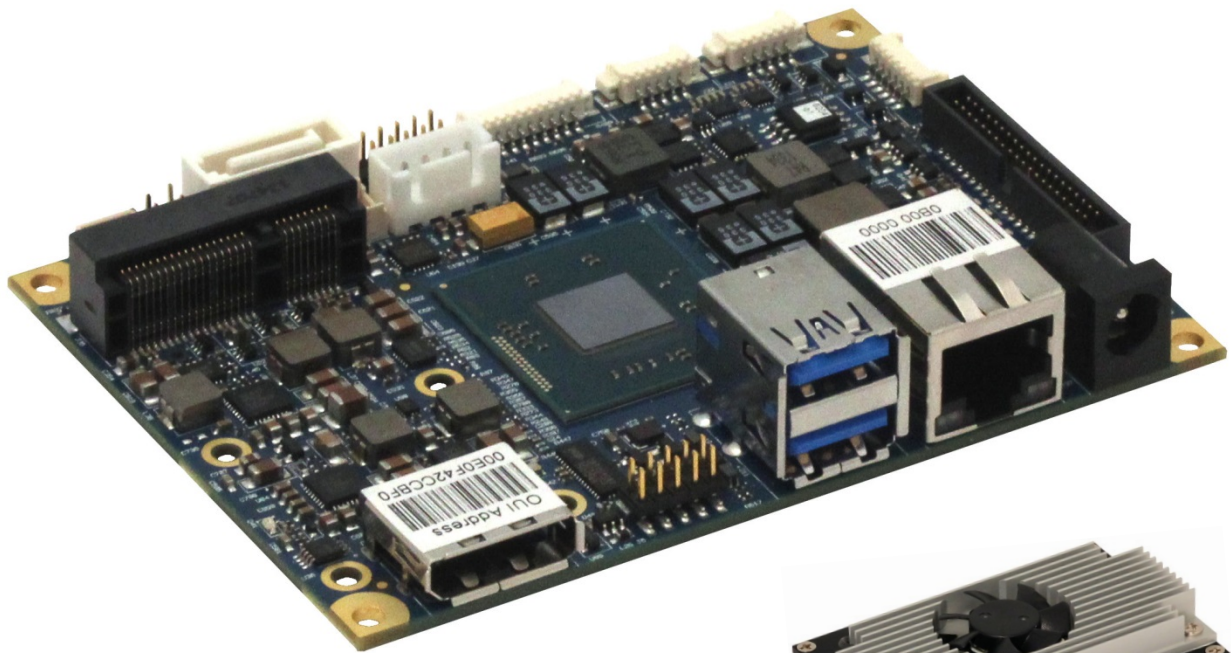


# » Kontron User's Guide «



pITX-E38



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## Document Revision History

| Revision | Date                          | By  | Comment                                                                                                                                                                                                  |
|----------|-------------------------------|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| E        | January 26 <sup>th</sup> 2015 | MLA | Battery Module Connector type added. TPM in BIOS section removed. Added note for mSATA selection in BIOS. Added warning when changing cooling system.                                                    |
| D        | Nov. 6 <sup>th</sup> 2014     | MLA | <F2> changed to <Del> - key to enter BIOS Menu. Added note on "OS Selection". SD changed to MicroSD. Added System Memory Support. Updated BIOS part. Added reference to COM port setup Application Note. |
| C        | Sept. 25 <sup>th</sup> 2014   | MLA | Lithium battery info corrected.                                                                                                                                                                          |
| B        | Sept. 23 <sup>rd</sup> 2014   | MLA | Added info to DC Power Jack connector. Environmental Conditions update. Added note on mPCIe fixing tool.                                                                                                 |
| A        | July 15 <sup>th</sup> 2014    | MLA | Added Frontpanel Pin 1 indication. Reference to "Flex" removed. Power Consumption Measurements added. Added Cooler, Battery Module and connector list. Added cable kits and BIOS part.                   |
| 0        | April 1 <sup>st</sup> 2014    | MLA | Preliminary version                                                                                                                                                                                      |

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If you have questions about installing or using your KONTRON Technology Product, then please notice that you will find many answers in this Users Guide. To obtain support please contact your local Distributor or Field Application Engineer (FAE).

**Before Contacting Support:** Please be prepared to provide as much information as possible:

- CPU Board
  1. Type.
  2. Part Number (find PN on label)
  3. Serial Number if available (find SN on label)
- Configuration
  1. DRAM Type and Size.
  2. BIOS Revision (find the version info in the BIOS Setup).
  3. BIOS Settings different than *Default* Settings (refer to the BIOS Setup section).
- System
  1. O/S Make and Version.
  2. Driver Version numbers (Graphics, Network, and Audio).
  3. Attached Hardware: Harddisks, CD-Rom, LCD Panels etc.

If the Kontron Technology product seems to be defect and you want to return it for repair, please follow the guide lines from the following page:

<http://kontron.com/services/rma-information/kontron-technology-a-s/>

# 1 Introduction

This manual describes the pITX-E38 boards made by KONTRON Technology A/S. In this manual the boards will also be denoted E38.

The E38 boards are based on Intel Atom E38xx SoC (System on Chip) "Intel Bay Trail" and will be available in three versions. The three types of boards are listed in this table:

| Feature              | pITX-E3815     | pITX-E3826     | pITX-E3845      |
|----------------------|----------------|----------------|-----------------|
| Bay Trail SoC        | E3815 (1 core) | E3826 (2cores) | E3845 (4 cores) |
| Kontron PN           | 810602-4500    | 810601-4500    | 810600-4500     |
| Core speed           | 1,46GHz        | 1,46GHz        | 1,91GHz         |
| Cooling (integrated) | Passive        | Passive        | Active          |
| Battery module       | Included       | Included       | Included        |
| Total Design Power   | 5W             | 7W             | 10W             |



**Warning:** If changing the premounted cooling system, then the system might get overheated resulting in instable system or defects if the cooling system is sufficient.

Use of this Users Guide implies a basic knowledge of PC-AT hard- and software. This manual is focused on describing the E38 board's special features and is not intended to be a standard PC-AT textbook.

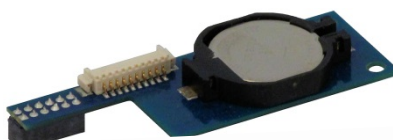
New users are recommended to study the short installation procedure stated in the following chapter before switching-on the power.

All configuration and setup of the CPU board is either done automatically or manually by the user via the BIOS setup menus. Only exceptions are the "Clear CMOS" Jumper and the "Always On" jumper.

Latest revision of this manual, datasheet, BIOS, drivers, BSP's (Board Support Packages), Mechanical drawings (2D and 3D) can be downloaded from here:

<http://www.kontron.com/products/boards-and-mezzanines/embedded-sbc/pitx-25-sbc/pitx-e38.html>

Battery Module:  
PN 1055-7645



Active cooler:



## 2 Installation Procedure

### 2.1 Installing the Board

To get the board running follow these steps. If the board shipped from KONTRON has already components like RAM and CPU cooler mounted, then relevant steps below can be skipped.

#### 1. Turn off the PSU (Power Supply Unit)



**Warning:** Turn off PSU (Power Supply Unit) completely (no mains power connected to the PSU) or leave the Power Connectors unconnected while configuring the board. Otherwise components (RAM, LAN cards etc.) might get damaged. Make sure to use +5V single supply only. Alternatively use a standard ATX PSU with suitable cable kit and PS\_ON# active.

#### 2. Insert the DDR3L SODIMM module

For a list of approved DDR3L SODIMMs contact your Distributor or FAE. See also chapter "System Memory Support".

#### 3. Cooler Installation

Normally the cooler is premounted, but in case not, then make sure the heat paste etc. on the cooler is intact and cover the full area of the SoC. Connect Cooler Fan electrically to the FAN\_CPU connector.

#### 4. Connecting Interfaces

Insert all external cables for hard disk, keyboard etc. A monitor must be connected in order to change BIOS settings.

#### 5. Connect and turn on PSU

Connect PSU to the board by the +5Vin-Internal connector or the +5Vin-External connector. Please note that current limitations apply, see relevant connector description.

#### 6. Power Button

If the board does not start by itself when switching on the ATX PSU AC mains, then follow these instructions to start the board. Install the Always On Jumper in the Always On position or toggle the PWRBTN\_IN# signal (available in the FRONTPNL connector), by momentary shorting pins 2 (PWRBTN\_IN#) and pin 4 (GND). A "normally open" switch is recommended.

#### 7. BIOS Setup

Enter the BIOS setup by pressing the <F2> key during boot up.

Enter "Exit Menu" and Load Setup Defaults.

Refer to the "BIOS Configuration / Setup" section of this manual for details on BIOS setup. Please note that BIOS may boot in UEFI shell, if so then type exit to activate BIOS menu and select Set-up.

**Note:** To clear all BIOS settings, including Password protection, activate "Clear CMOS Settings" Jumper for ≈10 sec (without power connected).



## 8. Mounting the board in chassis



**Warning:** When mounting the board to chassis etc. please notice that the board contains components on both sides of the PCB which can easily be damaged if board is handled without reasonable care. A damaged component can result in malfunction or no function at all.

When fixing the Motherboard on a chassis it is recommended using screws with integrated washer and a diameter of  $\approx 7$ mm. Do not use washers with teeth, as they can damage the PCB and cause short circuits.

## 2.2 Requirements IEC60950

Take care when designing chassis interface connectors in order to fulfil the IEC60950 standard.

When an interface or connector has a VCC (or other power) pin which is directly connected to a power plane like the VCC plane:

To protect the external power lines of the peripheral devices the customer has to ensure:

- Wires have suitable rating to withstand the maximum available power.
- That the enclosure of the peripheral device fulfils the fire protecting requirements of IEC60950.

### Lithium battery precautions

|                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                           |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>CAUTION!</b></p> <p>Danger of explosion if battery is incorrectly re- placed. Replace only with same or equivalent type recommended by manufacturer. Dispose of used batteries according to the manufacturer's instruc- tions.</p>                           | <p><b>VORSICHT!</b></p> <p>Explosionsgefahr bei unsachgemäßem Austausch der Batterie. Ersatz nur durch den selben oder einen vom Hersteller empfohlenen gleichwertigen Typ. Entsorgung gebrauchter Batterien nach Anga- ben des Herstellers.</p>          |
| <p><b>ATTENTION!</b></p> <p>Risque d'explosion avec l'échange inadéquat de la batterie. Remplacement seulement par le même ou un type équivalent recommandé par le producteur. L'évacuation des batteries usagées conformément à des indications du fabricant.</p> | <p><b>PRECAUCION!</b></p> <p>Peligro de explosión si la batería se sustituye incorrectamente. Sustituya solamente por el mismo o tipo equivalente recomendado por el fabricante. Disponga las baterías usadas según las instrucciones del fabricante.</p> |
| <p><b>ADVARSEL!</b></p> <p>Lithiumbatteri – Eksplosionsfare ved fejlagtig håndtering. Udskiftning må kun ske med batteri af samme fabrikat og type. Levér det brugte batteri tilbage til leverandøren.</p>                                                         | <p><b>ADVARSEL!</b></p> <p>Ekspløsjonsfare ved feilaktig skifte av batteri. Benytt samme batteritype eller en tilsvarende type anbefalt av apparatfabrikanten. Brukte batterier kasseres i henhold til fabrikantens instruksjoner.</p>                    |
| <p><b>VARNING!</b></p> <p>Explosionsfara vid felaktigt batteribyte. Använd samma batterityp eller en ekvivalent typ som rekommenderas av apparattillverkaren. Kassera använt batteri enligt fabrikantens instruktion.</p>                                          | <p><b>VAROITUS!</b></p> <p>Paristo voi räjähtää, jos se on virheellisesti asennettu. Vaihda paristo ainoastaan latteval- mistajan suosittelemaan tyyppiln. Hävitä käytetty paristo valmistajan ohjeiden mukaisesti.</p>                                   |

## 3 System Specifications

### 3.1 Component main data

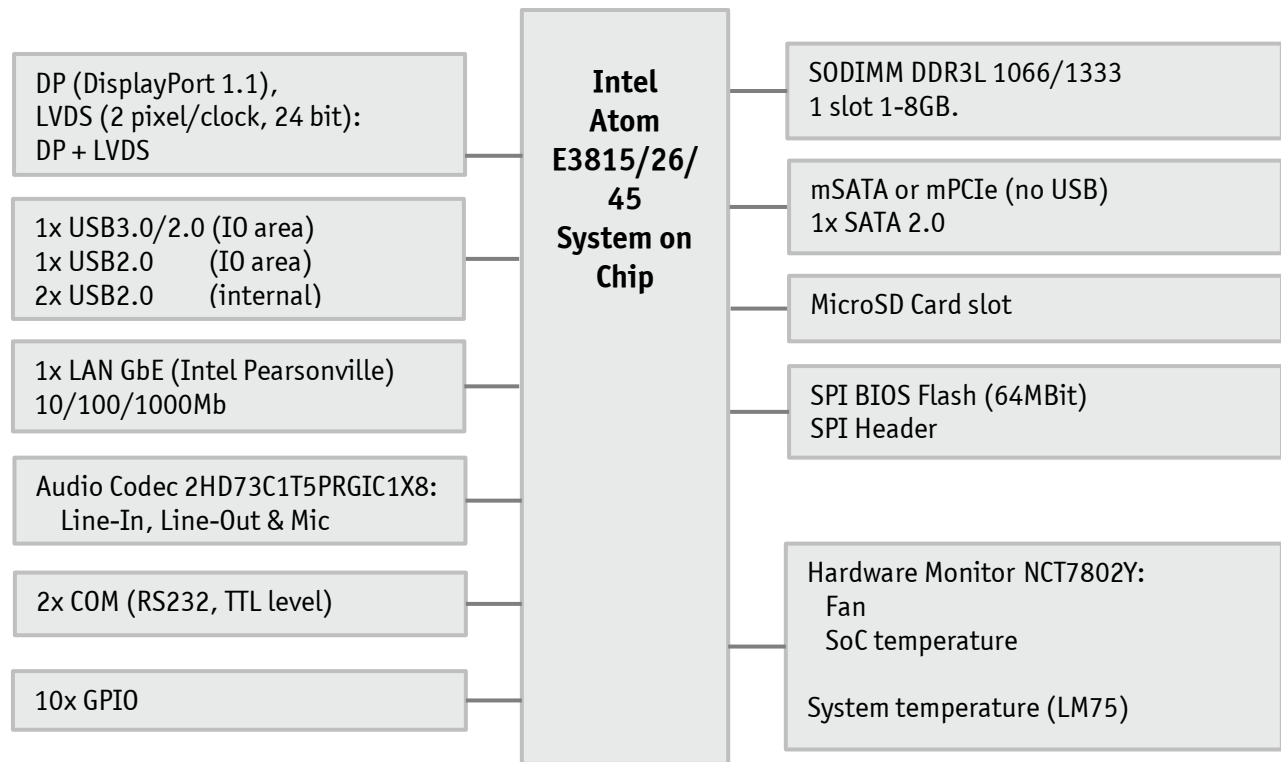
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|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Form factor</b>                | pITX (picoITX) 100 mm by 72 mm                                                                                                                                                                                                                                        |
| <b>Processor</b>                  | Intel Bay Trail FCBGA1170 Type 3 27x25mm 0.593 Ball Pitch.<br>Three versions available:<br>E3815 (1 core), 1,46GHz, 5W<br>E3826 (2 core), 1,46GHz, 7W<br>E3845 (4 core), 1,91GHz, 10W                                                                                 |
| <b>Memory</b>                     | 1x DDR3L SODIMM socket supporting single-channel unbuffered DDR3L 1066/1333MHz (PC3-8500/PC3-10600). pITX-E3815/E3826 supports only DDR3-1066MHz. Up to 4GB (Intel specification) however Kontron has qualified 8GB. (ECC not supported).                             |
| <b>Lan</b>                        | 1x Gbe LAN Intel I210 "Springville"                                                                                                                                                                                                                                   |
| <b>DP</b>                         | DP (DisplayPort) v1.1a<br>Intel® Gen7 Graphics, OpenGL 3.0, OpenCL 1.2, DX11, H.264, MPEG2, MCV, VC-1, VP8                                                                                                                                                            |
| <b>LVDS</b>                       | LVDS panels up to 2 pixels per clock, 24 bit colors (VESA/JEIDA). Based on DP to LVDS converter type PTN3460BS.                                                                                                                                                       |
| <b>USB</b>                        | <ul style="list-style-type: none"> <li>1x USB3.0/2.0 (IO area, lower port)</li> <li>1x USB2.0 (IO area, upper port)</li> <li>2x USB2.0 (internal)</li> </ul>                                                                                                          |
| <b>Serial</b>                     | 2x Serial ports (RS232) (TTL only) on internal 5-pin connector                                                                                                                                                                                                        |
| <b>Sata</b>                       | 1x SATA2.0                                                                                                                                                                                                                                                            |
| <b>GPIO</b>                       | 10 x GPIOs (General Purpose I/Os), (via GPIO connector)                                                                                                                                                                                                               |
| <b>MicroSD Card</b>               | 1x MicroSD Card Slot                                                                                                                                                                                                                                                  |
| <b>mPCIe or mSATA</b>             | 1x mPCIe (miniPCI Express) or 1x mSATA (miniSATA). Full- or halfsize formfactor. (No USB included)                                                                                                                                                                    |
| <b>Hardware Monitor Subsystem</b> | <ul style="list-style-type: none"> <li>Fan control system support Thermal cruise (fixed temperature limit, no BIOS setup).</li> <li>Thermal inputs: PCB near SoC temperature (precision +/- 3°C).</li> <li>System temperature sensor (precision +/- 0.5°C)</li> </ul> |
| <b>Power Supply Unit</b>          | +5V single supply via either Vin-Int. (4-pin connector) or Vin-Ext. connector (DC Connector RA 2mm locking type)                                                                                                                                                      |
| <b>Audio</b>                      | HDA Codec IDT 92HD73C1T5PRGIC1X8: <ul style="list-style-type: none"> <li>1x Stereo Line in</li> <li>1x Stereo Line out</li> <li>1x Mic in</li> </ul>                                                                                                                  |

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Environmental Conditions</b> | <p><b>Operating:</b><br/>-25°C to 75°C operating temperature. It is the customer's responsibility to provide sufficient airflow around each of the components to keep them within allowed temperature range.</p> <p>10% to 90% relative humidity (non-condensing)</p> <p><b>Storage:</b><br/>-20°C to 70°C; lower limit of storage temperature is defined by specification restriction of on-board BR2032 battery. Board with battery has been verified for storage temperature down to -40°C by Kontron.</p> <p>5% to 95% relative humidity (non-condensing)</p> <p><b>Electro Static Discharge (ESD) / Radiated Emissions (EMI):</b><br/>All Peripheral interfaces intended for connection to external equipment are ESD/ EMI protected.<br/>EN 61000-4-2:2000 ESD Immunity<br/>EN55022:2006+A1:2007 class B Generic Emission Standard.</p> <p><b>Safety:</b><br/>IEC 60950-1: 2005, 2nd Edition<br/>UL 60950-1<br/>CSA C22.2 No. 60950-1<br/>Product Category: Information Technology Equipment Including Electrical Business Equipment<br/>Product Category CCN: NWGQ2, NWGQ8<br/>File number: E194252</p> <p><b>Shock:</b><br/>IAW IEC 60068-2-27, Test Ea, shock, 18 shocks 3 per axis, 6 directions.<br/>Shock pulse 50g, 11ms halfsine.</p> <p><b>Bump:</b><br/>IAW IEC 60068-2-29, Test Eb, Bump, 3000 bumps, 500 per axis, 6 directions.<br/>Half Sine Waveform Acceleration 2g; Pulse Duration 11ms.</p> <p><b>Vibration:</b><br/>IAW IEC 60068-2-64, Test Fh, Random Vibration. 90 min per axis, 3 axes, at 1.9 grms, with PSD: 10-20 Hz: 0.05 g<sup>2</sup>/Hz and 20-500 Hz: -3dB/octave.</p> <p><b>Theoretical MTBF:</b><br/>414.670 / 183.190 hours @ 40°C / 75°C. Note that these values are without the active cooler used on the pITX-E3845 (see next page).</p> <p><b>Restriction of Hazardous Substances (RoHS):</b><br/>All boards in the pITX-E38 family are RoHS compliant.</p> <p><b>Capacitor utilization:</b><br/>Solid Capacitors with Conductive Polymer rated for 105 °C used on board.</p> |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

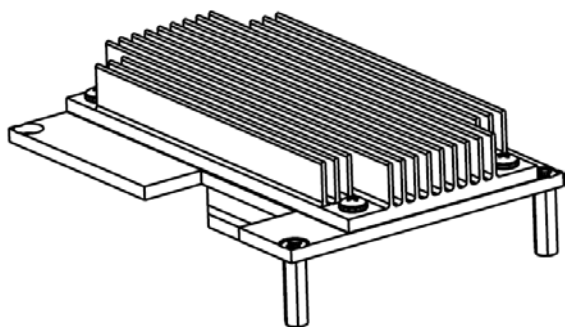
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|---------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Battery</b><br><br><b>(via Battery Module)</b> | <p>Battery Module PN 1055-7645. Contains exchangeable 3.0V Lithium battery for on-board Real Time Clock and CMOS RAM.</p> <p>Manufacturer Panasonic / Part-number BR-2032BN.<br/> Approximate 7.2 years retention.<br/> Current draw is typical less than 3 <math>\mu</math>A when PSU is disconnected and 0 <math>\mu</math>A in S0 – S5.</p> <p>Note that if BR-2032BN is replaceable by CR2032 type Panasonic CR-2032L/BN, CR2032N/BN or CR-2032L/BE, then operating temperature range is -25°C to 60°C and storage temperature range is -20°C to 60°C and approximate 8.8 years retention.<br/> Note that Intel specifies that battery must be connected, however it is unspecified what is the risk of not using battery. When battery is not connected, Kontron has not been able to find any problems except for RTC not running.</p> <p><b>CAUTION: Danger of explosion if the battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.</b></p> |
| <b>Cooler</b>                                     | <p>The Cooler heatspreader is passive on the pITX-E3815 and pITX-E3826, so no fan is included.</p> <p>The Cooler heatspreader is active on the pITX-E3845, so the cooler has integrated fan (UL-approved) with the following specifications:<br/> Supply Voltage: 4.5V – 5.5V<br/> Startup Voltage: 4.0V<br/> Rotation Speed, rated: 5000 RPM<br/> Noise level, maximum: 27.0 dB(A)<br/> MTBF: 70000 Hours @ 40°C<br/> Operating Temperature: -25°C to +90°C</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

### 3.1 System overview

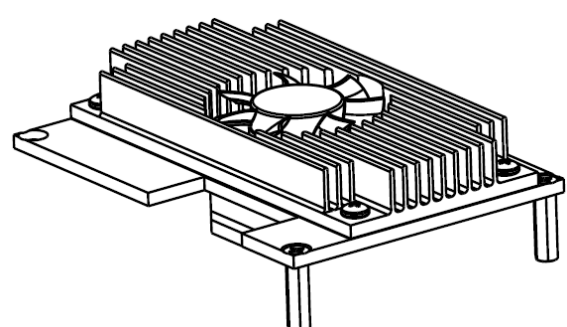
The block diagram below shows the architecture and main components of the pITX-E38. The key component on the board is the Intel® Atom E38xx SoC (Bay Trail).



### 3.2 Integrated premounted cooler



Passive cooler on the pITX-E3815 and pITX-E3826



Active cooler on the pITX-E3845



## 3.2 Power Consumption

The following items were used in the test setup:

### 1. Low Power Setup (E3815):

Standard system configuration equipped with Internal graphics, 1x 500GB SATA disk, mSATA 40GB, 1x SODIMM (2GB Modules), DP Monitor, USB Keyboard & Mouse. 1x 8GB USB2.0 Stick, 1x LAN Gigabit.

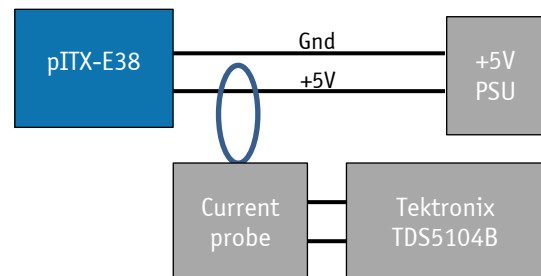
### Mid Power Setup (E3826):

Standard system configuration equipped with Internal graphics, 1x 500GB SATA disk, mSATA 40GB, 1x SODIMM (4GB Modules), DP Monitor, USB Keyboard & Mouse. 2x 8GB USB2.0 Stick, 1x LAN Gigabit.

### High Power Setup (E3845):

Standard system configuration equipped with Internal graphics, 1x 500GB SATA disk, mSATA 40GB, 1x SODIMM (8GB Modules), DP Monitor, LVDS, USB Keyboard & Mouse. 2x 8GB USB2.0 Stick, 1x 16GB USB3.0 Stick, 1x LAN Gigabit.

2. Active cooler (High & Mid), Passive cooler (Low)
3. USB Keyboard/Mouse
4. 2.5" SATA HDD external power.
5. Agilent E3634A @ 5V, 4A
6. Lecroy SDA820Zi-A Oscilloscope
7. Lecroy AP015 Current Probe
8. USB Flash 1x 8GB USB 2.0
9. USB Flash 1x 16GB USB 3.0
10. DP Monitor 1200x1600
11. LVDS Display 1200x1600
12. mSATA: 40GB
13. Memory: 8/4/2 GB SODIMM 1333 PC3-10600



Note that power consumption of the Display and HDD are not included.

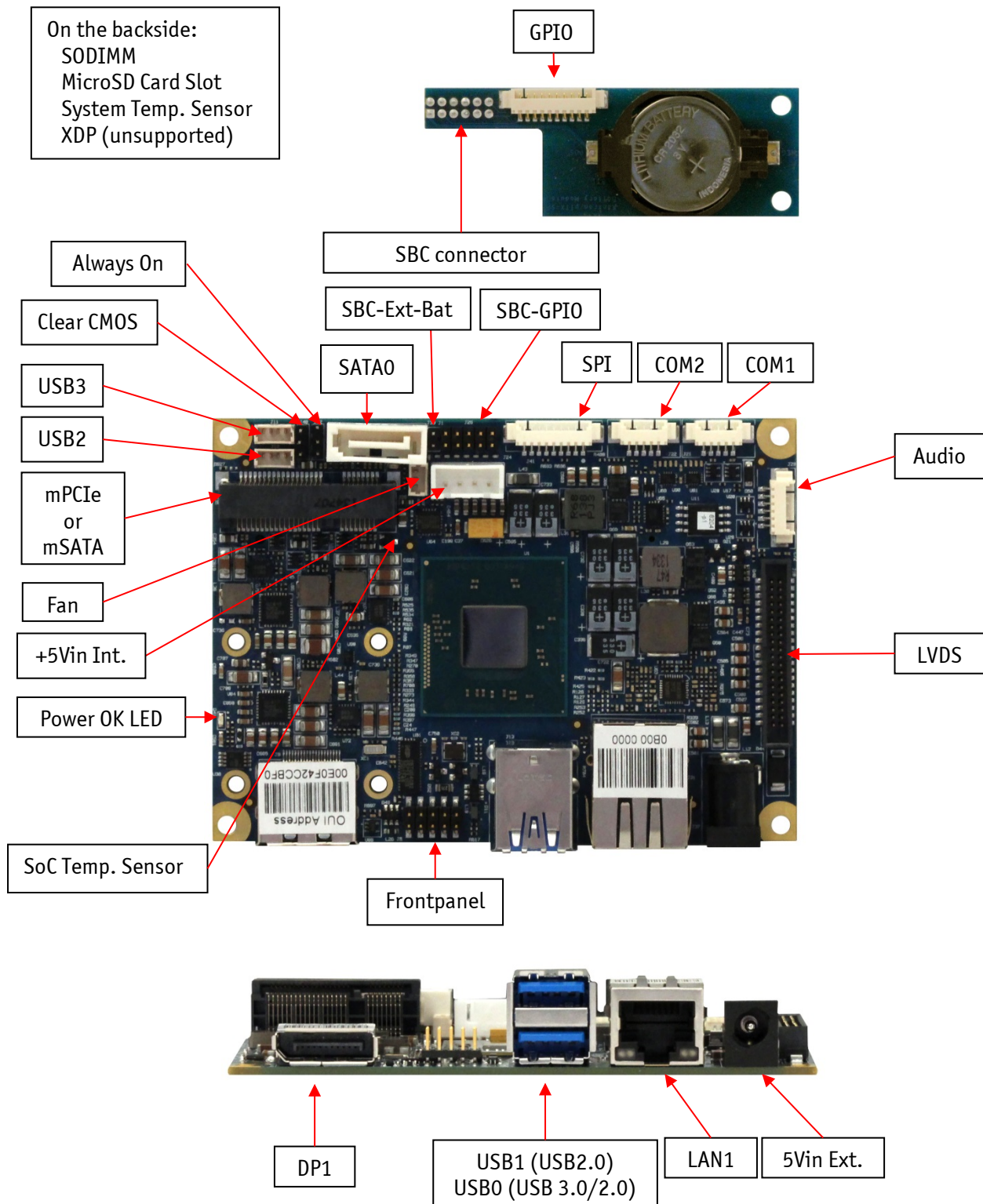
### Power measurements:

| Low Power Setup (E3815)                              | Mid Power Setup (E3826) | High Power Setup (E3845) |
|------------------------------------------------------|-------------------------|--------------------------|
| DOS Idle                                             |                         |                          |
| 760mA - 3.8W                                         | 935mA - 4.675W          | 1150mA - 5.75W           |
| Windows 7, 3DMARK AE (first scene) +Burn in test 7.1 |                         |                          |
| 1320mA - 6.6W                                        | 1810mA - 9.05W          | 2270mA - 11.35W          |
| Windows 7, idle, desktop, no applications running    |                         |                          |
| 848mA - 4.24W                                        | 1130mA - 5.65W          | 1250mA - 6.25W           |
| S3 Mode                                              |                         |                          |
| 247mA - 1.235W                                       | 255mA - 1.275W          | 266mA - 1.33W            |
| S4 Mode                                              |                         |                          |
| 239mA - 1.195W                                       | 238mA - 1.19W           | 236mA - 1.18W            |
| S5 Mode                                              |                         |                          |
| 214mA - 1.070W                                       | 219mA - 1.095W          | 228mA - 1.14             |



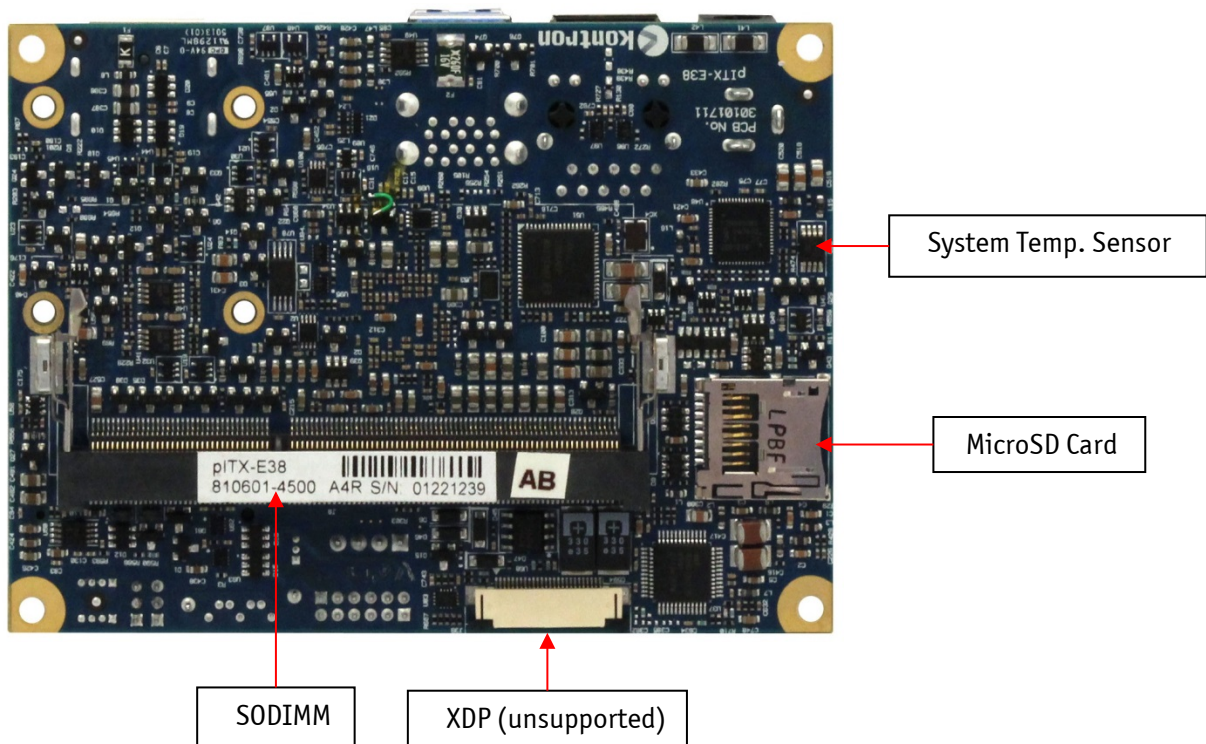
## 4 Connector Locations

### 4.1 pITX-E38 - frontside





## 4.2 pITX-E38 - backside



## 5 Connector Definitions

The following sections provide pin definitions and detailed description of all on-board connectors.

The connector definitions follow the following notation:

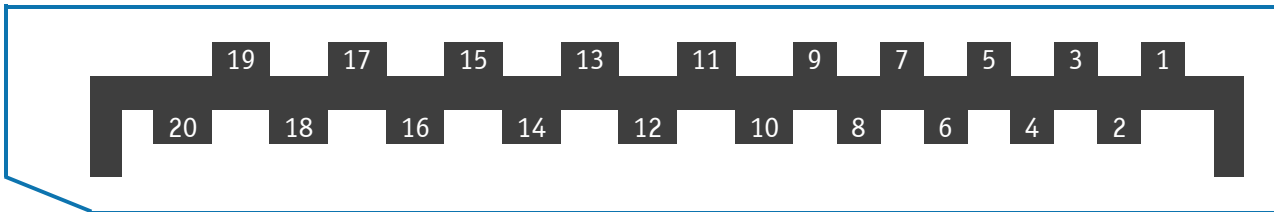
| Column name | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Pin         | Shows the pin-numbers in the connector. The graphical layout of the connector definition tables is made similar to the physical connectors.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Signal      | The mnemonic name of the signal at the current pin. The notation "XX#" states that the signal "XX" is active low.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Type        | AI: Analogue Input.<br>AO: Analogue Output.<br>I: Input, TTL compatible if nothing else stated.<br>IO: Input / Output. TTL compatible if nothing else stated.<br>IOT: Bi-directional tristate IO pin.<br>IS: Schmitt-trigger input, TTL compatible.<br>IOC: Input / open-collector Output, TTL compatible.<br>IOD: Input / Output, CMOS level Schmitt-triggered. (Open drain output)<br>NC: Pin not connected.<br>O: Output, TTL compatible.<br>OC: Output, open-collector or open-drain, TTL compatible.<br>OT: Output with tri-state capability, TTL compatible.<br>LVDS: Low Voltage Differential Signal.<br>PWR: Power supply or ground reference pins. |
|             | Ioh: Typical current in mA flowing out of an output pin through a grounded load, while the output voltage is > 2.4 V DC (if nothing else stated).<br>Iol: Typical current in mA flowing into an output pin from a VCC connected load, while the output voltage is < 0.4 V DC (if nothing else stated).                                                                                                                                                                                                                                                                                                                                                      |
| Pull U/D    | On-board pull-up or pull-down resistors on input pins or open-collector output pins.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Note        | Special remarks concerning the signal.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

The abbreviation *TBD* is used for specifications which are not available yet or which are not sufficiently specified by the component vendors.

## 6 IO-Area Connectors

### 6.1 DP Connectors (DP1)

The DP (DisplayPort) connector is based on standard DP type Foxconn 3VD51203-H7JJ-7H or similar.



| Pin | Signal     | Description                    | Type | Note                                                                                                                                             |
|-----|------------|--------------------------------|------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| 1   | Lane 0 (p) |                                | LVDS |                                                                                                                                                  |
| 2   | GND        |                                | PWR  |                                                                                                                                                  |
| 3   | Lane 0 (n) |                                | LVDS |                                                                                                                                                  |
| 4   | Lane 1 (p) |                                | LVDS |                                                                                                                                                  |
| 5   | GND        |                                | PWR  |                                                                                                                                                  |
| 6   | Lane 1 (n) |                                | LVDS |                                                                                                                                                  |
| 7   | Lane 2 (p) |                                | LVDS |                                                                                                                                                  |
| 8   | GND        |                                | PWR  |                                                                                                                                                  |
| 9   | Lane 2 (n) |                                | LVDS |                                                                                                                                                  |
| 10  | Lane 3 (p) |                                | LVDS |                                                                                                                                                  |
| 11  | GND        |                                | PWR  |                                                                                                                                                  |
| 12  | Lane 3 (n) |                                | LVDS |                                                                                                                                                  |
| 13  | Config1    | Aux or DDC selection           | I    | Internally pull down (1Mohm).<br>Aux channel on pin 15/17 selected as default (when NC)<br>DDC channel on pin 15/17, If HDMI adapter used (3.3V) |
| 14  | Config2    | (Not used)                     | 0    | Internally connected to GND                                                                                                                      |
| 15  | Aux Ch (p) | Aux Channel (+)<br>or DDC Clk  |      | AUX (+) channel used by DP<br>DDC Clk used by HDMI                                                                                               |
| 16  | GND        |                                | PWR  |                                                                                                                                                  |
| 17  | Aux Ch (n) | Aux Channel (-)<br>or DDC Data |      | AUX (-) channel used by DP<br>DDC Data used by HDMI                                                                                              |
| 18  | Hot Plug   |                                | I    | Internally pull down (100Kohm).                                                                                                                  |
| 19  | Return     |                                | PWR  | Same as GND                                                                                                                                      |
| 20  | 3.3V       |                                | PWR  | Fused by 1.5A resetable PTC fuse.                                                                                                                |

## 6.2 Ethernet Connector

The pITX-E38 support single channels of 10/100/1000Mb Ethernet based on Intel® Springville i210.

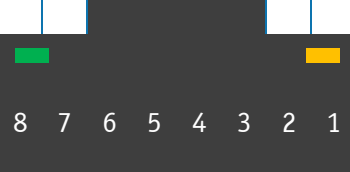
In order to achieve the specified performance of the Ethernet port, Category 5 twisted pair cables must be used with 10/100MB and Category 5E, 6 or 6E with 1Gb LAN networks.

The signals for the Ethernet ports are as follows:

| Signal            | Description                                                                                                                                                                                                                                         |
|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MDI[0]+ / MDI[0]- | In MDI mode, this is the first pair in 1000Base-T, i.e. the BI_DA+/- pair, and is the transmit pair in 10Base-T and 100Base-TX.<br>In MDI crossover mode, this pair acts as the BI_DB+/- pair, and is the receive pair in 10Base-T and 100Base-TX.  |
| MDI[1]+ / MDI[1]- | In MDI mode, this is the second pair in 1000Base-T, i.e. the BI_DB+/- pair, and is the receive pair in 10Base-T and 100Base-TX.<br>In MDI crossover mode, this pair acts as the BI_DA+/- pair, and is the transmit pair in 10Base-T and 100Base-TX. |
| MDI[2]+ / MDI[2]- | In MDI mode, this is the third pair in 1000Base-T, i.e. the BI_DC+/- pair.<br>In MDI crossover mode, this pair acts as the BI_DD+/- pair.                                                                                                           |
| MDI[3]+ / MDI[3]- | In MDI mode, this is the fourth pair in 1000Base-T, i.e. the BI_DD+/- pair.<br>In MDI crossover mode, this pair acts as the BI_DC+/- pair.                                                                                                          |

**Note:** MDI = Media Dependent Interface.

The pinout of the RJ45 connectors is as follows:

| Signal                       | PIN                                                                                 | Type           | Ioh/Iol | Note |
|------------------------------|-------------------------------------------------------------------------------------|----------------|---------|------|
| MDI0+                        |                                                                                     |                |         |      |
| MDI0-                        |                                                                                     |                |         |      |
| MDI1+                        |                                                                                     |                |         |      |
| MDI2+                        |                                                                                     |                |         |      |
| MDI2-                        |                                                                                     |                |         |      |
| MDI1-                        |                                                                                     |                |         |      |
| MDI3+                        |                                                                                     |                |         |      |
| MDI3-                        |                                                                                     |                |         |      |
| Flashing =><br>communication |  | On => 1GB link |         |      |

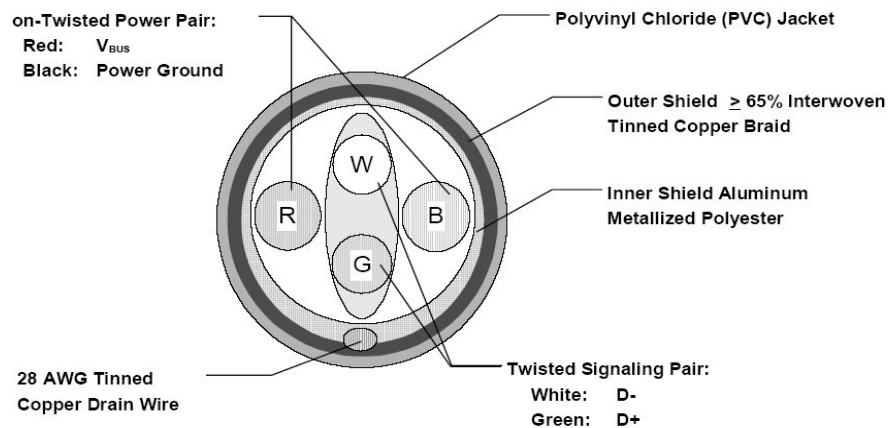
## 6.1 USB Connectors (IO Area)

The pITX-E38 board contains support for 1 USB3.0/2.0 port (Lower USB port, USB0) and one USB2.0 port (higher USB port, USB1) in the IO area.

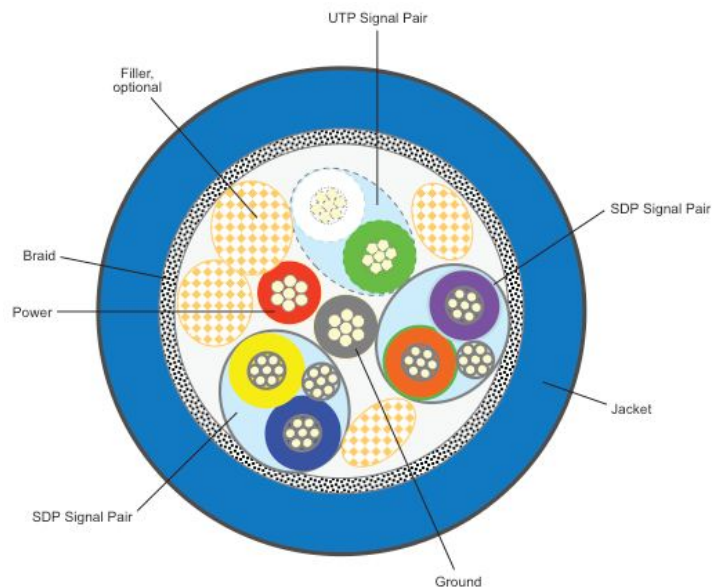
USB 2.0 ports allowing data transfers up to 480Mb/s. The USB 3.0 port allowing data transfers up to 5Gb/s.

(Two internal USB ports are available via internal 4-pin connectors)

For USB2.0 cabling it is required to use only HiSpeed USB cable, specified in USB2.0 standard:



For USB3.0 cabling it is required to use only HiSpeed USB cable, specified in USB3.0 standard:



USB Ports 0 and 1 are mounted together, USB1 (USB2.0) on top of the USB0 (USB3.0/USB2.0).

| Note | Type | Signal  | PIN |   |   |       | Signal | Type | Note |
|------|------|---------|-----|---|---|-------|--------|------|------|
|      | IO   | USB1-   |     |   |   | USB1+ |        | IO   |      |
| 1    | PWR  | 5V/SB5V | 1   | 2 | 3 | 4     | GND    | PWR  |      |
|      | -    | nc      | 5   | 6 | 7 | 8     | 9      | nc   | -    |
|      | -    | nc      |     |   |   | nc    |        | -    |      |
|      | PWR  | GND     |     |   |   |       |        |      |      |
|      | IO   | USB0-   |     |   |   | USB0+ |        | IO   |      |
| 1    | PWR  | 5V/SB5V | 1   | 2 | 3 | 4     | GND    | PWR  |      |
|      | IO   | RX0-    | 5   | 6 | 7 | 8     | 9      | TX0+ | IO   |
|      | IO   | RX0+    |     |   |   | TX0-  |        | IO   |      |
|      | PWR  | GND     |     |   |   |       |        |      |      |

**Note 1:** In order to meet the requirements of USB standard, the 5V input supply must be at least 5.00V.

| Signal                                            | Description                                                                                                                                                              |
|---------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| USBn+ USBn-<br>RXn+ RXn-<br>TXn+ TXn-<br>(n= 0,1) | Differential pair works as serial differential receive/transmit data lines.                                                                                              |
| 5V/SB5V                                           | 5V supply for external devices. SB5V is supplied during power-down to allow wakeup on USB device activity. Protected by 1.0A current limiting circuit for each USB port. |

## 6.2 DC Power Jack Connector (5Vin Ext.)

Either the DC Power Jack Connector (5Vin Ext.) or the “5Vin Int.” connector must be used to supply the board with +5V +/-5%.

The 5Vin Ext. power connector has Vin to the center pin and mates with Ø 6.3 mm DC Power jack with Ø 2.0 mm pin hole. (DC Connector RA 2mm locking type). Maximum allowed current is 5A.

Warning: Hot Plugging power supply is not supported. Hot plugging might damage the board.

---

Notes: **To protect the external power lines of peripheral devices make sure that**

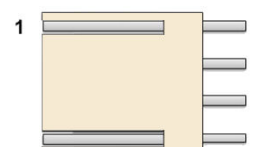
- the wires have the right diameter to withstand the maximum available current.
- to enclosure of the peripheral device fulfills the fire-protecting conditions of IEC/EN 60950.

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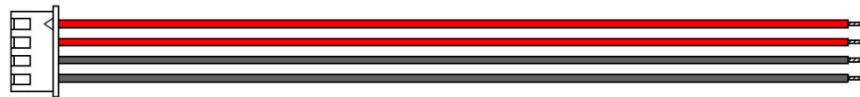
## 7 Internal Connectors

### 7.1 Internal Power Connector (Vin Int.)

| Header                                                                            | Pin | Signal | Description     | Type |
|-----------------------------------------------------------------------------------|-----|--------|-----------------|------|
|  | 1   | +5V    | +5V power input | PWR  |
|                                                                                   | 2   | +5V    | +5V power input | PWR  |
|                                                                                   | 3   | GND    | Power Ground    | PWR  |
|                                                                                   | 4   | GND    | Power Ground    | PWR  |

Maximum allowed current on each pin is 3A.

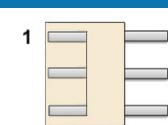
Available cable kit:



1055-8061 Cable Power 4p 30cm OE pITX-E38

### 7.2 Fan Connector (Fan)

The Fan can be used to actively cool the heatsink mounted on the board. The fan rotation speed can be monitored and the fan speed controlled by the temperature of the PCB (near SoC).

| Header                                                                              | Pin | Signal | Description    | Type |
|-------------------------------------------------------------------------------------|-----|--------|----------------|------|
|  | 1   | TACHO  | Rotation speed | I    |
|                                                                                     | 2   | PWM    | PWM output     | 0-5V |
|                                                                                     | 3   | GND    | Ground         | PWR  |

| Signal | Description                                                                                                                                                                                                                                                                                               |
|--------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PWM    | PWM output signal for FAN speed control.                                                                                                                                                                                                                                                                  |
| TACHO  | Tacho input signal from the fan, for rotation speed supervision RPM (Rotation Per Minute). The signal shall be generated by an open collector transistor or similar. Onboard is a pull-up resistor 2K2 to +3.3V. The signal has to be pulsed and onboard circuit is prepared for two pulses per rotation. |
| GND    | Power Supply GND signal                                                                                                                                                                                                                                                                                   |

## 7.1 LVDS Flat Panel Connector (LVDS)

The LVDS connector is based on 40 pole connector type Samtec SHF-120-01-F-D-SM-K-TR or similar.

| Note       | Type | Signal     | PIN   | Signal     | Type | Note       |
|------------|------|------------|-------|------------|------|------------|
| Max. 0.5A  | PWR  | +5V        | 1 2   | +5V        | PWR  | Max. 0.5A  |
| Max. 0.5A  | PWR  | +5V        | 3 4   | +5V        | PWR  | Max. 0.5A  |
| Max. 0.5A  | PWR  | +5V        | 5 6   | GND        | PWR  | Max. 0.5A  |
| Max. 0.5A  | PWR  | +5V        | 7 8   | GND        | PWR  | Max. 0.5A  |
| Max. 0.5A  | PWR  | LCDVCC     | 9 10  | LCDVCC     | PWR  | Max. 0.5A  |
| 2K2Ω, 3.3V | OT   | DDC CLK    | 11 12 | DDC DATA   | OT   | 2K2Ω, 3.3V |
| 3.3V level | OT   | BKLTCTL    | 13 14 | VDD ENABLE | OT   | 3.3V level |
| 3.3V level | OT   | BKLTEN#    | 15 16 | GND        | PWR  | Max. 0.5A  |
|            | LVDS | LVDS A0-   | 17 18 | LVDS A0+   | LVDS |            |
|            | LVDS | LVDS A1-   | 19 20 | LVDS A1+   | LVDS |            |
|            | LVDS | LVDS A2-   | 21 22 | LVDS A2+   | LVDS |            |
|            | LVDS | LVDS ACLK- | 23 24 | LVDS ACLK+ | LVDS |            |
|            | LVDS | LVDS A3-   | 25 26 | LVDS A3+   | LVDS |            |
| Max. 0.5A  | PWR  | GND        | 27 28 | GND        | PWR  | Max. 0.5A  |
|            | LVDS | LVDS B0-   | 29 30 | LVDS B0+   | LVDS |            |
|            | LVDS | LVDS B1-   | 31 32 | LVDS B1+   | LVDS |            |
|            | LVDS | LVDS B2-   | 33 34 | LVDS B2+   | LVDS |            |
|            | LVDS | LVDS BCLK- | 35 36 | LVDS BCLK+ | LVDS |            |
|            | LVDS | LVDS B3-   | 37 38 | LVDS B3+   | LVDS |            |
| Max. 0.5A  | PWR  | GND        | 39 40 | GND        | PWR  | Max. 0.5A  |

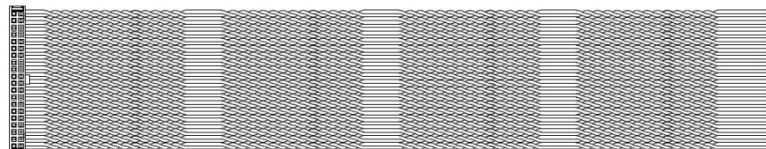
**Note:** The LVDS connector supports single and dual channel, 18/24bit SPWG panels up to a resolution of 1600x1200 or 1920x1080 and with limited frame rate up to 1920x1200.

| Signal      | Description                                                                                                                                                |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| LVDS A0..A3 | LVDS A Channel data                                                                                                                                        |
| LVDS ACLK   | LVDS A Channel clock                                                                                                                                       |
| LVDS B0..B3 | LVDS B Channel data                                                                                                                                        |
| LVDS BCLK   | LVDS B Channel clock                                                                                                                                       |
| BKLTCTL     | Backlight control (1), PWM signal to implement voltage in the range 0-3.3V                                                                                 |
| BKLTEN#     | Backlight Enable signal (active low) (2)                                                                                                                   |
| VDD ENABLE  | Output Display Enable.                                                                                                                                     |
| LCDVCC      | VCC supply to the display. 5V or 3.3V (1A Max.) selected in BIOS setup menu. Power sequencing depends on LVDS panel selection. (Shared with eDP connector) |
| DDC CLK     | DDC Channel Clock                                                                                                                                          |

**Notes:** Windows API will be available to operate the BKLTCTL signal. Some Inverters have a limited voltage range 0- 2.5V for this signal: If voltage is > 2.5V the Inverter might latch up. Some Inverters generates noise on the BKLTCTL signal, causing the LVDS transmission to fail (corrupted picture on the display). By adding a 1Kohm resistor in series with this signal, mounted at the Inverter end of the cable kit, the noise is limited and the picture is stable.

If the Backlight Enable is required to be active high then, check the following BIOS Chipset setting: Backlight Signal Inversion = Enabled.

Available cable kit:



821515 Open End LVDS Cable 572mm

## 7.2 SATA (Serial ATA) Disk interface (SATA0)

Sata0 connector pinning:

| PIN | Signal    | Type | Ioh/Iol | Note |
|-----|-----------|------|---------|------|
| 1   | GND       | PWR  | -       |      |
| 2   | SATA* TX+ |      |         |      |
| 3   | SATA* TX- |      |         |      |
| 4   | GND       | PWR  | -       |      |
| 5   | SATA* RX- |      |         |      |
| 6   | SATA* RX+ |      |         |      |
| 7   | GND       | PWR  | -       |      |

| Signal          | Description                               |
|-----------------|-------------------------------------------|
| SATA0 RX+ / RX- | Host transmitter differential signal pair |
| SATA0 TX+ / TX- | Host receiver differential signal pair    |

Available cable kit:



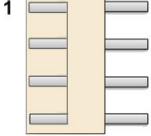
PN 96079-0000-00-1 Cable SATA 500mm

### 7.3 USB Connectors (USB2 and USB3)

The pITX-E38 support two internal USB 2.0 ports (USB2 and USB3) allowing data transfers up to 480Mb/s.

Legacy Keyboard/Mouse and wakeup from sleep states are supported. Over-current detection on all fourteen USB ports is supported.

See chapter “USB Connectors (IO Area)” for more information on USB0 – USB1.

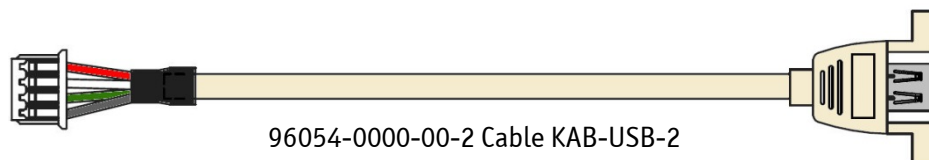
| Header                                                                            | Pin | Signal  | Description | Type |
|-----------------------------------------------------------------------------------|-----|---------|-------------|------|
|  | 1   | GND     | Ground      | PWR  |
|                                                                                   | 2   | USBx+   |             | IO   |
|                                                                                   | 3   | USBx-   |             | IO   |
|                                                                                   | 4   | 5V/SB5V | 5V power    | PWR  |

Note1:

| Signal      | Description                                                                                                                                                             |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| USBx+ USBx- | Differential pair works as Data/Address/Command Bus.                                                                                                                    |
| 5V/SB5V     | 5V supply for external devices. SB5V is supplied during powerdown to allow wakeup on USB device activity. Protected by 1.0A current limiting circuit for each USB port. |

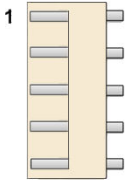
In order to meet the requirements of USB standard, the 5V input supply must be at least 5.00V.

Available cable kit:



## 7.4 Serial COM1 – COM2 Ports (COM1, COM2)

Two RS232 serial ports (TTL signals only) are available on the pITX-E38.

| Header                                                                            | Pin | Signal | Description | Type |
|-----------------------------------------------------------------------------------|-----|--------|-------------|------|
|  | 1   | TxD    | TTL signal  | O    |
|                                                                                   | 2   | RxD    | TTL signal  | I    |
|                                                                                   | 3   | RTS    | TTL signal  | O    |
|                                                                                   | 4   | CTS    | TTL signal  | I    |
|                                                                                   | 5   | GND    | Ground      | PWR  |

The typical definition of the signals in the COM ports is as follows:

| Signal | Description                                                                                                                                                                                    |
|--------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| TxD    | Transmitted Data, sends data to the communications link. The signal is set to the marking state (0V) on hardware reset when the transmitter is empty or when loop mode operation is initiated. |
| RxD    | Received Data, receives data from the communications link.                                                                                                                                     |
| RTS    | Request To Send, indicates to the modem etc. that the on-board UART is ready to exchange data.                                                                                                 |
| CTS    | Clear To Send, indicates that the modem or data set is ready to exchange data.                                                                                                                 |

Available cable kit:

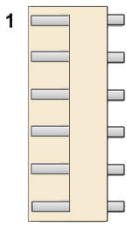


1055-8059 Cable Serial 5p 20cm OE pITX-E38

For more detailed information how to set up the COM ports please find KTD-N0914 “pITX-E38 COM port Application Note” on EMD Customer Section [http://emdcustomersection.kontron.com/wp-login.php?redirect\\_to=/](http://emdcustomersection.kontron.com/wp-login.php?redirect_to=/)

## 7.5 Audio Connector

The on-board Audio circuit implements High Definition Audio with UAA (Universal Audio Architecture), featuring 24-bit stereo DAC and 20-bit stereo ADCs.

| Header                                                                            | Pin | Signal         | Description | Type |
|-----------------------------------------------------------------------------------|-----|----------------|-------------|------|
|  | 1   | Line-in left   |             | 0    |
|                                                                                   | 2   | Mic            | Microphone  | I    |
|                                                                                   | 3   | Line-in right  |             | 0    |
|                                                                                   | 4   | Line-out left  |             | I    |
|                                                                                   | 5   | GND            | Ground      | PWR  |
|                                                                                   | 6   | Line-out right |             | 0    |

Available cable kit:

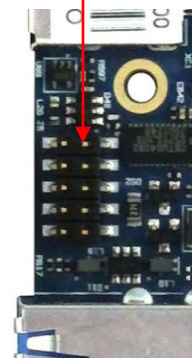


96063-0000-00-1 Cable KAB-SOUND-CMP-2

## 7.6 Front Panel Connector (FRONTPNL)

| Note | Pull U/D | Ioh/Iol | Type | Signal     | PIN  | Signal   | Type | Ioh/Iol | Pull U/D | Note |
|------|----------|---------|------|------------|------|----------|------|---------|----------|------|
|      | -        | -       | I    | PWRBTN_IN# | 2 1  | RSTIN#   | I    | -       | -        |      |
|      | -        | -       | PWR  | Gnd        | 4 3  | GND      | PWR  | -       | -        |      |
|      | -        | -       | PWR  | 5V         | 6 5  | Beep     |      | -       | -        |      |
|      | 220R     | -       | 0    | 3.3V       | 8 7  | 3.3V     | 0    | -       | 220R     |      |
| 1    | -        | -       | 0    | SuspendLED | 10 9 | SataLED# | 0    | -       | -        | 1    |

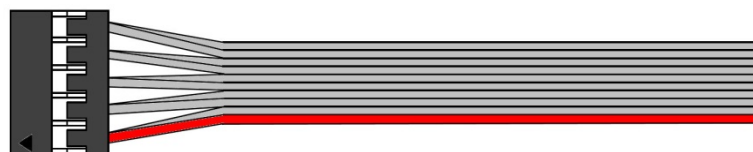
Pin 1



Note1, LED output has integrated 220 ohm.

| Signal     | Description                                                                |
|------------|----------------------------------------------------------------------------|
| RSTIN#     | Reset Input active low.                                                    |
| PWRBTN_IN# | Power Button In. Toggle this signal low to boot the board or to shut down. |
| Beep       |                                                                            |
| +5V        | 5V maximum load is 500mA.                                                  |
| 3.3V       | 3.3V signal via 220 ohm resistor pullup to 3.3V.                           |
| SATA_LED#  | SATA Activity LED (active low signal). 3V3 output when passive.            |
| SUS_LED    | Suspend Mode LED (active high signal). Output 3.3V via 220Ω.               |

Available cable kit:



1055-8065 Cable Frontpanel 10p 20cm OE pITX-E38

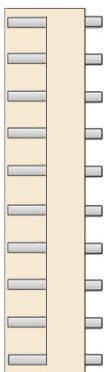
## 7.7 Battery Module

The battery module PN 1055-7645 contains Lithium battery BR2032/BN in a socket, GPIO connector and SBC-Connector. The SBC Connector is used to interface the SBC-GPIO and SBC-Ext-Bat connectors.

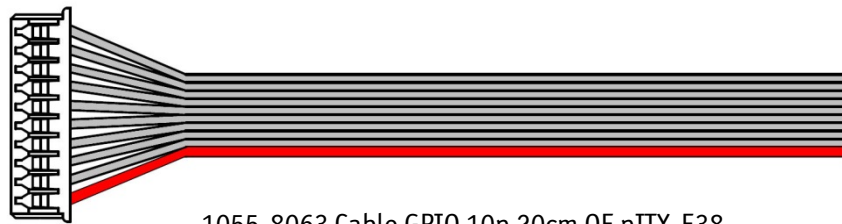


### GPIO Connector (GPIO)

The GPIO connector is present on the Battery Module, type Molex 53261-1071 (or similar).

| Header                                                                             | Pin | Signal | Description    | Type |
|------------------------------------------------------------------------------------|-----|--------|----------------|------|
|  | 1   | 3.3V   | 3.3V Power Out | PWR  |
|                                                                                    | 2   | GPIO0  |                | IOT  |
|                                                                                    | 3   | GPIO1  |                | IOT  |
|                                                                                    | 4   | GPIO2  |                | IOT  |
|                                                                                    | 5   | GPIO3  |                | IOT  |
|                                                                                    | 6   | GPIO4  |                | IOT  |
|                                                                                    | 7   | GPIO5  |                | IOT  |
|                                                                                    | 8   | GPIO6  |                | IOT  |
|                                                                                    | 9   | GPIO7  |                | IOT  |
|                                                                                    | 10  | GND    | Ground         | PWR  |

Available cable kit:



1055-8063 Cable GPIO 10p 20cm OE pITX-E38

### SBC Connector (SBC-Connector)

The SBC connector is present on the Battery Module and used to interface the Battery Module to the SBC.

| Note | Pull U/D | Ioh/Iol | Type | Signal | PIN   | Signal | Type | Ioh/Iol | Pull U/D | Note |
|------|----------|---------|------|--------|-------|--------|------|---------|----------|------|
|      | -        | -       |      | Bat-   | 2 1   | Bat+   |      |         | -        |      |
|      | -        | TBD     | IOT  | GPIO7  | 4 3   | GND    | PWR  |         | -        |      |
|      | -        | TBD     | IOT  | GPIO5  | 6 5   | GPIO6  | IOT  | TBD     | -        |      |
|      | -        | TBD     | IOT  | GPIO3  | 8 7   | GPIO4  | IOT  | TBD     | -        |      |
|      | -        | TBD     | IOT  | GPIO1  | 10 9  | GPIO2  | IOT  | TBD     | -        |      |
|      | -        |         | PWR  | 3.3V   | 12 11 | GPIO0  | IOT  | TBD     | -        |      |

## 7.8 SBC-GPIO Connector (SBC-GPIO)

The SBC-GPIO connector is present on the SBC and used to interface the Battery Module. The two connectors SBC-GPIO and SBC-Ext-Bat is positioned so that they fit a single 2x6 pin header connector on the Battery Module.

| Battery Module | Pull U/D | Ioh/Iol | Type | Signal | PIN  | Signal | Type | Ioh/Iol | Pull U/D | Battery Module |
|----------------|----------|---------|------|--------|------|--------|------|---------|----------|----------------|
| SBC-12         | -        | -       | PWR  | 3.3V   | 1 2  | GPIO0  | IOT  | TBD     |          | SBC-11         |
| SBC-10         | -        | TBD     | IOT  | GPIO1  | 3 4  | GPIO2  | IOT  | TBD     |          | SBC-9          |
| SBC-8          | -        | TBD     | IOT  | GPIO3  | 5 6  | GPIO4  | IOT  | TBD     |          | SBC-7          |
| SBC-6          | -        | TBD     | IOT  | GPIO5  | 7 8  | GPIO6  | IOT  | TBD     |          | SBC-5          |
| SBC-4          | -        | TBD     | IOT  | GPIO7  | 9 10 | GND    | PWR  | -       | -        | SBC-3          |

| Signal   | Description                                                                                                                                         |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| 3.3V     |                                                                                                                                                     |
| GPIO0..7 | General Purpose Inputs / Output. These Signals may be controlled or monitored through the use of the KT-API-V2 (Application Programming Interface). |

## 7.9 SBC-External battery (SBC-Ext-Bat)

The two connectors SBC-GPIO and SBC-Ext-Bat is positioned so that they fit a single 2x6 pin header connector on the Battery Module.

Pin 1 is Bat+, (same as pin 1 on the SBC connector on the Battery Module)

Pin 2 is Bat-, (same as pin 2 on the SBC connector on the Battery Module)

Note that Intel specifies that battery must be connected, however it is unspecified what is the risk of not using battery. When battery is not connected, Kontron has not been able to find any problems except for RTC not running.

## 7.10 Clear CMOS (CLR-CMOS)

Connect jumper to clear CMOS settings. Don't leave the jumper installed.

| CMOS1  |        | Description                                           |
|--------|--------|-------------------------------------------------------|
| pin1-2 | pin2-3 |                                                       |
| -      | X      | Default position                                      |
| X      | -      | Load Default BIOS Settings exclusive erasing Password |
| -      | -      | No function.                                          |



## 7.11 “Always On” (Always On)

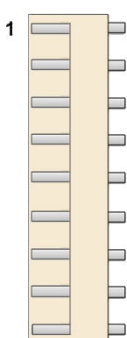
The “Always On” can be used to implement hardware controlled Always ON by jumper. When “Always On” is selected, then the board will power up automatically when power is connected. It doesn't matter if “Always On” is not selected in BIOS.

The board can still be shut down by PWRBTN\_IN# (power button in) activation (via Front Panel connector).

| Always On |        | Description                                                             |
|-----------|--------|-------------------------------------------------------------------------|
| pin1-2    | pin2-3 |                                                                         |
| X         | -      | Always On selection                                                     |
| -         | X      | Default position                                                        |
| -         | -      | No function. Note: may load default BIOS settings after several minutes |

## 7.12 SPI Connector (SPI)

The SPI (Serial Peripheral Interface) Bus connector provides synchronous full duplex in a 9 pin header.

| Header                                                                              | Pin | Signal   | Description                    | Type   |
|-------------------------------------------------------------------------------------|-----|----------|--------------------------------|--------|
|  | 1   | GND      | Ground                         | PWR    |
|                                                                                     | 2   | SPI_MISO | SPI master input, Slave Output | IO-3.3 |
|                                                                                     | 3   | SPI_MOSI | SPI master output, Slave Input | IO-3.3 |
|                                                                                     | 4   | SPI_CS#  | SPI slave select, active low   | O-3.3  |
|                                                                                     | 5   | SPI_CLK  | SPI clock                      | O-3.3  |
|                                                                                     | 6   | NC       | Not connected                  | NC     |
|                                                                                     | 7   | 3.3V     | 3.3V Power                     | PWR    |
|                                                                                     | 8   | ADDIN    | Disable onboard SPI flash      | I-3.3  |
|                                                                                     | 9   | ISOLATE# | Disable the SPI interface      | I-3.3  |

| Signal        | Description                                                                                                                                                                                                                                  |
|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SPI_CLK       | Serial Clock                                                                                                                                                                                                                                 |
| 3.3V          | 3.3V Standby Voltage power line. Normally output power, but when Motherboard is turned off then the on-board SPI Flash can be 3.3V power sourced via this pin.                                                                               |
| SPI_CS#       | CS# Chip Select, active low.                                                                                                                                                                                                                 |
| ADDIN         | ADDIN input signal must be NC.                                                                                                                                                                                                               |
| SPI_MOSI      | Master Output, Slave Input.                                                                                                                                                                                                                  |
| ISOLATE#      | The ISOLATE# input, active low, is normally NC, but must be connected to GND when programming the SPI flash. Power Supply to the Motherboard must be turned off when loading SPI flash. The pull up resistor is connected via diode to 5VSB. |
| SPI_MISO      | Master Input, Slave Output                                                                                                                                                                                                                   |
| SPI_IO2_#WP   | SPI Data I/O: A bidirectional signal used to support Dual IO Fast Read, Quad IO Fast Read and Quad Output Fast Read modes. The signal is not used in Dual Output Fast Read mode.                                                             |
| SPI_IO3_#HOLD | SPI Data I/O: A bidirectional signal used to support Dual IO Fast Read, Quad IO Fast Read and Quad Output Fast Read modes. The signal is not used in Dual Output Fast Read mode.                                                             |

### 7.13 XDP (XDP)

The XDP-CPU (Intel Debug Port for CPU) connector is not mounted and not supported. XDP connector layout (pads) is located on the backside of PCB and is prepared for the Molex 52435-2671 (or 52435-2672).

| Pin | Signal   | Description     | Type | Pull Up/Down | Note |
|-----|----------|-----------------|------|--------------|------|
| 1   | OBSFN_A0 |                 |      | 220R to 1,8V |      |
| 2   | OBSFN_A1 |                 |      |              |      |
| 3   | GND      |                 | PWR  | -            |      |
| 4   | NC       |                 | NC   | -            |      |
| 5   | NC       |                 | NC   | -            |      |
| 6   | GND      |                 | PWR  | -            |      |
| 7   | NC       |                 | NC   | -            |      |
| 8   | NC       |                 | NC   | -            |      |
| 9   | GND      |                 | PWR  | -            |      |
| 10  | HOOK0    | PMC_RSMRST#     |      |              |      |
| 11  | HOOK1    | PWRBTN#         |      |              |      |
| 12  | HOOK2    | PMC_CORE_PWROK  |      |              |      |
| 13  | HOOK3    | XDP_RTEST#      |      |              |      |
| 14  | HOOK4    |                 | NC   |              |      |
| 15  | HOOK5    |                 | NC   |              |      |
| 16  | +1,8V    |                 | PWR  | -            |      |
| 17  | HOOK6    | PLTRST#         |      |              |      |
| 18  | HOOK7    | 1,8V_SYS_RESET# |      |              |      |
| 19  | GND      |                 | PWR  | -            |      |
| 20  | TDO      |                 |      | 50R to 1,8V  |      |
| 21  | TRST#    |                 |      | /50R         |      |
| 22  | TDI      |                 |      | 50R to 1,8V  |      |
| 23  | TMS      |                 |      | 50R to 1,8V  |      |
| 24  | NC       |                 | NC   | -            |      |
| 25  | GND      |                 | PWR  | -            |      |
| 26  | TCKO     |                 |      | /50R         |      |

## 8 Slot Connectors (mPCIe, mSATA, MicroSD card)

### 8.1 mPCIe or mSATA slot

The miniPCIe port support mPCIe, mSATA and LPC POST module.  
(No USB is included).



| Note | Type | Signal         | PIN |    | Signal     | Type | Note |
|------|------|----------------|-----|----|------------|------|------|
|      |      | WAKE#          | 1   | 2  | +3V3       | PWR  |      |
|      | NC   | NC             | 3   | 4  | GND        | PWR  |      |
|      | NC   | NC             | 5   | 6  | +1.5V      | PWR  |      |
| 1    |      | CLKREQ#        | 7   | 8  | LPC_Frame# | O    |      |
|      | PWR  | GND            | 9   | 10 | LPC_AD3    | IO   |      |
|      |      | PCIE_mini CLK# | 11  | 12 | LPC_AD2    | IO   |      |
|      |      | PCIE_mini CLK  | 13  | 14 | LPC_AD1    | IO   |      |
|      | PWR  | GND            | 15  | 16 | LPC_ADO    | IO   |      |
|      |      |                |     |    |            |      |      |
| 3    | O    | RST#_LPC       | 17  | 18 | GND        | PWR  |      |
|      | O    | CLK_Debug      | 19  | 20 | W_Disable# |      | 2    |
|      | PWR  | GND            | 21  | 22 | RST#       |      |      |
|      |      | PCIE_RXN       | 23  | 24 | +3V3 Dual  | PWR  |      |
|      |      | PCIE_RXP       | 25  | 26 | GND        | PWR  |      |
|      | PWR  | GND            | 27  | 28 | +1.5V      | PWR  |      |
|      | PWR  | GND            | 29  | 30 | SMB_CLK    |      |      |
|      |      | PCIE_TXN       | 31  | 32 | SMB_DATA   |      |      |
|      |      | PCIE_TXP       | 33  | 34 | GND        | PWR  |      |
|      | PWR  | GND            | 35  | 36 | NC         | NC   |      |
|      | PWR  | GND            | 37  | 38 | NC         | NC   |      |
|      | PWR  | +3V3 Dual      | 39  | 40 | GND        | PWR  |      |
|      | PWR  | +3V3 Dual      | 41  | 42 | NC         | NC   |      |
|      | PWR  | GND            | 43  | 44 | NC         | NC   |      |
|      |      | CLK_MPCIE      | 45  | 46 | NC         | NC   |      |
|      |      | DATA_MPCIE     | 47  | 48 | +1.5V      | PWR  |      |
|      |      | RST_MPCIE#     | 49  | 50 | GND        | PWR  |      |
|      |      | SEL_MSATA      | 51  | 52 | +3V3 Dual  | PWR  |      |

Note 1: 10K ohm pull-up to 3V3.

Note 2: 2K2 ohm pull-up to 3V3 Dual.

Note 2: 10K ohm pull-down to GND.

Recommended fixing tool is "Richco MDLSP1-08M-01"

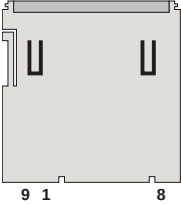
<http://portal.richco-inc.com/login>



## 8.2 MicroSD card slot

SD Card 3.0 interface.

- Up to 832Mbits per second data rate using up to 4 parallel data lines.
- Transfers the data in following UHS-I modes: HS and DDR50.
- Cyclic Redundancy Check CRC7 for command and CRC16 for data integrity.
- Designed to work with I/O cards, Read-only cards and Read/Write cards.
- Supports Read wait Control. SDIO only validated with WIFI devices.

| Header                                                                            | Pin | Signal     | Description              | Type   |
|-----------------------------------------------------------------------------------|-----|------------|--------------------------|--------|
|  | 1   | CD / DATA3 | Card detect / Data bit 3 | IO-3.3 |
|                                                                                   | 2   | CMD        | Command line             | IO-3.3 |
|                                                                                   | 3   | GND        | Ground                   | PWR    |
|                                                                                   | 4   | VCC3       | Power +3.3V              | PWR    |
|                                                                                   | 5   | CLK        | Clock                    | O-3.3  |
|                                                                                   | 6   | GND        | Ground                   | PWR    |
|                                                                                   | 7   | DATA0      | Data bit 0               | IO-3.3 |
|                                                                                   | 8   | DATA1      | Data bit 1               | IO-3.3 |
|                                                                                   | 9   | DATA2      | Data bit 2               | IO-3.3 |
|                                                                                   | 10  | CD#        | Card Detection on low    | I      |
|                                                                                   | 11  | WP         | Write Protect            | I      |

## 9 On-board - & mating connector types

The Mating connector(s) / Cable Kits(s) which are fitting the On-board connectors are listed in below table. The highlighted cable kits are included in the “pITX-E38 Cable & Driver Kit” PN 1056-2142 / 1000000021 (Different quantity of each cable kit included, depending on the quantity of onboard connectors).

| Connector                                   | On-board Connectors |                        | Mating Connectors / Cables |                                |
|---------------------------------------------|---------------------|------------------------|----------------------------|--------------------------------|
|                                             | Manufacturer        | Type no.               | Manufacturer               | Type no.                       |
| FAN (J25)                                   | MOLEX               | 53047-0310             |                            |                                |
| XDP (J39)                                   | MOLEX               | 52435-2671             |                            |                                |
| SATA0 (J30)                                 | LOTES               | ABA-SAT-055-K03        | Kontron                    | <b>96079-0000-00-1 (cable)</b> |
|                                             |                     |                        |                            |                                |
| +5Vin Int. (J24)                            | JST                 | B4B-XH-A(LF)(SN)       | Kontron                    | <b>1055-8061 (cable)</b>       |
|                                             |                     |                        |                            |                                |
| USB2 (J12)                                  | MOLEX               | 53047-0410             | Kontron                    | <b>96054-0000-00-2 (cable)</b> |
| USB3 (J11)                                  | EFCO                | 1250S-04TW             |                            |                                |
| LVDS (J10)                                  | DON CONNEX          | C44-40BSBC1-G          | Don Connex                 | A32-40-C-G-B-1                 |
|                                             | WIESON TECHNOLOGIES | G2124-03200101-00      | Kontron                    | 910000005                      |
|                                             | Hon Kon Technology  | HB12-220-VFS-20R       | Kontron                    | <b>821515 (cable)</b>          |
|                                             | SAMTEC              | SHF-120-01-F-D-SM-K-TR | Kontron                    | 821155 (cable)                 |
| COM1 (J21)                                  | MOLEX               | 53261-0571             | Kontron                    | <b>1055-8059 (cable)</b>       |
| COM2 (J22)                                  |                     |                        |                            |                                |
| Audio (J28)                                 | MOLEX               | 53261-0671             | Kontron                    | <b>96063-0000-00-1 (cable)</b> |
|                                             |                     |                        |                            |                                |
| Ext. Battery (J1)                           | Wuerth Elektronik   | 62000211121            | Kontron                    | Battery Module                 |
|                                             | W+P                 | 314-010-002-XX         |                            |                                |
| Always On (J42)<br>Clear CMOS (J40)         | YIMTEX              | 3291*03SAGR(6T)        | TE Connectivity            | 382575-3 (jumper)              |
|                                             |                     |                        | TE Connectivity            | 382575-2 (jumper)              |
|                                             |                     |                        | W+P                        | 351-201-10-00/BF*2 (jumper)    |
| SPI (J41)                                   | MOLEX               | 53261-0971             |                            |                                |
|                                             |                     |                        |                            |                                |
| FRONTPNL (J5)                               | MOLEX               | 87759-1014             | Kontron                    | <b>1055-8065 (cable)</b>       |
|                                             |                     |                        |                            |                                |
| GPIO (J2)<br>(2x6 pin to<br>Battery Module) | PLASTRON            | LTZ-10S2-B-C/D-F       |                            |                                |
|                                             | PLASTRON            | LTZ-10S2-B-040/028-F   |                            |                                |
|                                             | FCI                 | 57102-F06-05ULF        |                            |                                |
|                                             | MOLEX               | 0877581016             |                            |                                |
|                                             | W+P                 | 314-200-010-00         |                            |                                |
| GPIO 10-pole<br>(from Battery<br>Module)    | Molex               | 53261-1071             | Kontron                    | <b>1055-8063 (cable)</b>       |
|                                             | ACES ELECTRONIC     | 85204-10001            |                            |                                |
|                                             | ACES ELECTRONIC     | 85204-10301            |                            |                                |

**Note:** In above table, more than one connector can be listed for each type of on-board connector, if they all have same fit, form and function and are approved by Kontron as an alternative. Please notice that standard connectors like DP, miniPCIE, Ethernet and USB are not included in the list.

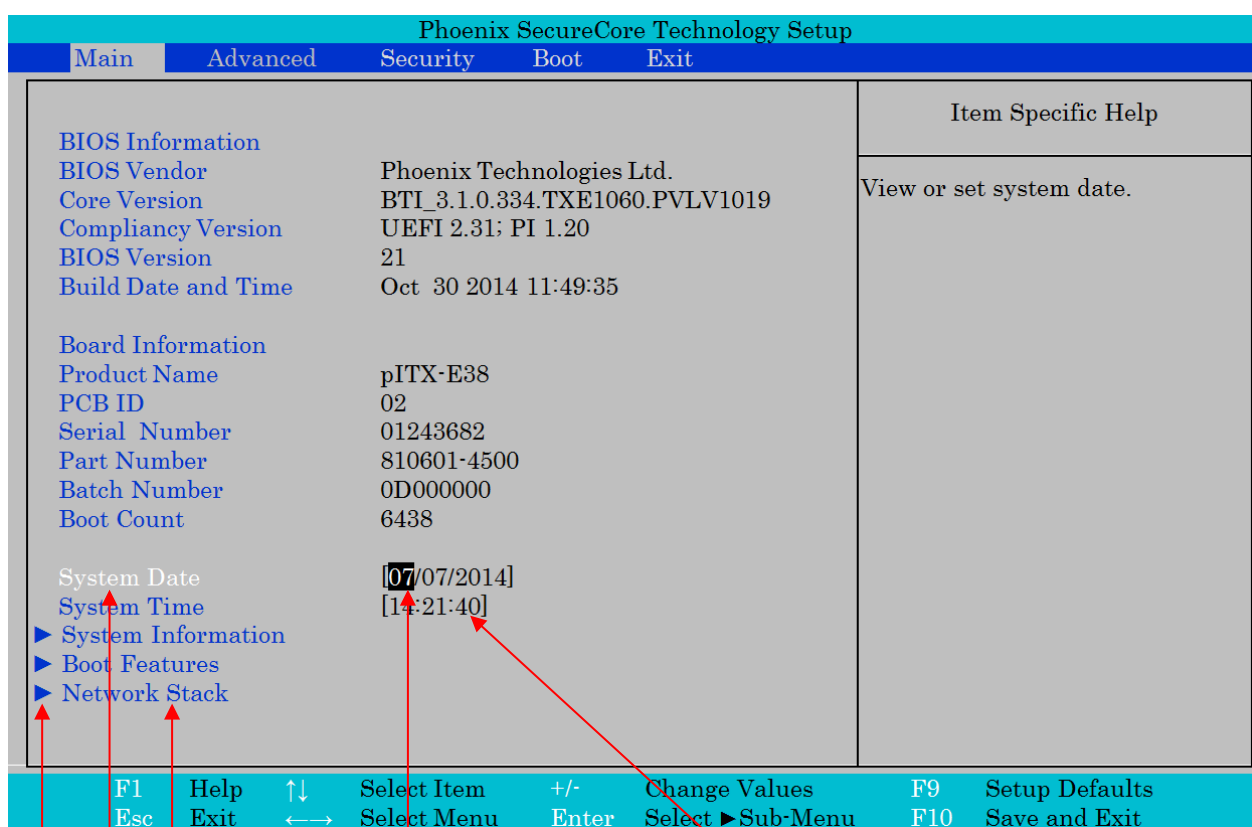
## 10 BIOS

The BIOS Setup is used to view and configure BIOS settings for the board. The BIOS Setup is accessed by pressing the <Del>-key (<F2>-key on BIOS version v.16 or below) after the Power-On Self-Test (POST) memory test begins and before the operating system boot begins.

From the EFI Shell write "Exit" followed by <TAB> and <Return> in order to enter BIOS Menu menu.

The BIOS settings will be loaded automatically when loading "Restore Default" see "Save & Exit" menu. In this Users Guide the default settings are indicated by **bold**. Please notice that "Restore User Defaults" might have different set of default values.

### 10.1 Main



Sub Menu available.

White text for actual selected function which can be modified.

Blue text for functions (not all can be modified).

Black background for actual selection. Black text actual settings.

The following table describes the changeable settings:

| Feature     | Options    | Description          |
|-------------|------------|----------------------|
| System Date | MM/DD/YYYY | Set the system date. |
| System Time | HH:MM:SS   | Set the system time. |

## System Information

| Phoenix SecureCore Technology Setup |                                      |  |  |
|-------------------------------------|--------------------------------------|--|--|
| Main                                |                                      |  |  |
| System Information                  |                                      |  |  |
| BIOS Version                        | pITXE38.334.TXE1060.PVLV1019.B21 X64 |  |  |
| Build Time                          | 10/30/2014                           |  |  |
| Processor Type                      | Intel ® Atom™ CPU E3845 @ 1.91GHz    |  |  |
| Processor Speed                     | 1.926 GHz                            |  |  |
| System Memory Speed                 | 1333 MHz                             |  |  |
| L2 Cache RAM                        | 2048 KB                              |  |  |
| Total Memory                        | 4096 MB                              |  |  |

|     |      |    |             |       |                   |     |                |
|-----|------|----|-------------|-------|-------------------|-----|----------------|
| F1  | Help | ↑↓ | Select Item | +/-   | Change Values     | F9  | Setup Defaults |
| Esc | Exit | ←→ | Select Menu | Enter | Select ► Sub-Menu | F10 | Save and Exit  |

## Boot Features

| Phoenix SecureCore Technology Setup |      |            |             |       |                                    |     |                |  |  |
|-------------------------------------|------|------------|-------------|-------|------------------------------------|-----|----------------|--|--|
| Main                                |      |            |             |       |                                    |     |                |  |  |
| Boot Features                       |      |            |             |       | Item Specific Help                 |     |                |  |  |
| NumLock:                            |      | [On]       |             |       | Select Power-on state for NumLock. |     |                |  |  |
| Timeout                             |      | [ 0]       |             |       |                                    |     |                |  |  |
| CSM Support                         |      | [Yes]      |             |       |                                    |     |                |  |  |
| Quick Boot                          |      | [Disabled] |             |       |                                    |     |                |  |  |
| Diagnostic Splash Screen            |      | [Disabled] |             |       |                                    |     |                |  |  |
| Diagnostic Summary Screen           |      | [Disabled] |             |       |                                    |     |                |  |  |
| BIOS Level USB                      |      | [Enabled]  |             |       |                                    |     |                |  |  |
| Console Redirection                 |      | [Disabled] |             |       |                                    |     |                |  |  |
| Allow Hotkey in S4 resume           |      | [Enabled]  |             |       |                                    |     |                |  |  |
| UEFI Boot                           |      | [Enabled]  |             |       |                                    |     |                |  |  |
| Legacy Boot                         |      | [Enabled]  |             |       |                                    |     |                |  |  |
| Boot in Legacy Video Mode           |      | [Disabled] |             |       |                                    |     |                |  |  |
| Load OPROM                          |      | [All]      |             |       |                                    |     |                |  |  |
| F1                                  | Help | ↑↓         | Select Item | +/-   | Change Values                      | F9  | Setup Defaults |  |  |
| Esc                                 | Exit | ←→         | Select Menu | Enter | Select ► Sub-Menu                  | F10 | Save and Exit  |  |  |



| Function                  | Selection                  | Description                                                                                                                                                                                                                                                        |
|---------------------------|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| NumLock:                  | <b>On</b><br>Off           | Select Power-on state for NumLock.                                                                                                                                                                                                                                 |
| Timeout                   | 0      Note 1              | Number of seconds that P.O.S.T will wait for the user input before booting.                                                                                                                                                                                        |
| CSM Support               | No<br><b>Yes</b>           | Compatibility Support Module that provides backward compatibility services for legacy BIOS services, like int10/int13, dependent OS.                                                                                                                               |
| Quick Boot                | <b>Disabled</b><br>Enabled | Enable/Disable quick boot.                                                                                                                                                                                                                                         |
| Diagnostic Splash Screen  | <b>Disabled</b><br>Enabled | If you select 'Enabled' the diagnostic splash screen always displays during boot. If you select 'Disabled' the diagnostic splash screen does not display unless you press HOTKEY during boot.                                                                      |
| Diagnostic Summary Screen | <b>Disabled</b><br>Enabled | Display the diagnostic summary screen during boot.                                                                                                                                                                                                                 |
| BIOS Level USB            | Disabled<br><b>Enabled</b> | Enable/Disable all BIOS support for USB in order to reduce boot time. Note that this will prevent using a USB biometric scanner such as a finger print reader to control access to setup, but does not prevent the operating system from supporting such hardware. |
| Console Redirection       | <b>Disabled</b><br>Enabled | Enable/Disable Universal Console Redirection.                                                                                                                                                                                                                      |
| Allow Hotkey in S4 resume | Disabled<br><b>Enabled</b> | Enable hotkey detection when system resuming from Hibernation state.                                                                                                                                                                                               |
| UEFI Boot                 | Disabled<br><b>Enabled</b> | Enable the UEFI boot.                                                                                                                                                                                                                                              |
| Legacy Boot               | Disabled<br><b>Enabled</b> | Enable the Legacy boot.                                                                                                                                                                                                                                            |
| Boot in Legacy Video Mode | <b>Disabled</b><br>Enabled | Enable to force the display adapter to switch the video mode to Text Mode 3 at the end of BIOS POST for non-UEFI boot mode (Legacy Boot). Some legacy software, such as DUET, requires that the BIOS explicitly enter text video mode prior to boot.               |
| Load OPROM                | <b>All</b><br>On Demand    | Load all OPROMs or on demand according to the boot device.                                                                                                                                                                                                         |

Note 1: Use either digit keys to enter value (0 – 99) or +/- keys to increase/decrease value.

## Boot Features

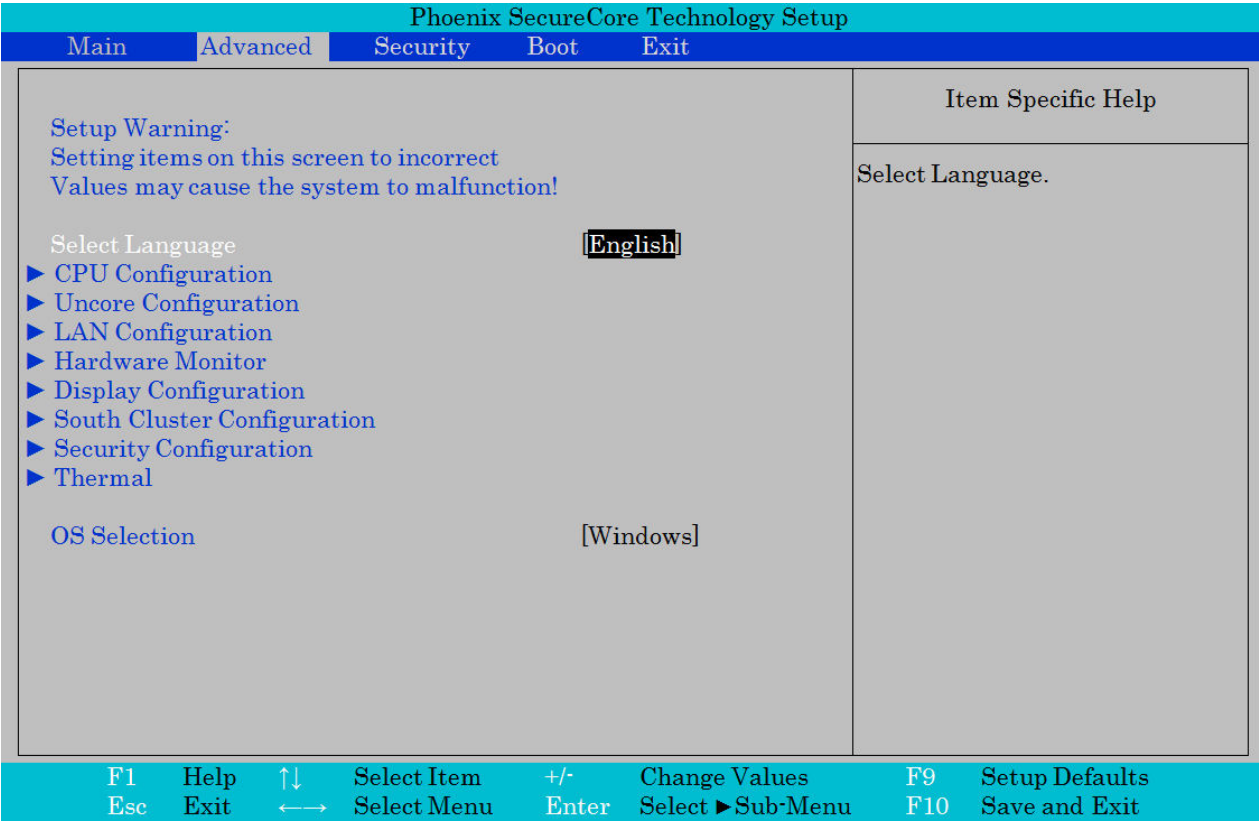
| Phoenix SecureCore Technology Setup |              |                                    |             |       |                   |     |                |
|-------------------------------------|--------------|------------------------------------|-------------|-------|-------------------|-----|----------------|
| Main                                |              |                                    |             |       |                   |     |                |
| Network Stack                       |              | Item Specific Help                 |             |       |                   |     |                |
| Network Stack                       | [Enabled]    | Enable/Disable UEFI Network Stack. |             |       |                   |     |                |
| IPv4                                | [Enabled]    |                                    |             |       |                   |     |                |
| IPv6                                | [Enabled]    |                                    |             |       |                   |     |                |
| UEFI PXE Boot Priority              | [IPv4 First] |                                    |             |       |                   |     |                |
| F1                                  | Help         | ↑↓                                 | Select Item | +/-   | Change Values     | F9  | Setup Defaults |
| Esc                                 | Exit         | ←→                                 | Select Menu | Enter | Select ► Sub-Menu | F10 | Save and Exit  |

| Function               |       | Selection                       | Description                        |
|------------------------|-------|---------------------------------|------------------------------------|
| Network Stack          |       | <b>Disabled</b><br>Enabled      | Enable/Disable UEFI Network Stack. |
| IPv4                   | Note1 | Disabled<br><b>Enabled</b>      | Enable/Disable IPv4.               |
| IPv6                   | Note1 | <b>Disabled</b><br>Enabled      | Enable/Disable IPv6.               |
| UEFI PXE Boot Priority | Note2 | IPv6 First<br><b>IPv4 First</b> | Set the priority of UEFI PXE Boot. |

Note1: Only shown if Network Stack is enabled.

Note2: Only shown if Network Stack is enabled and greyed if not both IPv4 and IPv6 are enabled.

10.2 Advanced



The Advanced (main) menu contains only submenu selections which will be described in more details on the following pages.

In order to make a selection of a submenu activated the  $\updownarrow$  keys until the requested submenu becomes white color, then activate the <Enter>.

| Function        | Selection                          | Description      |
|-----------------|------------------------------------|------------------|
| Select Language | <b>English</b><br>Francais<br>Etc. | Select Language. |
| OS Selection    | <b>Windows</b><br>Linux            | OS Selection     |

**Note:** OS Selection must be set in according to the requested OS to boot. If incorrect OS Selection then system will not boot correctly.

## CPU Configuration

| Phoenix SecureCore Technology Setup                                                                                                                                            |                   |                                                                                                                      |             |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|----------------------------------------------------------------------------------------------------------------------|-------------|
| Advanced                                                                                                                                                                       |                   |                                                                                                                      |             |
| CPU Configuration                                                                                                                                                              |                   | Item Specific Help                                                                                                   |             |
| CPU Configuration<br>Execute Disable Bit <b>[Enable]</b><br>AESNI <b>[Enable]</b><br>Limit CPUID Maximum <b>[Disable]</b><br>DTS <b>[Enable]</b><br><br>► CPU Power Management |                   | Execute Disable Bit prevent certain classes of malicious buffer overflow attacks when combined with a supporting OS. |             |
| F1                                                                                                                                                                             | Help              | ↑↓                                                                                                                   | Select Item |
| Esc                                                                                                                                                                            | Exit              | ←→                                                                                                                   | Select Menu |
| +/-                                                                                                                                                                            | Change Values     |                                                                                                                      |             |
| Enter                                                                                                                                                                          | Select ► Sub-Menu |                                                                                                                      |             |
| F9                                                                                                                                                                             | Setup Defaults    |                                                                                                                      |             |
| F10                                                                                                                                                                            | Save and Exit     |                                                                                                                      |             |

| Function            | Selection                  | Description                                                                                                          |
|---------------------|----------------------------|----------------------------------------------------------------------------------------------------------------------|
| Execute Disable Bit | Disable<br><b>Enable</b>   | Execute Disable Bit prevent certain classes of malicious buffer overflow attacks when combined with a supporting OS. |
| AESNI               | Disable<br><b>Enable</b>   | AESNI.                                                                                                               |
| Limit CPUID Maximum | <b>Disable</b><br>Enable   | Disabled for Windows XP.                                                                                             |
| DTS                 | Disabled<br><b>Enabled</b> | Enabled/Disable Digital Thermal Sensor.                                                                              |

## CPU Power Management

| Phoenix SecureCore Technology Setup                                                                                                                                                                                                                      |                                                 |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|
| Advanced                                                                                                                                                                                                                                                 |                                                 |
| CPU Power Management                                                                                                                                                                                                                                     | Item Specific Help                              |
| System Power Options<br>Intel® SpeedStep™ <b>[Enable]</b><br>Boot performance mode <b>[Max Performance]</b><br>Intel® Turbo Boost Technology <b>[Enable]</b><br>C-States <b>[Enable]</b><br>Enhanced C-states <b>[Enable]</b><br>Max C State <b>[C7]</b> | Enable processor performance states (P-States). |
| F1 Help ↑↓ Select Item +/- Change Values F9 Setup Defaults<br>Esc Exit ←→ Select Menu Enter Select ► Sub-Menu F10 Save and Exit                                                                                                                          |                                                 |

| Function                      | Selection                             | Description                                                                                                                                                                 |
|-------------------------------|---------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Intel® SpeedStep™             | Disable<br><b>Enable</b>              | Enable processor performance states (P-States).                                                                                                                             |
| Boot performance mode         | <b>Max Performance</b><br>Max Battery | Select the performance state that the BIOS will set before OS handoff.                                                                                                      |
| Intel® Turbo Boost Technology | Disable<br><b>Enable</b>              | Enable to automatically allow processor cores to run faster than the base operating frequency if it's operating below power, current, and temperature specification limits. |
| C-States                      | Disabled<br><b>Enabled</b>            | Enable/Disable C States.                                                                                                                                                    |
| Enhanced C-states             | Disabled<br><b>Enabled</b>            | Enable/Disable C1E, C2E and C4E. When enabled, CPU will switch to minimum speed when all cores enter C-State.                                                               |
| Max C State                   | <b>C7</b><br>C6<br>C4<br>C1           | This option controls the Max C State that the processor will support.                                                                                                       |

## Uncore Configuration

| Phoenix SecureCore Technology Setup             |                |    |             |                    |                                                                  |
|-------------------------------------------------|----------------|----|-------------|--------------------|------------------------------------------------------------------|
| Advanced                                        |                |    |             |                    |                                                                  |
| Uncore Configuration                            |                |    |             | Item Specific Help |                                                                  |
| GOP Configuration<br>GOP Driver                 |                |    |             | [Enable]           | Enable GOP Driver will unload VBIOS; Disable it will load VBOIS. |
| IGD Configuration<br>Integrated Graphics Driver |                |    |             | [Enable]           |                                                                  |
| Primary Display                                 |                |    |             | [Auto]             |                                                                  |
| PAVC                                            |                |    |             | [LITE Mode]        |                                                                  |
| DVMT Pre-Allocated                              |                |    |             | [64M]              |                                                                  |
| Spread Spectrum clock                           |                |    |             | [Disable]          |                                                                  |
| IGD – LCD Control                               |                |    |             |                    |                                                                  |
| LCD Panel Type                                  |                |    |             | [Auto]             |                                                                  |
| IGD Boot Type                                   |                |    |             | [Auto]             |                                                                  |
| Panel Scaling                                   |                |    |             | [Auto]             |                                                                  |
| F1                                              | Help           | ↑↓ | Select Item | +/-                | Change Values                                                    |
| Esc                                             | Exit           | ↔  | Select Menu | Enter              | Select ► Sub-Menu                                                |
| F9                                              | Setup Defaults |    |             |                    | F10                                                              |
|                                                 |                |    |             | Save and Exit      |                                                                  |

| Function                   | Selection                                                                                                                                                                                                                                                                                                                                                                 | Description                                                                                                                                                                                                           |
|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| GOP Driver                 | Disabled<br><b>Enabled</b>                                                                                                                                                                                                                                                                                                                                                | Enable GOP Driver will unload VBIOS; Disable it will load VBOIS.                                                                                                                                                      |
| Integrated Graphics Driver | Disabled<br><b>Enabled</b>                                                                                                                                                                                                                                                                                                                                                | Enable: Enable Integrated Graphics Device (IGD) when selected as the Primary Video Adaptor. Disable: Always disabled IGD.                                                                                             |
| Primary Display            | <b>AUTO</b><br>IGD<br>PCIe<br>SG                                                                                                                                                                                                                                                                                                                                          | Select which of IGD/PCI Graphics device should be Primary Display Or select SG for Switchable/Hybrid Gfx.                                                                                                             |
| PAVC                       | Disable<br><b>LITE Mode</b><br>SERPENT Mode                                                                                                                                                                                                                                                                                                                               | Enable/Disable Protected Audio Video Control.                                                                                                                                                                         |
| DVMT Pre-Allocated         | <b>64M</b> , 96M, ..., 512M                                                                                                                                                                                                                                                                                                                                               | Select DVMT 5.0 Pre-Allocated (Fixed) Graphics Memory size used by the Internal Graphics Device.                                                                                                                      |
| Spread Spectrum clock      | <b>Disabled</b><br>Enable                                                                                                                                                                                                                                                                                                                                                 | Enable clock chip Spread Spectrum feature.                                                                                                                                                                            |
| LCD Panel Type             | <b>Auto</b><br>Panel1 640 x 480<br>Panel2 800 x 600<br>Panel3 1024 x 768<br>Panel4 1280 x 1024<br>Panel5 1400 x 1050<br>Panel6 1400 x 1050<br>Panel7 1600 x 1200<br>Panel8 1360 x 768<br>Panel9 1680 x 1050<br>Panel10 1820 x 1200<br>Panel11 1440 x 900<br>Panel12 1280 x 1024<br>Panel13 1600 x 900<br>Panel14 1024 x 768<br>Panel15 1920 x 1080<br>Panel16 2048 x 1536 |                                                                                                                                                                                                                       |
| IGD Boot Type              | <b>Auto</b><br>VGA Port<br>HDMI Port B<br>DP Port B<br>DP Port C<br>eDP<br>DSI Port A<br>DSI Port C                                                                                                                                                                                                                                                                       | Selects preference for Integrated Graphics Device (IGD) display interface used when system boots. If CSM Enable:<br>HDMI PortB=EFP1<br>DP PortB=EFP1<br>DP PortC=EFP2<br>eDP=LFP1<br>DSI PortA=LFP2<br>DSI PortC=LFP2 |
| Panel Scaling              | <b>Auto</b><br>Centering<br>Stretching                                                                                                                                                                                                                                                                                                                                    | Select the LCD panel scaling option used by Internal Graphics Device.                                                                                                                                                 |

## LAN Configuration

| Phoenix SecureCore Technology Setup                                                                                                                                  |      |    |             |       |                                            |     |                |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|----|-------------|-------|--------------------------------------------|-----|----------------|
| Advanced                                                                                                                                                             |      |    |             |       |                                            |     |                |
| LAN Configuration                                                                                                                                                    |      |    |             |       | Item Specific Help                         |     |                |
| LAN Configuration<br>System UUID {A7409B5D-A70F-1350-3D4D-6ADB329A768B}<br><br>ETH1 Configuration<br>MAC Address & Link status : <b>[Enabled]</b><br>[00E0F42CF929-] |      |    |             |       | Control the Ethernet Devices and PXE boot. |     |                |
| F1                                                                                                                                                                   | Help | ↑↓ | Select Item | +/-   | Change Values                              | F9  | Setup Defaults |
| Esc                                                                                                                                                                  | Exit | ←→ | Select Menu | Enter | Select ► Sub-Menu                          | F10 | Save and Exit  |

Note: The "+" and "-" (to the right of the MAC address) indicates respectively if link is established or not.

| Function           | Selection                                   | Description                                |
|--------------------|---------------------------------------------|--------------------------------------------|
| ETH1 Configuration | Disabled<br><b>Enabled</b><br>With PXE boot | Control the Ethernet Devices and PXE boot. |



## Hardware Monitor

| Phoenix SecureCore Technology Setup                                                                                                                                                                                                                                                                                                              |      |    |             |       |                                                        |     |                |  |  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|----|-------------|-------|--------------------------------------------------------|-----|----------------|--|--|
| Advanced                                                                                                                                                                                                                                                                                                                                         |      |    |             |       |                                                        |     |                |  |  |
| Hardware Monitor                                                                                                                                                                                                                                                                                                                                 |      |    |             |       | Item Specific Help                                     |     |                |  |  |
| <b>Hardware Monitor</b><br><br>Board Temp                    [°C]: [32]<br>CPU Control Temp            [°C]: [33]<br>Internal CPU Temp            [°C]: [24]<br>Fan Speed                    [RPM]: [4810]<br><br>Fan Trip Point                [°C]: [30]<br>Trip Point Speed              [ % ]: [ 50]<br>Fan Poles                      : [4] |      |    |             |       | Temperature where fan accelerates.<br>Range 20 – 80 C. |     |                |  |  |
| F1                                                                                                                                                                                                                                                                                                                                               | Help | ↑↓ | Select Item | +/-   | Change Values                                          | F9  | Setup Defaults |  |  |
| Esc                                                                                                                                                                                                                                                                                                                                              | Exit | ←→ | Select Menu | Enter | Select ► Sub-Menu                                      | F10 | Save and Exit  |  |  |

| Function         | Selection                         | Description                                                                                        |
|------------------|-----------------------------------|----------------------------------------------------------------------------------------------------|
| Fan Trip Point   | 20, 21, ..., <b>30</b> , ..., 80  | Temperature where fan accelerates.<br>Range 20 – 80 C.                                             |
| Trip Point Speed | 30, 31, ..., <b>50</b> , ..., 100 | Fan speed at trip point in %. Minimum value is 30.                                                 |
| Fan Poles        | 2<br><b>4</b><br>6                | The number of pole pairs inside the fan. Ex:<br>Fan poles=4 generates 2 pulses every one rotation. |

## Display Configuration

| Phoenix SecureCore Technology Setup                                                                                                                                                            |      |                              |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------------------------------|
| Advanced                                                                                                                                                                                       |      |                              |
| Display Configuration                                                                                                                                                                          |      | Item Specific Help           |
| Display Configuration<br><br>Onboard LVDS <b>Enabled</b><br>Resolution [640 x 480]<br>Manufacture [(Standard)]<br>Panel name [640x480 18]<br>Panel VCC [3,3V]<br>Backlight Enable Active [Low] |      | Enable/Disable onboard LVDS. |
| F1                                                                                                                                                                                             | Help | ↑↓                           |
| Esc                                                                                                                                                                                            | Exit | ←→                           |
| Select Item                                                                                                                                                                                    |      | +/-                          |
| Select Menu                                                                                                                                                                                    |      | Enter                        |
| Change Values                                                                                                                                                                                  |      | F9                           |
| Select ► Sub-Menu                                                                                                                                                                              |      | F10                          |
|                                                                                                                                                                                                |      | Setup Defaults               |
|                                                                                                                                                                                                |      | Save and Exit                |

| Function                | Selection                                                                                                                                                 | Description                     |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|
| Onboard LVDS            | <b>Disabled</b><br>Enabled                                                                                                                                | Enable/Disable onboard LVDS.    |
| Resolution              | <b>640 x 480</b><br>800 x 480<br>800 x 600<br>1024 x 600<br>1024 x 768<br>1280 x 800<br>1280 x 1024<br>1366 x 768<br>1600 x 1200<br>1920 x 1080<br>Custom | Resolution of panel to select.  |
| Manufacture             | <b>(Standard)</b><br>AUO<br>Philips<br>Primeview<br>Samsung                                                                                               | Manufacture of panel to select. |
| Panel name              | Note1<br><b>640x480 18</b><br>640x480 24<br>N/A                                                                                                           | Name of panel to select.        |
| Panel VCC               | <b>3,3V</b><br>5V                                                                                                                                         | VCC of panel selected panel.    |
| Backlight Enable Active | <b>Low</b><br>High                                                                                                                                        | Inversion of backlight signal.  |

Note1: Depend on Resolution and Manufacture combination. If combination doesn't exist then Panel name is N/A (Not Available).

## South Cluster Configuration

| Phoenix SecureCore Technology Setup                                                                                                                                                                                                      |      |    |             |       |                                     |     |                |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|----|-------------|-------|-------------------------------------|-----|----------------|
| Advanced                                                                                                                                                                                                                                 |      |    |             |       |                                     |     |                |
| South Cluster Configuration                                                                                                                                                                                                              |      |    |             |       | Item Specific Help                  |     |                |
| <ul style="list-style-type: none"><li>▶ PCI Express Configuration</li><li>▶ USB Configuration</li><li>▶ Audio Configuration</li><li>▶ SATA Drives</li><li>▶ LPSS &amp; SCC Configuration</li><li>▶ Miscellaneous Configuration</li></ul> |      |    |             |       | PCI Express Configuration Settings. |     |                |
| F1                                                                                                                                                                                                                                       | Help | ↑↓ | Select Item | +/-   | Change Values                       | F9  | Setup Defaults |
| Esc                                                                                                                                                                                                                                      | Exit | ←→ | Select Menu | Enter | Select ▶ Sub-Menu                   | F10 | Save and Exit  |

## PCI Express Configuration

| Phoenix SecureCore Technology Setup |          |                       |  |
|-------------------------------------|----------|-----------------------|--|
| Advanced                            |          |                       |  |
| PCI Express Configuration           |          | Item Specific Help    |  |
| PCIe 1 Speed                        | [Auto]   | Configure PCIe Speed. |  |
| PCIe 2 Speed                        | [Auto]   |                       |  |
| PCI Express Root Port 2             | [Enable] |                       |  |
| PCI Express Root Port 3             | [Enable] |                       |  |
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| Function                | Selection                   | Description                        |
|-------------------------|-----------------------------|------------------------------------|
| PCIe 1 Speed            | <b>Auto</b><br>Gen1<br>Gen2 | Configure PCIe Speed.              |
| PCIe 2 Speed            | <b>Auto</b><br>Gen1<br>Gen2 | Configure PCIe Speed.              |
| PCI Express Root Port 2 | <b>Enable</b><br>Disable    | Control the PCI Express Root Port. |
| PCI Express Root Port 2 | <b>Enable</b><br>Disable    | Control the PCI Express Root Port. |

## USB Configuration

| Phoenix SecureCore Technology Setup |                |                                                                                        |                   |
|-------------------------------------|----------------|----------------------------------------------------------------------------------------|-------------------|
| Advanced                            |                |                                                                                        |                   |
| USB Configuration                   |                | Item Specific Help                                                                     |                   |
| xHCI Mode                           | [Disable]      | Mode of operation of xHCI controller.<br><br>To use DOS, enable EHCI and disable XHCI. |                   |
| XHCI Link Power Management          | [Enable]       |                                                                                        |                   |
| USB OTG Support                     | [Disable]      |                                                                                        |                   |
| EHCI Controller                     | [Enable]       |                                                                                        |                   |
| USB Per-Port Control                | [Enable]       |                                                                                        |                   |
| USB Port #0                         | [Enable]       |                                                                                        |                   |
| USB Port #1                         | [Enable]       |                                                                                        |                   |
| USB Port #2                         | [Enable]       |                                                                                        |                   |
| USB Port #3                         | [Enable]       |                                                                                        |                   |
| F1 Help                             | ↑↓ Select Item | +/- Change Values                                                                      | F9 Setup Defaults |
| Esc Exit                            | ←→ Select Menu | Enter Select ► Sub-Menu                                                                | F10 Save and Exit |

| Function                   | Selection                               | Description                                                                                                                                   |
|----------------------------|-----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| xHCI Mode                  | <b>Disable</b><br>Smart Auto            | Mode of operation of xHCI controller.<br><br>To use DOS, enable EHCI and disable XHCI.                                                        |
| XHCI Link Power Management | Disable<br><b>Enable</b>                | Enable/Disable XHCI Link Power Management.                                                                                                    |
| USB OTG Support            | <b>Disable</b><br>PCI Mode<br>ACPI Mode | Enable/Disable USB OTG Support                                                                                                                |
| EHCI Controller            | <b>Enable</b><br>Disable                | Control the USB EHCI (USB 2.0) functions.<br><br>One EHCI controller must always be enabled.<br><br>To use DOS, enable EHCI and disable XHCI. |
| USB Per-Port Control       | <b>Disable</b><br>Enable                | Control each of the USB ports (0~3) disabling.                                                                                                |
| USB Port #0                | Disable<br><b>Enable</b>                | Disable USB port.                                                                                                                             |
| USB Port #1                | Disable<br><b>Enable</b>                | Disable USB port.                                                                                                                             |
| USB Port #2                | Disable<br><b>Enable</b>                | Disable USB port.                                                                                                                             |
| USB Port #3                | Disable<br><b>Enable</b>                | Disable USB port.                                                                                                                             |

## Audio Configuration

| Phoenix SecureCore Technology Setup                                   |      |    |             |       |                   |                                                                                                                                                             |                |  |  |
|-----------------------------------------------------------------------|------|----|-------------|-------|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|--|--|
| Advanced                                                              |      |    |             |       |                   |                                                                                                                                                             |                |  |  |
| Audio Configuration                                                   |      |    |             |       |                   | Item Specific Help                                                                                                                                          |                |  |  |
| Audio Controller <b>[Enable]</b><br>Azalia HDMI Codec <b>[Enable]</b> |      |    |             |       |                   | Control Detection of the Azalia device.<br><br>Disabled = Azalia will be unconditionally disabled.<br><br>Enabled = Azalia will be unconditionally Enabled. |                |  |  |
| F1                                                                    | Help | ↑↓ | Select Item | +/-   | Change Values     | F9                                                                                                                                                          | Setup Defaults |  |  |
| Esc                                                                   | Exit | ←→ | Select Menu | Enter | Select ► Sub-Menu | F10                                                                                                                                                         | Save and Exit  |  |  |

| Function          | Selection                | Description                                                                                                                                                 |
|-------------------|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Audio Controller  | Disable<br><b>Enable</b> | Control Detection of the Azalia device.<br><br>Disabled = Azalia will be unconditionally disabled.<br><br>Enabled = Azalia will be unconditionally Enabled. |
| Azalia HDMI Codec | Disable<br><b>Enable</b> | Enable/Disable internal HDMI codec for Azalia.                                                                                                              |

## SATA Drives

| Phoenix SecureCore Technology Setup                                                                                                                                                                                                                           |                                                                                                                                                        |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| Advanced                                                                                                                                                                                                                                                      |                                                                                                                                                        |
| SATA Drives                                                                                                                                                                                                                                                   | Item Specific Help                                                                                                                                     |
| <p>SATA Drives</p> <p>Chipset-SATA Controller Configuration</p> <p>Chipset SATA <b>[Enabled]</b></p> <p>Chipset SATA Mode <b>[ACHI]</b></p> <p>SATA Port 0 Hot Plug Capability <b>[Disabled]</b></p> <p>SATA Port 1 Hot Plug Capability <b>[Disabled]</b></p> | <p>Enables or Disables the Chipset SATA Controller. The Chipset SATA Controller supports the internal SATA ports (up to 3Gb/s supported per port).</p> |
| <p>F1 Help ↑↓ Select Item +/- Change Values F9 Setup Defaults</p> <p>Esc Exit ←→ Select Menu Enter Select ► Sub-Menu F10 Save and Exit</p>                                                                                                                    |                                                                                                                                                        |

| Function                        | Selection                  | Description                                                                                                                                                                                          |
|---------------------------------|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Chipset SATA                    | Disabled<br><b>Enabled</b> | Enables or Disables the Chipset SATA Controller. The Chipset SATA Controller supports the internal SATA ports (up to 3Gb/s supported per port).                                                      |
| Chipset SATA Mode               | IDE<br><b>AHCI</b>         | IDE: Compatibility mode disables AHCI support.<br>AHCI: Supports advanced SATA features such as Native Command Queuing.<br><br>Warning: OS may not boot if this setting is changed after OS install. |
| SATA Port 0 Hot Plug Capability | <b>Disabled</b><br>Enabled | If enabled, SATA port will be reported as Hot Plug capable. Note: Requires hardware support.                                                                                                         |
| SATA Port 1 Hot Plug Capability | <b>Disabled</b><br>Enabled | If enabled, SATA port will be reported as Hot Plug capable. Note: Requires hardware support.                                                                                                         |

## LPSS & SCC Configuration

| Phoenix SecureCore Technology Setup                                                                                                                                                                                                                         |                   |                                   |             |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-----------------------------------|-------------|
| Advanced                                                                                                                                                                                                                                                    |                   |                                   |             |
| LPSS & SCC Configuration                                                                                                                                                                                                                                    |                   | Item Specific Help                |             |
| LPSS & SCC Devices Mode <b>[PCI Mode]</b><br><br>SCC Configuration<br><br>SCC SD Card Support      [Enable]<br>SD SDR 25 Support      [Enable]<br>SD SDR 50 Support      [Enable]<br>LPSS HSUART#1 Support    [Enable]<br>LPSS HSUART#2 Support    [Enable] |                   | LPSS & SCC Devices Mode Settings. |             |
| F1                                                                                                                                                                                                                                                          | Help              | ↑↓                                | Select Item |
| Esc                                                                                                                                                                                                                                                         | Exit              | ←→                                | Select Menu |
| +/-                                                                                                                                                                                                                                                         | Change Values     |                                   |             |
| Enter                                                                                                                                                                                                                                                       | Select ► Sub-Menu |                                   |             |
| F9                                                                                                                                                                                                                                                          | Setup Defaults    |                                   |             |
| F10                                                                                                                                                                                                                                                         | Save and Exit     |                                   |             |

| Function               | Selection                    | Description                            |
|------------------------|------------------------------|----------------------------------------|
| LPSS & SCC Device Mode | ACPI Mode<br><b>PCI Mode</b> | LPSS & SCC Devices Mode Settings.      |
| SCC SD Card Support    | Disable<br><b>Enable</b>     | SCC SD Card Support Enable\Disable.    |
| SD SDR 25 Support      | Disable<br><b>Enable</b>     |                                        |
| SD SDR 50 Support      | Disable<br><b>Enable</b>     |                                        |
| LPSS HSUART #1 Support | Disable<br><b>Enable</b>     | LPSS HSUART #1 Support Enable\Disable. |
| LPSS HSUART #2 Support | Disable<br><b>Enable</b>     | LPSS HSUART #2 Support Enable\Disable. |



## Miscellaneous Configuration

| Phoenix SecureCore Technology Setup                                                                                             |  |                                                                                        |
|---------------------------------------------------------------------------------------------------------------------------------|--|----------------------------------------------------------------------------------------|
| Advanced                                                                                                                        |  |                                                                                        |
| Miscellaneous Configuration                                                                                                     |  | Item Specific Help                                                                     |
| Miscellaneous Configuration<br>AC Power Loss [Power On]<br>PCI Mmio Size [1GB]<br>mSATA/mPCIE Selection [mPCIE]                 |  | Specify what state to go to when power is re-applied after a power failure (G3 state). |
| F1 Help ↑↓ Select Item +/- Change Values F9 Setup Defaults<br>Esc Exit ←→ Select Menu Enter Select ► Sub-Menu F10 Save and Exit |  |                                                                                        |

| Function              | Selection                            | Description                                                                            |
|-----------------------|--------------------------------------|----------------------------------------------------------------------------------------|
| AC Power Loss         | <b>Power On</b><br>Power Off         | Specify what state to go to when power is re-applied after a power failure (G3 state). |
| PCI Mmio Size         | 2GB<br>1.5GB<br>1.25GB<br><b>1GB</b> | PCI Mmio Size.                                                                         |
| mSATA/mPCIE Selection | <b>mPCIE</b><br>mSATA (Note 1)       | Select mSATA or PCIE.                                                                  |

Note 1: The mSATA setting works only on released board versions. (Batch no. 01.00 or above).

Example of mSATA modules working with the setting mPCIE:  
 SanDisk X110 mSATA SSD - 128GB (SD6SF1M-128G-1022)

Examples of mSATA modules working with the setting mSATA:  
 Transcend MSA370 (TS64GMSA370)  
 Apacer APSDM016GM5PN-PCM (0 °C to 70 °C)  
 Apacer APSDM016GM5PN-PCMW (-40 °C to 85 °C)

## Security Configuration

| Phoenix SecureCore Technology Setup                                                                                                                                                                                                                                                                                                                         |      |                    |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|--------------------|
| Advanced                                                                                                                                                                                                                                                                                                                                                    |      |                    |
| Security Configuration                                                                                                                                                                                                                                                                                                                                      |      | Item Specific Help |
| <b>TXE Configuration</b><br>TXE FW Version 1.0.2.1060<br>TXE FW Capabilities A0001040<br>TXE FW Features A0001040<br>TXE FW OEM Tag 00000000<br>TXE Firmware Mode Normal<br>TXE File System Integrity Value 0<br><br>TXE <b>[Enable]</b><br>TXE HMRFP0 [Disable]<br>TXE Firmware Update [Enable]<br>TXE EOP Message [Enable]<br>TXE Unconfiguration Perform |      |                    |
| F1                                                                                                                                                                                                                                                                                                                                                          | Help | ↑↓                 |
| Esc                                                                                                                                                                                                                                                                                                                                                         | Exit | ←→                 |
| Select Item                                                                                                                                                                                                                                                                                                                                                 |      | +/-                |
| Select Menu                                                                                                                                                                                                                                                                                                                                                 |      | Enter              |
| Change Values                                                                                                                                                                                                                                                                                                                                               |      | F9                 |
| Select ► Sub-Menu                                                                                                                                                                                                                                                                                                                                           |      | F10                |
| Setup Defaults                                                                                                                                                                                                                                                                                                                                              |      |                    |
| Save and Exit                                                                                                                                                                                                                                                                                                                                               |      |                    |

| Function                    | Selection                  | Description                      |
|-----------------------------|----------------------------|----------------------------------|
| TXE                         | Disabled<br><b>Enabled</b> |                                  |
| TXE HMRFP0                  | <b>Disabled</b><br>Enabled |                                  |
| TXE Firmware Update         | Disabled<br><b>Enabled</b> |                                  |
| TXE EOP Message             | Disabled<br><b>Enabled</b> | Send EOP Message Before Enter OS |
| TXE Unconfiguration Perform |                            |                                  |

## Thermal

| Phoenix SecureCore Technology Setup                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |                                                                                                                                                                                                          |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Advanced                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |      |                                                                                                                                                                                                          |
| Thermal                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      | Item Specific Help                                                                                                                                                                                       |
| <b>Thermal Configuration Parameters</b><br>Critical Trip Point [90 C]<br>Passive Trip Point [85 C]<br><br><b>Dynamic Platform &amp; Thermal Framework</b><br><b>DPFT</b> [Disable]<br>CPU Sensor Participants<br>Critical [70 C]<br>Passive [60 C]<br>Ambient Sensor Participants<br>Critical [70 C]<br>Passive [52 C]<br>DDR Sensor Participants<br>Critical [85 C]<br>Passive [61 C]<br><br>Start P-State [P0]<br>Step Size [25%]<br>Power Control Setting [Core Offlining]<br>Performance Control Setting [Core Offlining]<br><br>Charger Participant [Enable]<br>Display Participant [Enable]<br>Power Participant [Enable] |      | This value controls the temperature of the ACPI Critical Trip Point – the point in which the OS will shut the system off.<br><br>NOTE: 100C is the Plan Of Record (POR) for all Intel mobile processors. |
| F1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Help | ↑↓                                                                                                                                                                                                       |
| Esc                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Exit | ←→                                                                                                                                                                                                       |
| Select Item                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |      | +/-                                                                                                                                                                                                      |
| Select Menu                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |      | Change Values                                                                                                                                                                                            |
| Enter                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      | F9                                                                                                                                                                                                       |
| Select ► Sub-Menu                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |      | Setup Defaults                                                                                                                                                                                           |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |      | F10                                                                                                                                                                                                      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |      | Save and Exit                                                                                                                                                                                            |

| Function            | Selection                                                                    | Description                                                                                                                                                                                              |
|---------------------|------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Critical Trip Point | 15 C, 23C, 31 C, 39C, 47 C, 55 C, 63 C, 71 C, 79 C, 85 C, 87 C, <b>90 C</b>  | This value controls the temperature of the ACPI Critical Trip Point – the point in which the OS will shut the system off.<br><br>NOTE: 100C is the Plan Of Record (POR) for all Intel mobile processors. |
| Passive Trip Point  | 15 C, 23C, 31 C, 39C, 47 C, 55 C, 63 C, 71 C, 79 C, <b>85 C</b> , 87 C, 90 C | This value controls the temperature of the ACPI Passive Trip Point – the point in which the OS will begin to throttling the processor.                                                                   |
| DPFT                | <b>Disable</b><br>Enable                                                     | Enable/Disable DPTF.                                                                                                                                                                                     |
| Charger Participant | Disable<br><b>Enable</b>                                                     | Enable/Disable Charger Participant Device.                                                                                                                                                               |
| Display Participant | Disable<br><b>Enable</b>                                                     | Enable/Disable Display Participant Device.                                                                                                                                                               |
| Power Participant   | Disable<br><b>Enable</b>                                                     | Enable/Disable Power Participant Device.                                                                                                                                                                 |

## 10.3 Security

| Phoenix SecureCore Technology Setup                                                                                                                                                                                                                                                                                                                                                       |              |          |                            |              |                                    |                                                 |                                 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|----------|----------------------------|--------------|------------------------------------|-------------------------------------------------|---------------------------------|
| Main                                                                                                                                                                                                                                                                                                                                                                                      |              | Advanced |                            | Security     | Boot                               | Exit                                            |                                 |
| Secure Boot Activation [Disabled]<br>► Secure Boot Configuration<br>Supervisor Password is: Cleared<br>User Password is: Cleared<br><br>Set Supervisor Password [Enter]<br>Supervisor Hint String [ ]<br><br>Set User Password [Enter]<br>User Hint String [ ]<br><br>Min. password length [ 1]<br><br>Authenticate User on Boot [Disabled]<br><br>HDD Security Status<br>No HDD detected |              |          |                            |              |                                    | Item Specific Help                              |                                 |
|                                                                                                                                                                                                                                                                                                                                                                                           |              |          |                            |              |                                    | Set or clear the Supervisor account's password. |                                 |
| F1<br>Esc                                                                                                                                                                                                                                                                                                                                                                                 | Help<br>Exit | ↑↓<br>↔  | Select Item<br>Select Menu | +/-<br>Enter | Change Values<br>Select ► Sub-Menu | F9<br>F10                                       | Setup Defaults<br>Save and Exit |

| Function                | Selection             | Description                                               |
|-------------------------|-----------------------|-----------------------------------------------------------|
| Set Supervisor Password | (up to 20 characters) | Set or clear the Supervisor account's password.           |
| Supervisor Hint String  | (up to 20 characters) | Press Enter to type Supervisor Hint String.               |
| Min. password length    | 1, 2, ..., 20         | Set the minimum number of characters for password (1-20). |

## 10.4 Boot

| Phoenix SecureCore Technology Setup                                                                                                                                                                                                                     |      |          |             |          |                   |      |                                                                                                                                                                                                |  |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|----------|-------------|----------|-------------------|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|
| Main                                                                                                                                                                                                                                                    |      | Advanced |             | Security |                   | Boot | Exit                                                                                                                                                                                           |  |  |
| <div>Boot Priority Order</div> <div>1. ATAPI CD:</div> <div>2. PCI LAN:</div> <div>3. ATA HDD0:</div> <div>4. ATA HDD1:</div> <div>5. USB HDD:</div> <div>6. USB CD:</div> <div>7. USB FDD:</div> <div>8. SD Card1:</div> <div>9. Internal Shell:</div> |      |          |             |          |                   |      | Item Specific Help                                                                                                                                                                             |  |  |
|                                                                                                                                                                                                                                                         |      |          |             |          |                   |      | Keys used to view or configure devices: ↑ and ↓ arrows Select a device. ‘+’ and ‘-’ move the device up or down. ‘Shift + 1’ enables or disables a device. ‘Del’ deletes an unprotected device. |  |  |
| F1                                                                                                                                                                                                                                                      | Help | ↑↓       | Select Item | +/-      | Change Values     | F9   | Setup Defaults                                                                                                                                                                                 |  |  |
| Esc                                                                                                                                                                                                                                                     | Exit | ←→       | Select Menu | Enter    | Select ► Sub-Menu | F10  | Save and Exit                                                                                                                                                                                  |  |  |

## 10.5 Exit

| Phoenix SecureCore Technology Setup                                                                      |          |          |             |       |                                                                                                                         |     |                |  |  |
|----------------------------------------------------------------------------------------------------------|----------|----------|-------------|-------|-------------------------------------------------------------------------------------------------------------------------|-----|----------------|--|--|
| Main                                                                                                     | Advanced | Security | Boot        | Exit  |                                                                                                                         |     |                |  |  |
| Exit Saving Changes<br>Exit Discarding Changes<br>Load Setup Defaults<br>Discard Changes<br>Save Changes |          |          |             |       | Item Specific Help                                                                                                      |     |                |  |  |
|                                                                                                          |          |          |             |       | Equal to F10, save all changes of all menus, then exit setup configure driver. Finally resets the system automatically. |     |                |  |  |
| F1                                                                                                       | Help     | ↑↓       | Select Item | +/-   | Change Values                                                                                                           | F9  | Setup Defaults |  |  |
| Esc                                                                                                      | Exit     | ←→       | Select Menu | Enter | Select ► Sub-Menu                                                                                                       | F10 | Save and Exit  |  |  |

| Function                | Description                                                                                                             |
|-------------------------|-------------------------------------------------------------------------------------------------------------------------|
| Exit Saving Changes     | Equal to F10, save all changes of all menus, then exit setup configure driver. Finally resets the system automatically. |
| Exit Discarding Changes | Equal to ESC, never save changes, then exit setup configure driver.                                                     |
| Load Setup Defaults     | Equal to F9. Load standard defaults values.                                                                             |
| Discard Changes         | Load the original value of this boot time. Not the default Setup value.                                                 |
| Save Changes            | Save all changes of all menus, but do not reset system.                                                                 |