA[2]        | GPIO1[29] | Sensor port data            |
| 106 | 3V3 | CSI_D3    | <b>CSI_D5</b>    | CTS_5 / DAT7 / SCKT<br>TX0 / RDY<br>USBOTG_DATA[3]          | GPIO1[30] | Sensor port data            |
| 107 | 3V3 | CSI_D4    | <b>CSI_D6</b>    | ROW[6] / CMD / FST<br>PD0 / SS0<br>USBOTG_DATA[4]           | GPIO1[31] | Sensor port data            |
| 108 | 3V3 | CSI_D5    | <b>CSI_D7</b>    | ROW[7] / CLK / HCKT<br>RX0 / SS1<br>USBOTG_DATA[5]          | GPIO1[6]  | Sensor port data            |
| 109 | 3V3 | CSI_D6    | <b>CSI_D8</b>    | COL[6] / AUD6_RXC<br>TX5_RX0 / CLK0/ SS2<br>USBOTG_DATA[6]  | GPIO1[7]  | Sensor port data            |
| 110 | 3V3 | CSI_D7    | <b>CSI_D9</b>    | COL[7] / AUD6_RXFS<br>TX4_RX1 / RST0/ SS3<br>USBOTG_DATA[7] | GPIO4[21] | Sensor port data            |
| 111 | GND | GND       |                  |                                                             |           |                             |
| 112 | 3V3 | CSI_HSYNC | <b>CSI_HSYNC</b> | AUD6_TXC / DAT2<br>TX1 / PD0<br>BT_RES[2]<br>USBOTG_NXT     | GPIO1[10] | Sensor port horizontal sync |
| 113 | 3V3 | CSI_VSYNC | <b>CSI_VSYNC</b> | AUD6_RXD / DAT1<br>TX2_RX3 / TX0<br>USBOTG_STP<br>BT_RES[1] | GPIO1[9]  | Sensor port vertical sync   |

| PIN                                            | Type | Function   | i.MX25 Pad Name   | Alternate functions                                                            | GPIO                | Description (refer to I.MX25 manuals for details)                                      |
|------------------------------------------------|------|------------|-------------------|--------------------------------------------------------------------------------|---------------------|----------------------------------------------------------------------------------------|
| 114                                            | 3V3  | CSI_PIXCLK | <b>CSI_PIXCLK</b> | AUD6_TXFS<br>DAT3 / TX0 / RX0<br>USBOTG_CLK<br>BT_RES[3]                       | GPIO1[11]           | Sensor port data latch clock                                                           |
| 115                                            | 3V3  | CSI_MCLK   | <b>CSI_MCLK</b>   | AUD6_TXD / DAT0<br>TX3_RX2 / VEN0<br>USBOTG_DIR<br>BT_RES[0]                   | GPIO1[8]            | Sensor port master clock                                                               |
| 116                                            | GND  | GND        |                   |                                                                                |                     |                                                                                        |
| <b>LCD Controller and Smart LCD Controller</b> |      |            |                   |                                                                                |                     |                                                                                        |
| 117                                            | 3V3  | GPIO       | CLKO              |                                                                                | GPIO2[21]           | Clock out pin from CRM, clock source is controllable and can also be used for debug.   |
| 118                                            | 3V3  | CONTRAST   | CONTRAST          | CAPIN1 / SS1 / DA_2<br>PWM0 / CRS<br>USBH2_PWR<br>WDOG_B                       |                     |                                                                                        |
| 119                                            | 3V3  | LD0        | <b>LD0</b>        | SLCDC_DATA[0]<br>CSI_D[0] / DATA[0]<br>CLK1 / USBH2_CLK<br>BT_MEM_CTRL[0]      | GPIO2[15]<br>47K-PU | LCD Data Bus                                                                           |
| 120                                            | 3V3  | LD1        | <b>LD1</b>        | SLCDC_DATA[1]<br>CSI_D[1] / DATA[1]<br>RST1 / USBH2_DIR<br>BT_MEM_CTRL[1]      | GPIO2[16]<br>10K-PD | LCD Data Bus                                                                           |
| 121                                            | 3V3  | LD2        | <b>LD2</b>        | SLCDC_DATA[2]<br>CSI_D[15] / DATA[2]<br>VEN1 / USBH2_STP<br>BT_MEM_TYPE[0]     | GPIO2[17]<br>10K-PD | LCD Data Bus                                                                           |
| 122                                            | 3V3  | LD3        | <b>LD3</b>        | SLCDC_DATA[3]<br>CSI_D[14] / DATA[3]<br>TX1 / USBH2_NXT<br>BT_MEM_TYPE[1]      | GPIO2[18]<br>10K-PD | LCD Data Bus                                                                           |
| 123                                            | 3V3  | LD4        | <b>LD4</b>        | SLCDC_DATA[4]<br>CSI_D[13] / DATA[4]<br>PD1 / USBH2_DATA[0]<br>BT_PAGE_SIZE[0] | GPIO2[19]<br>47K-PU | LCD Data Bus                                                                           |
| 124                                            | 3V3  | LD5        | <b>LD5</b>        | SLCDC_DATA[5]<br>CSI_D[12] / DATA[5]<br>RX1 / USBH2_DATA[1]<br>BT_PAGE_SIZE[1] | GPIO1[19]<br>10K-PD | LCD Data Bus                                                                           |
| 125                                            | 3V3  | GPIO       | A13               | EIM_DA_H[13]<br>LCDC_CLS                                                       | GPIO4[1]            |                                                                                        |
| 126                                            | 3V3  | GPIO       | A15               | EIM_DA_H2[15]<br>RST1 / LCDC_PS                                                | GPIO2[1]            |                                                                                        |
| 127                                            | 3V3  | LD6        | <b>LD6</b>        | SLCDC_DATA[6]<br>CSI_D[11] / DATA[6]<br>CLK1 USBH2_DATA[2]<br>BT_BUS_WIDTH[0]  | GPIO1[20]<br>10K-PD | LCD Data Bus                                                                           |
| 128                                            | 3V3  | LD7        | <b>LD7</b>        | SLCDC_DATA[7]<br>CSI_D[10] / DATA[7]<br>RST1 USBH2_DATA[3]<br>BT_BUS_WIDTH[1]  | GPIO1[21]<br>10K-PD | LCD Data Bus                                                                           |
| 129                                            | GND  | GND        |                   |                                                                                |                     |                                                                                        |
| 130                                            | 3V3  | LD8        | <b>LD8</b>        | SLCDC_DATA[8]<br>UART4_RXD/DATA[8]<br>AUD3_TXD / TX_ERR<br>CMD_BT_USB_SRC[0]   | 10K-PD              | LCD Data Bus                                                                           |
| 131                                            | 3V3  | LD9        | <b>LD9</b>        | SLCDC_DATA[9]<br>UART4_TXD/DATA[9]<br>AUD3_RXD / COL<br>CLK_BT_USB_SRC[1]      | 10K-PD              | LCD Data Bus                                                                           |
| 132                                            | 3V3  | LD10       | <b>LD10</b>       | SLCDC_DATA[10]<br>RTS_4 / DATA[10]<br>AUD3_TXC / RX_ERR<br>DAT0 / BT_MLC_SEL   | 10K-PD              | LCD Data Bus                                                                           |
| 133                                            | 3V3  | LD11       | <b>LD11</b>       | SLCDC_DATA[11]<br>CTS_4 / DATA[11]<br>AUD3_TXFS<br>RDATA[2] / DAT1             | 10K-PD              | LCD Data Bus                                                                           |
| 134                                            | 3V3  | GPIO       | A16               | EIM_A[16]<br>VEN1 / LCDC_REV                                                   | GPIO2[2]            | Signal for common electrode driving signal preparation (Sharp panel dedicated signal). |
| 135                                            | 3V3  | GPIO       | A14               | EIM_DA_H2[14]<br>CLK1 / LCDC_SPL                                               | GPIO2[0]            | Sampling start signal for left and right scanning.                                     |
| 136                                            | 3V3  | LD12       | <b>LD12</b>       | SLCDC_DATA[12]<br>MOSI / DATA[12]<br>ROW[6] / RDATA[3]<br>DAT2 / BT_SRC[0]     |                     | LCD Data Bus                                                                           |

| PIN | Type | Function    | i.MX25 Pad Name | Alternate functions                                                                 | GPIO                | Description (refer to I.MX25 manuals for details)                                                                                     |
|-----|------|-------------|-----------------|-------------------------------------------------------------------------------------|---------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| 137 | 3V3  | LD13        | <b>LD13</b>     | SLCDC_DATA[13]<br>MISO / DATA[13]<br>ROW[7] / TDATA[2]<br>DAT3 / BT_SRC[1]          |                     | LCD Data Bus                                                                                                                          |
| 138 | 3V3  | LD14        | <b>LD14</b>     | SLCDC_DATA[14]<br>SCLK / DATA[14]<br>COL[6] / TDATA[3]<br>AUD3_RXC<br>BT_EEPROM_CFG | 47K-PU              | LCD Data Bus                                                                                                                          |
| 139 | 3V3  | LD15        | <b>LD15</b>     | SLCDC_DATA[15]<br>RDY / DATA[15]<br>COL[7] / RX_CLK<br>AUD3_RXFS<br>BT_UART_SRC[0]  | 10K-PD              | LCD Data Bus                                                                                                                          |
| 140 | 3V3  | LD16 / GPIO | D15             | EIM_D[15] / DAT7<br><b>LCDC_LD[16]</b>                                              | GPIO4[5]            | LCD Data Bus                                                                                                                          |
| 141 | 3V3  | LD17 / GPIO | D14             | EIM_D[14] / DAT6<br><b>LCDC_LD[17]</b>                                              | GPIO4[6]            | LCD Data Bus                                                                                                                          |
| 142 | GND  | GND         |                 |                                                                                     |                     |                                                                                                                                       |
| 143 | 3V3  | HSYNC       | <b>HSYNC</b>    | SCL / BUFFER_EN<br>VEN1<br>USBH2_DATA[4]<br>BT_UART_SRC[1]                          | GPIO1[22]<br>10K-PD | Line Pulse or HSync                                                                                                                   |
| 144 | 3V3  | VSYN        | <b>VSYN</b>     | SDA / DMARQ / TX1<br>USBH2_DATA[5]<br>BT_UART_SRC[2]                                | GPIO1[23]<br>10K-PD | Frame Sync or Vsync—This signal also serves as the clock signal output for gate; driver (dedicated signal SPS for Sharp panel HR-TFT) |
| 145 | 3V3  | OE_ACD      | <b>OE_ACD</b>   | SLCDC_RS<br>SS0 / DA_1 / RX1<br>USBH2_DATA[7]<br>BT_LPB_FREQ[1]                     | GPIO1[25]<br>47K-PU | Alternate Crystal Direction/Output Enable                                                                                             |
| 146 | 3V3  | LSCLK       | <b>LSCLK</b>    | SLCDC_CS<br>DA_0 / PD1<br>USBH2_DATA[6]<br>BT_LPB_FREQ[0]                           | GPIO1[24]<br>47K-PU | Shift Clock                                                                                                                           |
| 147 | GND  | GND         |                 |                                                                                     |                     |                                                                                                                                       |

### Module Specific Signals

|     |     |      |      |                  |           |  |
|-----|-----|------|------|------------------|-----------|--|
| 148 | 3V3 | GPIO | A10  |                  | GPIO4[0]  |  |
| 149 | 3V3 | GPIO | A17  | TX1<br>TX_ERR    | GPIO2[3]  |  |
| 150 | 3V3 | GPIO | A18  | PD1<br>COL       | GPIO2[4]  |  |
| 151 | 3V3 | GPIO | A19  | RX1<br>RX_ERR    | GPIO2[5]  |  |
| 152 | 3V3 | GPIO | A20  | CLK1<br>RDATA[2] | GPIO2[6]  |  |
| 153 | 3V3 | GPIO | A21  | RST1<br>RDATA[3] | GPIO2[7]  |  |
| 154 | 3V3 | GPIO | A22  | VEN1<br>TDATA[2] | GPIO2[8]  |  |
| 155 | 3V3 | GPIO | A23  | TX1<br>TDATA[3]  | GPIO2[9]  |  |
| 156 | 3V3 | GPIO | A24  | PD1<br>RX_CLK    | GPIO2[10] |  |
| 157 | 3V3 | GPIO | A25  | RX1<br>CRS       | GPIO2[11] |  |
| 158 | 3V3 | GPIO | CS0  |                  | GPIO4[2]  |  |
| 159 | 3V3 | GPIO | CS1  | NANDF_CE3        | GPIO4[3]  |  |
| 160 | GND | GND  |      |                  |           |  |
| 161 | 3V3 | D[0] | D[0] |                  |           |  |
| 162 | 3V3 | D[1] | D[1] |                  |           |  |
| 163 | 3V3 | D[2] | D[2] |                  |           |  |
| 164 | 3V3 | D[3] | D[3] |                  |           |  |
| 165 | 3V3 | D[4] | D[4] |                  |           |  |
| 166 | 3V3 | D[5] | D[5] |                  |           |  |
| 167 | 3V3 | D[6] | D[6] |                  |           |  |

| PIN | Type         | Function    | i.MX25 Pad Name | Alternate functions | GPIO | Description (refer to I.MX25 manuals for details)                                                                                                                                                                                                                                                                                       |
|-----|--------------|-------------|-----------------|---------------------|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 168 | 3V3          | D[7]        | D[7]            |                     |      |                                                                                                                                                                                                                                                                                                                                         |
| 169 | 3V3          | A [0]       | A [0]           |                     |      |                                                                                                                                                                                                                                                                                                                                         |
| 170 | 3V3          | A [1]       | A [1]           |                     |      |                                                                                                                                                                                                                                                                                                                                         |
| 171 | GND          | GND         |                 |                     |      |                                                                                                                                                                                                                                                                                                                                         |
| 172 | NVDD_DR YICE | TAMPER_A    | TAMPER_A        |                     |      | DRYICE external tamper detect pins, active high. If either TAMPER_A or TAMPER_B asserted, then external tampering is detected. Should be tied to pull-down if no tamper detection is required on board.                                                                                                                                 |
| 173 | NVDD_DR YICE | TAMPER_B    | TAMPER_B        |                     |      |                                                                                                                                                                                                                                                                                                                                         |
| 174 | NVDD_DR YICE | MESH_C      | MESH_C          |                     |      | Wire-mesh tamper detect pins which can be routed at the PCB board to detect attempted tampering of a protected wire. MESH_C is active high and should be connected to an on-board pull-down if no tamper detection is required. MESH_D is active low and should be connected to an on-board pull-up if no tamper detection is required. |
| 175 | NVDD_DR YICE | MESH_D      | MESH_D          |                     |      |                                                                                                                                                                                                                                                                                                                                         |
| 176 | 3V3          | A [2]       | A [2]           |                     |      |                                                                                                                                                                                                                                                                                                                                         |
| 177 | 3V3          | A [3]       | A [3]           |                     |      |                                                                                                                                                                                                                                                                                                                                         |
| 178 | 3V3          | A [4]       | A [4]           |                     |      |                                                                                                                                                                                                                                                                                                                                         |
| 179 | 3V3          | A [5]       | A [5]           |                     |      |                                                                                                                                                                                                                                                                                                                                         |
| 180 | 3V3          | A [6]       | A [6]           |                     |      |                                                                                                                                                                                                                                                                                                                                         |
| 181 | 3V3          | A [7]       | A [7]           |                     |      |                                                                                                                                                                                                                                                                                                                                         |
| 182 | 3V3          | A [8]       | A [8]           |                     |      |                                                                                                                                                                                                                                                                                                                                         |
| 183 | GND          | GND         |                 |                     |      |                                                                                                                                                                                                                                                                                                                                         |
| 184 | analog       | REF         | REF             |                     |      | Touchscreen ADC External reference voltage (2.5 V). REF may be left floating if the internally generated 2.5 V supply is enabled. Use of an external reference is recommended.                                                                                                                                                          |
| 185 | analog       | XN          | XN              |                     |      | Touchscreen ADC input channels                                                                                                                                                                                                                                                                                                          |
| 186 | analog       | XP          | XP              |                     |      |                                                                                                                                                                                                                                                                                                                                         |
| 187 | analog       | YN          | YN              |                     |      |                                                                                                                                                                                                                                                                                                                                         |
| 188 | analog       | YP          | YP              |                     |      |                                                                                                                                                                                                                                                                                                                                         |
| 189 | analog       | WIPER       | WIPER           |                     |      |                                                                                                                                                                                                                                                                                                                                         |
| 190 | analog       | INAUX0      | INAUX0          |                     |      | General purpose measurements channels                                                                                                                                                                                                                                                                                                   |
| 191 | analog       | INAUX1      | INAUX1          |                     |      |                                                                                                                                                                                                                                                                                                                                         |
| 192 | analog       | INAUX2      | INAUX2          |                     |      |                                                                                                                                                                                                                                                                                                                                         |
| 193 | power        | NVCC_DRYICE | NVCC_DRYICE     |                     |      | DRYICE power supply output. Source can be SoC supply or backup supply. This pin can be used to power external tamper detect components.                                                                                                                                                                                                 |
| 194 | 3V3          | A [9]       | A [9]           |                     |      |                                                                                                                                                                                                                                                                                                                                         |
| 195 | 3V3          | A [11]      | A [11]          |                     |      |                                                                                                                                                                                                                                                                                                                                         |
| 196 | 3V3          | A [12]      | A [12]          |                     |      |                                                                                                                                                                                                                                                                                                                                         |
| 197 | NC           |             |                 |                     |      | not connected                                                                                                                                                                                                                                                                                                                           |
| 198 | NC           |             |                 |                     |      | not connected                                                                                                                                                                                                                                                                                                                           |
| 199 | NC           |             |                 |                     |      | not connected                                                                                                                                                                                                                                                                                                                           |
| 200 | GND          | GND         | GND             |                     |      |                                                                                                                                                                                                                                                                                                                                         |