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voipac

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**iMX6 OpenRex  
Single Board Computer**

Designed by FEDEVEL Academy

## Datasheet

| Date              | Revision | Changes                       |
|-------------------|----------|-------------------------------|
| November 15, 2016 | 1.0      | Initial Release               |
| April 6, 2017     | 1.1      | PCIe micro SIM socket updated |
|                   |          |                               |

## Table of Contents

|                                                                                               |           |
|-----------------------------------------------------------------------------------------------|-----------|
| <b>1. Introduction.....</b>                                                                   | <b>4</b>  |
| 1.1 General.....                                                                              | 4         |
| 1.2 Software.....                                                                             | 4         |
| 1.3 Booting Options.....                                                                      | 4         |
| 1.4 Hardware – Block Diagram .....                                                            | 5         |
| 1.5 Features.....                                                                             | 6         |
| 1.6 Reference Documents.....                                                                  | 7         |
| <b>2. Functional Processor Description.....</b>                                               | <b>7</b>  |
| 2.1 Features.....                                                                             | 7         |
| 2.2 i.MX6 Series Applications Processors Block Diagram.....                                   | 8         |
| <b>3. Features Description.....</b>                                                           | <b>9</b>  |
| 3.1 User Interfaces.....                                                                      | 9         |
| 3.2 Board Layout – Connectors, Jumpers, LEDs, Buttons and Peripheral selection resistors..... | 9         |
| 3.3 Connectors, Jumpers, LEDs, Buttons and Resistors list .....                               | 12        |
| <b>4. Connector Description.....</b>                                                          | <b>13</b> |
| 4.1 Pinout Description.....                                                                   | 13        |
| 4.1.1 J1 – Arduino Like Header.....                                                           | 13        |
| 4.1.2 J2 – Raspberry PI Compatible Connector.....                                             | 14        |
| 4.1.3 J3 – UART Serial Console.....                                                           | 15        |
| 4.1.4 J4 – USB 2x Host Stacked.....                                                           | 15        |
| 4.1.5 J5 – HDMI Output Connector.....                                                         | 16        |
| 4.1.6 J6 – Ethernet Connector.....                                                            | 17        |
| 4.1.7 J7 – CSI Camera Input or RGB Display Output.....                                        | 18        |
| 4.1.8 J8 – SATA Connector.....                                                                | 19        |
| 4.1.9 J9 – Power Input Connector.....                                                         | 20        |
| 4.1.10 J10 – Touchscreen Connector.....                                                       | 20        |
| 4.1.11 J11 – USB OTG.....                                                                     | 20        |
| 4.1.12 J12 – Raspberry Pi Camera or LVDS.....                                                 | 21        |
| 4.1.13 J13 – microSD™ Slot.....                                                               | 21        |
| 4.1.14 J14 – Audio Jack.....                                                                  | 22        |
| 4.1.15 J15 – PCIe Mini Card 1 Slot.....                                                       | 23        |
| 4.1.16 J17 – PCIe Micro SIM Socket .....                                                      | 24        |
| <b>5. Jumper, Buttons, LEDs and Resistors Description.....</b>                                | <b>25</b> |
| 5.1 Jumper Pinout Description.....                                                            | 25        |
| 5.1.1 JP1 – Power Input Selection.....                                                        | 25        |
| 5.1.2 JP2 – Boot Mode Selection.....                                                          | 25        |
| 5.2 Buttons and LEDs Description.....                                                         | 26        |
| 5.2.1 SW1 – Reset/Power button.....                                                           | 26        |
| 5.2.2 SW2 – User/Android Button (Home/Wake Up).....                                           | 26        |
| 5.2.3 SW3 – User/Android Button (Back/Volume-).....                                           | 26        |
| 5.2.4 SW4 – User/Android Button (Recent/Volume+).....                                         | 26        |
| 5.2.5 D1, D2, D3, D33 – CPU/MCU User LED (RED).....                                           | 27        |

|                                                 |           |
|-------------------------------------------------|-----------|
| 5.2.6 D5, D6, D7, D34 – CPU User LED (RED)..... | 27        |
| 5.2.7 D11, D25, D26 – MPCIE LEDs (GREEN).....   | 27        |
| 5.2.8 D12 – USB LED (ORANGE).....               | 27        |
| 5.2.9 D14 – microSD LED (ORANGE).....           | 28        |
| 5.2.10 D21 – CPU User LED (ORANGE).....         | 28        |
| 5.2.11 D22 – Power OK LED (GREEN).....          | 28        |
| 5.2.12 D24 – MCU User LED (ORANGE).....         | 28        |
| 5.3 Resistors Selection Description.....        | 29        |
| 5.3.1 PSR1 USB0 Routing.....                    | 29        |
| 5.3.2 PSR2 USB1 Routing.....                    | 29        |
| 5.3.3 PSR3 USB1 to Header / MCU Routing.....    | 30        |
| 5.3.4 PSR4 CSI / LVDS Routing.....              | 30        |
| <b>6. Technical Specifications.....</b>         | <b>31</b> |
| 6.1 Input Voltage.....                          | 31        |
| 6.2 Mechanical.....                             | 32        |
| 6.3 Temperature Range.....                      | 33        |
| 6.4 CE compliance of Voipac products.....       | 33        |
| 6.5 RoHS and WEEE Compliance.....               | 33        |
| Warranty:.....                                  | 34        |
| Disclaimer:.....                                | 34        |
| Trademark Acknowledgment:.....                  | 34        |

# 1. Introduction

## 1.1 General

**iMX6 OpenRex is completely open source** Single Board Computer (SBC) powered by NXP (Freescale) i.MX6 ARM® Cortex® A9 multicore CPU. The board further features NXP LPC1345 ARM® Cortex® M3 microcontroller, multiple camera inputs, and a series of built-in sensors including compass & accelerometer, gyroscope, humidity sensor, and temperature sensor making it ideal choice for industrial as well as home automation applications.

It was designed also for playing, learning and hacking thus includes Raspberry Pi & Arduino like GPIO headers, and is **available with complete Altium Designer project documentation** including **schematics** and **PCB layout** source files, as well as **manufacturing documentation**.

## 1.2 Software

Voipac fully supports Linux operating system with drivers for all basic interfaces. Custom additional drivers for specific applications can be developed upon request.

| Operating system | Description                                                     |
|------------------|-----------------------------------------------------------------|
| Yocto            | Yocto Project Linux distribution preinstalled on microSDHC card |
| Android          | TBA                                                             |

## 1.3 Booting Options

iMX6 OpenRex Single Board Computer in standard configuration comes with e-Fuses set for boot from SPI Flash. There are more booting possibilities:

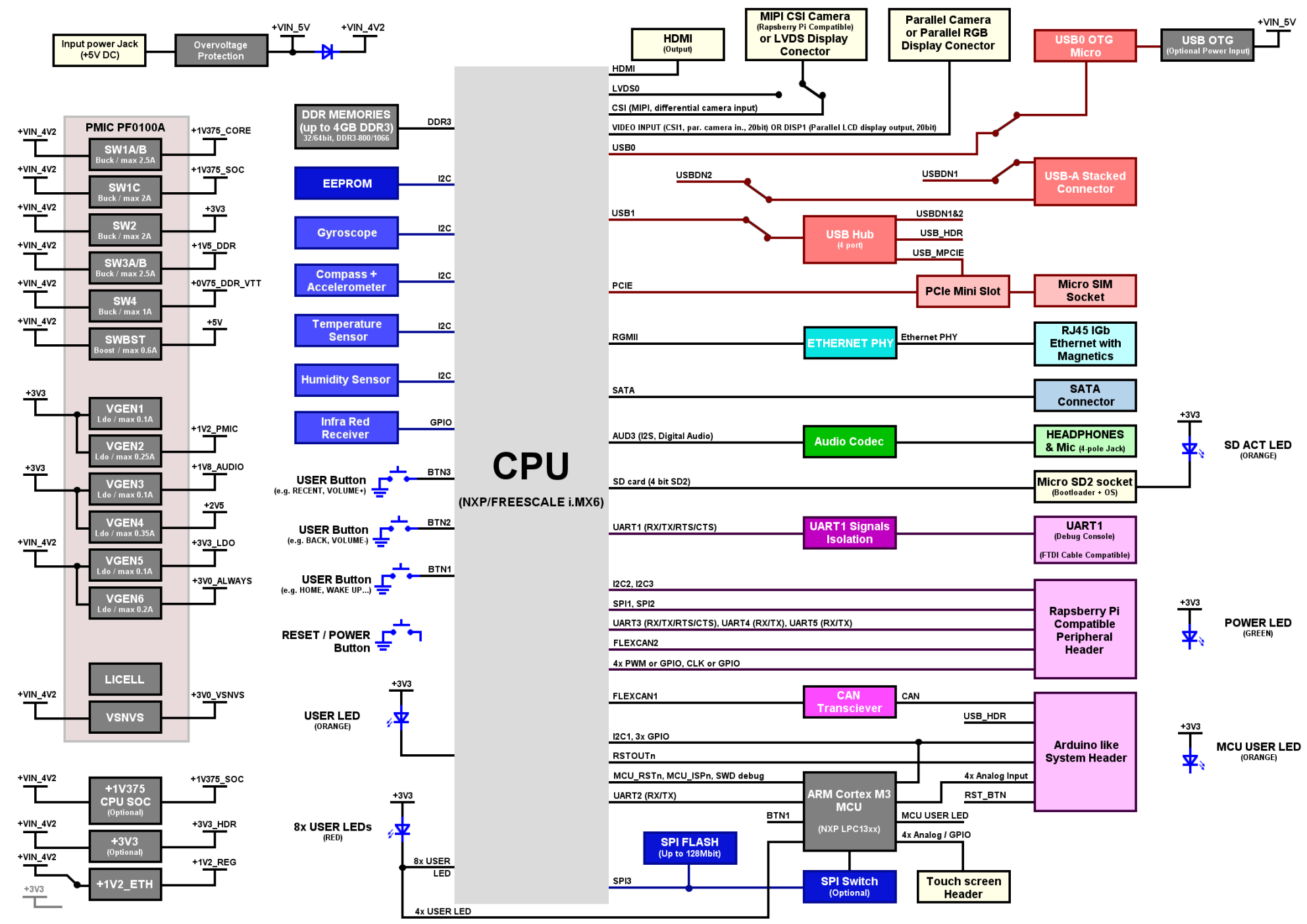
| Booting Option | Description                                                                                   |
|----------------|-----------------------------------------------------------------------------------------------|
| SD Card        | A standard configuration board is set for this boot option (SD2) in u-boot through SPI Flash. |
| I2C            | Supported possibility for EEPROM booting (I2C1).                                              |
| SPI            | Default booting from SPI Flash on OpenRex Single Board Computer (SPI3).                       |
| SPI            | Possible SPI1 booting. Signals are on connector J2 (RPI Header).                              |
| SATA           | Available only with i.MX6 QuadPlus / Quad / Dual processors.                                  |

The SBC supports following booting options:

- Boot From e-Fuses : Standard mode
- Serial Downloader : USB mode

Internal Boot mode is not supported.

1.4 Hardware – Block Diagram



## 1.5 Features

| FEATURES                                                                            |                                                            | ULTRA<br>CONFIGURATION | MAX<br>CONFIGURATION | BASIC<br>CONFIGURATION |
|-------------------------------------------------------------------------------------|------------------------------------------------------------|------------------------|----------------------|------------------------|
| NXP (Freescale) i.MX6 ARM® Cortex® A9                                               |                                                            | QuadPlus CPU, 1GHz     | Quad CPU, 1GHz       | Solo CPU, 1GHz         |
| NXP microcontroller <a href="#">LPC1345FHN33</a> ARM® Cortex® M3, 72MHz             |                                                            | ✓                      | ✓                    | ✓                      |
| DDR3-1066 SDRAM                                                                     |                                                            | 4GB (533MHz)           | 2GB (533MHz)         | 512MB (400MHz)         |
| 1x 10/100/1000 Mbps Ethernet                                                        |                                                            | ✓                      | ✓                    | ✓                      |
| 1x HDMI Output (up to QXGA 2048×1536)                                               |                                                            | ✓                      | ✓                    | ✓                      |
| 1x Parallel CSI Camera input or RGB Parallel Display output                         |                                                            | ✓                      | ✓                    | ✓                      |
| 1x Differential Camera Input (Compatible with Raspberry Pi) or LVDS display output) |                                                            | ✓                      | ✓                    | ✓                      |
| 1x SATA                                                                             |                                                            | ✓                      | ✓                    | ✗                      |
| 1x micro SD                                                                         |                                                            | ✓                      | ✓                    | ✓                      |
| PCIE mini slot + micro SIM (can be used for WiFi or Wireless modem)                 |                                                            | ✓                      | ✓                    | ✓                      |
| 1x USB OTG Micro                                                                    |                                                            | ✓                      | ✓                    | ✓                      |
| 2x USB                                                                              |                                                            | ✓                      | ✓                    | ✓                      |
| 1x CAN transceiver                                                                  |                                                            | ✓                      | ✓                    | ✓                      |
| 1x Compass + Accelerometer                                                          |                                                            | ✓                      | ✓                    | ✓                      |
| 1x Gyroscope                                                                        |                                                            | ✓                      | ✓                    | ✓                      |
| 1x Humidity sensor                                                                  |                                                            | ✓                      | ✓                    | ✓                      |
| 1x Temperature sensor                                                               |                                                            | ✓                      | ✓                    | ✓                      |
| 1x Audio (Headphones output, Microphone input)                                      |                                                            | ✓                      | ✓                    | ✓                      |
| 1x Touchscreen connector (Touchscreen through LPC1345 / Optional 4x Analog input)   |                                                            | ✓                      | ✓                    | ✓                      |
| 1x EEPROM                                                                           |                                                            | 16Kbit I2C             | 16Kbit I2C           | 2Kbit I2C              |
| 1x 32Mbit SPI FLASH                                                                 |                                                            | ✓                      | ✓                    | ✓                      |
| 1x IR Receiver                                                                      |                                                            | ✓                      | ✓                    | ✓                      |
| 1x Arduino type header (Default)                                                    | 4x Analog input<br>3x GPIO<br>1x I2C<br>1x CAN<br>1x USB   | ✓                      | ✓                    | ✓                      |
| 1x Raspberry Pi type header (Default)                                               | 2x I2C<br>2x UART<br>1x CAN TX/RX<br>2x SPI<br>3x GPIO/PWM | ✓                      | ✓                    | ✓                      |
| 1x UART Debug console (FTDI compatible)                                             |                                                            | ✓                      | ✓                    | ✓                      |
| 8+2 USER LED                                                                        |                                                            | ✓                      | ✓                    | ✓                      |
| Power LED, SD Card LED, USB HUB LED                                                 |                                                            | ✓                      | ✓                    | ✓                      |
| 1x Reset button, 3x User button (e.g. Home, Volume Up, Volume Down)                 |                                                            | ✓                      | ✓                    | ✓                      |
| Size: 70 x 95 mm (2.75 x 3.75 inch)                                                 |                                                            |                        |                      |                        |
| Input power: 5V DC (through Power Jack or USB micro)                                |                                                            |                        |                      |                        |
| 8GB microSDHC Class 4 memory card                                                   |                                                            |                        |                      |                        |
| 1x Aluminum 14x14x14mm heatsink                                                     |                                                            |                        |                      |                        |
| 0°C to +70°C commercial temperature range                                           |                                                            |                        |                      |                        |
| Yocto Project Linux distribution preinstalled on microSDHC card                     |                                                            |                        |                      |                        |
| Lead free / RoHS compliant                                                          |                                                            |                        |                      |                        |

## 1.6 Reference Documents

For more detailed technical information about the iMX6 OpenRex SBC components, please refer to the web resources and documents listed below.

| Component                                                             | Manufacturer         | Type                                                     |
|-----------------------------------------------------------------------|----------------------|----------------------------------------------------------|
| <b>Microprocessor</b> ARM® Cortex®-A9                                 | NXP (Freescale)      | <a href="#">i.MX6 QuadPlus / i.MX6 Quad / i.MX6 Solo</a> |
| <b>Microcontroller</b> ARM® Cortex®-M3 LPC13xx                        | NXP                  | <a href="#">LPC1345FHN33</a>                             |
| <b>DDR3 SDRAM</b> 4GBIT 800MHZ FBGA                                   | Micron Technology    | <a href="#">MT41J256M16HA-125:E</a>                      |
| <b>EEPROM</b> 2KBIT(BASIC Config.) / 16KBIT(MAX Config.) 400KHZ 8MSOP | Rohm Semiconductor   | <a href="#">BR24Lxxx-W</a>                               |
| <b>SPI FLASH</b> 32MBIT                                               | Microchip Technology | <a href="#">SST26VF032B-104I/MF-ND</a>                   |
| Transceiver Full <b>Ethernet</b>                                      | Microchip Technology | <a href="#">KSZ9021RN</a>                                |
| <b>HDMI</b> Transmitter IC Consumer Electronics                       | ON Semiconductor     | <a href="#">CM2020-00TR</a>                              |
| Stereo <b>Audio</b> Interface                                         | NXP (Freescale)      | <a href="#">SGTL5000XNAA3R2</a>                          |
| <b>USB Hub</b> Controller USB 2.0                                     | Microchip Technology | <a href="#">USB2514BI-AEZG</a>                           |
| High Speed <b>CAN Transceiver</b>                                     | NXP (Freescale)      | <a href="#">TJA1040T</a>                                 |
| <b>IR Receiver</b> Module                                             | Vishay Semiconductor | <a href="#">TSOP38238</a>                                |
| 3-Axis Digital Angular Rate <b>Gyroscope</b>                          | NXP (Freescale)      | <a href="#">FXAS21002CQR1</a>                            |
| 3-Axis Linear <b>Accelerometer</b> and 3-Axis <b>Magnetometer</b>     | NXP (Freescale)      | <a href="#">FXOS8700CQR1</a>                             |
| <b>Temperature Sensor</b> Digital                                     | Texas Instruments    | <a href="#">TMP101NA</a>                                 |
| <b>Humidity and Temperature Sensor</b>                                | Sensirion AG         | <a href="#">SHT21</a>                                    |
| 14 Channel Configurable <b>Power Management Integrated Circuit</b>    | NXP (Freescale)      | <a href="#">MMPF0100NPAEP</a>                            |
| Compact Synchronous Buck Regulator                                    | Intersil             | <a href="#">ISL8024AIRTAJZ-T7A</a>                       |

## 2. Functional Processor Description

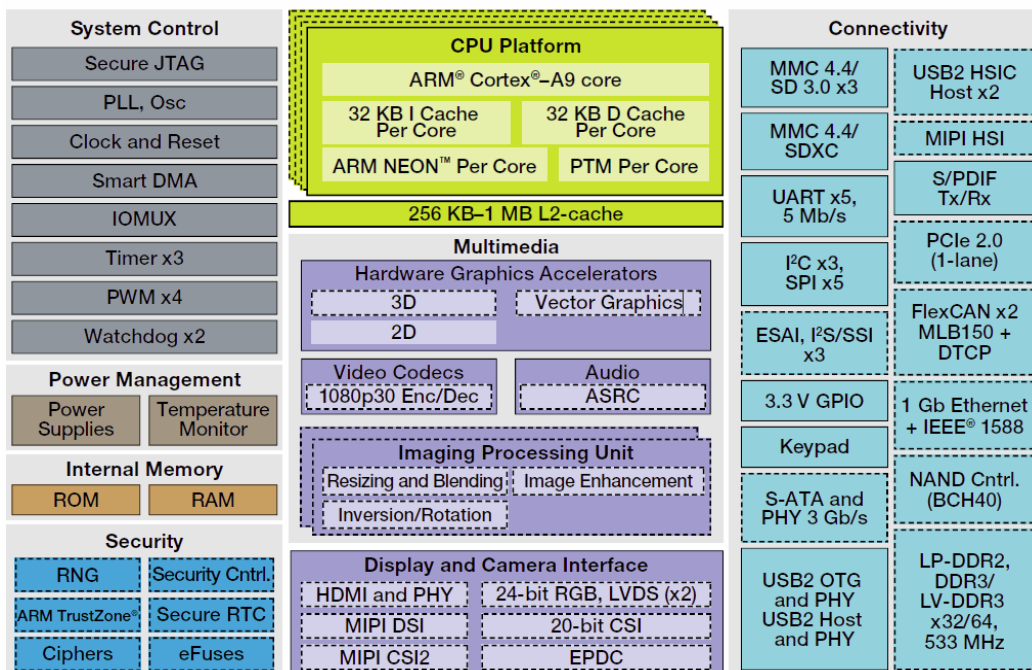
### 2.1 Features

The i.MX6 processor features NXP's advanced and power-efficient implementation of the ARM® Cortex® A9 core, which operates at speeds as high as 1,2 GHz. Up to 533 MHz DDR3 and mobile DDR DRAM clock rates are supported. The CPU is suitable for the following applications:

|                                  |                                                 |                                          |
|----------------------------------|-------------------------------------------------|------------------------------------------|
| • <b>Tablets</b>                 | • <b>Smartbooks</b>                             | • <b>E-Readers</b>                       |
| • <b>Home audio systems</b>      | • <b>Home energy management systems</b>         | • <b>Portable medical devices</b>        |
| • <b>Automotive infotainment</b> | • <b>In-flight entertainment</b>                | • <b>Point-of-sale devices</b>           |
| • <b>Digital signage</b>         | • <b>Intelligent industrial control systems</b> | • <b>Vehicle to vehicle connectivity</b> |
| • <b>Human-machine interface</b> | • <b>IP phones, IPTV</b>                        | • <b>Secure smart-connected devices</b>  |

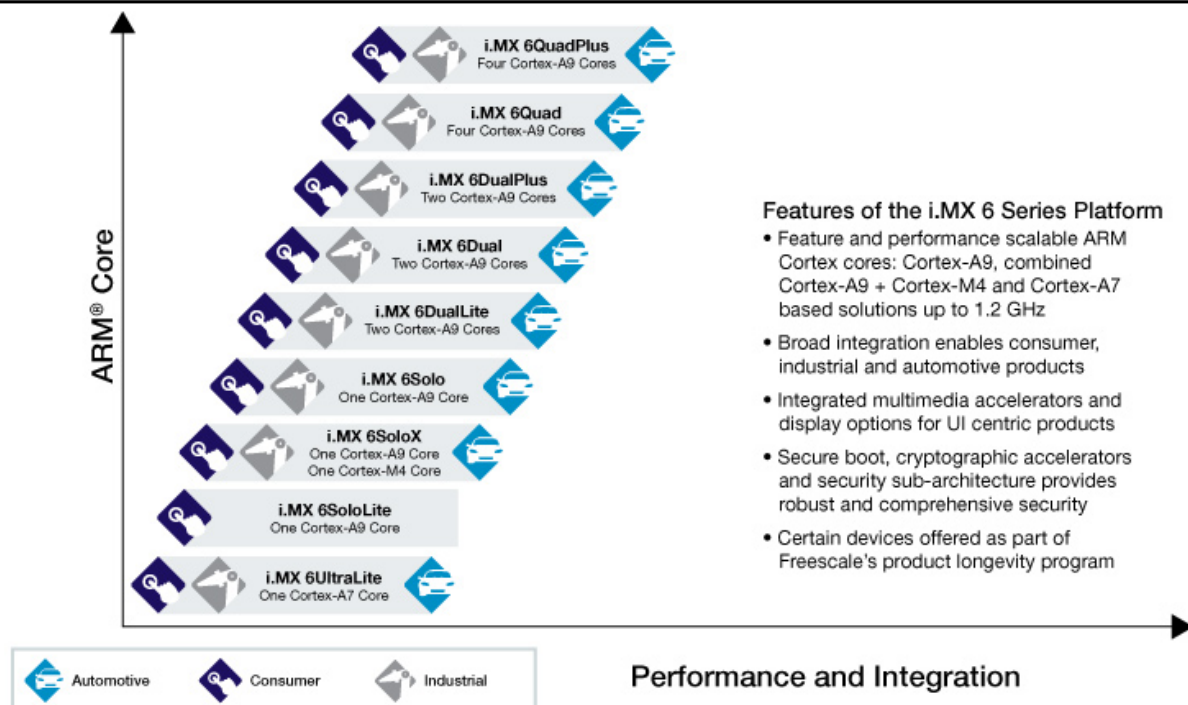
More information in interactive table on [NXP /Freescale webpage](#)

## 2.2 i.MX6 Series Applications Processors Block Diagram



Available on certain product families. More information in interactive table on [NXP/Freescale's webpage](http://NXP/Freescale's webpage)

### i.MX 6 Series



|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>i.MX6 Quad</b><br><b>Quad ARM® Cortex®-A9 up to 1.2 GHz</b> <ul style="list-style-type: none"> <li>• 1 MB L2 cache, NEON, VFPv16 TrustZone</li> <li>• 3D graphics with four shaders</li> <li>• Two 2D graphics engines</li> <li>• 64-bit DDR3 and 2-channel 32-bit LPDDR2 at 533 MHz</li> <li>• Gigabit Ethernet MAC</li> <li>• Integrated SATA-II</li> <li>• HDMIv1.4 controller plus PHY</li> <li>• LVDS controller plus PHY</li> <li>• PCIe controller plus PHY</li> <li>• MLB and FlexCAN controllers</li> </ul> | <b>i.MX6 QuadPlus</b><br><b>Quad ARM® Cortex®-A9 up to 1.2 GHz</b> <ul style="list-style-type: none"> <li>• 1 MB L2 cache, NEON, VFPv16 TrustZone</li> <li>• <b>Enhanced</b> 3D graphics with four shaders</li> <li>• <b>Enhanced</b> Two 2D graphics engines</li> <li>• <b>Prefetch &amp; Resolve Engine</b></li> <li>• <b>Optimized</b> 64-bit DDR3 and 2-channel 32-bit LPDDR2 at 533 MHz</li> <li>• Gigabit Ethernet MAC</li> <li>• Integrated SATA-II</li> <li>• HDMIv1.4 controller plus PHY</li> <li>• LVDS controller plus PHY</li> <li>• PCIe controller plus PHY</li> <li>• MLB and FlexCAN controllers</li> </ul> |
| <b>i.MX6 Solo</b><br><b>Single ARM® Cortex®-A9 up to 1.0 GHz</b> <ul style="list-style-type: none"> <li>• 512 KB L2 cache, NEON, VFPv16 TrustZone</li> <li>• 3D graphics with one shader</li> <li>• 2D graphics</li> <li>• 32-bit DDR3 and LPDDR2 at 400 MHz</li> <li>• Gigabit Ethernet MAC</li> <li>• Integrated EPD controller</li> <li>• HDMIv1.4 controller plus PHY</li> <li>• LVDS controller plus PHY</li> <li>• PCIe controller plus PHY</li> <li>• MLB and FlexCAN controllers</li> </ul>                     | <b>i.MX6 Dual</b><br><b>Dual ARM® Cortex®-A9 up to 1.2 GHz</b> <ul style="list-style-type: none"> <li>• <b>1 MB</b> L2 cache, NEON, VFPv16 TrustZone</li> <li>• 3D graphics with <b>four</b> shaders</li> <li>• <b>Two</b> 2D graphics engines</li> <li>• <b>64-bit</b> DDR3 and 2-channel 32-bit LPDDR2 at 533 MHz</li> <li>• Gigabit Ethernet MAC</li> <li>• Integrated <b>SATA-II</b></li> <li>• HDMIv1.4 controller plus PHY</li> <li>• LVDS controller plus PHY</li> <li>• PCIe controller plus PHY</li> <li>• MLB and FlexCAN controllers</li> </ul>                                                                   |

↑↑ Red indicates change from table to the left

## 3. Features Description

### 3.1 User Interfaces

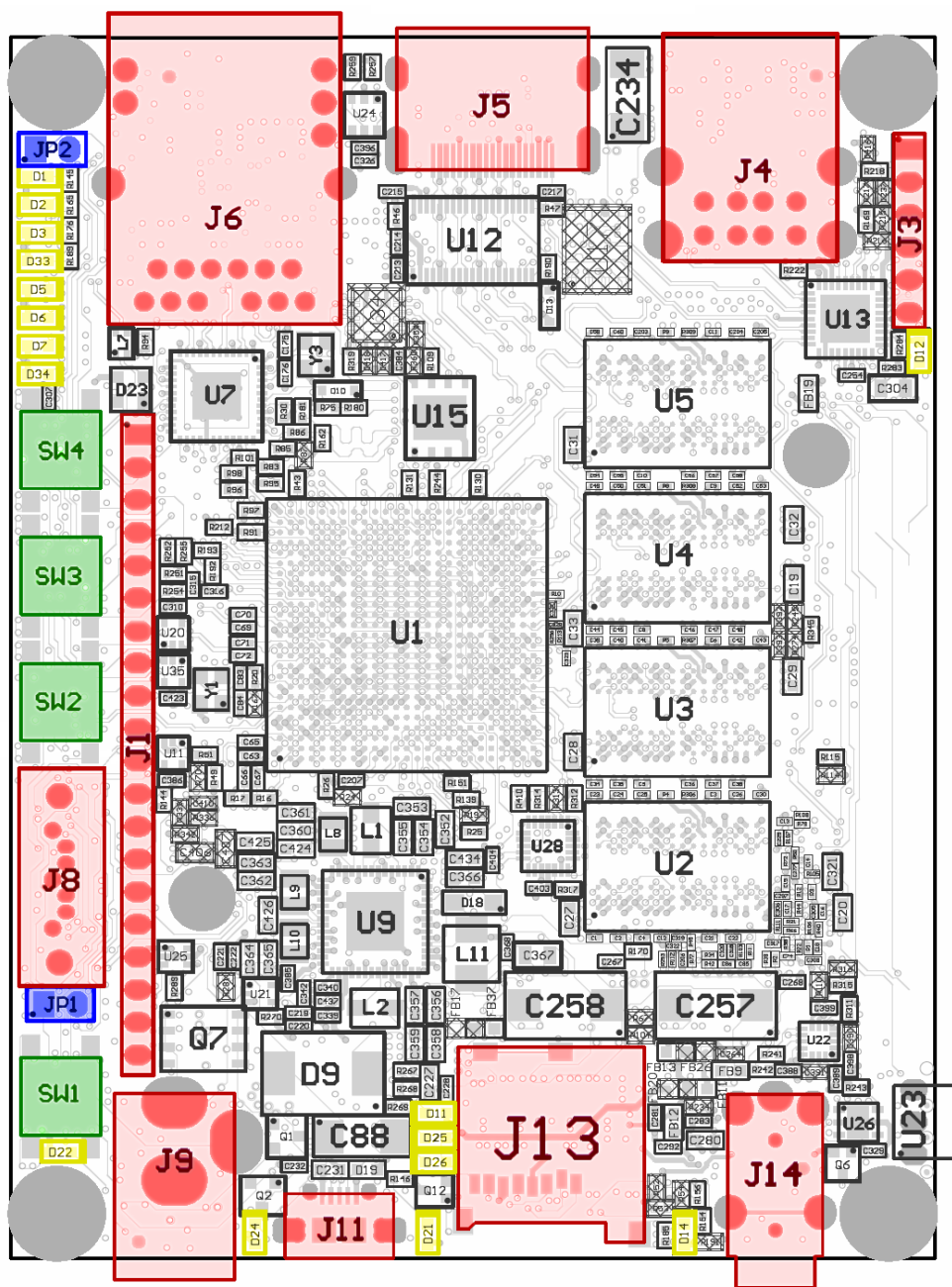
The following user interfaces are available on the Voipac iMX6 OpenRex SBC.

| Interface   | Description                                                                                                  |
|-------------|--------------------------------------------------------------------------------------------------------------|
| HDMI        | HDMI Output with Audio                                                                                       |
| USB         | 1x USB OTG, 2x USB, 1x USB on Header, 1x USB on Mini PCIe Slot                                               |
| PCIE        | Mini Card Socket (PCIE & USB)                                                                                |
| Power Input | Power Jack or USB Micro Connector                                                                            |
| Headers     | 4x UART, 2x SPI, 1x CAN (Differential), 3x I2C, 3x PWM, 8x GPIO, 4x Analog Inputs, Power Output +3V3 and +5V |

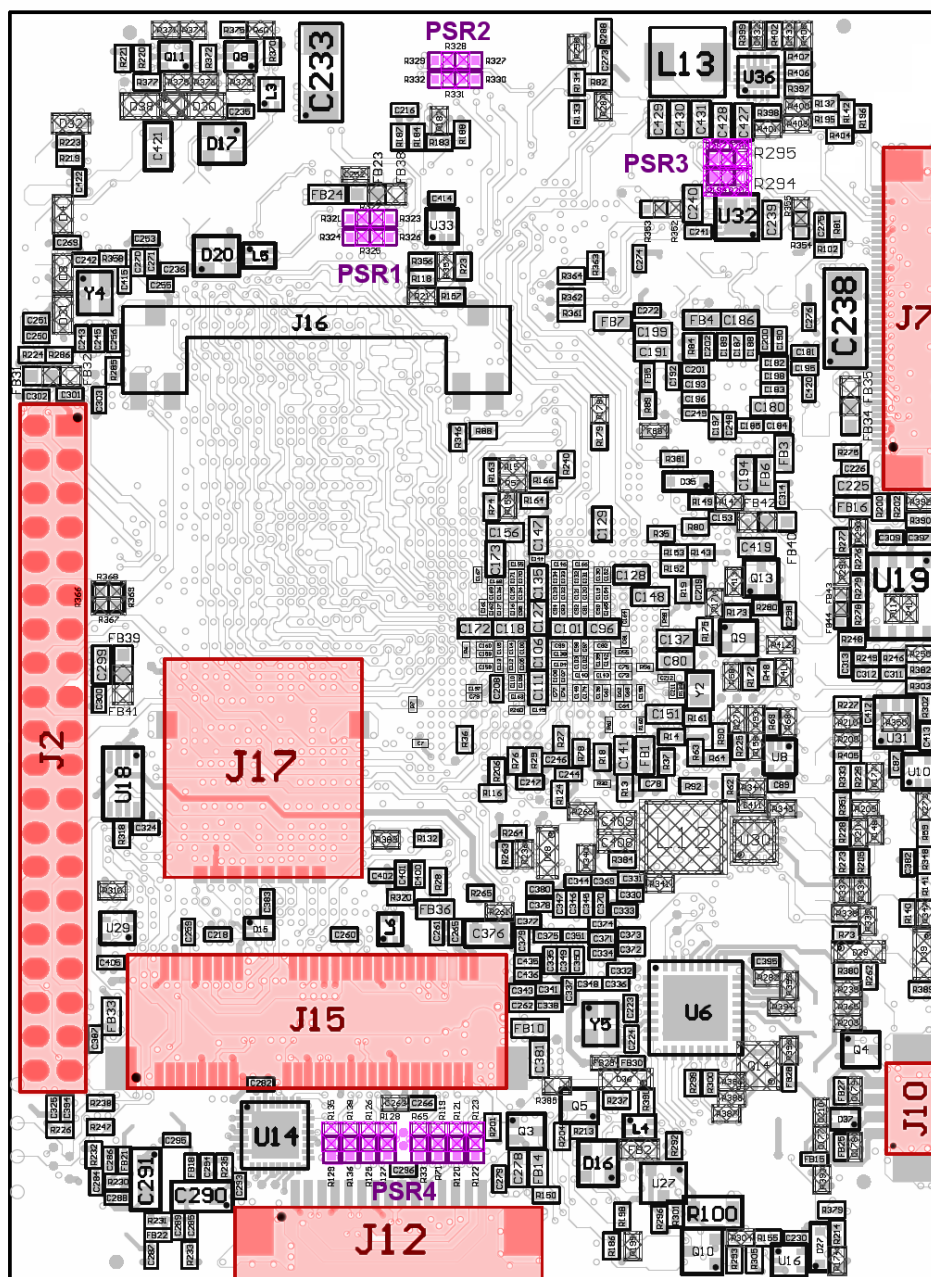
### 3.2 Board Layout – Connectors, Jumpers, LEDs, Buttons and Peripheral selection resistors

The top and bottom component placement on the next page shows interfaces layout of the iMX6 OpenRex SBC. All useful interfaces are shown in assembly top and bottom drawings and summarized in subsection 3.3.

## TOP SIDE



## BOTTOM SIDE



### 3.3 Connectors, Jumpers, LEDs, Buttons and Resistors list

| CONNECTORS |                                        |      |
|------------|----------------------------------------|------|
| Ref.Num.   | Description                            | Page |
| J1         | Arduino Like Header                    | 13   |
| J2         | Raspberry Pi Compatible Connector      | 14   |
| J3         | UART Serial Console                    | 15   |
| J4         | USB 2x Host Stacked                    | 15   |
| J5         | HDMI Output Connector                  | 16   |
| J6         | 1G Ethernet Connector RJ-45            | 17   |
| J7         | CSI Camera Input or RGB Display Output | 18   |
| J8         | SATA Connector                         | 19   |
| J9         | Power Jack                             | 20   |
| J10        | Touchscreen Connector                  | 20   |
| J11        | USB OTG                                | 20   |
| J12        | Raspberry Pi Camera or LVDS            | 21   |
| J13        | Micro SD Slot                          | 21   |
| J14        | Audio Jack                             | 22   |
| J15        | PCIe Mini Card Slot                    | 23   |
| J16        | PCIe Mini Card Latch                   |      |
| J17        | PCIe Micro SIM Socket                  | 24   |

| PERIPHERAL SELECTIONS RESISTORS |                              |      |
|---------------------------------|------------------------------|------|
| Ref.Num.                        | Description                  | Page |
| PSR1                            | USB0 Routing                 | 29   |
| PSR2                            | USB1 Routing                 | 29   |
| PSR3                            | USB1 to Header / MCU Routing | 30   |
| PSR4                            | CSI/LVDS Routing             | 30   |

| BUTTONS  |                                      |      |
|----------|--------------------------------------|------|
| Ref.Num. | Description                          | Page |
| SW1      | Reset /Power Button                  | 26   |
| SW2      | User/Android Button (Home/Wake Up)   | 26   |
| SW3      | User/Android Button (Back/Volume-)   | 26   |
| SW4      | User/Android Button (Recent/Volume+) | 26   |

| LEDS     |                  |      |
|----------|------------------|------|
| Ref.Num. | Description      | Page |
| D1       | CPU/MCU User LED | 27   |
| D2       | CPU/MCU User LED | 27   |
| D3       | CPU/MCU User LED | 27   |
| D5       | CPU User LED     | 27   |
| D6       | CPU User LED     | 27   |
| D7       | CPU User LED     | 27   |
| D11      | MPCIE LED        | 27   |
| D12      | USB Hub LED      | 27   |
| D14      | microSD LED      | 28   |
| D21      | CPU User LED     | 28   |
| D22      | Power OK LED     | 28   |
| D24      | MCU User LED     | 28   |
| D25      | MPCIE LED        | 27   |
| D26      | MPCIE LED        | 27   |
| D33      | CPU/MCU User LED | 27   |
| D34      | CPU User LED     | 27   |

| JUMPERS  |                       |      |
|----------|-----------------------|------|
| Ref.Num. | Description           | Page |
| JP1      | Power Input Selection | 25   |
| JP2      | Boot Mode selection   | 25   |

## 4. Connector Description

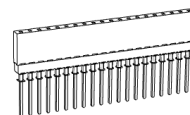
This chapter describes the connectors of the iMX6 OpenRex SBC. Some connectors have dedicated functionality, but some like TFT can be used also for other purposes, like general purpose IO (GPIO) or general expansion bus. Described functions are **default**.

### 4.1 Pinout Description

#### 4.1.1 J1 – Arduino Like Header (CONN RCPT 40POS .100" GOLD)

Description: 20 Position Receptacle Connector 0.100" (2.54mm) Through Hole Gold.  
The Connector is accesible from both sides. More functions are supported.  
(See Schematics, page 24)

Manufacturer: Samtec Inc.  
Connector: [ESQ-120-14-G-S](#)



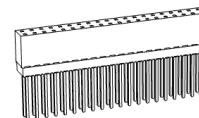
| PIN | Signal Name | Type | Description |
|-----|-------------|------|-------------|
| 1   | +VIN_5V     | PO   |             |
| 2   | USB_HDR_N   | I/O  |             |
| 3   | USB_HDR_P   | I/O  |             |
| 4   | GND         | G    |             |
| 5   | I2C1_SDA    | I/O  |             |
| 6   | I2C1_SCL    | I/O  |             |
| 7   | +3V3_HDR    | PO   |             |
| 8   | CAN_N       | I/O  |             |
| 9   | CAN_P       | I/O  |             |
| 10  | GND         | G    |             |
| 11  | CPU_GPIO0   | I/O  |             |
| 12  | CPU_GPIO1   | I/O  |             |
| 13  | CPU_GPIO2   | I/O  |             |
| 14  | RSTOUTn     | O    |             |
| 15  | RST_BTN_HDR | I    |             |
| 16  | GND         | G    |             |
| 17  | ANALOG_IN_0 | I    |             |
| 18  | ANALOG_IN_1 | I    |             |
| 19  | ANALOG_IN_2 | I    |             |
| 20  | ANALOG_IN_3 | I    |             |

#### 4.1.2 J2 – Raspberry PI Compatible Connector (CONN RCPT 40POS .100" DUAL GOLD)

Description: 40 Position Receptacle Connector 0.100" (2.54mm) Through Hole Gold.  
The Connector is accesible from both sides. More functions are supported.

(See Schematics, page 24)

Manufacturer: Samtec Inc.  
Connector: [ESQ-120-14-G-D](#)

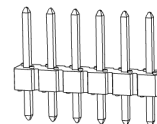


| Description | Type | Signal Name   | PIN | PIN | Signal Name   | Type | Description |
|-------------|------|---------------|-----|-----|---------------|------|-------------|
|             | PO   | +3V3_HDR      | 1   | 2   | +VIN_5V       | PO   |             |
|             | I/O  | I2C3_SDA      | 3   | 4   | +VIN_5V       | PO   |             |
|             | O    | I2C3_SCL      | 5   | 6   | GND           | G    |             |
|             | I/O  | GPIO_OR_CLK   | 7   | 8   | UART3_TXD     | O    |             |
|             | G    | GND           | 9   | 10  | UART3_RXD     | I    |             |
|             | O    | UART3_RTS     | 11  | 12  | UART_TXD      | O    |             |
|             | I    | UART4_RXD     | 13  | 14  | GND           | G    |             |
|             | O    | FLEXCAN2_TX   | 15  | 16  | FLEXCAN2_RX   | I    |             |
|             | PO   | +3V3_HDR      | 17  | 18  | UART5_RXD     | I    |             |
|             | O    | CSPI1_MOSI    | 19  | 20  | GND           | G    |             |
|             | I    | CSPI1_MISO    | 21  | 22  | UART5_TXD     | O    |             |
|             | O    | CSPI1_CLK     | 23  | 24  | CSPI1_CS0     | O    |             |
|             | G    | GND           | 25  | 26  | CSPI1_CS1     | O    |             |
|             | I/O  | I2C2_SDA      | 27  | 28  | I2C2_SCL      | O    |             |
|             | I/O  | GPIO_OR_PWM_1 | 29  | 30  | GND           | G    |             |
|             | I/O  | GPIO_OR_PWM_2 | 31  | 32  | GPIO_OR_PWM_3 | I/O  |             |
|             | I/O  | GPIO_OR_PWM_4 | 33  | 34  | GND           | G    |             |
|             | O    | CSPI2_CS0     | 35  | 36  | UART3_CTS     | I    |             |
|             | O    | CSPI2_MOSI    | 37  | 38  | CSPI2_CLK     | O    |             |
|             | G    | GND           | 39  | 40  | CSPI2_MISO    | I    |             |

#### 4.1.3 J3 – UART Serial Console (CONN HEADER 6POS .100 STR 15AU)

Description: 6 Positions Header, Unshrouded Connector 0.100" (2.54mm) Through Hole Gold or Gold, GXT™.  
Serial console header is designed to be used with FTDI TTL-232R-3V3 TTL to USB Serial Converter.

Manufacturer: Amphenol FCI  
Connector: [68001-206HLF](#)

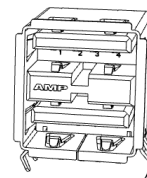


| PIN | Signal Name    | Type | Description |
|-----|----------------|------|-------------|
| 1   | GND            | G    |             |
| 2   | UART1_RTS_FTDI | O    |             |
| 3   | +5V_FTDI       | PI   |             |
| 4   | UART1_RXD_FTDI | I    |             |
| 5   | UART1_TXD_FTDI | O    |             |
| 6   | UART1_CTS_FTDI | I    |             |

#### 4.1.4 J4 – USB 2x Host Stacked (CONN RCPT R/A 4OVER4POS GOLD PCB)

Description: USB - A, Stacked USB 2.0 Receptacle Connector 8 Position Through Hole, Right Angle, Horizontal.

Manufacturer: TE Connectivity AMP Connectors  
Connector: [5787617-1](#)



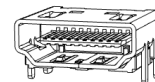
| Description | Type | PIN Name | PIN | PIN | PIN Name | Type | Description |
|-------------|------|----------|-----|-----|----------|------|-------------|
| +5V_USB_BOT | PO   | VBUS1    | 1   | 5   | VBUS2    | PO   | +5V_USB_TOP |
| USB_BOT_L_N | I/O  | D1-      | 2   | 6   | D2-      | I/O  | USB_TOP_L_N |
| USB_BOT_L_P | I/O  | D1+      | 3   | 7   | D2+      | I/O  | USB_TOP_L_P |
| GND         | G    | GND1     | 4   | 8   | GND2     | G    | GND         |

#### 4.1.5 J5 – HDMI Output Connector (CONN RCPT 19POS HDMI RT ANG SMD)

Description: HDMI Receptacle Connector 19 Position Surface Mount, Right Angle, Horizontal.

Manufacturer: Molex, LLC

Connector: [47151-0001](#)

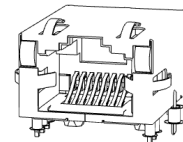


| PIN | PIN Name  | Type | Description   |
|-----|-----------|------|---------------|
| 1   | D2+       | O    | HDMI_D2_P     |
| 2   | D2 SHIELD | G    | GND           |
| 3   | D2-       | O    | HDMI_D2_N     |
| 4   | D1+       | O    | HDMI_D1_P     |
| 5   | D1 SHIELD | G    | GND           |
| 6   | D1-       | O    | HDMI_D1_N     |
| 7   | D0+       | O    | HDMI_D0_P     |
| 8   | D0 SHIELD | G    | GND           |
| 9   | D0-       | O    | HDMI_D0_N     |
| 10  | CK+       | O    | HDMI_CLK_P    |
| 11  | CK SHIELD | G    | GND           |
| 12  | CK-       | O    | HDMI_CLK_N    |
| 13  | CE REMOTE | I/O  | HDMI_CEC_CON  |
| 14  | NC.14     |      | Not connected |
| 15  | DDC CLK   | O    | HDMI_SCL_CON  |
| 16  | DDC DATA  | I/O  | HDMI_SDA_CON  |
| 17  | GND       | G    | GND           |
| 18  | +5V       | PO   | +5V_HDMI_CON  |
| 19  | HP DET    | I    | HDMI_HPD_CON  |

#### 4.1.6 J6 – Ethernet Connector (CONN MAGJACK 1PORT SHLD 1000BT )

Description: 1 Port RJ45 Magjack Connector Through Hole 10/100/1000 Base-T, AutoMDIX.

Manufacturer: Bel Fuse Inc.  
Connector: [L829-1J1T-43](#)



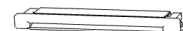
| PIN | PIN Name  | Type | Description   |
|-----|-----------|------|---------------|
| 1   | TRCT3     |      |               |
| 2   | TRD3-     | I/O  | TRD2_N        |
| 3   | TRD3+     | I/O  | TRD2_P        |
| 4   | TRD2+     | I/O  | TRD1_P        |
| 5   | TRD2-     | I/O  | TRD1_N        |
| 6   | TRCT2     |      |               |
| 7   | TRCT4     |      |               |
| 8   | TRD4+     | I/O  | TRD3_P        |
| 9   | TRD4-     | I/O  | TRD3_N        |
| 10  | TRD1-     | I/O  | TRD0_N        |
| 11  | TRD1+     | O    | TRD0_P        |
| 12  | TRCT1     |      |               |
| 13  | Y_CATODE  | O    | ENET_LED_LINK |
| 14  | Y_ANODE   |      | +3V3          |
| 15  | O_CATODE  | NC   | ENET_LED_RX   |
| 16  | COM_ANODE | G    | +3V3          |
| 17  | G_CATODE  | O    | ENET_LED_RX   |
| 18  | SHIELD1   | G    | GND           |
| 19  | SHIELD2   | G    | GND           |

| Link / Activity         | State of Yellow LED | State of Green LED |
|-------------------------|---------------------|--------------------|
| Link off                | OFF                 | OFF                |
| 1000 Link / No activity | ON                  | OFF                |
| 1000 Link / Activity    | Blinking            | OFF                |
| 100 Link / No Activity  | OFF                 | ON                 |
| 100 Link / Activity     | OFF                 | Blinking           |
| 10 Link / No Activity   | ON                  | ON                 |
| 10 Link / Activity      | Blinking            | Blinking           |

#### 4.1.7 J7 – CSI Camera Input or RGB Display Output (CONN FPC BOTTOM 40POS 0.50MM R/A)

Description: 40 Position FPC Connector Contacts, Bottom 0.020" (0.50mm) Surface Mount, Right Angle. More functions are supported. (See Schematics, page 17)

Manufacturer: TE Connectivity AMP Connectors  
Connector: [4-1734592-0](#)



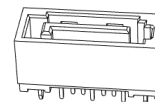
| PIN | Signal Name        | Type | Description |
|-----|--------------------|------|-------------|
| 1   | +3V3               |      |             |
| 2   | +3V3               |      |             |
| 3   | GND                |      |             |
| 4   | VID_IN_CSI1_PIXCLK | I    |             |
| 5   | GND                |      |             |
| 6   | VID_IN_CSI1_HSYNC  | I    |             |
| 7   | VID_IN_CSI1_VSYNC  | I    |             |
| 8   | GND                |      |             |
| 9   | VID_IN_CSI1_D0     | I    |             |
| 10  | VID_IN_CSI1_D1     | I    |             |
| 11  | VID_IN_CSI1_D2     | I    |             |
| 12  | VID_IN_CSI1_D3     | I    |             |
| 13  | GND                |      |             |
| 14  | VID_IN_CSI1_D4     | I    |             |
| 15  | VID_IN_CSI1_D5     | I    |             |
| 16  | VID_IN_CSI1_D6     | I    |             |
| 17  | VID_IN_CSI1_D7     |      |             |
| 18  | GND                |      |             |
| 19  | VID_IN_CSI1_D8     | I    |             |
| 20  | VID_IN_CSI1_D9     | I    |             |
| 21  | VID_IN_CSI1_D10    | I    |             |
| 22  | VID_IN_CSI1_D11    | I    |             |
| 23  | GND                |      |             |
| 24  | VID_IN_CSI1_D12    | I    |             |
| 25  | VID_IN_CSI1_D13    | I    |             |
| 26  | VID_IN_CSI1_D14    | I    |             |
| 27  | VID_IN_CSI1_D15    | I    |             |

| PIN | Signal Name      | Type | Description |
|-----|------------------|------|-------------|
| 28  | GND              |      |             |
| 29  | VID_IN_CSI1_D16  | I    |             |
| 30  | VID_IN_CSI1_D17  | I    |             |
| 31  | VID_IN_CSI1_D18  | I    |             |
| 32  | VID_IN_CSI1_D19  | I    |             |
| 33  | GND              |      |             |
| 34  | VID_IN_CSI1_DE   | I    |             |
| 35  | VID_IN_CSI1_INT  | I    |             |
| 36  | VID_IN_CSI1_INT2 | I    |             |
| 37  | VID_IN_CSI1_RSTn | O    |             |
| 38  | GND              |      |             |
| 39  | I2C3_SDA         | I/O  |             |
| 40  | I2C3_SCL         | O    |             |

#### 4.1.8 J8 – SATA Connector (CONN SATA HDR 7POS PCB VERT)

Description: High Speed Connector to the SATA Interface (SATA interface is available only on Quad and Dual i.MX6 Processors).

Manufacturer: Molex, LLC  
Connector: [0471554001](#)

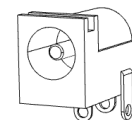


| PIN | PIN Name | Type | Description |
|-----|----------|------|-------------|
| 1   | GND1     | G    | GND         |
| 2   | TX+      | O    | SATA_TX_P   |
| 3   | TX-      | O    | SATA_TX_N   |
| 4   | GND2     | G    | GND         |
| 5   | RX-      | I    | SATA_RX_N   |
| 6   | RX+      | I    | SATA_RX_P   |
| 7   | GND3     | G    | GND         |

#### 4.1.9 J9 – Power Input Connector (CONN PWR JACK 2.1X5.5MM HIGH CUR)

Description: Power Barrel Connector Jack 2.00mm ID (0.079"), 5.50mm OD (0.217") Surface Mount.

Manufacturer: CUI Inc.  
Connector: [PJ-002AH](#)



| PIN          | Signal Name | Type | Description               |
|--------------|-------------|------|---------------------------|
| Center       | +V_INPUT    | PI   | Input power for the board |
| Outer Barrel | GND         | G    | Power ground              |

#### 4.1.10 J10 – Touchscreen Connector (CONN HEADER 4POS 1.25MM R/A SMD)

Description: 4 Positions Header, Shrouded Connector 0.049" (1.25mm) Surface Mount, Right Angle Tin.

Manufacturer: Molex, LLC  
Connector: [0532610471](#)



| PIN | Signal Name | Type | Description      |
|-----|-------------|------|------------------|
| 1   | TS_X+       | I    | X+ channel input |
| 2   | TS_X-       | I    | X- channel input |
| 3   | TS_Y-       | I    | Y- channel input |
| 4   | TS_Y+       | I    | Y+ channel input |

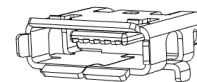
#### 4.1.11 J11 – USB OTG (CONN RCPT MICRO USB AB R/A SMD)

Description: USB OTG connector is connected to the CPU-USB0 interface. It can be used as a slave for the debugging purposes (by default) or as a master to connect USB device.

(See Schematics, page 19)

Micro USB connector can also power the whole board. (See Schematics, page 28)

Manufacturer: Molex, LLC  
Connector: [0475890001](#)



| PIN | PIN Name | Type  | Description   |
|-----|----------|-------|---------------|
| 1   | 5V       | PO/PI | +5V_USB_OTG   |
| 2   | D-       | I/O   | USB_OTG_CON_N |
| 3   | D+       | I/O   | USB_OTG_CON_P |
| 4   | ID       | I/O   | USB0_ID       |
| 5   | G        | G     | GND           |

#### 4.1.12 J12 – Raspberry Pi Camera or LVDS (CONN FPC BOTTOM 15POS 1.00MM R/A)

Description: 15 Position FPC Connector Contacts, Bottom 0.039" (1.00mm) Surface Mount, Right Angle. Can be used as LVDS Output. (See Schematics, page 17)

Manufacturer: TE Connectivity AMP Connectors  
Connector: [1-84952-5](#)



| PIN | Signal Name  | Type | Description |
|-----|--------------|------|-------------|
| 1   | GND          | G    |             |
| 2   | CSI_D0_N     | I    |             |
| 3   | CSI_D0_P     | I    |             |
| 4   | GND          | G    |             |
| 5   | CSI_D1_N     | I    |             |
| 6   | CSI_D1_P     | I    |             |
| 7   | GND          | G    |             |
| 8   | CSI_CLK0_N   | I    |             |
| 9   | CSI_CLK0_P   | I    |             |
| 10  | GND          | G    |             |
| 11  | CSI1_GPIO0   | I/O  |             |
| 12  | CSI1_GPIO1   | I/O  |             |
| 13  | I2C2_CSI_SCL | O    |             |
| 14  | I2C2_CSI_SDA | I/O  |             |
| 15  | +VDD_CSI     | PO   | +3V3        |

#### 4.1.13 J13 – microSD™ Slot (CONN MICRO SD 8 POS SMD)

Description: Slot J13 is connected to the CPU-SD2 interface. Card detection is supported. Possible boot up from the card inserted into the slot J13. e-Fuses must be set correctly.

Manufacturer: Wurth Electronics Inc.  
Connector: [693071010811](#)



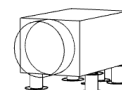
| PIN | PIN Name | Type | Description |
|-----|----------|------|-------------|
| 1   | DAT2     | I/O  | SD2_DATA2   |
| 2   | CD/DAT3  | I/O  | SD2_DATA3   |
| 3   | CMD      | I/O  | SD2_CMD     |
| 4   | VDD      | PO   | +3v3        |
| 5   | CLK      | O    | SD2_CLK     |
| 6   | VSS      | G    | GND         |
| 7   | DAT0     | I/O  | SD2_DATA0   |
| 8   | DAT1     | I/O  | SD2_DATA1   |
| 9   | SW_1     | I    | SD2_CD      |
| 10  | SW_2     | I    | SD2_CD      |
| 11  | CASE2    | G    | GND         |
| 12  | CASE3    | G    | GND         |

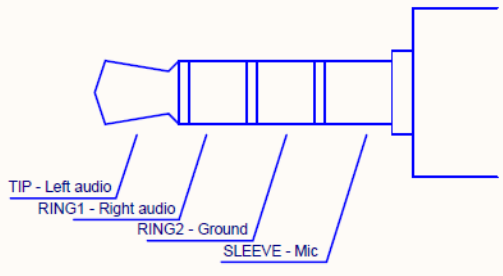
#### 4.1.14 J14 – Audio Jack (CONNECTOR, PHONO, 3.5MM, JACK, 4POLE)

**Description:** This component is a 3.5mm 4 pole jack socket. This jack socket is for applications with a suitable interface control where additional functionality is controlled by the fourth circuit. Audio Jack is designed to support CTIA/AHJ standard.

**Manufacturer:** Cliff Electronic Components

**Connector:** [FC68125](#)



| PIN | PIN Name | Type | Description | Audio Jack Reference                                                                                                                                            |
|-----|----------|------|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1   | SLEEVE   | I    | FIL_MIC_IN  | <p><i>3.5mm 4-pole jack reference<br/>(TRSS standard - CTIA / AHJ)</i></p>  |
| 2   | RING     | O    | FIL_HP_OUTR |                                                                                                                                                                 |
| 3   | TIP1     | O    | FIL_HP_OUTL |                                                                                                                                                                 |
| 4   | TIP2     | O    | FIL_HP_OUTL |                                                                                                                                                                 |
| 5   | HOLE_1   | NC   |             |                                                                                                                                                                 |
| 6   | SL&RING  |      | GND         |                                                                                                                                                                 |
| 7   | HOLE_2   | NC   |             |                                                                                                                                                                 |

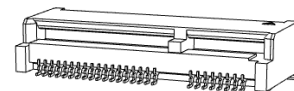
#### 4.1.15 J15 – PCIe Mini Card 1 Slot (CONN MINI EXPRESS CARD 52POS SMD)

Description: The Card Socket is connected to the PCI Express interface.

Manufacturer: Japan Aviation Electronics Industry, Limited

Connector: JAE [MM60-52B1-E1-R650](#)

Card Latch: JAE MM60-EZH059-B5-R650



| Description | Type | PIN Name          | PIN | PIN | PIN Name   | Type | Description    |
|-------------|------|-------------------|-----|-----|------------|------|----------------|
| PCIE_WAKE   | OD   | WAKE#             | 1   | 2   | 3.3V_1     | PO   | +3V3_MPCIE     |
|             | NC   | Reserved_1        | 3   | 4   | GND_7      | G    | GND            |
|             | NC   | Reserved_2        | 5   | 6   | 1.5V_1     | PO   | +1V5_MPCIE     |
|             | NC   | CLKREQ#           | 7   | 8   | UIM_PWR    | PI   | +MPCIE_SIM_PWR |
| GND         | G    | GND_1             | 9   | 10  | UIM_DATA   | I/O  | MPCIE_SIM_DATA |
| PCIE_CLK_N  | O    | REFCLK-           | 11  | 12  | UIM_CLK    | I    | MPCIE_SIM_CLK  |
| PCIE_CLK_P  | O    | REFCLK+           | 13  | 14  | UIM_RESET  | I    | MPCIE_SIM_RST  |
| GND         | G    | GND_2             | 15  | 16  | UIM_VPP    | PI   | +MPCIE_SIM_VPP |
|             |      | Reserved / UIM_C8 | 17  | 18  | GND_8      | G    | GND            |
|             |      | Reserved / UIM_C4 | 19  | 20  | W_DISABLE# | O    | PCIE_WDISn     |
| GND         | G    | GND_3             | 21  | 22  | PERST#     | O    | PCIE_RSTn      |
| PCIE_RX_N   | I    | PERn0             | 23  | 24  | +3.3Vaux   | PO   | +3V3_MPCIE     |
| PCIE_RX_P   | I    | PERp0             | 25  | 26  | GND_9      | G    | GND            |
| GND         | G    | GND_4             | 27  | 28  | 1.5V_2     | PO   | +1V5_MPCIE     |
| GND         | G    | GND_5             | 29  | 30  | SMB_CLK    | O    | I2C2_SCL       |
| PCIE_TX_N   | O    | PETn0             | 31  | 32  | SMB_DATA   | I/O  | I2C2_SDA       |
| PCIE_TX_P   | O    | PETp0             | 33  | 34  | GND_10     | G    | GND            |
| GND         | G    | GND_6             | 35  | 36  | USB_D-     | I/O  | USB_MPCIE_N    |
| GND         | G    | Reserved_3        | 37  | 38  | USB_D+     | I/O  | USB_MPCIE_P    |
| +3V3_MPCIE  | PO   | Reserved_4        | 39  | 40  | GND_11     | G    | GND            |
| +3V3_MPCIE  | PO   | Reserved_5        | 41  | 42  | LED_WWAN#  | I    | LED_MPCIE_WWAN |
| GND         | G    | Reserved_6        | 43  | 44  | LED_WLAN#  | I    | LED_MPCIE_WLAN |
|             | NC   | Reserved_7        | 45  | 46  | LED_WPAN#  | I    | LED_MPCIE_WPAN |
|             | NC   | Reserved_8        | 47  | 48  | 1.5V_3     | PO   | +1V5_MPCIE     |
| +5V_MPCIE   | PO   | Reserved_9        | 49  | 50  | GND_12     | G    | GND            |
| +5V_MPCIE   | PO   | Reserved_10       | 51  | 52  | 3.3V_2     | PO   | +3V3_MPCIE     |

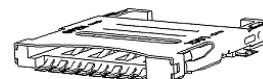
#### 4.1.16 J17 – PCIe Micro SIM Socket (CONN SMART CARD )

Description: 8 Position Card Connector Micro SIM Surface Mount, Right Angle Gold.

Manufacturer: Würth Electronics Inc.

Connector: [693022010811](#)

Card Type: Micro SIM



| PIN       | PIN Name | Type | Description    |
|-----------|----------|------|----------------|
| <b>C1</b> | VCC      |      | +MPCIE_SIM_PWR |
| <b>C2</b> | RESET    |      | MPCIE_SIM_RST  |
| <b>C3</b> | CLK      |      | MPCIE_SIM_CLK  |
| <b>C4</b> | RFU_1    |      | MPCIE_SIM_C4   |
| <b>C5</b> | GND      | G    |                |
| <b>C6</b> | VPP      |      | +MPCIE_SIM_VPP |
| <b>C7</b> | I/O      |      | MPCIE_SIM_DATA |
| <b>C8</b> | RFU_2    |      | MPCIE_SIM_C8   |
| <b>G1</b> | GND_1    | G    |                |
| <b>G2</b> | GND_2    | G    |                |

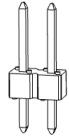
## 5. Jumper, Buttons, LEDs and Resistors Description

### 5.1 Jumper Pinout Description

#### 5.1.1 JP1 – Power Input Selection (1x2pin, BERGSTIK II .100" SR STRAIGHT)

Description: 2 Positions Header, Unshrouded Connector 0.100" (2.54mm) Through Hole Gold or Gold, GXT™.

Manufacturer: FCI Electronics  
 Connector: [68001-202HLF](#)  
 Mating housing: TE 1658622-1 or equivalent

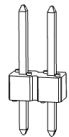


| Status        | Level         | Description                                                                                                          |
|---------------|---------------|----------------------------------------------------------------------------------------------------------------------|
| <b>CLOSED</b> | GND           | Board powered through USB OTG connector when Power Jack is not plugged in (e.g. USB charger can power up the board). |
| <b>OPEN</b>   | +5V_USB_OTG_Q | Board powered Trough Power Jack <b>(default)</b>                                                                     |

#### 5.1.2 JP2 – Boot Mode Selection (1x2pin, BERGSTIK II .100" SR STRAIGHT)

Description: 2 Positions Header, Unshrouded Connector 0.100" (2.54mm) Through Hole Gold or Gold, GXT™.

Manufacturer: FCI Electronics  
 Connector: [68001-202HLF](#)  
 Mating housing: TE 1658622-1 or equivalent



| Status        | Level       | Description                         |
|---------------|-------------|-------------------------------------|
| <b>CLOSED</b> | GND         | USB OTG bootloader mode             |
| <b>OPEN</b>   | +3V0_ALWAYS | Boots from e-Fuses <b>(default)</b> |

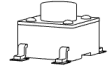
Usage: By default, the board boots up from the e-Fuses. For special purpose the link on JP2 can be fitted. The board then boots from the USB OTG host device.

## 5.2 Buttons and LEDs Description

### 5.2.1 SW1 – Reset/Power button (SWITCH TACTILE SPST-NO 0.05A 12V)

Description: The SW1 button is used to reset the board **by default**. It is a hardware reset. This button can be set up for power on/off feature. (See Schematics, page 25)

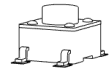
Manufacturer: Apem Inc.  
Connector: [MJTP1138ATR](#)



### 5.2.2 SW2 – User/Android Button (Home/Wake Up) (SWITCH TACTILE SPST-NO 0.05A 12V)

Description: The SW2 button is a general purpose button and can be used by your application. This button can be used by both: CPU and MCU.  
ANDROID FUNCTION - HOME / WAKE UP

Manufacturer: Apem Inc.  
Connector: [MJTP1138ATR](#)



### 5.2.3 SW3 – User/Android Button (Back/Volume-) (SWITCH TACTILE SPST-NO 0.05A 12V)

Description: The SW3 button is a general purpose button and can be used by your application.  
ANDROID FUNCTION - BACK / VOLUME-

Manufacturer: Apem Inc.  
Connector: [MJTP1138ATR](#)



### 5.2.4 SW4 – User/Android Button (Recent/Volume+) (SWITCH TACTILE SPST-NO 0.05A 12V)

Description: The SW4 button is a general purpose button and can be used by your application.  
ANDROID FUNCTION - RECENT / VOLUME+

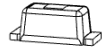
Manufacturer: Apem Inc.  
Connector: [MJTP1138ATR](#)



### 5.2.5 D1, D2, D3, D33 – CPU/MCU User LED (RED) (LED SMARTLED RED 630NM 0603 SMD)

Description: These LED diodes are general purpose indicators and can be used by your application using both: CPU and MCU.

Manufacturer: OSRAM Opto Semiconductors Inc.  
Connector: [LS L29K-H1J2-1-Z](#)



### 5.2.6 D5, D6, D7, D34 – CPU User LED (RED) (LED SMARTLED RED 630NM 0603 SMD)

Description: These LED diodes are general purpose indicators and can be used by your application.

Manufacturer: OSRAM Opto Semiconductors Inc.  
Connector: [LS L29K-H1J2-1-Z](#)

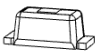


### 5.2.7 D11, D25, D26 – MPCIE LEDs (GREEN) (LED SMARTLED GREEN 570NM 0603)

Description: These LED diodes indicate the PCIe Mini Card activity:

D11 - PCIe Mini Card WWAN activity  
D25 - PCIe Mini Card WLAN activity  
D26 - PCIe Mini Card WPAN activity

Manufacturer: OSRAM Opto Semiconductors Inc.  
Connector: [LG L29K-G2J1-24-Z](#)



### 5.2.8 D12 – USB LED (ORANGE) (LED SMARTLED ORANGE 606NM 0603)

Description: D12 indicates an Active / Suspend status of the USB Interface.

LED Status: LED ON – USB is active.  
LED OFF – USB is not plugged in.

Manufacturer: OSRAM Opto Semiconductors Inc.  
Connector: [LO L29K-H2K1-24-Z](#)



### 5.2.9 D14 – *microSD LED (ORANGE)* (LED SMARTLED ORANGE 606NM 0603)

Description: D14 indicates that the SD2 interface is in the busy state.

LED Status: LED ON – (SD2\_ACT High): SD interface busy  
LED OFF – (SD2\_ACT Low): SD interface in idle

Manufacturer: OSRAM Opto Semiconductors Inc.

Connector: [LO L29K-H2K1-24-Z](#)

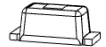


### 5.2.10 D21 – *CPU User LED (ORANGE)* (LED SMARTLED ORANGE 606NM 0603)

Description: User LED D21 can be controlled using PWM output.

Manufacturer: OSRAM Opto Semiconductors Inc.

Connector: [LO L29K-H2K1-24-Z](#)



### 5.2.11 D22 – *Power OK LED (GREEN)* (LED SMARTLED GREEN 570NM 0603)

Description: If all the powers are OK, power LED is on.

Manufacturer: OSRAM Opto Semiconductors Inc.

Connector: [LG L29K-G2J1-24-Z](#)



### 5.2.12 D24 – *MCU User LED (ORANGE)* (LED SMARTLED ORANGE 606NM 0603)

Description:

Manufacturer: OSRAM Opto Semiconductors Inc.

Connector: [LO L29K-H2K1-24-Z](#)



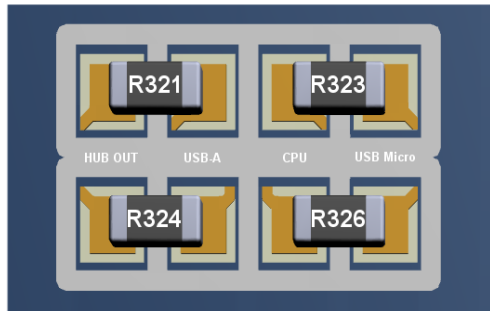
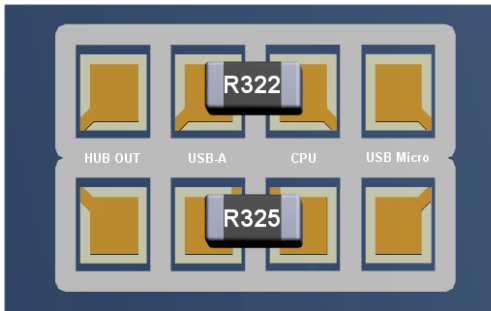
## 5.3 Resistors Selection Description

### 5.3.1 PSR1 USB0 Routing (RES 0.0 OHM 1/16W 0402 SMD)

Description: Use one of the options to fit series resistors according to the picture below.

Manufacturer: Yageo Corporation  
 Component: RC0402JR-070RL  
[www.yageo.com.tw](http://www.yageo.com.tw)

| Resistors Fitted | R321, R323, R324, R326 (DEFAULT) |                       | R322, R325 |                   |
|------------------|----------------------------------|-----------------------|------------|-------------------|
| OPTION           | R321 and R324                    | USB1 HUB to USB-A     | R322       | USB0 CPU to USB-A |
|                  | R323 and R326                    | USB0 CPU to USB Micro | R325       | USB0 CPU to USB-A |

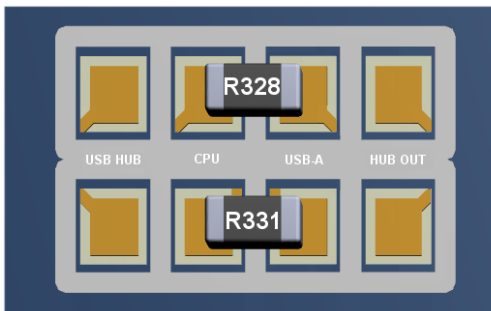



### 5.3.2 PSR2 USB1 Routing (RES 0.0 OHM 1/16W 0402 SMD)

Description: Use one of the options to fit series resistors according to the picture below.

Manufacturer: Yageo Corporation  
 Component: RC0402JR-070RL  
[www.yageo.com.tw](http://www.yageo.com.tw)

| Resistors Fitted | R327, R329, R330, R332 (DEFAULT) |                     | R328, R331 |                   |
|------------------|----------------------------------|---------------------|------------|-------------------|
| OPTION           | R329 and R332                    | USB1 CPU to USB HUB | R328       | USB1 CPU to USB-A |
|                  | R327 and R330                    | USB1 HUB to USB-A   | R331       | USB1 CPU to USB-A |

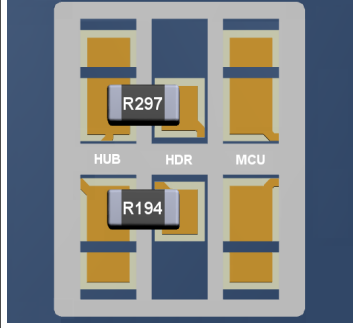
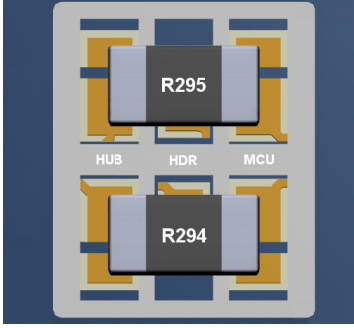
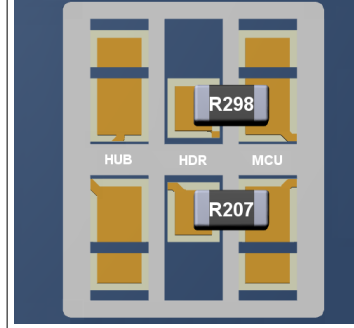



### 5.3.3 PSR3 USB1 to Header / MCU Routing (RES 0.0 OHM 1/16W 0402, 0805 SMD)

Description: Use one of the options to fit series resistors according to the picture below.

Manufacturer: Yageo Corporation  
 Component: RC0402JR-070RL  
[www.yageo.com.tw](http://www.yageo.com.tw)

| Resistors Fitted | R297, R194 (DEFAULT) |             | R295, R294  |             | R298, R207  |                |
|------------------|----------------------|-------------|-------------|-------------|-------------|----------------|
| OPTION           | R297 (0402)          | USB1 to HDR | R295 (0805) | USB1 to MCU | R298 (0402) | USB MCU to HDR |
|                  | R194 (0402)          | USB1 to HDR | R294 (0805) | USB1 to MCU | R207 (0402) | USB MCU to HDR |

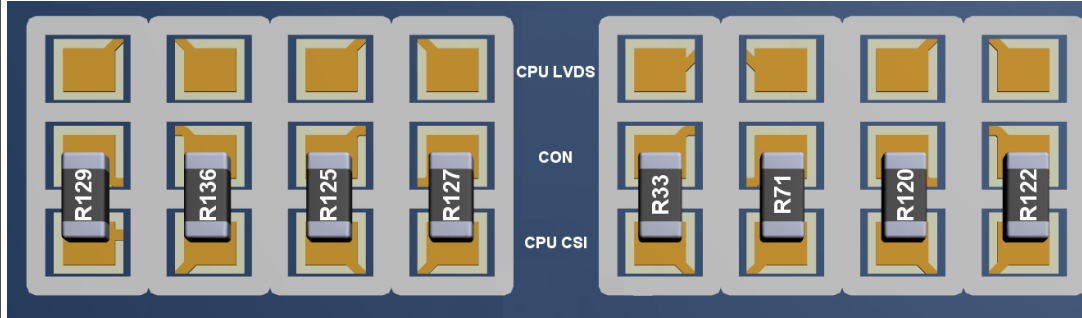
### 5.3.4 PSR4 CSI / LVDS Routing (RES 0.0 OHM 1/16W 0402 SMD)

Description: Use one of the options to fit series resistors according to the picture below.

Manufacturer: Yageo Corporation  
 Component: RC0402JR-070RL  
[www.yageo.com.tw](http://www.yageo.com.tw)

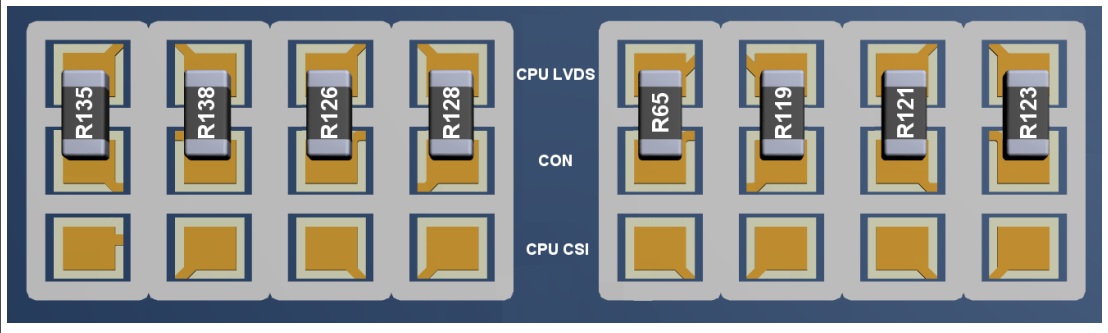
Option: CSI Routing

| Resistors Fitted | R33, R71, R120, R122, R125, R127, R129, R136 (DEFAULT) |  |  |  |  |  |  |  |
|------------------|--------------------------------------------------------|--|--|--|--|--|--|--|
| OPTION           | CSI to CON                                             |  |  |  |  |  |  |  |



### Option: LVDS Routing

|                  |                                               |
|------------------|-----------------------------------------------|
| Resistors Fitted | R65, R119, R121, R123, R126, R128, R135, R138 |
| OPTION           | LVDS to CON                                   |



## 6. Technical Specifications

### 6.1 Input Voltage

OpenRex SBC has default input voltage (+VIN\_5V) ranging from +4.9V to +5.2V.

If more than +5.3V is applied as an input voltage (+V\_INPUT), the board is turned off automatically to protect the circuits. Maximum current through Power Jack connector J9 is 5A.

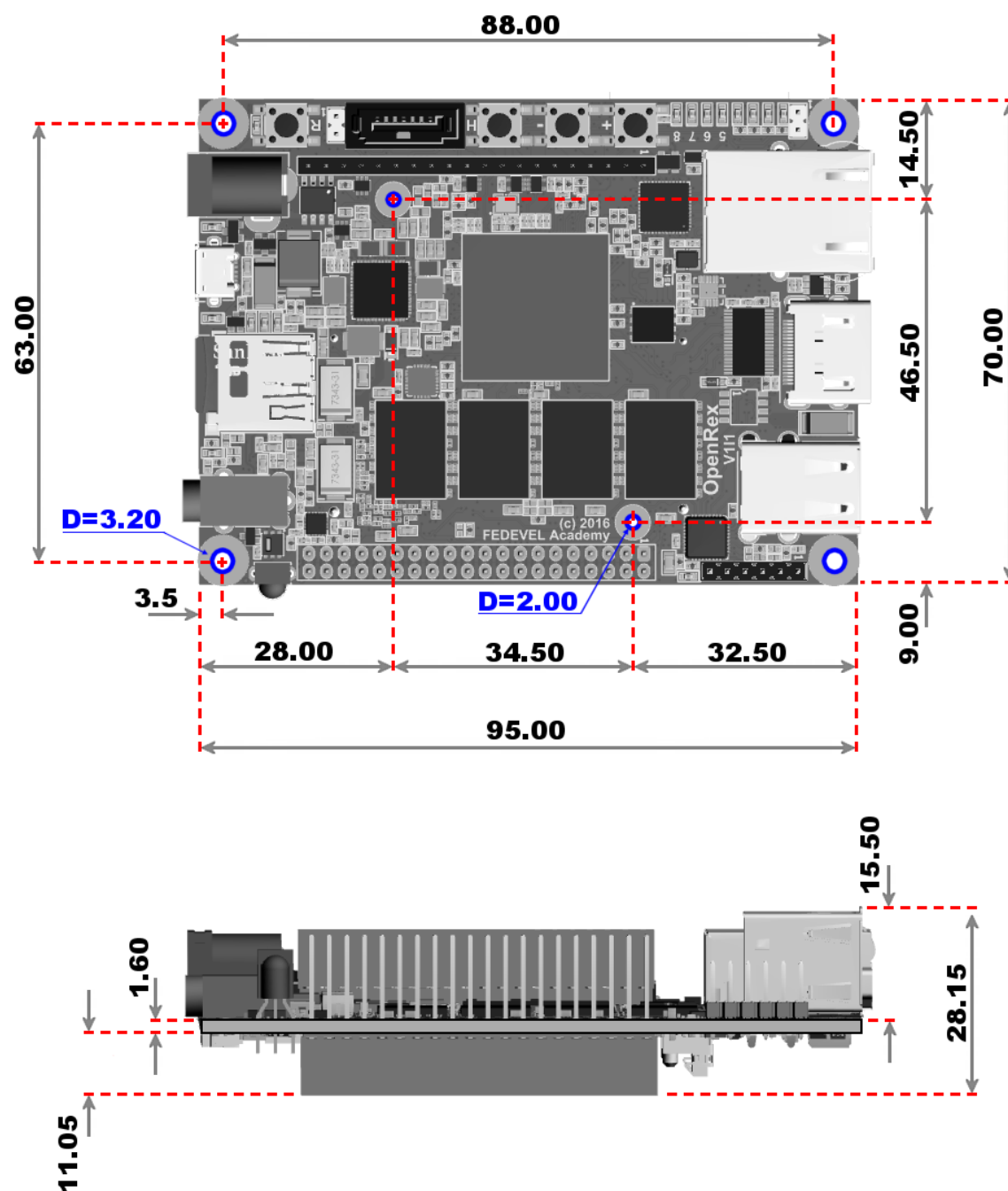
OpenRex SBC can be powered through USB OTG connector (when Power Jack is not plugged in) and Jumper JP1 is shortened.



**(Note)** USB OTG Power Switch is turned off by default. To turn it on, one of these conditions must occur:

- power input jack is not plugged in and jumper JP1 is shortened
- USB-A cable is plugged into USB OTG connector - USB act as a host
- USB0\_ID is tied low by software

| Dimmensions | Width          | Length         | Height            | Unit      |
|-------------|----------------|----------------|-------------------|-----------|
| PCB         | 70 (2.755906 ) | 95 (3.740158 ) | 1.6 (0.06299213 ) | mm (inch) |



### 6.3 Temperature Range

| Symbol | Description                              | Min | Max | Unit | Standard Unit Range |
|--------|------------------------------------------|-----|-----|------|---------------------|
| T_AMB  | Operating temperature range - COMMERCIAL | 0   | +70 | °C   | X                   |
| T_AMB  | Operating temperature range - EXTENDED   | -20 | +70 | °C   |                     |

### 6.4 CE compliance of Voipac products

The CE label is a mandatory conformity mark for complex electronic devices placed on the market in the European Economic Area and each product sold within the EU needs a CE Certificate of Conformance that ensures that the product conforms to the essential requirements of the applicable EC directives.

However, if such complex electronic devices are produced for further processing by the industry, skilled development teams or system integrators, they do not need to observe the above mentioned CE requirements and consequently do not need any identification either. This applies to the Voipac Single Board Computers, because these are not used as stand-alone devices by the general public.

To make sure that Voipac SBCs can be used in CE marked devices, they are designed to obey the EC directives and the standard configuration SBCs manufactured by Voipac are tested for Electromagnetic Interference and operating temperature ranges.

### 6.5 RoHS and WEEE Compliance

All of the products designed and manufactured by Voipac are classified as Electrical and Electronic Equipment (EEE) under the Directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment 2002/95/EC (RoHS). To comply with the RoHS directive, the restricted use of Lead (Pb), Mercury (Hg), Cadmium (Cd), Hexavalent Chromium (Cr 6+), Polybrominated Biphenyls (PBB) and Polybrominated Diphenyl Ethers (PBDE) must be ensured. Voipac guarantees that products ordered after July 1, 2006 are assembled in full compliance with the RoHS directive from the European Parliament and Counsel. The company procedures also complies with the Waste Electrical and Electronic Equipment Directive 2002/96/EC (WEEE).

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