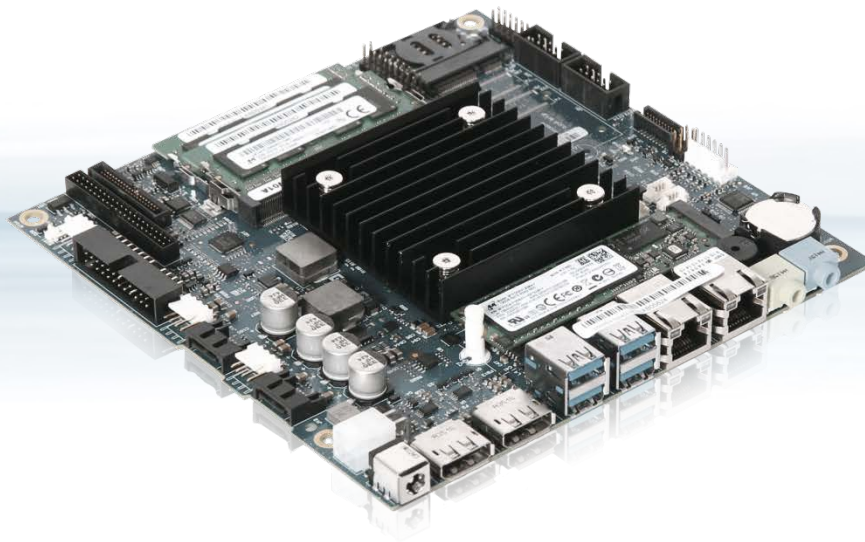




mITX-BDW-U

User Guide, Rev. 1.7

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 MITX-BDW-U

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REVISION HISTORY

Revision	Brief Description of Changes	Date of Issue
0.0	Preliminary version	2015-Feb-20
0.1	Remove fan assemble drawing	2015-04-21
1.1	Removed mSATA Updated to user guide to the new corporate identity Replaced Kontron Technology with Kontron	2016-06-15
1.2	Updated memory modules	2016-06-17
1.3	Updated connector names from the top view and front panel figure Added Display Configuration functions in the BIOS menu	2016-12-16
1.4	Added missing 19V power consumption tolerance voltages	2016-12-20
1.5	Added chapter 7.17 SATA Power Connector Added the SATA Power Connector to Chapter 9 On-board and Mating Connector Types	2017-07-13
1.6	Removed Wake up from LAN option	2018-10-26
1.7	Updated embedded controller GPIO0 and GPIO1 pins	2018-11-07

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Symbols

The following symbols may be used in this manual.

⚠ DANGER

DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.

⚠ WARNING

WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.

⚠ CAUTION

CAUTION indicates a hazardous situation which, if not avoided, may result in minor or moderate injury.

NOTICE

NOTICE indicates a property damage message.



Electric Shock!

This symbol and title warn of hazards due to electrical shocks (> 60 V) when touching products or parts of them. Failure to observe the precautions indicated and/or prescribed by the law may endanger your life/health and/or result in damage to your material. Please refer also to the "High-Voltage Safety Instructions" portion below in this section.



ESD Sensitive Device!

This symbol and title inform that the electronic boards and their components are sensitive to static electricity. Care must therefore be taken during all handling operations and inspections of this product in order to ensure product integrity at all times.



HOT Surface!

Do NOT touch! Allow to cool before servicing.



Laser!

This symbol inform of the risk of exposure to laser beam from an electrical device. Eye protection per manufacturer notice shall review before servicing.



This symbol indicates general information about the product and the user manual.

This symbol also indicates detail information about the specific product configuration.



This symbol precedes helpful hints and tips for daily use.

For Your Safety

Your new Kontron product was developed and tested carefully to provide all features necessary to ensure its compliance with electrical safety requirements. It was also designed for a long fault-free life. However, the life expectancy of your product can be drastically reduced by improper treatment during unpacking and installation. Therefore, in the interest of your own safety and of the correct operation of your new Kontron product, you are requested to conform with the following guidelines.

High Voltage Safety Instructions

As a precaution and in case of danger, the power connector must be easily accessible. The power connector is the product's main disconnect device.

⚠ CAUTION

Warning

All operations on this product must be carried out by sufficiently skilled personnel only.

⚠ CAUTION



Electric Shock!

Before installing a non hot-swappable Kontron product into a system always ensure that your mains power is switched off. This also applies to the installation of piggybacks. Serious electrical shock hazards can exist during all installation, repair, and maintenance operations on this product. Therefore, always unplug the power cable and any other cables which provide external voltages before performing any work on this product.

Earth ground connection to vehicle's chassis or a central grounding point shall remain connected. The earth ground cable shall be the last cable to be disconnected or the first cable to be connected when performing installation or removal procedures on this product.

Special Handling and Unpacking Instruction

NOTICE



ESD Sensitive Device!

Electronic boards and their components are sensitive to static electricity. Therefore, care must be taken during all handling operations and inspections of this product, in order to ensure product integrity at all times.

Do not handle this product out of its protective enclosure while it is not used for operational purposes unless it is otherwise protected.

Whenever possible, unpack or pack this product only at EOS/ESD safe work stations. Where a safe work station is not guaranteed, it is important for the user to be electrically discharged before touching the product with his/her hands or tools. This is most easily done by touching a metal part of your system housing.

It is particularly important to observe standard anti-static precautions when changing piggybacks, ROM devices, jumper settings etc. If the product contains batteries for RTC or memory backup, ensure that the product is not placed on conductive surfaces, including anti-static plastics or sponges. They can cause short circuits and damage the batteries or conductive circuits on the product.

General Instructions on Usage

In order to maintain Kontron's product warranty, this product must not be altered or modified in any way. Changes or modifications to the product, that are not explicitly approved by Kontron and described in this User Guide or received from Kontron's Technical Support as a special handling instruction, will void your warranty.

This product should only be installed in or connected to systems that fulfill all necessary technical and specific environmental requirements. This also applies to the operational temperature range of the specific board version, that must not be exceeded. If batteries are present, their temperature restrictions must be taken into account.

In performing all necessary installation and application operations, only follow the instructions supplied by the present User Guide.

Keep all the original packaging material for future storage or warranty shipments. If it is necessary to store or ship the product then re-pack it in the same manner as it was delivered.

Special care is necessary when handling or unpacking the product. See Special Handling and Unpacking Instruction.

Environmental Protection Statement

This product has been manufactured to satisfy environmental protection requirements where possible. Many of the components used (structural parts, printed circuit boards, connectors, batteries, etc.) are capable of being recycled.

Final disposition of this product after its service life must be accomplished in accordance with applicable country, state, or local laws or regulations.



Environmental protection is a high priority with Kontron.

Kontron follows the WEEE directive

You are encouraged to return our products for proper disposal.

The Waste Electrical and Electronic Equipment (WEEE) Directive aims to:

- ▶ Reduce waste arising from electrical and electronic equipment (EEE)
- ▶ Make producers of EEE responsible for the environmental impact of their products, especially when the product become waste
- ▶ Encourage separate collection and subsequent treatment, reuse, recovery, recycling and sound environmental disposal of EEE

Improve the environmental performance of all those involved during the lifecycle of EEE

Life Support Policy

KONTRON PRODUCTS ARE NOT FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT EXPRESS WRITTEN APPROVAL OF THE GENERAL MANAGER OF KONTRON.

As used herein:

Life support devices or systems are devices or systems that (a) are intended for surgical implant into body or (b) support or sustain life and whose failure to perform when properly used in accordance with instructions for use provided in the labelling can be reasonably expected to result in significant injury to the user.

A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system or to affect its safety or effectiveness.

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1/ Introduction

This manual describes the mITX-BDW-U board made by Kontron. This board will also be denoted mITX-BDW-U within this user guide.

The mITX-BDW-U board is based on the BDW-U chipset and supports the 5th generation Intel® Broadwell i7 -, i5 -, i3 2Core mobile processors. See Chapter 3.3 Processor Support Table, for specific details.

Use of this user guide implies a basic knowledge of PC-AT hard- and software. This manual focuses on describing the mITX-BDW-U 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 within this user guide before switching-on the power.

Configuration and setup of the CPU board is either done automatically or manually by the user via the BIOS setup menus.

Latest revision of the user guide, datasheet, thermal simulations, BIOS, drivers, BSP's (Board Support Packages), Mechanical drawings (2D and 3D) can be downloaded from the following link:

<http://www.kontron.com/products/boards-and-mezzanines/embedded-motherboards/mini-itx-motherboards/>

2/ Installation Procedure

2.1. Installing the Board

Follow these steps to get the board up and running. If the board already has components like RAM and CPU cooler mounted, leave out the relevant steps below.

1. Turn off the PSU (Power Supply Unit)

NOTICE

Turn off PSU (Power Supply Unit) completely (no mains power connected to the PSU) or leave the Power Connectors unconnected while configuring the board. Failure to do so might damage components (RAM, LAN cards etc.). Only use a standard ATX PSU. Running the board with a non-compliant ATX PSU may damage the board within minutes.

2. Insert the DDR3L SO-DIMM 204-pin SO-DIMM module(s)

Be careful to push it in the slot(s) before locking the tabs. For a list of approved DDR3L SO-DIMMs contact your Distributor or FAE. For more information refer to chapter "System Memory Support".

3. Cooler Installation

The mITX-BDW-U comes with a passive heatsink pre-installed and a separate fan, that can be mounted onto the heatsink, should the system require additional airflow. Connect Cooler Fan electrically to the FANCPU 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 ATX+12 V- 4p connector or alternatively connect a 19 V power adapter to the I/O power jack.

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 16 (PWRBTN_IN#) and pin 18 (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.



To clear all BIOS settings, including Password protection, activate "Load Default BIOS Settings" Jumper for approximately 10 sec (without power connected).

8. Mounting the board in chassis

NOTICE

When mounting the board to the chassis etc. take note that the board contains components on both sides of the PCB that can easily be damaged if board is handled without reasonable care. A damaged component can result in malfunction or no function.

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

2.2. Chassis Safety Standards

When designing the chassis interface connectors, take care that the connectors fulfil the IEC60950 standard.

mITX-BDW-U (T4006) users must evaluate the end-product to ensure that the requirements of the 60950-1 safety standard are met:

- ▶ The motherboard must be installed in a suitable mechanical, electrical and fire enclosure.
- ▶ The system, in its enclosure, must be evaluated for temperature and air flow considerations.
- ▶ The motherboard must be powered by a CSA or UL approved power supply that limits the maximum input current to 10A via external barrel-type 19 VDC connector, and to 16 A via internal square 12 VDC ATX connector.
- ▶ For interfaces having a power pin such as external power or fan, ensure that the connectors and wires are suitably rated. All connections from/to the product shall be with SELV circuits only.
- ▶ Wires have suitable rating to withstand the maximum available power.
- ▶ The enclosure of the peripheral device fulfils the fire protecting requirements of IEC60950.

2.3. Lithium Battery Precautions

CAUTION! 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 instructions.	VORSICHT! Explosionsgefahr bei unsachgemäßem Austausch der Batterie. Ersatz nur durch den selben oder einen vom Hersteller empfohlenen gleichwertigen Typ. Entsorgung gebrauchter Batterien nach Angaben des Herstellers.
ATTENTION! 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.	PRECAUCION! 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.
ADVARSEL! Lithiumbatteri – Eksplosionsfare ved feilagtig håndtering. Udskiftning må kun ske med batteri af samme fabrikat og type. Levér det brugte batteri tilbage til leverandøren.	ADVARSEL! Eksplosjonsfare ved feilaktig skifte av batteri. Benytt samme batteritype eller en tilsvarende type anbefalt av apparatfabrikanten. Brukte batterier kasseres i henhold til fabrikantens instruksjoner.
VARNING! Explosionsfara vid felaktigt batteribyte. Använd samma batterityp eller en ekvivalent typ som rekommenderas av apparattillverkaren. Kassera använt batteri enligt fabrikantens instruktion.	VAROITUS! Paristo voi räjähtää, jos se on virheellisesti asennettu. Vaihda paristo ainoastaan latteval- mistajan suosittelemaan tyyppiln. Hävitä käytetty paristo valmistajan ohjeiden mukaisesti.

3/ System Specifications

3.1. Component Main Data

The table below summarizes the features of the mITX-BDW-U embedded motherboard.

Form Factor	mITX-BDW-U: miniITX (170.18 mm by 170.18 mm), height approx. 23 mm from top of PCB board.
Processor	On board CPU variants Support 5th Generation Intel® Core™ (Broadwell-U Mobile) processors on a BGA 1168 in a Multi-chip package with the PCH (max. 15 W TDP) Intel® Core™ i7 Intel® Core™ i5 Intel® Core™ i3
Memory	DDR3L, SO-DIMM 204-pin socket (2 sockets) Support single and dual ranks DDR3L 1333/1600 MT/s (PC3-10600/PC3-12800) Support system memory from 1x 1 GB up to 2x 8 G  Less than 4 GByte displayed in System Properties using 32 bit OS (Shared Video Memory/PCI resources is subtracted). ECC not supported
Chipset	Intel Series 9 PCH-LP (Platform Controller Hub) Intel® VT-d (Virtualisation Technology for Directed I/O) Intel® TXT (Trusted Execution Technology) Intel® HD Audio Technology Intel® RST (Rapid Storage Technology) SATA (Serial ATA) 6 Gb/s USB revision 2.0 USB revision 3.0 PCI Express revision 2.0 ACPI 4.0a compliant Triple Display support (Triple Graphic Pipes) Blue-ray HD video playback Enhanced DMA controller, interrupt controller and timer functions
Audio	Audio, 5.1 Channel High Definition Audio Codec using the Realtek ALC662 codec Line-in and Line-out Microphone: MIC1 and MIC2 SPDIF-Out (electrical Interface only) On-board speaker (Electromagnetic Sound Generator like Hycom HY-05LF)
Video	Intel® i3, i5 & i7 5th Generation Mobile processors support 3x digital display ports via the Intel® Broadwell-U CPU: 2x DP (DisplayPorts), comply with DisplayPort 1.2a specification. HDMI panel support via DP to HDMI Adapter Converter. LVDS panel support up to 2 pixel/clock 24 bit colors (VESA and JEIDA) Triple independent pipes for Mirror or Triple independent display support Triple independent pipes for triple independent or cloned displays are supported from OS. Any 3 displays via DP1, DP2 and LVDS can be used.
I/O Control	Via ITE IT8528E Embedded Controller via LPC Bus interface
Peripheral interfaces	Four USB 3.0 / USB 2.0 on I/O area Four USB 2.0 ports on internal pinrows Two Serial ports (RS232) on internal pinrows Two Serial ATA-600 (one further SATA port implemented in M.2 connector) RAID 0/1 support

LAN Support	1x 10/100/1000 Mbps/s LAN (ETHER1) using Intel® Clarksville WGI218LM Gigabit PHY connected to BDW-U 1x 10/100/1000 Mbps/s LAN (ETHER2) using Intel® Pearsonville I211AT PCI Express controller PXE Netboot supported.
Expansion Capabilities	PCI-Express slots: 1x mPCIe connector with USB 2.0 port support for 3G modem (SIM socket) 1x M.2 connector with 1x SATA/ PCIe x2 SMBus, compatible with ACCES BUS and I2C BUS, (via Feature connector) SPI bus routed to SPI connector (BIOS Recovery module interface) DDC/AUX Bus routed to DP connector (Auto detect to DDC when using passive DP to HDMI adapters) 18x GPIOs (General Purpose I/Os), (via Feature connector) DAC, ADC, PWM and TIMER (Multiplexed), (via Feature connector) WAKE UP / Interrupt Inputs (Multiplexed), (via Feature connector) 3-Wire Bus for GPIO Expansion (up to 152 GPIOs), (via Feature connector) 8 bit Timer output, (via Feature connector)
Hardware Monitor Subsystem	Smart Fan control system, support Thermal® and Speed® cruise for two on-board Fan connectors: CPU Fan (on-board) and System Fan (on-board) Thermal inputs: CPU Die temperature (precision +/- 3° C), System temperature (precision +/- 3° C) Intrusion (Case Open) detect input, (via Feature connector) Sleep S5# Indication, (via Feature connector) System Powergood Signal, (via Feature connector)
Power Supply Unit	ATX+12 V PSU 4-pin on internal 2x 2 pin connector. Or: 19V notebook-style Power adapter through I/O power jack.
Battery	Exchangeable 3.0 V Lithium battery for on-board Real Time Clock and CMOS RAM. Manufacturer Panasonic / Part-number CR-2032L/BN, CR2032N/BN or CR-2032L/BE. Approximate 6.2 years retention. Current draw is less than 4.2 µA when PSU is disconnected and 0 µA in S0 – S5. ⚠ CAUTION Danger of explosion if the battery is not replaced correctly. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.
BIOS	Phoenix BIOS (EFI core version) Support for ACPI 4.0 (Advanced Configuration and Power Interface), Plug & Play Suspend (S1 mode) Suspend To Ram (S3 mode) Suspend To Disk (S4 mode) "Always On" BIOS power setting RAID Support (RAID modes 0 and 1)
Operating Systems Support	Windows 7 (32 b* + 64 b) Windows 8 (32 b* + 64 b) Linux *= Out Of The Box installation test only.
Environmental Conditions	Operating: 0° C – 60° C operating temperature (forced cooling). It is the customer's responsibility to provide sufficient airflow around each of the components to keep them within allowed temperature range. Please refer to the thermal simulation report for information about airflow. 10 % - 90 % relative humidity (non-condensing) Storage: -20° C – 70° C; lower limit of storage temperature is defined by specification restriction of on-board CR2032 battery. Board with battery has been verified for storage temperature down to -40°C by Kontron. 5 % - 95 % relative humidity (non-condensing) Electro Static Discharge (ESD) / Radiated Emissions (EMI):

All Peripheral interfaces intended for connection to external equipment are ESD/ EMI protected.
 EN 61000-4-2:2000 ESD Immunity
 EN55022:2006+A1:2007 class B Generic Emission Standard.

Electrical Fast Transients (EFT) (Burst):
 EN 61000-4-4 Burst Immunity.

Safety:
 IEC 60950-1: 2005, 2nd Edition
 UL 60950-1
 CSA C22.2 No. 60950-1
 Product Category: Information Technology Equipment Including Electrical Business Equipment.
 Product Category CCN: NWGQ2, NWGQ8. File number: E194252

Shock:
 IAW IEC 60068-2-27, Test Ea, shock, 18 shocks 3 per axis, 6 directions.
 Shock pulse 50g, 11ms halfsine.

Bump:
 IAW IEC 60068-2-29, Test Eb, Bump, 3000 bumps, 500 per axis, 6 directions.
 Half Sine Waveform Acceleration 2g; Pulse Duration 11ms.

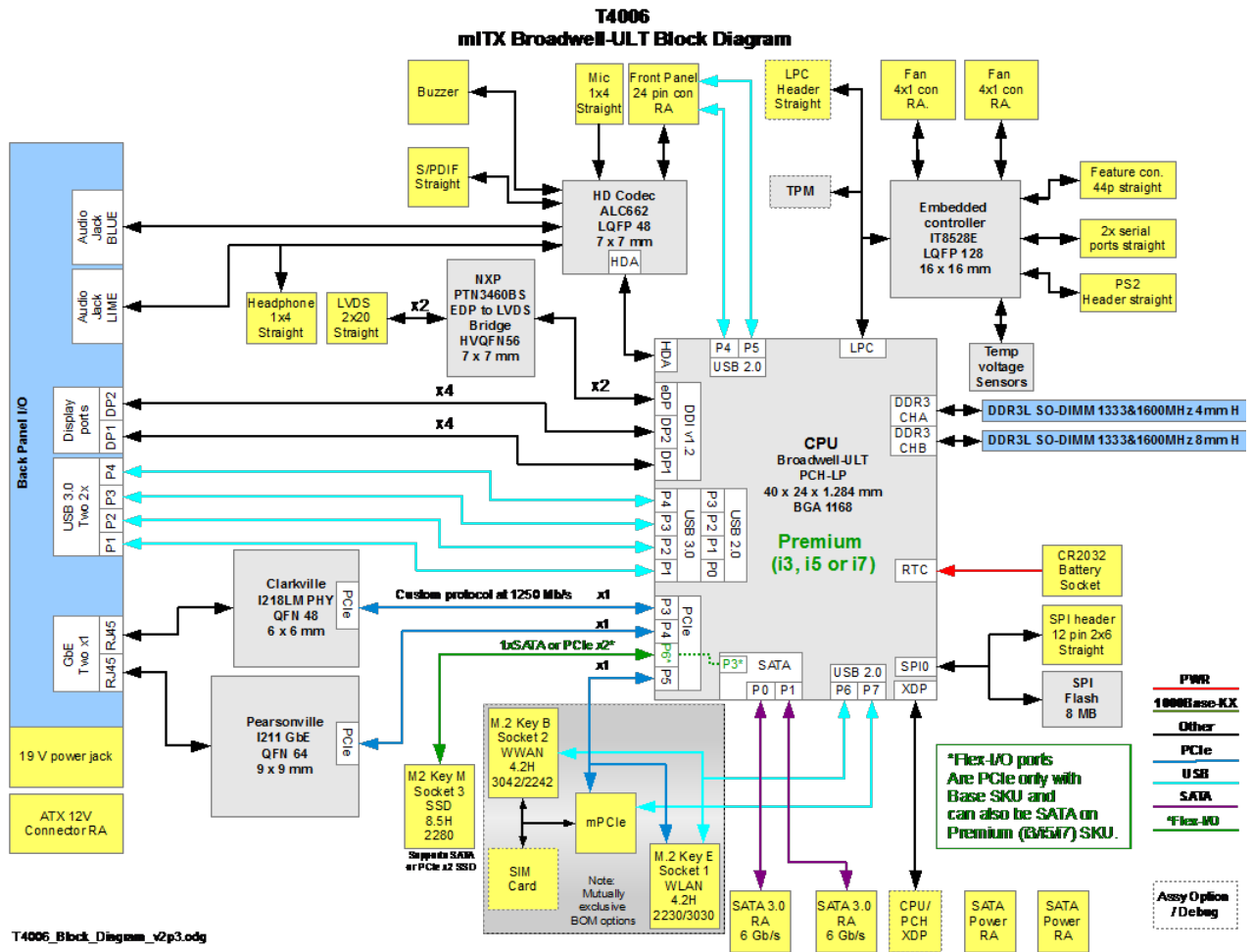
Vibration:
 IAW IEC 60068-2-64, Test Fh, Random Vibration. 90 min per axis, 3 axes, at 1.9 grms, with PSD: 10-20 Hz: 0.05 g²/Hz and 20-500 Hz: -3dB/octave.

Theoretical MTBF:
 365475 hours @ 30° C for the mITX-BDW-U

Restriction of Hazardous Substances (RoHS):
 All boards in the mITX-BDW-U family are RoHS compliant.

Capacitor utilization:
 No Tantalum capacitors on board
 Only Japanese brand Solid capacitors rated for 100 °C used on board

3.2. mITX-BDW-U Block Diagram



3.3. Processor Support Table

mITX-BDW-U is designed to support the following BGA1168 mobile processors:

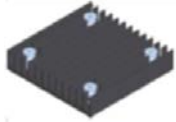
- ▶ 5th generation Intel® Core™ i7 processor
- ▶ 5th generation Intel® Core™ i5 processor
- ▶ 5th generation Intel® Core™ i3 processor

The BGA CPU is premounted at the factory. Kontron has defined the board versions as listed in the following table. Currently, all board versions are based on Embedded CPUs. Other versions are expected later.

mITX-BDW-U variants		CPU		
Name	Sales PN	Speed	Embed.	Cache
mITX-BDW-U i7-5650U	810610-4500	3.2 GHz	Yes	4 MByte
mITX-BDW-U i5-5350U	810611-4500	2.9 GHz	Yes	3 MByte
mITX-BDW-U i3-5010U	810612-4500	2.1 GHz	Yes	3 MByte

For sufficient cooling of the CPU conditions such as the worst-case maximum ambient operating temperature and the actual worst-case load of processor must be considered.

The mITX-BDW-U is delivered with a premounted heatsink:

Component	Technology	Overall Dimensions (mm)	Fin Arrangement	Fin Detail (mm)	Fin Pitch (mm)	TM	Detail
CPU	Extruded Aluminium	70 x 70 x 16.8	Plate Fn	11.8 x 1.0 (x13)	5.7	Lard T-PCM 585	

3.4. System Memory Support

The mITX-BDW-U has two DDR3L SO-DIMM sockets. The sockets support the following memory features:

- ▶ 2x DDR3L, 1.35 V, SO-DIMM 204-pin
- ▶ Dual-channel with one SO-DIMM per channel
- ▶ From 1 GByte and up to 2x 8 GByte.



If using 32bit OS, less than 4 GB are displayed in the system (Shared Video Memory/PCI resources is subtracted).

- ▶ Single/dual rank unbuffered 1333/1600MT/s (PC3-10600/PC3-12800)
- ▶ SPD timings supported
- ▶ ECC not supported

The installed DDR3L SO-DIMM should support the Serial Presence Detect (SPD) data structure. This allows the BIOS to read and configure the memory controller for optimal performance. If non-SPD memory is used, the BIOS will attempt to configure the memory settings, but performance and reliability may be impacted.

Memory Operating Frequencies

Regardless of the SO-DIMM type used, the memory frequency will either be equal to or less than the processor system bus frequency. For example, if DDR3L 1600 memory is used with a 1333 MHz system bus frequency processor, the memory clock will operate at 167 MHz. The table below lists the resulting operating memory frequencies based on the combination of SO-DIMMs and processor.

SO-DIMM Type	Module name	Memory Data Transfers [MT/s]	Processor System Bus Frequency [MHz]	Resulting Memory Clock Frequency [MHz]	Peak Transfer Rate [MB/s]
DDR3L 1600	PC3-12800	1600	1333	167	10666
DDR3L 1600	PC3-12800	1600	1600	200	12800

Kontron offers the following memory modules:

Part Number (PN)	Memory Module Description	Replaced Legacy PN
1060-2520	2 GByte DDR3L-1600, PC3-12800	1055-9939
1060-2522	4 GByte DDR3L-1600, PC3-12800	1055-9941
1060-2524	8 GByte DDR3L-1600, PC3-12800	1055-9942

Memory modules have, in general, a much lower longevity than embedded motherboards, and therefore EOL of memory modules can be expected several times during the lifetime of the motherboard. Kontron guarantees that the above Part Numbers (PNs) will be maintained by replacing EOL memory modules with other similar modules.

As a minimum, it is recommended to use Kontron memory modules for prototype system(s) in order to prove the stability of the system and for reference.

For volume production you might want to test and qualify other types of RAM. In order to qualify RAM it is recommended to configure 3 systems running a RAM Stress Test program in a heat chamber at 60° C for a minimum of 24 hours.

3.5. mITX-BDW-U Graphics Subsystem

The mITX-BDW-U equipped with Intel® i3, i5 or i7 processor, supports Intel® Gen 8 HD Graphics core. All mITX-BDW-U versions support three display pipes. The DP interface supports the DisplayPort 1.2a specification. The PCH supports high-bandwidth Digital Content Protection for high definition content playback over digital interfaces. The PCH also integrates audio codecs for audio support over DP interfaces.

Up to three displays (DP1, DP2 & LVDS) can be used simultaneously and be used to implement independent or a cloned display configuration. PCIe cards can be used to replace on-board graphics or in combination with on-board graphics.

Intel® HD Graphics

Features of the Intel Gen 8 Graphics core built into the i3, i5 and i7 processors, includes:

- ▶ High quality graphics engine supporting
 - ▶ 3 Symmetric Pipe Support
 - ▶ DirectX11.1 and OpenGL 4.x compliant and lower
 - ▶ Full AVC/VC1/MPEG2 HW Decode
 - ▶ Extension of H.264 format
 - ▶ VP8* Decode HW Acceleration
 - ▶ Advanced Scheduler 2.0, 1.0, XPDM support
 - ▶ OpenGL* 4.0, OpenGL* 4.2 support

- ▶ DP1 & DP2
 - ▶ 6/32bit colors in WQXGA 3840x2160 @ 60 Hz
 - ▶ Max HDMI resolution 4096x2304 @ 24 Hz
 - ▶ DisplayPort standard 1.2a
- ▶ LVDS
 - ▶ One or two pixels per clock, up to 1920x1200 – 24b bit colors
 - ▶ 12 V for backlight, up to 2.5 A
 - ▶ 3.3 V or 5 V for panel power, up to 1.0 A
 - ▶ PWM Brightness/Dimming
 - ▶ VESA and JEIDA color coding

3-displays Configurations:

Display1	Display2	Display3	Max Resolution @60 Hz		
			Display1	Display2	Display3
LVDS	DP	DP	1920x1200	3840x2160	3840x2160
LVDS	HDMI	DP	1920x1200	2560x1600	3840x2160
LVDS	HDMI	HDMI	1920x1200	2560x1600	2560x1600

HDMI means using a DP to HDMI passive adapter. If using an active adapter, the HDMI resolution will be increased to match the DP in above table.

DP Adapters

Use of DP Adapter Converters (3rd party accessories) can provide HDMI panel support.

The DP to HDMI supports the HDMI 1.4a specification including audio codec.



DP to HDMI

PN 1045-5781



Cable DP Extender cable 200mm

PN1051-7619

For all the above adapters the maximum resolution is: 1920 x 1200. Extension cables are available.

3.6. Power Consumption

In order to ensure safe operation of the board, the input power supply must monitor the supply voltage and shut down if the supply is out of range – refer to the actual power supply specification. Please note, in order to keep the power consumption to a minimal level, boards do not implement a guaranteed minimum load. In some cases, this can lead to compatibility problems with ATX power supplies that require a minimum load to stay in regulation. The mITX-BDW-U board must be powered through either the ATX+12V-4p (4-pole) connector using standard ATX power supply or by an external 19V power adapter through the I/O power jack.

ATX12V supply: ATX+12V-4p connector must be used in according to the ATX12V PSU standard.

NOTICE

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

The requirements to the supply voltages are as follows:

Supply	Min.	Max.	Note
+12 V	11.4 V	12.6 V	Should be $\pm 5\%$ for compliance with the ATX specification
+19 V	18.05 V	19.95 V	Should be $\pm 5\%$ for mITX-BDW-U compatibility

Total System power example

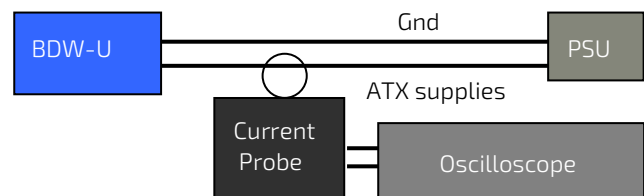
More detailed Static Power Consumption

On the following pages the power consumption of the T4006 Board is measured under:

1. Windows 7 Idle
2. Windows 7 3Dmark 2006
3. Windows 7 Intel® TAT, 100 % on all CPU cores and GFX
4. Windows 7 S3 (Sleep)
5. Windows 7 S5 (Shutdown)

The principal test system and test equipment used:

1. Tektronix DP07254
2. Tektronix TCP202
3. HP 34401A
4. ATX rail switch



Power consumption of PSU (power loss), Monitor and HDD are not included.

mITX-BDW-U Low Power Setup:

Standard system configuration equipped with Internal graphics, 1x SATA disks, Intel® Core™ i3 CPU, 1x SO-DIMM (2 GByte Module), DP Monitor, Keyboard & Mouse (USB), 1x 8 GByte USB2 Stick, 12 V active cooler, >90 W 12 V ATX PSU.

mITX-BDW-U Low Power Setup Results:

Windows 7 - Idle		
Supply	Current Draw / [mA]	Power Consumption / [W]
+12 V	636	7.808
+19 V		
TOTAL		7.808

Windows 7 – 3DMark2006		
Supply	Current Draw / [mA]	Power Consumption / [W]
+12 V	1688	20.72
+19 V		
TOTAL		20.72

Windows 7 – Intel® TAT 100% all CPU cores and GFX		
Supply	Current Draw / [mA]	Power Consumption / [W]
+12 V	1733	21.26
+19 V		
TOTAL		21.26

Windows 7 – S3 (Sleep)		
Supply	Current Draw / [mA]	Power Consumption / [W]
+12 V	74	0.9102
+19 V		
TOTAL		0.9102

Windows 7 – S5 (Shutdown)		
Supply	Current Draw / [mA]	Power Consumption / [W]
+12 V	67	0.824
+19 V		
TOTAL		0.824

mITX-BDW-U High Power Setup:

Standard system configuration equipped with PCIe M.2 SSD, 2x SATA disks, mPCI Wifi, Intel® Core™ i3 CPU, 2x SO-DIMM (8 GByte Modules), DP Monitor, Keyboard & Mouse (USB), 4x 1-8 GByte USB2 Sticks, 12 V active cooler, 1x Ethernet connected, >120 W 12 V ATX PSU.

mITX-BDW-U High Power Setup Results:

Windows 7 - Idle		
Supply	Current Draw / [mA]	Power Consumption / [W]
+12 V	1260	15.48
+19 V		
TOTAL		15.48

Windows 7 – 3DMark2006		
Supply	Current Draw / [mA]	Power Consumption / [W]
+12 V	2367	29.01
+19 V		
TOTAL		29.01

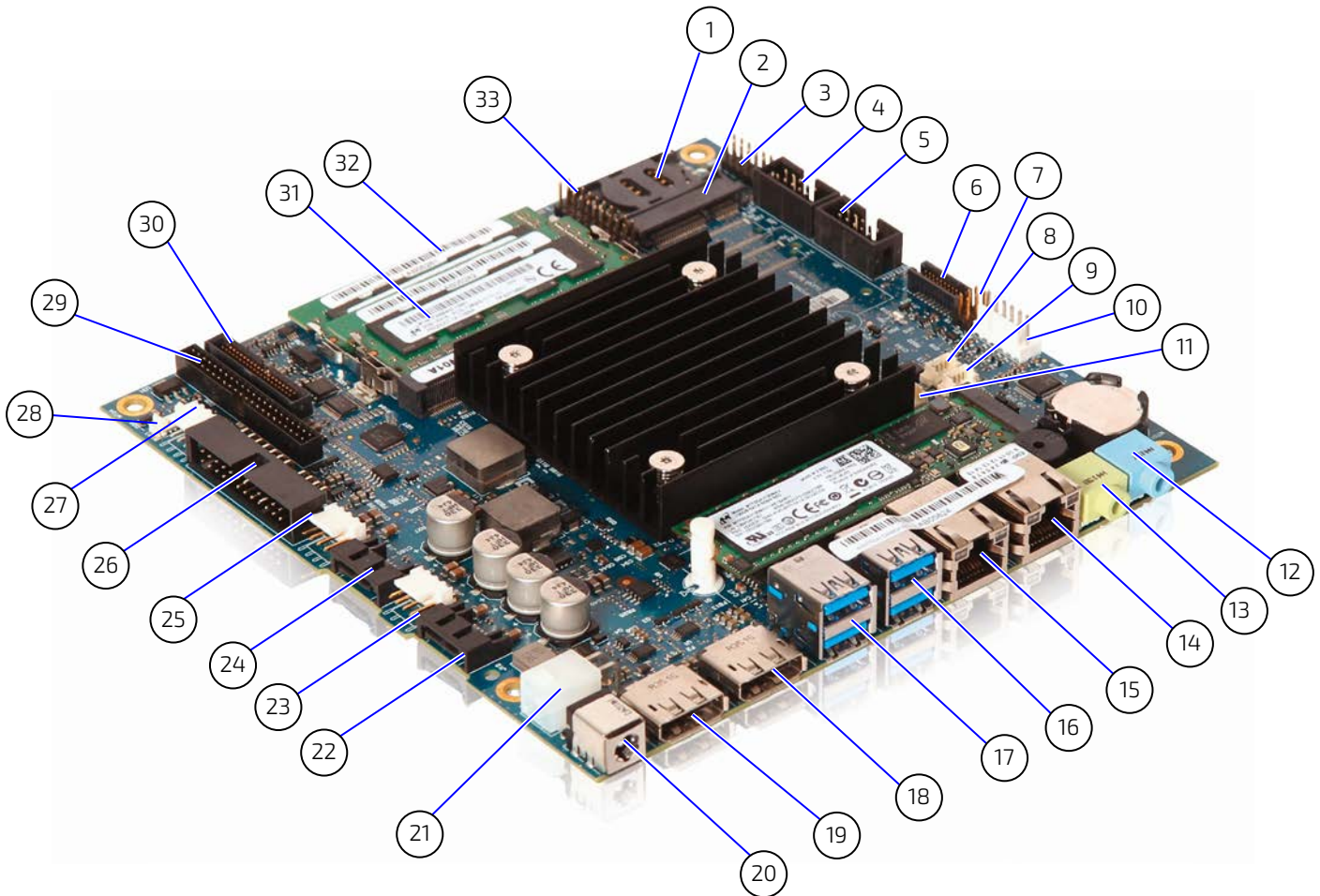
Windows 7 – Intel TAT 100% all CPU cores and GFX		
Supply	Current Draw / [mA]	Power Consumption / [W]
+12 V	2175	26.66
+19 V		
TOTAL		26.66

Windows 7 – S3 (Sleep)		
Supply	Current Draw / [mA]	Power Consumption / [W]
+12 V	120	1.475
+19 V		
TOTAL*		

Windows 7 – S5 (Shutdown)		
Supply	Current Draw / [mA]	Power Consumption / [W]
+12 V	78.87	0.969
+19 V		
TOTAL*		0.969

4/ Connector Locations

4.1. mITX-BDW-U – Top View and Front Panel



Item	Designation	Description	See Section
1	J35	SIMcard socket	8/
2	J27	Mini PCI Connector (mPCI)	8/
3	J30	SPI connector	7.15
4	J25	COM2 - RS232 serial port	7.10
5	J21	COM1 - RS232 serial port	7.10
6	J15	PS/2 keyboard and mouse connector	7.3
7	JP1	Load Default BIOS and Always On Jumper	7.13 / 7.14
8	J37	Speaker connector	7.6
9	J13	Microphone connector	7.7
10		Voltage test JIG connector (For test purposes, not required by user)	
11	J14	SPDIF-Out	7.8
12	J1	Mic1- Audio Input Microphone	6.4
13	J2	Line1 - Audio Output- Line	6.4
14	J4	LAN 10/100/1000 Mbit Ethernet connector	6.2
15	J5	LAN 10/100/1000 Mbit Ethernet connector	6.2
16	J6	USB 1 and USB 0	6.3
17	J7	USB3 and USB 2	6.3

Item	Designation	Description	See Section
18	J8	Display port connector	6.1
19	J9	Display port connector	6.1
20	J13	DC power jack +19 V external power connector	6.5
21	J10	DC power ATX +12 V internal power connector	7.1
22	J12	SATA connector	7.4
23	J16	Internal SATA power connector (12 V and 5 V)	7.4
24	J18	SATA connector	7.4
25	J20	Internal SATA power connector (12 V and 5 V)	7.4
26	J23	Front panel connector	7.9
27	J29	FAN SYS- powers, controls and monitors a fan for chassis ventilation	7.2
28	J34	FAN CPU used for CPU ventilation	7.2
29	J28	Features connector	7.12
30	J33	LVDS flat panel connector	7.11
31	J24	DDR3L memory socket	3.4
32	J32	DDR3L memory socket	3.4
34	J31	LPC connector	7.16

5/ Connector Definition

The following sections provide pin definitions and detailed descriptions of all mITX-BDW-U on-board connectors.

The connector definitions are given below:

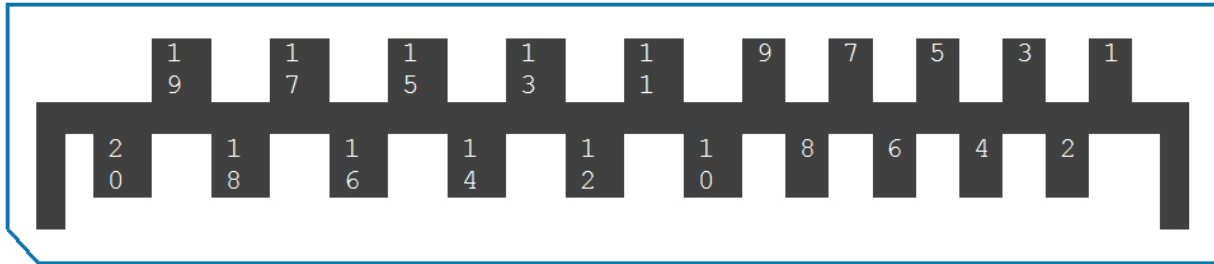
Column Name	Description
Pin	Shows the pin-numbers in the connector. The graphical layout of the connector definition tables is made similar to the physical connectors.
Signal	The mnemonic name of the signal at the current pin. The notation "XX#" states that the signal "XX" is active low.
Type	AI: Analogue Input. AO: Analogue Output. I: Input, TTL compatible if nothing else stated. IO: Input / Output. TTL compatible if nothing else stated. IOT: Bi-directional tristate IO pin. IS: Schmitt-trigger input, TTL compatible. IOC: Input / open-collector Output, TTL compatible. IOD: Input / Output, CMOS level Schmitt-triggered. (Open drain output) NC: Pin not connected. O: Output, TTL compatible. OC: Output, open-collector or open-drain, TTL compatible. OT: Output with tri-state capability, TTL compatible. LVDS: Low Voltage Differential Signal. 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). 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 that are not available yet or that are not sufficiently specified by the component vendors.

6/ I/O-Area Connectors

6.1. DP Connectors DP1 and DP2 (J8, J9)

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



Display Port Connector Pinout

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 (1 M Ω). Aux channel on pin 15/17 selected as default (when NC) DDC channel on pin 15/17, If HDMI adapter used (3.3 V)
14	Config2	(Not used)	O	Internally connected to GND
15	Aux Ch (p)	Aux Channel (+) or DDC Clk		AUX (+) channel used by DP DDC Clk used by HDMI
16	GND		PWR	
17	Aux Ch (n)	Aux Channel (-) or DDC Data		AUX (-) channel used by DP DDC Data used by HDMI
18	Hot Plug		I	Internally pull down (100 K Ω).
19	Return		PWR	Same as GND
20	3.3 V		PWR	Fused by 1.5 A resetable PTC fuse.

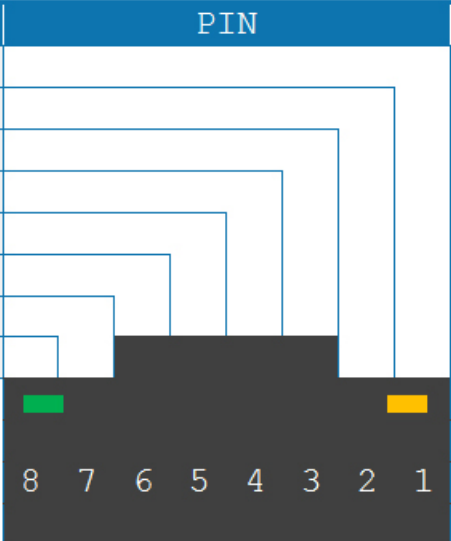
6.2. Ethernet Connectors (J4, J5)

The mITX-BDW-U supports two channels of 10/100/1000 Mbit Ethernet

- ▶ LAN1 is based on Intel® Clarkville i218LM Gigabit PHY
- ▶ LAN2 is based on Intel® Pearsonville i211AT PCI Express controller.

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

Ethernet RJ45 connector Pinout

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

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. 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. 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. 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. In MDI crossover mode, this pair acts as the BI_DC+/- pair.



MDI = Media Dependent Interface

6.3. USB Connectors (J6, J7)

The mITX-BDW-U board contains a EHCI (Enhanced Host Controller Interface) and a XHCI (Extensible Host Controller Interface). The EHCI controller supports six USB 2.0 ports allowing data transfers up to 480 Mb/s. The XHCI controller supports up to four USB 3.0 ports allowing data transfers up to 5 Gb/s. Four of the USB 3.0 ports are shared with four of the USB 2.0 ports (USB0 – USB3).

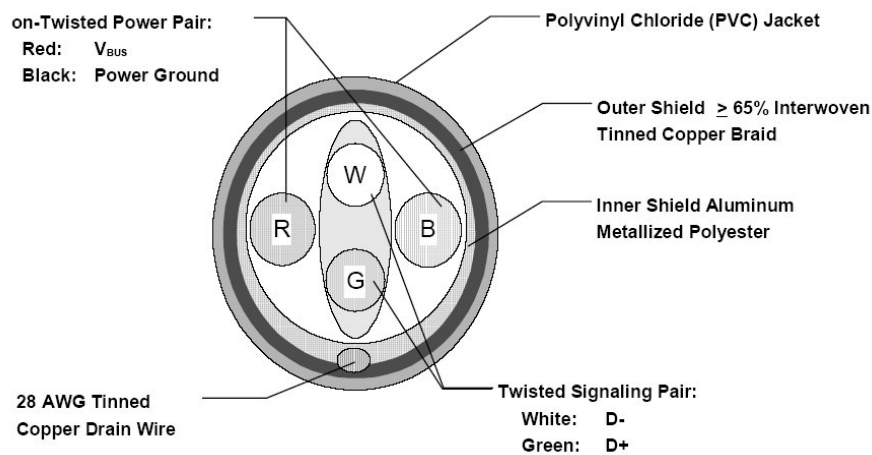


Not all USB 2.0 and USB 3.0 ports are physically connected to the board.

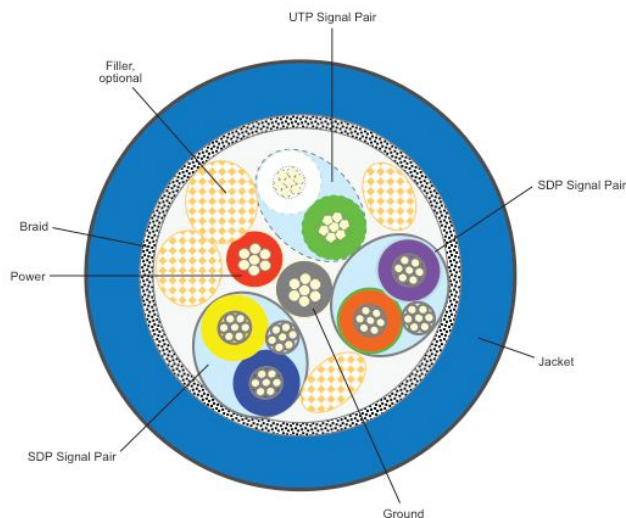
Legacy Keyboard/Mouse and wakeup from sleep states are supported. Over-current detection on all USB ports is supported. The following USB connectors are available:

- ▶ USB 2.0/3.0 Port 0, 1, 2 & 3 are supplied on the dual USB connectors in the I/O Area (J6 & J7) and supports USB3.0/USB2.0.
- ▶ USB 2.0 Port 4, 5 are supplied on the combined Front Panel connector (J23).
- ▶ USB 2.0 Port 7 is available in the mPCIe connector (J27).

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 Connector (USB0, 1, 2 & 3) Pinout

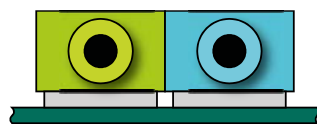
Note	Type	Signal	PIN				Signal	Type	Note
	IO	USB3-				USB3+		IO	
1	PWR	5V/SB5V	1	2	3	4	GND	PWR	
	IO	RX2-	5	6	7	8	9	TX2+	IO
	IO	RX1+				TX1-		IO	
	PWR	GND							
	IO	USB2-				USB2+		IO	
1	PWR	5V/SB5V	1	2	3	4	GND	PWR	
	IO	RX2-	5	6	7	8	9	TX2+	IO
	IO	RX2+				TX2-		IO	
	PWR	GND							

Signal	Description
USBn+ USBn- RXn+ RXn- TXn+ TXn- (n= 0,1,2,3)	Differential pair works as serial differential receive/transmit data lines.
5 V / SB5 V	5 V supply for external devices. SB5 V is supplied during power-down to allow wakeup on USB device activity. Protected by resettable 2 A fuse covering both USB ports.

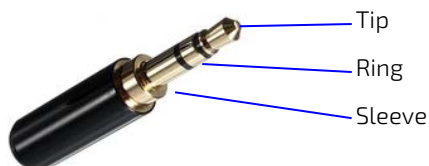
6.4. Audio Jack Connectors (J1, J2)

The on-board audio circuit implements up to six Channel High Definition Audio via the SPDIF-Out connector, see SPDIF-Out (J14) description.

Interface is based on UAA (Universal Audio Architecture), featuring five 24 bit stereo DACs and three 20 bit stereo ADCs. The following Audio connectors are available in the I/O Area.



J2, Line 1 and J1, Mic1



Mating Audio Jack (Example)

Audio Speakers, Line-in and Microphone are available in a stacked Audio Jack Connector:

Pin Designation	Signal	Type	Note
Tip	LINE1-IN-L	IA	1.0 V _{RMS} , 30 kΩ
Ring	LINE1-IN-R	IA	1.0 V _{RMS} , 30 kΩ
Sleeve	GND	PWR	

Pin Designation	Signal	Type	Note
Tip	OUT-L	OA	For headphone, max 1.6 V _{RMS}
Ring	OUT-R	OA	For headphone, max 1.6 V _{RMS}
Sleeve	GND	PWR	

Signal	Description	Note
LINE1-IN-L	Line In signal Left	
LINE1-IN-R	Line In signal Right	
OUT-L	Speaker Out Left	Shared with J37 pin header connector
OUT-R	Speaker Out Right	Shared with J37 pin header connector

6.5. DC Power - Jack Connector -19 V –(J13)

The mITX-BDW-U can be supplied from either an external 19 V power adapter (J13) or an external 19 V power adapter. The DC power Jack connector (Ext19 V) must be used to supply the board with +19 V+/-10 %.

The external 19 V power connector has Vin at the center pin and mates with a 5.5 mm diameter DC power jack with 2.5 mm diameter pin hole. The maximum allowed current is 5A.

DC Power Jack 19 V-Power Connector Pinout

Pin	Signal	Type	Note
1	+19 V	PWR	1
2	GND	PWR	1

NOTICE

- 1) Hot Plugging power supply is not supported. Hot Plugging might damage the board. When connecting to the motherboard, turn off the mains supply etc. to make sure all the power lines (+12 V or +19 V) are turned off.

7/ Internal Connectors

7.1. DC Power – ATX Connector -12 V (J10)

The mITX-BDW-U can be supplied from either an internal 12 V ATX power supply (J10) or an external 19 V power adapter (J13). The Internal 12 V connector must be used to supply the board with +12 V +/- 5 %

ATX+12 V-4p Power Connector Pinout

Note	Type	Signal	PIN		Signal	Type	Note
	PWR	GND	2	4	+12 V	PWR	1
	PWR	GND	1	3	+12 V	PWR	1

NOTICE

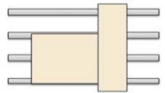
- 1) Hot Plugging power supply is not supported. Hot Plugging might damage the board. When connecting to the motherboard, turn off the mains supply etc. to make sure all the power lines (+12 V or +19 V) are turned off.

7.2. Fan Connectors (J34, J29)

The mITX-BDW-U uses either 4-wire or 3-wire fan connectors. The FANSYS (J29) connector can be used to power, control and monitor a fan for chassis ventilation etc. The FANCPU (J34) is used for the connection of the fan for the CPU.

To drive a 4-wire type Fan a 4-pin header is recommended in order to implement FAN speed control. Support for a 3-wire Fan is also possible, but fan speed control is not integrated.

4-Pin and 3-Pin header Pinouts

4-pin Header	Pin	Signal	Description	Type
	1	PWM	PWM output	0-3.3
	2	TACHO	Tacho signal	I
	3	12 V	Power +12 V	PWR
	4	GND	Ground	PWR
3-pin Header	Pin	Signal	Description	Type
	1		Not used	
	2	TACHO	Tacho signal	I
	3	12 V	Power +12 V	PWR
	4	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 4.7 V to +12 V. The signal has to be pulsed and onboard circuit is prepared for two pulses per rotation.
12 V	+12 V supply for fan. This pin supplies a maximum of 2000 mA.
GND	Power Supply GND signal

7.3. PS/2 Keyboard and Mouse Connector (KBDMSE) (J15)

A PS/2 keyboard/mouse can be attached via the pinrow connector KBDMSE (J15). Both interfaces utilize open-drain signalling with on-board pull-up.

In standby mode the PS/2 mouse and keyboard are supplied from SB5 V, to enable keyboard or mouse activity to bring the system out of power saving states. The supply is provided through a 1.1 A resettable fuse.



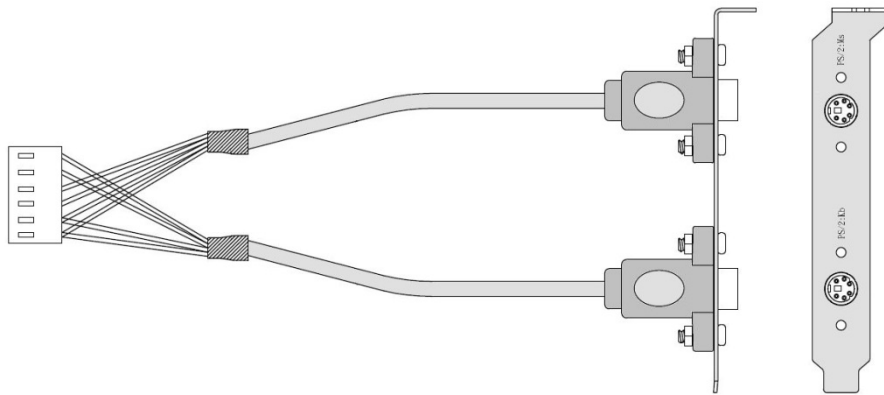
The PS/2 connector does not support wake functions.

Keyboard and Mouse Connector (KBDMSE) Pinout

PIN	Signal	Type	Ioh/Iol	Pull U/D	Note
1	KBDCLK	IOD	/14 mA	2.7 K Ω	
2	KBDDAT	IOD	/14 mA	2.7 K Ω	
3	MSCLK	IOD	/14 mA	2.7 K Ω	
4	MSDAT	IOD	/14 mA	2.7 K Ω	
5	5 V/SB5 V	PWR			
6	GND	PWR			

Signal	Description
MSCLK	Bi-directional clock signal used to strobe data/commands from/to the PS/2 mouse.
MSDAT	Bi-directional serial data line used to transfer data from or commands to the PS/2 mouse.
KDBCLK	Bi-directional clock signal used to strobe data/commands from/to the PC-AT keyboard.
KBDDAT	Bi-directional serial data line used to transfer data from or commands to the PC-AT keyboard.

Available cable kit:



PN 1053-2384 Bracket Cable 6-Pin to PS2-Kbd-Mse

7.4. SATA (Serial ATA) Ports (J12, J18)

The mITX-BDW-U has an integrated SATA Host controller (PCH in the BDW-U chipset) that supports independent DMA operation on two ports. One device can be installed on each port for a maximum of two SATA devices via two SATA connectors and one M.2 connector. A point-to-point interface (SATA cable) is used for host to device connections. All SATA ports support data transfer rates of up to 6.0 Gb/s, 3.0 Gb/s and 1.5 Gb/s.



Before installing OS on a SATA drive make sure the drive is not a former member of a RAID system. If this is the case, some hidden data on the disk has to be erased. To do this, connect two SATA drives and select RAID in BIOS. Save settings and select <Ctrl> <I> while booting to enter the RAID setup menu. Now the hidden RAID data will be erased from the selected SATA drive.

Supported SATA features:

- ▶ 2 to 4-drive RAID 0 (data striping)
- ▶ 2-drive RAID 1 (data mirroring)
- ▶ AHCI (Advanced Host Controller Interface)
- ▶ NCQ (Native Command Queuing). NCQ is for faster data access.
- ▶ Swap bay support (not supported on M.2)
- ▶ Intel® Rapid Recover Technology
- ▶ 2 – 256 TByte volume (Data volumes only)
- ▶ Capacity expansion
- ▶ TRIM in Windows 7 (in AHCI and RAID mode for drives not part of a RAID volume). (TRIM is for SSD data garbage handling).

SATA0 and SATA1 Connector Pinout

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
SATA* RX+ / RX-	Host transmitter differential signal pair
SATA* TX+ / TX-	Host receiver differential signal pair

“*” specifies 0 or 1 depending on SATA port.

Available cable kit:



PN 821035 Cable SATA 500 mm

7.5. USB Connectors (Internal)

The following USB2.0 ports are available on Internal pinrows:

- ▶ USB2.0 Port 4 and 5 - the internal FRONTPNL connector (J23) supplies USB2.0 Port 4 and 5. See Chapter 7.9 Front Panel Connector (FRONTPNL) (J23).
- ▶ USB2.0 Port 7 - the internal mPCIe connectors (J27) supplies USB2.0 Port 7. See Chapter 8 Slot Connectors (miniPCIe).

7.6. Speaker Connector (J37)

The Speaker audio-out interface is available through the connector J37 (4-pins). These outputs are shared with the speaker audio jack connector (J2) (green). With up to 100 dB Signal-to-Noise Ratio (SNR).

Speaker Connector Pinout

Header	Pin	Signal	Type
	4	FRONT_R_HEADER	AO
	3	GND	PWR
	2	FRONT_L-HEADER	AO
	1	GND	PWR

7.7. Microphone Connector (J13)

The microphone audio-in interface is available through the connector J13 (4-pins). With up to 100 dB Signal-to-Noise Ratio (SNR).

Microphone Connector Pinout

Header	Pin	Signal	Type
	4	MIC1_R_HEADER	AI
	3	GND	PWR
	2	MIC1_L_HEADER	AI
	1	GND	PWR

7.8. SPDIF-Out (J14)

The digital audio interface (electrical SPDIF-Out) is available through the connector J14 (2-pins) and can be used to implement 6 (5.1) Channel High Definition Audio.

The circuit is based on a high fidelity six channel HD audio codec that is compatible with the Intel HD Audio specification and supports a stereo 24 bit resolution and up to 192 kHz sample rate for DACs/ADCs. The Signal-to-Noise Ratio (SNR) is up to 90 dB.

16 bit/ 20 bit/ 24 bit SPDIF TX Outputs supporting 48 KHz/ 96 KHz/ 44.1 KHz/ 88.2 KHz sample rate.

SPDIF-Out Connector Pinout

Header	Pin	Signal	Type
	2	GND	PWR
	1	SPDIF_OUT	O-3.3

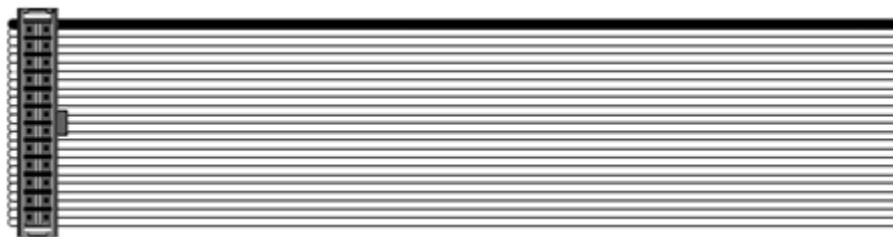
7.9. Front Panel Connector (FRONTPNL) (J23)

Front panel connector Pinout

Note	Pull U/D	Ioh/Iol	Type	Signal	PIN		Signal	Type	Ioh/Iol	Pull U/D	Note
			PWR	USB4_5 V	1	2	USB5_5 V	PWR			
				USB4-	3	4	USB5-				
				USB4+	5	6	USB5+				
			PWR	GND	7	8	GND	PWR			
			NC	NC	9	10	LINE2-L				
			PWR	+5 V	11	12	+5 V	PWR			
		25/25 mA	O	SATA_LED#	13	14	SUS_LED	O	7 mA		
			PWR	GND	15	16	PWRBTN_I#	I		1.1 K Ω	
	4.7 K Ω		I	RSTIN#	17	18	GND	PWR			
			PWR	SB3V3	19	20	LINE2-R				
			PWR	A_GND	21	22	A_GND	PWR			
			AI	MIC2-L	23	24	MIC2-R	AI			

Signal	Description
USB4_5 V and USB5_5 V	5 V supply for external devices. SB5V is supplied during power down to allow wakeup on USB device activity. Protected by active power switch 1A fuse for each USB ports.
USB4+/USB4-	Universal Serial Bus Port 8 Differentials: Bus Data/Address/Command Bus.
USB5+/USB5-	Universal Serial Bus Port 11 Differentials: Bus Data/Address/Command Bus.
+5 V	Maximum load per pin is 1 A (using IDC connector) or 2 A (using crimp terminals).
SATA_LED#	SATA Activity LED (active low signal). 3V3 output when passive.
SUS_LED	Suspend Mode LED (active high signal). Output 3.3 V via 470 Ω .
PWRBTN_IN#	Power Button In. Toggle this signal low to start the ATX / BTX PSU and boot the board.
RSTIN#	Reset Input. When pulled low for a minimum 16ms, the reset process will be initiated. The reset process continues even though the Reset Input is kept low.
LINE2	Line2 is second stereo Line signals
MIC2	MIC2 is second stereo microphone input.
SB3V3	Standby 3.3 V voltage
AGND	Analogue Ground for Audio

Available cable kit:



PN 821042 Cable Front Panel Open-End, 300 mm

7.10. Serial Ports COM1 and COM2 (J21, J25)

The mITX-BDW-U provides two RS232 serial ports.COM1 (J21) and COM2 (J25).

Serial Port COM1 and COM2 connector Pinout

Note	Ioh/Iol	Type	Signal	PIN		Signal	Type	Ioh/Iol	Note
		I	DCD	1	2	DSR	I		
		I	RxD	3	4	RTS	O		
		O	TxD	5	6	CTS	I		
		O	DTR	7	8	RI	I		
		PWR	GND	9	10	5V	PWR		1



- 1) The COM1, COM2 supply voltage (5 V) is fused with common 1.5 A resettable fuse.

Signal	Description
TxD	Transmitted Data, sends data to the communications link. The signal is set to the marking state (-12 V) on hardware reset when the transmitter is empty or when loop mode operation is initiated.
RxD	Received Data, receives data from the communications link.
DTR	Data Terminal Ready, indicates to the modem etc. that the on-board UART is ready to establish a communication link.
DSR	Data Set Ready, indicates that the modem etc. is ready to establish a 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.
DCD	Data Carrier Detect, indicates that the modem or data set has detected the data carrier.
RI	Ring Indicator, indicates that the modem has received a ringing signal from the telephone line.

DB9 adapter cables (PN 821016 200 mm long and 821017 100 mm long) are available for implementing standard COM ports on the chassis.

Available cable kit (DB9 adapter cables):



PN 821017 - 100 mm or PN 821016 - 200 mm

7.11. LVDS Flat Panel Connector (J33)

The LVDS connector (J33) is based on a 40-pin connector type Don Connex C44-40BSB1-G.

LVDS Connector Pinout

Note	Type	Signal	PIN		Signal	Type	Note
Max. 0.5 A	PWR	+12 V	1	2	+12 V	PWR	Max. 0.5 A
Max. 0.5 A	PWR	+12 V	3	4	+12 V	PWR	Max. 0.5 A
Max. 0.5 A	PWR	+12 V	5	6	GND	PWR	Max. 0.5 A
Max. 0.5 A	PWR	+5 V	7	8	GND	PWR	Max. 0.5 A
Max. 0.5 A	PWR	LCDVCC	9	10	LCDVCC	PWR	Max. 0.5 A
2K2Ω, 3.3 V	OT	DDC CLK	11	12	DDC DATA	OT	2.2 KΩ, 3.3 V
3.3 V level	OT	BKLTCTL	13	14	VDD ENABLE	OT	3.3 V level
3.3 V level	OT	BKLTEN#	15	16	GND	PWR	Max. 0.5 A
	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. 0.5 A	PWR	GND	27	28	GND	PWR	Max. 0.5 A
	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. 0.5 A	PWR	GND	39	40	GND	PWR	Max. 0.5 A



The LVDS connector supports single and dual channel, 18/24 bit 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 0-3.3 V
BKLTEN#	Backlight Enable signal (active low) (2)
VDD ENABLE	Output Display Enable.
LCDVCC	5 V or 3.3 V VCC supply to the display, (1 A Maximum) Selected in BIOS setup menu (Advanced > Display Configuration> Panel VCC) Power sequencing depends on LVDS panel selection, (Shared with eDP connector)
DDC CLK	DDC Channel Clock



Windows API will be available to operate the BKLTCTL signal. Some Inverters have a limited voltage range 0- 2.5 V for this signal: If the voltage is > 2.5 V the Inverter might latch up. Some Inverters generate noise on the BKLTCTL signal, causing the LVDS transmission to fail (corrupted picture on the display). By adding a 1 Kohm 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, check the following BIOS Chipset setting: Backlight Signal Inversion = Enabled.

7.12. Feature Connector (J28)

Feature Connector Pinout

Note	Pull U/D	Ioh/Iol	Type	Signal	PIN		Signal	Type	Ioh/Iol	Pull U/D	Note
1	1M/		I	CASE_OPEN#	1	2	SMBC		/4 mA	10K/	
		25 mA /25 mA	O	S5#	3	4	SMBD		/4 mA	10K/	
		25 mA /25 mA	O	PWR_OK	5	6	EXT_BAT	PWR			
			I	TOUCH_RST#	7	8	TOUCH_INTR#	O			
			PWR	SB3V3	9	10	SB5V	PWR			
			IOT	GPIO0	11	12	GPIO1	IOT			
			IOT	GPIO2	13	14	GPIO3	IOT			
			IOT	GPIO4	15	16	GPIO5	IOT			
			IOT	GPIO6	17	18	GPIO7	IOT			
			PWR	GND	19	20	GND	PWR			
			I	GPIO8	21	22	GPIO9	I			
			I	GPIO10	23	24	GPIO11	I			
			I	GPIO12	25	26	GPIO13	IOT			
			IOT	GPIO14	27	28	GPIO15	IOT			
			IOT	GPIO16	29	30	GPIO17	IOT			
			PWR	GND	31	32	GND	PWR			
		8/8 mA	O	EGCLK	33	34	EGCS#	O	8/8 mA		
		8/8 mA		EGAD	35	36	TMA0	O			
			PWR	+12 V	37	38	GND	PWR			
2	1K/		I	TOUCH_I2C_C LK	39	40	TOUCH_I2C_D AT	I/O		1K/	2
			PWR	GND	41	42	GND	PWR			
			PWR	GND	43	44	S3#	O	25 mA /25mA		



- 1) Pull-up to on-board Battery.
- 2) Pull-up to SB3V3.

Signal	Description
CASE_OPEN#	CASE OPEN, used to detect if the system case has been opened. This signal's status is readable, so it may be used like a GPI when the Intruder switch is not required.
SMBC	SMBus Clock signal
SMBD	SMBus Data signal
S3#	S3 sleep mode, active low output, optionally used to deactivate external system.
S5#	S5 sleep mode, active low output, optionally used to deactivate external system.
PWR_OK	Power OK, signal is high if no power failures are detected. (This is not the same as the P_OK signal generated by ATX PSU).
EXT_BAT	(External Battery) option for connecting + terminal of an external primary cell battery (2.5 V - 3.47 V) (– terminal connected to GND). The external battery is protected against charging and can be used with/without the on-board battery installed.
SB3V3	Max. load is 0.75 A (1.5 A < 1 sec.)
SB5 V	StandBy +5 V supply.
TOUCH_I2C_DAT	Serial I/O – I2 C interface data Line
TOUCH_I2C_CLK	Serial I/O – I2 C interface clock Line

Signal	Description
TOUCH_RST#	Serial I/O –interface reset
TOUCH_INTR#	Serial I/O –interrupt line
GPIO0..17	General Purpose Inputs / Output. These Signals may be controlled or monitored through the use of the KT-API-V2 (Application Programming Interface).
EGCLK	Extend GPIO Clock signal
EGAD	Extend GPIO Address Data signal
EGCS#	Extend GPIO Chip Select signal, active low
TMAO	Timer Output
+12 V	Max. load is 0.75 A (1.5 A < 1 sec.)

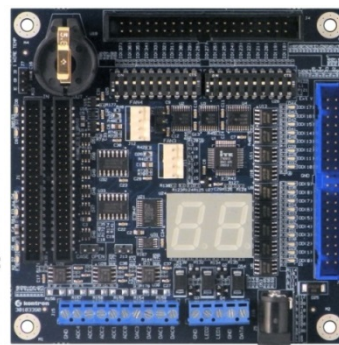
The GPIO's are controlled via the ITE, IT8528F Embedded Controller. Each GPIO has 100 pF to ground, clamping diode to 3.3 V and has multiplexed functionality. Some pins can be TACH (Tachometer output), HDIO (SPI memory Slave High Density Input/output), DAC (Digital to Analogue Converter output), PWM (Pulse Width Modulated signal output), ADC (Analogue to Digital Converter input), TMRI (Timer Counter Input), WUI (Wake Up Input), RI (Ring Indicator Input) or other special functions.

Signal	IT8528F pin name	Attribute	Description
GPIO0	TACH2//HDIO2/GPJ0	IK /IOK4/-	Tachometer input (Color sensor) / HSPI Input/Output signal
GPIO1	HDIO3 /GPJ1	IOK4/-	HSPI Input/Output signal
GPIO2	DAC2/TACH0B/GPJ2	AO/IK/-	Digital to analogue converter outputs
GPIO3	DAC3/TACH1B/GPJ3	AO/IK/-	/Tachometer Input
GPIO4	PWM2/GPA2		Output open drain control
GPIO5	PWM3/GPA3		
GPIO6	PWM4/GPA4		
GPIO7	PWM5/GPA5		
GPIO8	ADC0/GPI0		Analogue to digital Converter inputs
GPIO9	ADC1/GPI1		
GPIO10	ADC2/GPI2		
GPIO11	ADC3/GPI3		
GPIO12	ADC4/GPI4		Ring wake up event
GPIO13	RI1#/GPD0		
GPIO14	RI2#/GPD1		
GPIO15	TMRI0/GPC4		Timer counter input signals
GPIO16	TMRI1/GPC6		
GPIO17	L80HLAT/BAO/GPE0	O16/O16/-	LPC I70 Port 80, high-nibble LAD latch/ Buffer B output

Available cable kit and Break-Out-Board:



PN 1052-5885 Cable, Feature 44pol 1 to1, 300 mm



PN 820978 Feature BOB (Break-Out-Board)

7.13. "Load Default BIOS Settings" Jumper (JP1)

The "Load Default BIOS Settings" of jumper (JP1) can be used to recover from incorrect BIOS settings. As an example, an incorrect BIOS setting that causes the attached display not to turn on can be erased by this Jumper.

The Jumper has 6 positions: Pin 5-6 are used for the Load Default BIOS function.

7.14. Always On Jumper Setting (JP1)

The "Always On Setting" of jumper (JP1) can be used to automatically power up, when the external power supply is switched ON.

The Jumper has 6 positions: Pin 1-2 are used for the "Always On" function.

When the jumper is in not mounted, then the Always On feature is disabled and it might be necessary to activate the power on button (PWRBTN_IN#) at the front panel connector (FRONTPNL) in order to switch on the board.

7.15. SPI Connector (J30)

The SPI Connector (J30) is normally not used. If however a SPI BIOS is connected via the SPI Connector, then the board attempts to boot from it.

SPI Connector Pinout

Note	Pull U/D	Ioh/Iol	Type	Signal	PIN		Signal	Type	Ioh/Iol	Pull U/D	Note
				CLK	1	2	SB3V3	PWR			
			I	CS0#	3	4	ADDIN	IO		/10K	
	10K/			NC	5	6	NC				
	10K/		IO	MOSI	7	8	ISOLATE#	IO		100K	
			IO	MISO	9	10	GND	PWR			
	1K		IO	SPI_IO2_#WP	11	12	SPI_IO3_#HOLD	IO		1K	

Signal	Description
CLK	Serial Clock
SB3V3	3.3 V Standby Voltage power line. Normally output power, but when Motherboard is turned off then the on-board SPI Flash can be 3.3 V power sourced via this pin.
CS0#	CS0# Chip Select 0, active low.
ADDIN	ADDIN input signal must be NC.
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 5 VSB.
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.

7.16. LPC Connector (J31)

The LPC connector (J31) is general unsupported. Only under special circumstances may the LPC interface be of interest.

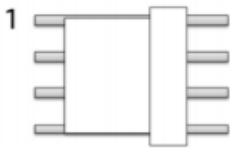
LPC Connector Pinout

Note	Pull U/D	loh/Iol	Type	Signal	PIN		Signal	Type	loh/Iol	Pull U/D	Note
			PWR	LPC CLK	1	2	GND				
			PWR	LPC FRAME#	3	4	KEY				
				LPC RST#	5	6	+5 V				
				LPC AD3	7	8	LPC AD2				
				+3V3	9	10	LPC AD1				
				LPC AD0	11	12	GND				
				SMB_CLK	13	14	SMB_DATA				
				SB3V3	15	16	LPC SERIRQ				
				GND	17	18	CLKRUN#				
				SUS_STAT#	19	20	TPM_DRQ#0				

7.17. SATA Power Connectors (J16,J20)

The SATA power connectors are available through the connector J16 and J20 (4-pins).

SATA Power Connector Pinout

SATA Power Connector	Pin	Signal	Description	Type
	1	+5V	Power +5 V	PWR
	2	GND	Ground	PWR
	3	GND	Ground	PWR
	4	+12V	Power +12 V	PWR

8/ Slot Connectors (miniPCle)

MiniPCle with USB2.0 and SIM-card support (J27).

Slot J27 supports mPCle, USB2.0 and SIM-card socket (J35).

The SIM-card socket makes it possible to use a 2G/3G-wireless modem in this mPCle slot.

The USB supports WAKE function.

MiniPCI Slot Connector Pinout

Note	Type	Signal	PIN		Signal	Type	Note
		WAKE#	1	2	+3.3 V	PWR	
	NC	NC	3	4	GND	PWR	
	NC	NC	5	6	+1.5 V	PWR	
		CLKREQ#	7	8	UIM_PWR	PWR	
	PWR	GND	9	10	UIM_DATA	NC	
		PCIE_mini CLK#	11	12	UIM_CLK	NC	
		PCIE_mini CLK	13	14	UIM_RESET	NC	
	PWR	GND	15	16	UIM_VPP	NC	
	NC	UIM_IC_DM	17	18	GND	PWR	
	NC	UIM_IC_DP	19	20	W_Disable#		
	PWR	GND	21	22	RST#		1
		SATA5_RXP	23	24	+3.3 V	PWR	
		SATA5_RXN	25	26	GND	PWR	
	PWR	GND	27	28	+1.5 V	PWR	
	PWR	GND	29	30	SMB_CLK		
		SATA5_TXN	31	32	SMB_DATA		
		SATA5_TXP	33	34	GND	PWR	
	PWR	GND	35	36	USB12N	IO	
	PWR	GND	37	38	USB12P	IO	
	PWR	+3V3	39	40	GND	PWR	
	PWR	+3V3	41	42	NC	NC	
2		SATA_DET5#	43	44	NC	NC	
	NC	NC	45	46	NC	NC	
	NC	NC	47	48	+1.5 V	PWR	
	NC	NC	49	50	GND	PWR	
	NC	NC	51	52	+3.3 V	PWR	



-
- 1) 10 K Ω pull-up to 3.3 V
 - 2) 100 K Ω pull-up to 3.3 V
-

9/ On-board and Mating Connector Types

The mating connectors / cables are connectors or cable kits that fit on the on-board connector. The Kontron cable kits marked with "*" are included in the "mITX-BDW-U Cable & Driver Kit" Part Number: 826603.

Connector	On-board Connectors		Mating Connectors / Cables	
	Manufacturer	Type no.	Manufacturer	Type no.
FANCPU (J34)	Foxconn	HF2704E-M1	AMP	1375820-4 (4-pole)
FANSYS (J29)	Foxconn	HF2704F-M2	AMP	1375820-3 (3-pole)
KBDMSE (J15)	Molex	22-23-2061	Molex	22-01-2065
	Tyco AMP	3-647050-6	Kontron	1046-3381 (kit) *
	Jaws	254K-WS-06T-S	Kontron	1053-2384 (kit)
LPC (J31)	Wieson	G2100C888-034H		
	Foxconn	HC11101-P0		
SATA,0,1 (J12,J18)	Lotes	ABA-SAT-010-K08	Molex	67489-8005
			Kontron	821035 (kit)
ATX+12V-4p (J10)	Lotes	ABA-POW-003-K02	Molex	39-01-2045
Speaker (J37)	Molex	53047-0410		
LVDS (J33)	Don Connex	C44-40BSB1-G	Don Connex	A32-40-C-G-B-1
	Samtec	SHF-120-01-FDSMKTR	Kontron	910000005
	Hon Kon	HB12-220-VFS-20R	Kontron	821515 (kit) *
	Wieson	G2124-03200101-00	Kontron	821155 (kit)
COM1,2 (J21,J25)	Pinrex	510-90-10GB00	Molex	90635-1103
	Cen Link	ZP91-014B1-10Y1	Kontron	821016 (kit)
	Foxconn	HL2205F	Kontron	821017 (kit) *
USB4/5 (*)	(FRONTPNL)	-	Kontron	821401 (kit)
SPI (J30)	Pinrex	210-92-06GB01		
SPDIF-Out (J14)	Molex	53047-0210		
FRONTPNL (J23)	Pinrex	510-80-24GB05	Molex	90635-1243
	Foxconn	HL2112V-P9	Kontron	821042 (kit) *
FEATURE (J28)	Pinrex	52A-90-44GB00	Don Connex	A05c-44-B-G-A-1-G
	Molex	87831-4420	Kontron	1052-5885 (kit) *
SATA Power Connector (J16,J20)	Molex	22-12-2044	Molex	0022013047

* USB4/USB5 are located in FRONTPNL connector.



More than one connector can be listed for each type of on-board connectors. Therefore, several types with the same fit, form and function are approved and could be used as an alternative. Please note that standard connectors like DP, miniPCle, Audio Jack, Ethernet and USB are not included in the list.

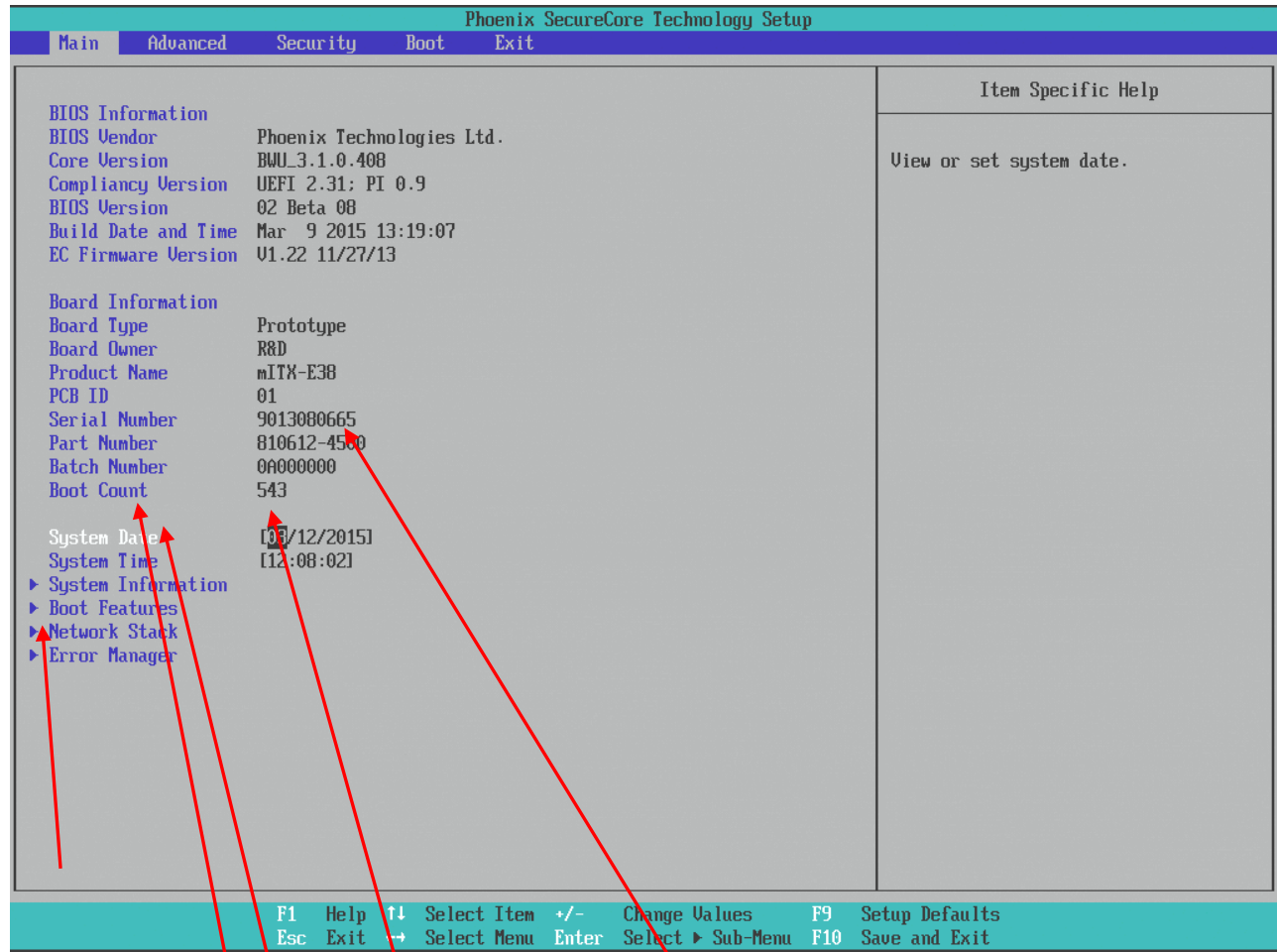
10/ BIOS

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

The BIOS settings will be loaded automatically when loading "Load Setup Defaults" see "Exit" menu. In this User Guide, the default settings are indicated in **bold**. Please note that "Load Optimized Defaults" might have a different set of default values.

The F9 and F10 keys only work if pressed from a keyboard (F9 and F10 do not work from a console terminal, use "Exit" menu instead).

10.1. Main



Sub Menu available.

White text for actual selected function that can be modified.

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

Black background for actual selection. Black text actual settings.

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

The following table describes the changeable settings:

System Information

Phoenix SecureCore Technology Setup			
Main			
System Information			
BIOS Version	T4006_02.b08		
Build Time	03/09/2015		
Processor Type	Intel(R) Core(TM) i3-5010U CPU @ 2.10GHz		
Processor Speed	2.100 GHz		
System Memory Speed	1600 MHz		
L2 Cache RAM	256 KB		
Total Memory	1024 MB		
[1]	0 MB		
[2]	1024 MB (DDR3- 1600) @ ChannelB-DIMM0		
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:		Selects Power-on state for NumLock.
Timeout	[2]	
CSM Support	[Yes]	
Quick Boot	[Disabled]	
Dark Boot	[Disabled]	
Diagnostic Splash Screen	[Enabled]	
Diagnostic Summary Screen	[Disabled]	
BIOS Level USB	[Enabled]	
USB Legacy	[Enabled]	
Console Redirection	[Disabled]	
Allow Hotkey in S4 resume	[Enabled]	
UEFI Boot	[Disabled]	
Legacy Boot	[Enabled]	
Boot in Legacy Video Mode	[Disabled]	
Load OPRM	[On Demand]	
Boot Priority	[UEFI First]	
F1 Help ↑↓ Select Item +/- Change Values F9 Setup Defaults Esc Exit ↔ Select Menu Enter Select ► Sub-Menu F10 Save and Exit		

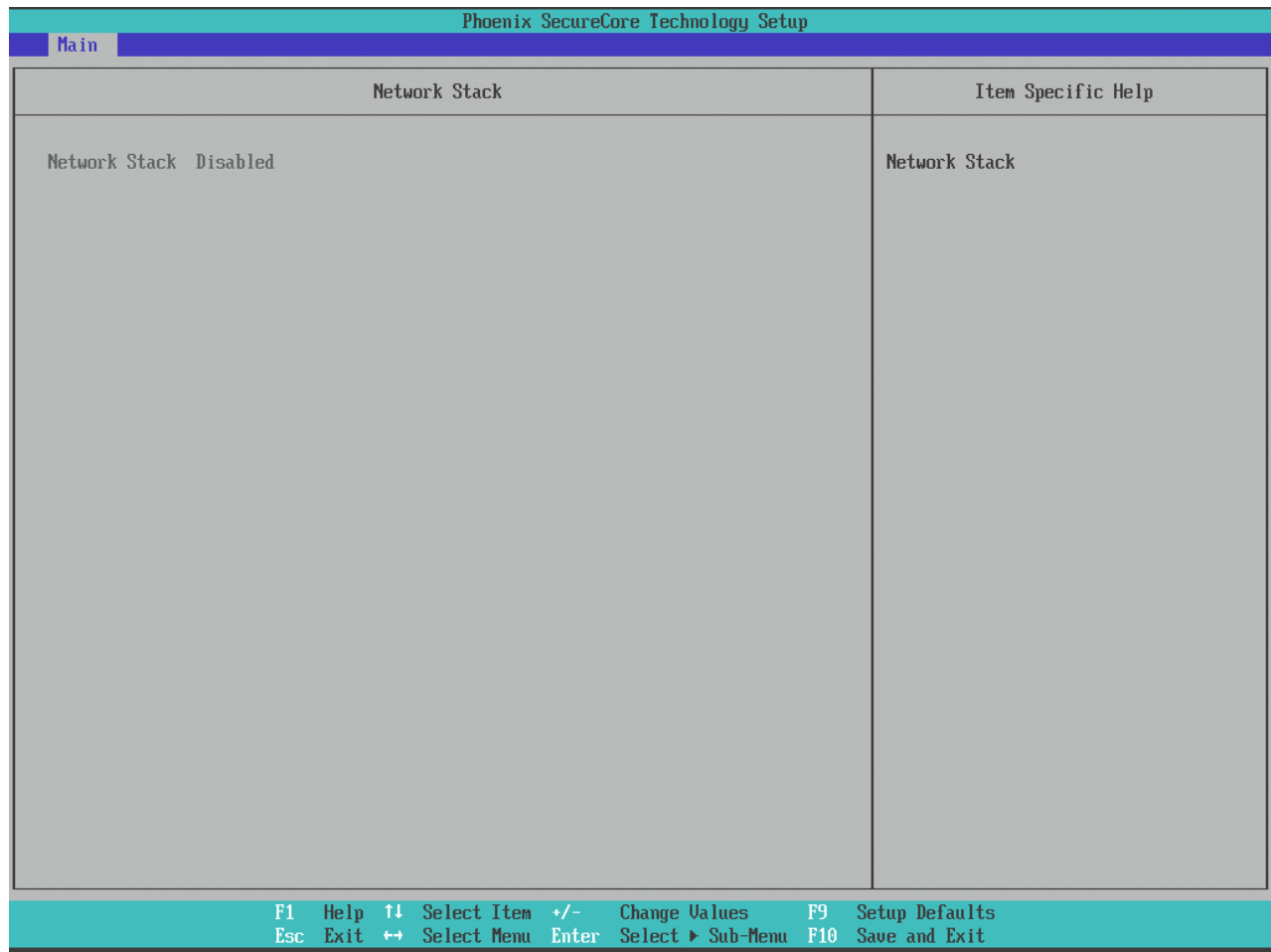
Function	Selection	Description
NumLock:	On Off	Select Power-on state for NumLock.
Timeout	2 Note 1	Number of seconds that P.O.S.T will wait for the user input before booting.
CSM Support	No Yes	Compatibility Support Module that provides backward compatibility services for legacy BIOS services, like int10/int13, dependent OS.
Quick Boot	Disabled Enabled	Enable/Disable quick boot
Dark Boot	Disabled Enabled	Enable/Disable dark boot
Diagnostic Splash Screen	Disabled 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	Disabled Enabled	Display the diagnostic summary screen during boot.
BIOS Level USB	Disabled Enabled	Enable/Disable all BIOS support for USB in order to reduce boot time. Note that this will prevent using a USB keyboard in setup or a USB biometric scanner such as a finger print reader to control access to setup, but does not prevent the operating system for supporting such hardware.
USB Legacy	Disabled	Enable/Disable USB BIOS SMM support for mouse, keyboard, mass

Function	Selection	Description
	Enabled	storage, etc. in legacy operating systems such as DOS.
Console Redirection	Disabled Enabled	Enable/Disable Universal Console Redirection.
Allow Hotkey in S4 resume	Disabled Enabled	Enable hotkey detection when system resuming from Hibernate state.
UEFI Boot	Disabled Enabled	Enable the UEFI boot.
Legacy Boot	Disabled Enabled	Enable the Legacy boot.
Boot in Legacy Video Mode	Disabled 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	All On Demand	Load all OPROMs or on demand according to the boot device.
Boot Priority	UEFI First Legacy First	Select priority of boot option between UEFI and Legacy.



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

Network Stack



Function	Selection	Description
Network Stack (Note 1)	Disabled Enabled	Enable/Disable UEFI Network Stack
IPv4 (Note 2)	Disabled Enabled	Enable/Disable IPv4
IPv6 (Note 2)	Disabled Enabled	Enable/Disable IPv6
UEFI PXE Boot Priority (Note 2)	IPv6 First IPv4 First	Set the priority of UEFI PXE Boot



To use legacy PXE boot support, disable this option.



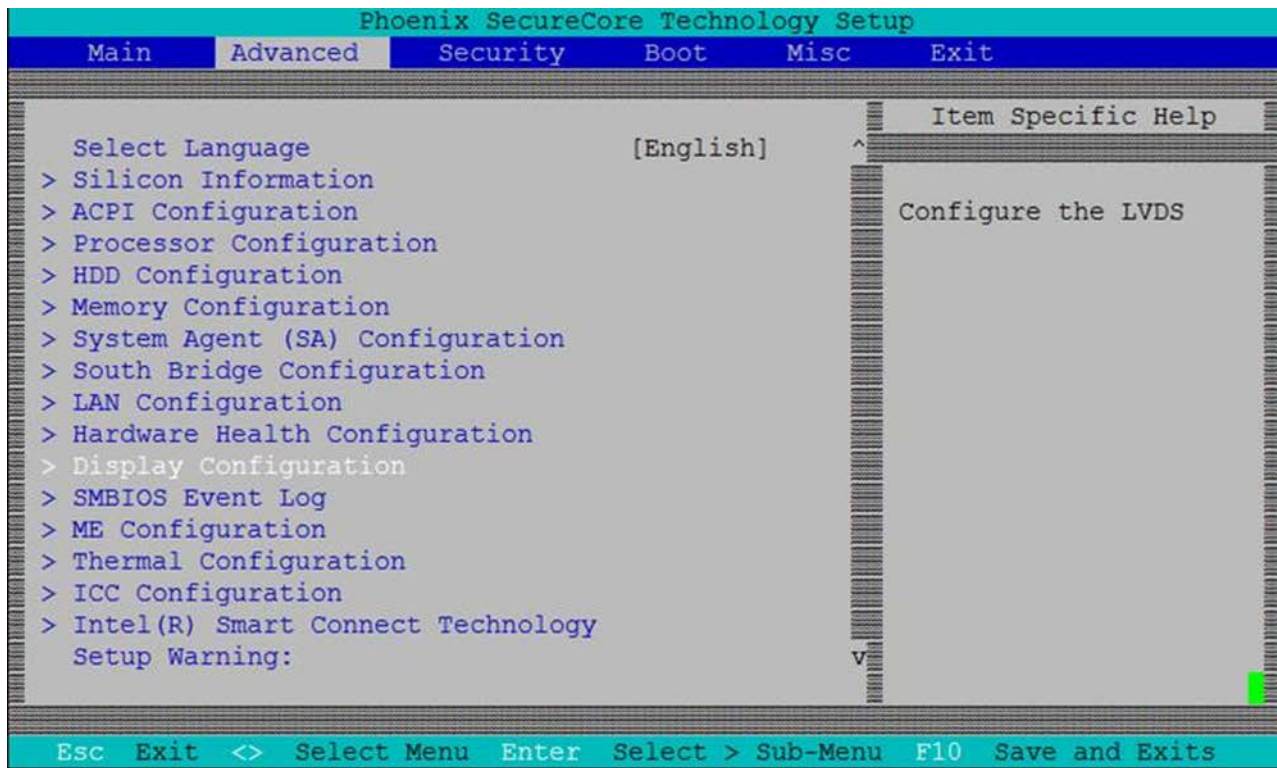
Only visible if Network Stack is enabled.

Error Manager

Phoenix SecureCore Technology Setup	
Main	
Error Manager	Item Specific Help
View Error Manager Log [Enter] Clear Error Manager Log [Enter]	Display Error Manager Log information.
F1 Help ↑↓ Select Item +/- Change Values F9 Setup Defaults Esc Exit ↔ Select Menu Enter Select ► Sub-Menu F10 Save and Exit	

Function	Selection	Description
View Error Manager Log	Enter	Display Error Manager Log information
Clear Error Manager Log	Enter	Clear Error Manager Log

10.2. Advanced



The Advanced (top) menu contains only submenu selections that are described in more detail on the following pages. To selection a submenu activate the ↑↓ keys until the requested submenu turns white, then activate the <Enter>.

Function	Selection	Description
Select Language	English Francais Etc.	Select Language

Silicon Information

Phoenix SecureCore Technology Setup	
Advanced	
Silicon Information	
CPU Information	
Family	4th Generation Intel(R) Core Processors
Model	Broadwell ULT Mobile
CpuId	306D4
Stepping	F0 Stepping
mCode PatchId	11
Core Frequency	2.10GHz
L1 Cache	32 KB 8-Way
L2 Cache	256 KB 8-Way
L3 Cache	3072 KB 12-Way
GT Info	GT2 (DeviceId = 0x1616)
PCH Information	
Name	WildcatPoint-LP
Stepping	B2 Stepping
SPI Read Frequency	50 MHz
F1 Help ↑↓ Select Item +/- Change Values F9 Setup Defaults Esc Exit ↔ Select Menu Enter Select ► Sub-Menu F10 Save and Exit	

ACPI Configuration

Phoenix SecureCore Technology Setup		
Advanced		
ACPI Configuration		Item Specific Help
FACP - RTC S4 Flag Value	[Enabled]	Valid Only for ACPI. Controls the value for the RTC S4 flag in the FACP table.
APIC - IO APIC Mode	[Enabled]	
ALS Support	[Legacy]	
EMA Support	[Disabled]	
MEF Support	[Disabled]	
Enabled PTID	[Disabled]	
FACP - PM Timer Flag Value	[Disabled]	
FACP - Low Power S0 Idle Capable Flag Value	[Disabled]	
CPPC	[Enabled]	
CPPC Platform Sci enable	[Enabled]	
Native PCI Express	[Enabled]	
Runtime D3 Support	[Disabled]	

F1	Help	↑↓	Select Item	+/-	Change Values	F9	Setup Defaults
Esc	Exit	↔	Select Menu	Enter	Select ▶ Sub-Menu	F10	Save and Exit

Function	Selection	Description
FACP – KTC S4 Flag Value	Disabled Enabled	Valid Only for ACPI. Controls the value for the RTC S4 flag in the FACP table.
APIC – IO APIC Mode	Disabled Enabled	This is valid only for WIN2000, Windows XP. A fresh install of OS must occur when APIC mode is enabled. The APIC table will be pointed to by the RSDT, the Local APIC will be initialized, and the proper enable bits are set in the PCH.
ALS Support	Legacy ACPI	Valid only for ACPI. Legacy = ALS support through the IGD INT10 function. ACPI = ALS support through an ACPI ALS driver.
EMA Support	Disabled Enabled	Valid only for ACPI. Controls the EMA device in an ACPI environment.
MEF Support	Disabled Enabled	Valid only for ACPI. Controls the Mobile East Fork feature support in an ACPI environment.
Enabled PTID	Disabled Enabled	Enable/Disable Power and Temperature Instrumentation Details.
FACP – PM Timer Flag Value	Disabled Enabled	Valid only for ACPI. Controls the PM Timer Flag Value in the FACP table.
FACP – Low Power S0 Idle Capable Flag Value	Disabled Enabled	Valid only for ACPI. Controls the Low Power S0 Idle Capable Flag (Bit 21) in the FACP table.
CPPC	Disabled Enabled	ACPI 5.0 Collaborative Processor Performance Control. When CPPC is enabled, the newer ACPI 5.0 method for processor performance

Function	Selection	Description
		control will be used. When disabled, the older methods (P-State and T-State) will be used.
CPPC Platform Sci enable	Disabled Enabled	When enabled, the platform will generate a GPE/SCI upon CPPC command completion. If disabled, the OS must poll for command completion.
Native PCI Express	Disabled Enabled	Native PCI Express Enable/Disable.
Runtime D3 Support	Disabled Enabled	Enable/Disable ACPI runtime D3 support.



To support RTD3, there must be hardware related design to control devices powered by software. A custom BIOS configuration may be needed

Processor Configuration

Phoenix SecureCore Technology Setup		
Advanced		
Processor Configuration		Item Specific Help
Active Processor Cores [All] Intel(R) HT Technology [Enabled] CPU Flex Ratio Override [Disabled] Enabled XD [Enabled] Limit Cpuid Maximum value [Disabled] Enable for BIST [Disabled] Machine Check [Enabled] Intel(R) Virtualization Technology [Enabled] Intel(R) Streamer Prefetcher [Enabled] Intel(R) Spatial Prefetcher [Enabled] MP Mwait/Cx State Support [Enabled] BIOS Guard [Disabled] ▶ Processor Power Management		Number of cores to enable in each processor package.
F1 Help ↑↓ Select Item +/- Change Values F9 Setup Defaults Esc Exit ↔ Select Menu Enter Select ▶ Sub-Menu F10 Save and Exit		

Function	Selection	Description
Active Processor Cores	All 1 2 3	Number of cores to enable in each processor package. <i>Note: number of cores vary according to the CPU SKU present.</i>

Function	Selection	Description
Intel® HT Technology	Disabled Enabled	When Disabled only one thread per enabled core is enabled.
CPU Flex Ratio Override	Disabled Enabled	Enable/Disable CPU Flex Ratio Programming
Enable XD	Disabled Enabled	Enabled Execute Disabled functionality. Also known as Data Execution Prevention (DEP).
Limit CpuId Maximum value	Disabled Enabled	When set to enable, this causes the cupid to return maximum value of 3.
Enable for BIST	Disabled Enabled	Enable/Disable BIST (Built-In Self Test) on reset.
Machine Check	Disabled Enabled	Enable processor Machine Check feature (disable only for test).
Intel® Virtualization Technology	Disabled Enabled	When enabled. A VMM can utilize the additional hardware capabilities.
Intel® Streamer Prefetcher	Disabled Enabled	Enable or disable MLC Streamer Prefetcher.
Intel® Spatial Prefetcher	Disabled Enabled	Enable or disable MLC Spatial Prefetcher
MP MWAIT/Cx State Support	Disabled Enabled	
BIOS Guard	Disabled Enabled	Enable/Disable BIOS Guard feature.

Process Configuration > Processor Power Management

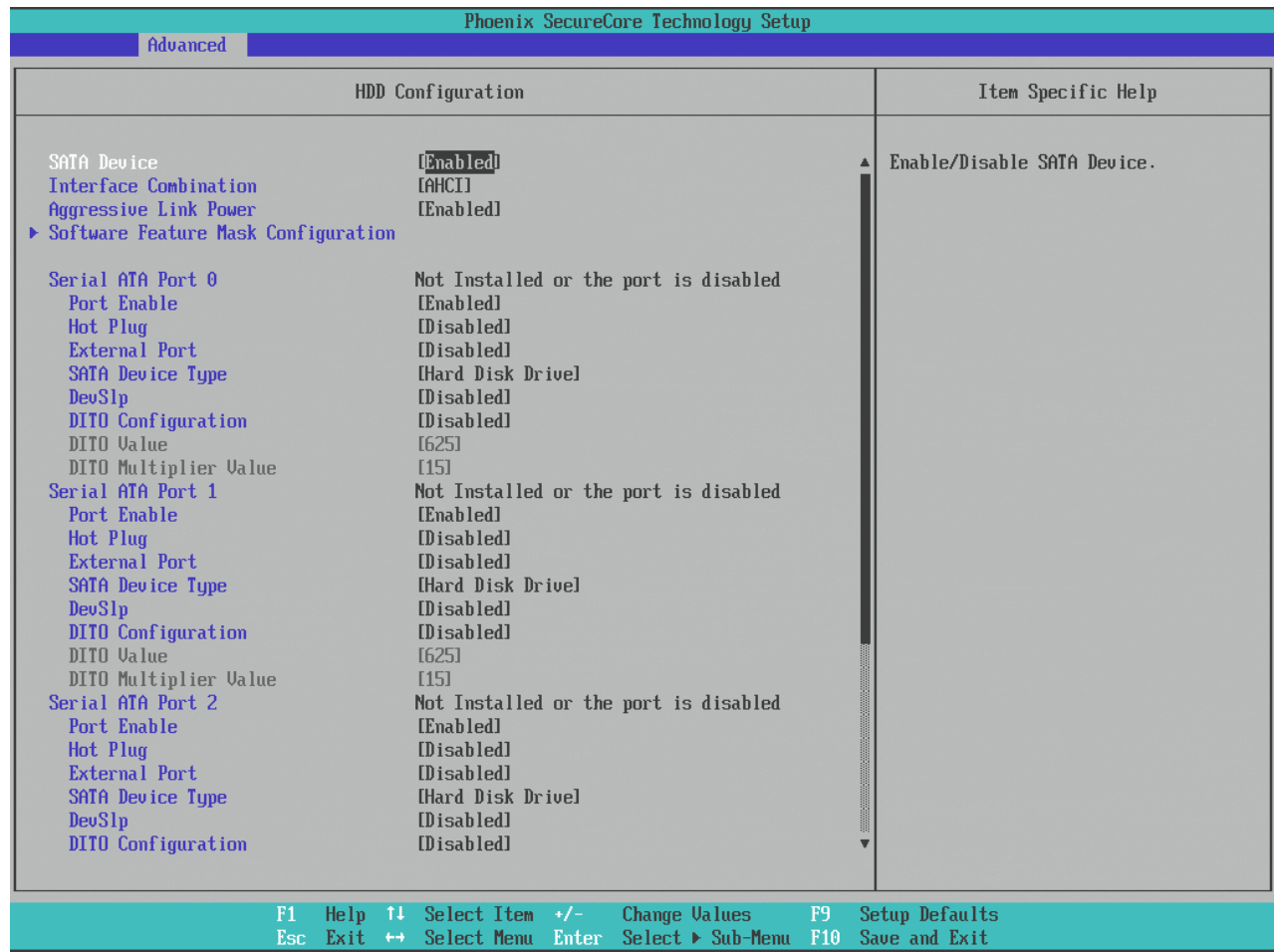
Phoenix SecureCore Technology Setup		
Advanced		
Processor Power Management		Item Specific Help
Intel(R) SpeedStep(tm)	[Enabled]	▲ Enable processor performance states (P-States) . ▼
Boot Performance Mode	[Max Performance]	
Turbo Mode	[Enabled]	
Turbo Mode Power Limit Lock	[Disabled]	
Long Power Limit	[0]	
Long Power Limit Time	[28]	
Short Power Limit	[0]	
Short Duration Turbo Mode	[Enabled]	
Power Limit 3	[0]	
Power Limit 3 Time	[0]	
Power Limit 3 Duty Cycle	[0]	
Energy Efficient Enable	[Enabled]	
Configure TDP Boot Mode	[Nominal]	
Lock TDP setting	[Disabled]	
CTDP BIOS control	[Disabled]	
TDP Custom Setting	[Disabled]	
C-States	[Enabled]	
Extend C-States	[Enabled]	
C3-State	[Enabled]	
C6-State	[Enabled]	
C6 Latency	[Short]	
C7-State	[C7s]	
C7 Latency	[Long]	
C8-State	[Enabled]	
C9-State	[Enabled]	
C10-State	[Enabled]	
C-State Auto Demotion	[C1 and C3]	
C-State UnDemotion	[C1 and C3]	
Package C State Demotion	[Disabled]	
Package C State UnDemotion	[Disabled]	
F1 Help F4 Select Item +/- Change Values F9 Setup Defaults Esc Exit F5 Select Menu Enter Select ► Sub-Menu F10 Save and Exit		

Phoenix SecureCore Technology Setup		
Advanced		
Processor Power Management		Item Specific Help
Short Power Limit	[0]	▲ Turbo Mode Short Duration Power Limit (aka Power Limit 2) in Watts. The value may vary from 0 to Fused Value. If the value is 0, the fused value will be programmed. A value greater than fused TDP value will not be programmed. ▼
Short Duration Turbo Mode	[Enabled]	
Power Limit 3	[0]	
Power Limit 3 Time	[0]	
Power Limit 3 Duty Cycle	[0]	
Energy Efficient Enable	[Enabled]	
Configure TDP Boot Mode	[Nominal]	
Lock TDP setting	[Disabled]	
CTDP BIOS control	[Disabled]	
TDP Custom Setting	[Disabled]	
C-States	[Enabled]	
Extend C-States	[Enabled]	
C3-State	[Enabled]	
C6-State	[Enabled]	
C6 Latency	[Short]	
C7-State	[C7s]	
C7 Latency	[Long]	
C8-State	[Enabled]	
C9-State	[Enabled]	
C10-State	[Enabled]	
C-State Auto Demotion	[C1 and C3]	
C-State UnDemotion	[C1 and C3]	
Package C State Demotion	[Disabled]	
Package C State UnDemotion	[Disabled]	
C State Pre-Wake	[Enabled]	
	[Range [255;0] = [31.875;0] in Watt.]	
	[Range [255;0] = [31.875;0] in Watt.]	
	[Range [255;0] = [31.875;0] in Watt.]	
	[Range [255;0] = [31.875;0] in Watt.]	
Lake Tiny	[Disabled]	
F1 Help F4 Select Item +/- Change Values F9 Setup Defaults Esc Exit F5 Select Menu Enter Select ► Sub-Menu F10 Save and Exit		

Function	Selection	Description
Intel® SpeedStep™	Disabled Enabled	Enable processor performance states (P-States).
Boot Performance Mode	Max Performance Max Battery Auto	Select the performance state that the BIOS sets before OS handoff.
Turbo Mode	Disabled Enabled	Enable processor Turbo Mode. EMTTM must also be enabled.
Turbo Mode Power Limit Lock	Disabled Enabled	Enable/Disable Locking of turbo settings. When Enabled, TURBO_POWER_LIMIT MSR will be locked and a reset will be required to unlock the register.
Long Power Limit	0, 1, 2, ... 200	Turbo Mode Long Duration Power Limit (aka Power Limit 1) in Watts. The value may vary from 0 to Fused Value. If the value is 0, the fused value will be programmed. A value greater than fused TDP value will not be programmed.
Long Power Limit Time	0, 1, ... 28, ... 55, 56	Long Duration Time Window (aka Power Limit 1 Time) value in seconds. The value may vary from 0 to 56. Indicates the time window over which TDP value should be maintained. If the value is 0, the fused value will be programmed.
Short Power Limit	0, 1, ... 32767	Turbo Mode Long Duration Power Limit (aka Power Limit 2) in Watts. The value may vary from 0 to Fused Value. If the value is 0, the fused value will be programmed. A value greater than fused TDP value will not be programmed.
Short Duration Turbo mode	Disabled Enabled	Enable Short Duration Turbo mode for processor.
Power Limit 3	0, 1, ... , 199, 200	Power Limit 3 in Watts. The value may vary from 0 to Fused Value. If the value is 0, the fused value will be programmed. A value greater than fused TDP value will not be programmed.
Power Limit 3 Time	0, 1, ... 55, 56	Power Limit 3 value in seconds. The value may vary from 3 to 64. Indicates the time window over which Power Limit 3 value should be maintained. If the value is 0, the fused value will be programmed.
Power Limit 3 Duty Cycle	0, 1, ... , 99, 100	Duty Cycle in percentage that the CPU is required to maintain the Power Limit 3 time.
Energy Efficient Enable	Disabled Enabled	Enable Energy Efficient for processor.
Configure TDP Boot Mode	Nominal Down Up Disabled	Configure TDP Mode as [Nominal] [Up] [Down] [Disabled] TDP selection. Disabled options will skip all cTDP boot configurations but dynamic cTDP can still work.
Lock TDP Setting	Disabled Enabled	Lock TDP in MSR_CONFIG_TDP_CONTROL
CTPD BIOS control	Disabled Enabled	Enables CTPD control via runtime ACPI BIOS methods. This "Bios only" feature does not require EC or driver support.
TDP Custom Setting	Disabled Enabled	Use TDP Custom Setting.
C-States	Disabled Enabled	Enable processor idle power saving states (C-States).
Extend C-States	Disabled Enabled	Enable C-State transitions to occur in combination with P-States.

Function	Selection	Description
C3-State	Disabled Enabled	Enable processor idle power saving C3 state.
C6-State	Disabled Enabled	Enable processor idle power saving C6 state.
C6 Latency	Short Long	Configure Short/Long Latency.
C7-State	Disabled C7 C7s	Enable processor idle power saving C7 state.
C7 Latency	Short Long	Configure Short/Long Latency.
C8-State	Disabled Enabled	Enable processor idle power saving C8 state.
C9-State	Disabled Enabled	Enable processor idle power saving C9 state.
C10-State	Disabled Enabled	Enable processor idle power saving C10 state.
C-State Auto Demotion	Disabled C1 C3 C1 and C3	Configure C-State Auto Demotion.
C-State UnDemotion	Disabled C1 C3 C1 and C3	Configure C-State Auto UnDemotion.
Package C State Demotion	Disabled Enabled	Enable/Disable Package C State Demotion.
Package C State UnDemotion	Disabled Enabled	Enable/Disable Package C State UnDemotion.
C State Pre-Wake	Disabled Enabled	Enable/Disable C State Pre-Wake.
Lake Tiny	Disabled Enabled	Lake Tiny Settings.

HDD Configuration



Function	Selection	Description
SATA Device	Disabled Enabled	Enable/Disable SATA Device.
Interface Combination	IDE AHCI RAID	Select the SATA controllers operation mode.
Serial ATA Port x (x = 0 – 3)	(Device if installed)	
Port Enable	Disabled Enabled	Enable/Disable this port.
Hot Plug	Disabled Enabled	Designates the port as Hot Pluggable. Note: Requires hardware support.
External Port	Disabled Enabled	Configure system to treat the port as internal or external.
SATA Device Type	Hard Disk Drive Solid State Drive	Select 'Solid State Drive' only if a Solid State Drive is connected to this SATA port.
DevSlp	Disabled Enabled	RTD3 Device Sleep Support
DITO Configuration	Disabled Enabled	Enable/Disable Device Sleep Idle Timeout Configuration.
DITO Value	625	
DITO Multiplier Value	15	

HDD Configuration > Software Feature Mask Configuration

Phoenix SecureCore Technology Setup	
Advanced	
HDD Configuration	Item Specific Help
HDD Unlock [Enabled] LED Locate [Enabled]	If enabled, indicates that the HDD password unlock in the OS is 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
HDD Unlock	Disabled Enabled	If enabled, indicates that the HDD password unlock in the OS is enabled.
LED Locate	Disabled Enabled	If enabled, indicates that the LED/SGPIO hardware is attached and ping to locate feature is enabled on the OS.

Memory Configuration

Phoenix SecureCore Technology Setup		
Advanced		
Memory Configuration		Item Specific Help
Memory Frequency Limiter	[Auto]	Maximum Memory Frequency Selections in Mhz.
Max TOLUD	[Dynamic]	
NMode Support	[Auto]	
Channel A DIMM Control	[Enabled]	
Channel B DIMM Control	[Enabled]	
Memory Remap	[Enabled]	
MRC FastBoot	[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
Memory Frequency Limiter	Auto 1067 1333 1600 1867 2133 2400 2667	Maximum Memory Frequency Selections in Mhz.
Max TOLUD	Dynamic 1 GByte 1.25 GByte 1.5 GByte 1.75GByte 2 GByte 2.25 GByte 2.5 GByte 2.75 GByte 3 GByte 3.25 GByte	Maximum Value of TOLUD. Dynamic assignment would adjust TOLUD automatically based on largest MMIO length of installed graphic controller.
NMode Support	Auto 1N Mode 2N Mode	Enable/Disable system to support N Mode.
Channel A DIMM Control	Disabled	Channel A DIMM control support.

Function	Selection	Description
	Enabled	Enable or disable DIMMs on Channel A.
Channel B DIMM Control	Disabled Enabled	Channel B DIMM control support. Enable or disable DIMMs on Channel B.
Memory Remap	Disabled Enabled	Enable/Disable Memory Remap above 4GB.
MRC FastBoot	Disabled Enabled	Enable/Disable MRC FastBoot. Generally, this option only takes effect when doing cold boots/resets.

System Agent (SA) Configuration

Phoenix SecureCore Technology Setup	
Advanced	
System Agent (SA) Configuration	Item Specific Help
▶ DMI Settings ▶ Intel(R) VT for Directed I/O (VT-d) ▶ Graphics Configuration ▶ PEG Port Configuration Cpu Audio Device (D0:D3:F0) [Enabled] CHAP Device (D0:D7:F0) [Disabled] Thermal Device (D0:D4:F0) [Disabled] CRID support [Disabled]	Displays and provides option to change the DMI Settings.
F1 Help ↑↓ Select Item +/- Change Values F9 Setup Defaults Esc Exit ↔ Select Menu Enter Select ▶ Sub-Menu F10 Save and Exit	

Function	Selection	Description
Cpu Audio Device (D0:D3:F0)	Disabled Enabled	Enable/Disable Cpu Audio Device.
CHAP Device (D0:D7:F0)	Disabled Enabled	Enable/Disable SA CHAP Device.
Thermal Device (D0:D4:F0)	Disabled Enabled	Enable/Disable SA Thermal Device.
CRID support	Disabled Enabled	Enable Compatible Revision ID.

System Agent (SA) Configuration > DMI Settings

Phoenix SecureCore Technology Setup		
Advanced		
DMI Configuration		Item Specific Help
DMI Vc1 Control	[Disabled]	Enable/Disable DMI Virtual channel 1 control.
DMI Vcp Control	[Enabled]	
DMI Vcm Control	[Enabled]	
DMI Link ASPM Control	[L0S And L1]	
DMI Extended Sync	[Disabled]	
DMI Gen2 Support Control	[Enabled]	
DMI De-emphasis Control	[-6 dB]	
DMI IOT Control	[Disabled]	

F1	Help	↑↓	Select Item	+/-	Change Values	F9	Setup Defaults
Esc	Exit	↔	Select Menu	Enter	Select ▶ Sub-Menu	F10	Save and Exit

Function	Selection	Description
DMI Vc1 Control	Disabled Enabled	Enable/Disable DMI Virtual channel 1 control.
DMI Vcp Control	Disabled Enabled	Enable/Disable DMI Virtual channel P control.
DMI Vcm Control	Disabled Enabled	Enable/Disable DMI Virtual channel M control.
DMI Link ASPM Control	Disabled L0S L1 L0S and L1 Auto	Enable/Disable the control of Active State Power Management on SA side of the DMI Link.
DMI Extended Sync	Disabled Enabled	Enable/Disable DMI Extend Sync control.
DMI Gen2 Support Control	Disabled Enabled Auto	Enable/Disable DMI Gen2 Support Control.
DMI De-emphasis Control	-6 dB -3.5 dB	DeEmphasis Control for DMI.
DMI IOT Control	Disabled Enabled	IOT Control for DMI.

System Agent (SA) Configuration > Intel® VT for Directed I/O (VT-d)

Phoenix SecureCore Technology Setup	
Advanced	
Intel(R) VT for Directed I/O (VT-d)	Item Specific Help
Intel(R) VT for Directed I/O (VT-d) [Enabled] X2APIC Opt Out [Enabled]	Enable/Disable Intel(R) Virtualization Technology for Directed I/O (VT-d) by reporting the I/O device assignment to VMM through DMAR ACPI Tables.
F1 Help ↑↓ Select Item +/- Change Values F9 Setup Defaults Esc Exit ↔ Select Menu Enter Select ► Sub-Menu F10 Save and Exit	

Function	Selection	Description
Intel® VT for Directed I/O (VT-d)	Disabled Enabled	Enable/Disable Intel® VT for Directed I/O (VT-d) by reporting the I/O device assignment to VMM through DMAR ACPI Tables.
X2APIC Opt Out	Disabled Enabled	Enable/Disable X2APIC_OPT_OUT bit.

System Agent (SA) Configuration > Graphics Configuration

Phoenix SecureCore Technology Setup		
Advanced		
Graphics Configuration		Item Specific Help
Graphics Turbo IMON Current [31] Primary Display Selection [Auto] Internal Graphics [Auto] GTT Size [2MB] Aperture Size [128MB] DVMT Pre-Allocated [32MB] DVMT Total Gfx Mem [256MB] Gfx Low Power Mode [Enabled] ▶ IGD Configuration ▶ Intel(R) Ultrabook Event Support		Graphics Turbo IMON Current value supported (14-31)
F1 Help ↑↓ Select Item +/- Change Values F9 Setup Defaults Esc Exit ↔ Select Menu Enter Select ▶ Sub-Menu F10 Save and Exit		

Function	Selection	Description
Graphics Turbo IMON Current	14, 15,... 30, 31	Graphics Turbo IMON Current value supported (14 – 31).
Primary Display Selection	IGD PEG PCI Auto	Select the primary display device.
Internal Graphics	Disabled Enabled Auto	Enable/Disable the Internal Graphics Device. This has no effect if external graphics are present.
GTT Size	1 MByte 2 MByte	Gtt Memory Size of IGD.
Aperture Size	128 MByte 256 MByte 512 MByte	Graphics Aperture Size.
DVMT Pre-Allocated	32 MByte 64 MByte 128 MByte	Select Pre-Allocated Graphics Memory size used by the Internal Graphics Device. This has no effect if external graphics are present.
DVMT Total Gfx Mem	128 MByte 256 MByte MAX	DVMT5.0 DVMT Graphic Memory Size. This has no effect if external graphics are present.
Gfx Low Power Mode	Disabled Enabled	Enable/Disable Gfx Low Power Mode.

System Agent (SA) Configuration > IGD Configuration

Phoenix SecureCore Technology Setup		
Advanced		
IGD Configuration		Item Specific Help
IGD - Boot Type	[VBIOS Default]	Select the Video Device activated during POST. This has no effect if external graphics are present.
IGD - LCD Panel Type	[VBIOS Default]	
IGD- Panel Scaling	[Auto]	
Backlight Control	[PWM-Normal]	
BIA	[Auto]	
Spread Spectrum clock Chip	[Off]	
IGD - Active LFP	[eDP Port-A]	
Panel Color Depth	[18 Bit]	
F1 Help ↑↓ Select Item +/- Change Values F9 Setup Defaults Esc Exit ↔ Select Menu Enter Select ► Sub-Menu F10 Save and Exit		

Function	Selection	Description
IGD – Boot Type	VBIOS Default CRT EFP LFP EFP3 EFP2 LFP2	Select the Video Device activated during POST. This has no effect if external graphics are present.
IGD – LCD Panel Type	VBIOS Default 640 x 480 LVDS Color Panel 800 x 600 LVDS Color Panel 1024 x 768 LVDS Color Panel 1280 x 1024 LVDS Color Panel 1400 x 1050 LVDS Color Panel Reduced Blanking 1400 x 1050 LVDS Color Panel, non-Reduced Blanking 1600 x 1200 LVDS Color Panel 1200 x 768 LVDS Color Panel 1600 x 1050 LVDS Color Panel 1920 x 1200 LVDS Color Panel Reserved 11# Reserved 12# Reserved 13#	Select the video Device that will be activated during POST. This has no effect if external graphics present.

Function	Selection	Description
	Reserved 14# - 1280x800 LVDS Color Panel Reserved 15# - 1280x600 LVDS Color Panel Reserved 16#	
IGD – Panel Scaling	Auto Force Scaling Off	Select the LCD Panel Scaling option used by the Internal Graphics Device.
Backlight Control	PWM-Inverted PWM-Normal	Back Light Control Setting
BIA	Auto Disabled Level 1 Level 2 Level 3 Level 4 Level 5	Auto: GMCH Use VBT Default; Level n: Enabled with Selected Aggressiveness Level.
Spread Spectrum clock Chip	Off Hardware Software	Hardware: Spread is controlled by chip. Software: Spread is controlled by BIOS.
IGD – Active LFP	No LVDS eDP Port-A eDP Port-D	Select the Active LFP Configuration.
Panel Color Depth	18 bit 24 bit	Select the LFP Panel Color Depth.

System Agent (SA) Configuration > PEG Port Configuration

Phoenix SecureCore Technology Setup		
Advanced		
PEG Port Configuration		Item Specific Help
PEG0 - Gen X	[Auto]	Configure PEG0 B0:D1:F0 Speed.
PEG1 - Gen X	[Auto]	
PEG2 - Gen X	[Auto]	
Run-time C7 Allowed	[Disabled]	
Always Enable PEG	[Disabled]	
PEG ASPM	[Auto]	
Program PCIe ASPM later than OpROM	[Disabled]	
De-emphasis Control	[-3.5 dB]	
Swing Control	[Full]	
PEG Sample Calibrate	[Disabled]	
Gen3 Equalization	[Enabled]	
PEG Gen3 Equalization Phase2	[Disabled]	
Gen3 Root Port Preset	[8]	
Gen3 Endpoint Preset	[7]	
Gen3 Endpoint Hint	[2]	
Gen3 Eq Preset Search	[Enabled]	
Always re-search Gen3 Eq Preset	[Disabled]	
Allow PREST# GPIO Usage	[Disabled]	
Preset Search Dwell Time	[1000]	
Timing Start Margin	[15]	
Voltage Start Margin	[20]	
Error Target	[1]	
PEG RxCEM Loopback Mode	[Disabled]	
PEG Gen3 RxCTLE Control	[8]	
Generate BDAT PEG Margin Data	[Disabled]	
F1 Help ↑↓ Select Item +/- Change Values F9 Setup Defaults		
Esc Exit ↔ Select Menu Enter Select ► Sub-Menu F10 Save and Exit		

Function	Selection	Description
PEG0 – Gen X	Auto Gen1 Gen2 Gen3	Configure PEG0 B0:D1:F0 Speed.
PEG1 – Gen X	Auto Gen1 Gen2 Gen3	Configure PEG1 B0:D1:F1 Speed.
PEG2 – Gen X	Auto Gen1 Gen2 Gen3	Configure PEG2 B0:D1:F2 Speed.
Run-time C7 Allowed	Enabled Disabled	Enable/Disable the entry to C7 state [Run-time control] . Don't enable this feature until you have all the appropriate Save/Restore Controller/Endpoint state.
Always Enable PEG	Disabled Enabled	Enable PEG.

Function	Selection	Description
PEG ASPM	Disabled L0S L1 L0S And L1 Auto	PEG ASPM Settings.
Program PCIe ASPM later than OpROM	Disabled Enabled	Enabled: PCIe ASPM will be programmed after OpROM. Disabled: PCIe ASPM will be programmed before OpROM
De-emphasis Control	-6 dB -3.5 dB	DeEmphasis control for PEG.
Swing Control	Reduced Half Full	Perform PEG Swing Control.
PEG Sample Calibrate	Disabled Enabled Auto	Enable/Disable PEG Sample Calibrate.
Gen3 Equalization	Disabled Enabled	Perform PEG Gen3 Equalization steps.
PEG Gen3 Equalization Phase2	Disabled Enabled	Enable/Disable PEG Gen3 Equalization Phase2.
Gen3 Root Port Preset	1, 2, ..., 8 , ..., 11	Root Port Preset value for Gen3 Equalization.
Gen3 Endpoint Preset	0, 1, ..., 7 , ..., 10	Endpoint Preset value for Gen3 Equalization.
Gen3 Endpoint Hint	0, 1, 2 , ..., 10	Endpoint Hint value for Gen3 Equalization.
Gen3 Eq Preset Search	Disabled Enabled	Perform PEG Gen3 SW Preset Search algorithm.
Always re-search Gen3 Eq Preset	Disabled Enabled	Always re-search PEG Gen3 Preset even it has been done once.
Allow PREST# GPIO Usage	Disabled Enabled	Enable/Disable GPIO-based resets to PEG endpoint(s) during margin search, if needed.
Preset Search Dwell Time	0, ..., 1000 , ..., 65535	PEG Gen3 Preset Search dwell time in [ms].
Timing Start Margin	4, ..., 15 , ..., 255	The starting value [4...255] for the backward margin search.
Voltage Start Margin	4, ..., 20 , ..., 255	The starting value [4...255] for the backward margin search.
Error Target	0, 1 , ..., 65535	The margin search error target value [1 ... 65535].
PEG RxCEM Loopback Mode	Disabled Enabled	Enable/Disable PEG RxCEM Loopback Mode.
PEG Gen3 RxCTLE Control	0, ..., 8 , ..., 255	PEG Gen3 RxCTLE for Bundle0(Lane0, Lane1).
Generate BDAT PEG Margin Data	Disabled Enabled	Enable to generate BDAT PCIe margin tables

South Bridge Configuration

Phoenix SecureCore Technology Setup		
Advanced		
South Bridge Configuration		Item Specific Help
SMBUS Device [Enabled] Port 80h Cycles [LPC Bus] PCI Clock Run Logic [Enabled] HPET Support [Enabled] HPET Memory Map BAR [FED00000] Enable CRID [Disabled] DeepSx Mode [Disabled] GP27 Wake From DeepSx [Enabled] State After G3 [State S0] ▶ SB PCI Express Config ▶ SB USB Config ▶ SB Azalia Config ▶ SB Serial IRQ Config ▶ SB Security Config ▶ SB SerialIo Config		Enable/Disable SMBUS Device.
F1 Help ↑↓ Select Item +/- Change Values F9 Setup Defaults Esc Exit ↔ Select Menu Enter Select ▶ Sub-Menu F10 Save and Exit		

Function	Selection	Description
SMBUS Device	Disabled Enabled	Enable/Disable SMBUS Device.
Port 80h Cycles	LPC Bus PCI Bus	Control where the Port 80h cycles are sent.
PCI Clock Run Logic	Disabled Enabled	Controls PCIe clock gate power saving feature.
HPET Support	Disabled Enabled	Control the High Precision Event Timer through this setup option. When enabled, the RSDT points to the HPET table and the proper enable bits are set.
HPET Memory Map BAR	FED00000 FED01000 FED02000 FED03000	Select the HPET Memory Map Base Address.
Enable CRID	Disabled Enabled	Enable Compatible Revision ID.
DeepSx Mode	Disabled Enabled only in S5/Battery Enabled only in S4-S5/Battery Enabled in S3-S5/Battery	Configure the DeepSx Mode configuration.
GP27 Wake From DeepSx	Disabled Enabled	Wake From DeepSx by the assertion of GP27 pin.
State After G3	State S5 State S0	Specify what state to switch to when power is re-applied after a power failure (G3 state).

South Bridge Configuration > SB PCI Express Config

Phoenix SecureCore Technology Setup	
Advanced	
SB PCI Express Config	Item Specific Help
PCI Express Root Port Clock Gating [Enabled] DMI Link ASPM Control [L0S] DMI Link Extended Synch Control [Disabled] PCI Express port assigned to LAN 3 ▶ PCI Express Port 4 Config ▶ PCI Express Port 5 Config ▶ PCI Express Port 6 Config	Enabled or Disabled PCI Express Root Port Clock Gating.
F1 Help ↑↓ Select Item +/- Change Values F9 Setup Defaults Esc Exit ↔ Select Menu Enter Select ▶ Sub-Menu F10 Save and Exit	

Function	Selection	Description
PCI Express Root Port Clock Gating	Disabled Enabled	Enabled or Disabled PCI Express Root Port Clock Gating.
DMI Link ASPM Control	Disabled L0S L1 L0S And L1 Auto	The control of Active State Power Management of the DMI Link.
DMI Link Extended Synch Control	Disabled Enabled	The control of Extended Sync on SB side of the DMI Link.
PCI Express port assigned to LAN	3	

South Bridge Configuration > PCI Express Root Port x Config (x= 4, 5, 6)

Phoenix SecureCore Technology Setup		
Advanced		
PCI Express Root Port 4		Item Specific Help
PCI Express Root Port 4	[Enabled]	Control the PCI Express Root Port.
PCIe Speed	[Auto]	
ASPM	[Auto]	
L1 Substates	[L1.1 & L1.2]	
HOT PLUG	[Disabled]	
URR	[Disabled]	
FER	[Disabled]	
NFER	[Disabled]	
CER	[Disabled]	
SEFE	[Disabled]	
SENFE	[Disabled]	
SECE	[Disabled]	
PME Interrupt	[Disabled]	
PME SCI	[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
PCI Express Root Port x Config (x= 4, 5, 6)	Disabled Enabled	Control the PCI Express Root Port.
PCIe Speed	Auto Gen1 Gen2	Select PCIe Speed to Gen1 or Gen2.
ASPM	Disabled L0S L1 L0S And L1 Auto	Control PCIe Active State Power Management settings.
L1 Substates	Disabled L1.1 L1.2 L1.1 & L1.2	PCI Express L1 Substates setting.
HOT PLUG	Disabled Enabled	PCI Express Hot Plug Enabled/Disabled.
URR	Disabled Enabled	PCI Express Unsupported Request Reporting Enabled/Disabled.
FER	Disabled Enabled	PCI Express Device Fatal Error Reporting Enabled/Disabled.
NFER	Disabled Enabled	PCI Express Device Non-Fatal Error Reporting Enabled/Disabled.
CER	Disabled	PCI Express Device Correctable Error Reporting

Function	Selection	Description
	Enabled	Enabled/Disabled.
SEFE	Disabled Enabled	Root PCI Express System Error on Fatal Error Enabled/Disabled.
SENE	Disabled Enabled	Root PCI Express System Error on Non-Fatal Error Enabled/Disabled.
SECE	Disabled Enabled	Root PCI Express System Error on Correctable Error Enabled/Disabled.
PME Interrupt	Disabled Enabled	Root PCI Express PME Interrupt Enabled/Disabled.
PME SCI	Disabled Enabled	PCI Express PME SCI Enabled/Disabled.

South Bridge Configuration > SB USB Configuration

Phoenix SecureCore Technology Setup		
Advanced		
SB USB Configuration		Item Specific Help
USB Precondition	Enabled	Precondition work on USB host controller and root ports for faster enumeration.
xHCI Mode	[Smart Auto]	
USB Per-Port Disable Control	[Disabled]	
F1 Help ↑↓ Select Item +/- Change Values F9 Setup Defaults Esc Exit ↔ Select Menu Enter Select ► Sub-Menu F10 Save and Exit		

Function	Selection	Description
USB Precondition	Disabled Enabled	Precondition work on USB host controller and root ports for faster enumeration.
xHCI Mode	Disabled Enabled Auto (note 1) Smart Auto (note 2)	Mode of operation of xHCI controller.
USB Per-Port Disable Control	Disabled Enabled	Control each of the USB ports (0~13) enable/disable.



“Auto”. This mode uses ACPI protocol to provide an option that enables the xHCI controller to reroute USB ports via the _OSC ACPI method call. Note, this mode switch requires special OS driver support for USB 3.0.



“Smart Auto”. This mode is similar to “Auto”, but it adds the capability to route the ports to xHCI or EHCI according to setting used in previous boots (for non-G3 boot) in the pre-boot environment. This allows the use of USB 3.0 devices prior to OS boot. Note, this mode switch requires special OS driver support for USB 3.0 and USB 3.0 software available in the pre-boot environment.

South Bridge Configuration > SB Azalia Configuration

Phoenix SecureCore Technology Setup	
Advanced	
SB Azalia Configuration	Item Specific Help
Azalia Auto Azalia Docking Support Enable [Enabled] Azalia PME Enabled [Disabled]	Control Detection of the Azalia device.
F1 Help ↑↓ Select Item +/- Change Values F9 Setup Defaults Esc Exit ↔ Select Menu Enter Select ► Sub-Menu F10 Save and Exit	

Function	Selection	Description
Azalia	Disabled Auto	Control Detection of the Azalia device.
Azalia Docking Support Enable	Disabled Enabled	Enable/Disable Docking Support for Azalia.
Azalia PME Enabled	Disabled Enabled	Enable/Disable PME for Azalia.

South Bridge Configuration > SB Serial IRQ Configuration

Phoenix SecureCore Technology Setup	
Advanced	
SB Serial IRQ Config	Item Specific Help
Enable Serial IRQ [Enabled] Serial IRQ Mode [Continuous] Start frames [4 Frames]	Enable/disable the Serial IRQ function in the PCH
F1 Help ↑↓ Select Item +/- Change Values F9 Setup Defaults Esc Exit ↔ Select Menu Enter Select ► Sub-Menu F10 Save and Exit	

Function	Selection	Description
Enable Serial IRQ	Disabled Enabled	Enable/Disable the serial IRQ function in the PCH.
Serial IRQ Mode	Quiet Continuous	The "Quiet" mode Serial IRQ is active only when needed, In "Continuous" it is active all the time.
Start frames	4 Frames 6 Frames 8 Frames	The number of start frames at the beginning of the serial IRQ.

South Bridge Configuration > SB Security Config

Phoenix SecureCore Technology Setup	
Advanced	
SB Security Config	Item Specific Help
GPIO Lockdown [Disabled] RTC Lock [Enabled] BIOS Lock [Disabled] SMM LOCK [Enabled]	Enable/Disable the PCH GPIO Lockdown feature.
F1 Help ↑↓ Select Item +/- Change Values F9 Setup Defaults Esc Exit ↔ Select Menu Enter Select ► Sub-Menu F10 Save and Exit	

Function	Selection	Description
GPIO Lockdown	Disabled Enabled	Enable/Disable the PCH GPIO Lockdown feature.
RTC Lock	Disabled Enabled	Enable will lock bytes 38h-3Fh in the lower/upper 128-byte bank of RTC RAM.
BIOS Lock	Disabled Enabled	Enable/Disable the PCH BIOS Lock Enable feature. The whole BIOS region is not writable.
SMM LOCK	Disabled Enabled	Enable/Disable SMM LOCK feature. It will lock the SMRAM and unable load SMM driver any more.

South Bridge Configuration > SB Serial IO Config

Phoenix SecureCore Technology Setup	
Advanced	
SB SerialIo Configuration	Item Specific Help
SerialIo MODE [ACPI Mode]	▲ Use ACPI mode in Win8 environment . PCI mode is only for debugging. ▼
SerialIo DMA [Enabled]	
SerialIo I2C0 [Enabled]	
SerialIo I2C0 Voltage [1.80V]	
SerialIo I2C0 Sensor Hub [Disabled]	
SerialIo I2C0 ST Test Wake Device [Disabled]	
SerialIo I2C0 Synaptics Precision Touchpad [Disabled]	
SerialIo I2C0 Synaptics Wake Touchpad [Disabled]	
SerialIo I2C0 Elantech Wake Touchpad [Disabled]	
SerialIo I2C0 WTTT Devices [Disabled]	
I2C0 Parameters Override [Disabled]	
SerialIo I2C1 [Enabled]	
SerialIo I2C1 Voltage [3.30V]	
SerialIo I2C1 Atmel TouchPanel [Disabled]	
SerialIo I2C1 Elan TouchPanel [Disabled]	
SerialIo I2C1 Elan TouchPad [Disabled]	
SerialIo I2C1 Synaptics TouchPad [Disabled]	
SerialIo I2C1 NTRIG TouchPanel [Disabled]	
SerialIo I2C1 EETL TouchPanel [Disabled]	
SerialIo I2C1 ALPS TouchPaD [Disabled]	
SerialIo I2C1 Cypress TouchPaD [Disabled]	
I2C1 Parameters Override [Disabled]	
SerialIo SPI0 [Enabled]	
SerialIo SPI1 [Enabled]	
SerialIo SDIO [Enabled]	
F1 Help ↑↓ Select Item +/- Change Values F9 Setup Defaults Esc Exit ↔ Select Menu Enter Select ▶ Sub-Menu F10 Save and Exit	

Phoenix SecureCore Technology Setup	
Advanced	
SB SerialIo Configuration	Item Specific Help
SerialIo DMA [Enabled]	▲ If ACPI mode for SerialIo is choosen , DMA controller must be enabled for proper functionality. ▼
SerialIo I2C0 [Enabled]	
SerialIo I2C0 Voltage [1.80V]	
SerialIo I2C0 Sensor Hub [Disabled]	
SerialIo I2C0 ST Test Wake Device [Disabled]	
SerialIo I2C0 Synaptics Precision Touchpad [Disabled]	
SerialIo I2C0 Synaptics Wake Touchpad [Disabled]	
SerialIo I2C0 Elantech Wake Touchpad [Disabled]	
SerialIo I2C0 WTTT Devices [Disabled]	
I2C0 Parameters Override [Disabled]	
SerialIo I2C1 [Enabled]	
SerialIo I2C1 Voltage [3.30V]	
SerialIo I2C1 Atmel TouchPanel [Disabled]	
SerialIo I2C1 Elan TouchPanel [Disabled]	
SerialIo I2C1 Elan TouchPad [Disabled]	
SerialIo I2C1 Synaptics TouchPad [Disabled]	
SerialIo I2C1 NTRIG TouchPanel [Disabled]	
SerialIo I2C1 EETL TouchPanel [Disabled]	
SerialIo I2C1 ALPS TouchPaD [Disabled]	
SerialIo I2C1 Cypress TouchPaD [Disabled]	
I2C1 Parameters Override [Disabled]	
SerialIo SPI0 [Enabled]	
SerialIo SPI1 [Enabled]	
SerialIo SDIO [Enabled]	
SerialIo SDIO Wifi [Disabled]	
F1 Help ↑↓ Select Item +/- Change Values F9 Setup Defaults Esc Exit ↔ Select Menu Enter Select ▶ Sub-Menu F10 Save and Exit	

Function	Selection	Description
Seriallo MODE	ACPI Mode PCI Mode	Use ACPI mode in Win8 environment. PCI mode is only for debugging.
Seriallo DMA	Disabled Enabled	If ACPI mode for SerialIO is choosen, DMA controller must be enable for proper functionality.
Seriallo I2C0	Disabled Enabled	I2C0 host controller.
Seriallo I2C0 Voltage	3.3 V 1.8 V	Use 1.8v for I2C0 devices listed below.
Seriallo I2C0 Sensor Hub	Disabled USB Sensor, Hub, Intel, Kalapana, Beach Sensor, Hub, Intel STM, Sensor Hub	Please Select Sensor Hub
Seriallo I2C0 ST test Wake Device	Disabled Enabled	Enables/Disables the Vendor Sensor
Seriallo I2C0 Synaptics Precision Touchpad	Disabled Enabled	Enables/Disables the Synaptics Precision Touchpad
Seriallo I2C0 Synaptics Wake Touchpad	Disabled Enabled	Enables/Disables the Synaptics Wake Touchpad
Seriallo I2C0 Elantech Wake Touchpad	Disabled Enabled	Enables/Disables the Elantech Wake Touchpad
Seriallo I2C0 WITT Devices	Disabled Enabled	Enables/Disables the Vendor Sensor
I2C0 Parameters Override	Disabled Enabled	Override the I2C0 Controller Parameters
Seriallo I2C1	Disabled Enabled	I2C1 host controller.
Seriallo I2C1 Voltage	3.3 V 1.8 V	Use 3.3 V for I2C1 devices listed below
Seriallo I2C1 Atmel TouchPanel	Disabled Enabled	Enables/Disables the Vendor Sensor
Seriallo I2C1 Elan TouchPanel	Disabled Enabled	Enables/Disables the Vendor Sensor.
Seriallo I2C1 Elan TouchPad	Disabled Enabled	Enables/Disables the Vendor Sensor.
Seriallo I2C1 Synaptics Precision Touchpad	Disabled Enabled	Enables/Disables the Vendor Sensor.
Seriallo I2C1 NTRIG TouchPanel	Disabled Enabled	Enables/Disables the Vendor Sensor.
Seriallo I2C1 EETL TouchPanel	Disabled Enabled	Enables/Disables the Vendor Sensor.
Seriallo I2C1 ALPS TouchPad	Disabled Enabled	Enables/Disables the Vendor Sensor.
Seriallo I2C1 Cypress TouchPad	Disabled Enabled	Enables/Disables the Vendor Sensor.
I2C1 Parameters Override	Disabled Enabled	Overrides the I2C1 Controller Parameters
Seriallo SPI0	Disabled Enabled	SPI0 host controller.
Seriallo SPI1	Disabled Enabled	SPI1 host controller
Seriallo SDIO	Disabled Enabled	SDHC host controller
Seriallo SDIO Wifi	Disabled Enabled	Enables/Disables the Vendor Sensor.

LAN Configuration

Phoenix SecureCore Technology Setup	
Advanced	
LAN Configuration	Item Specific Help
LAN Configuration System UUID {80982A9E-3C6F-8F52-34CE-D25A4A53E4ED} ETH1 Configuration (Left) [Enabled] MAC Address & Link status : [00E04B4E1FA0-] ETH2 Configuration (Right) [Enabled] MAC Address & Link status : [00E04B4E1FA1-]	Control of 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	



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

Function	Selection	Description
ETH1 Configuration (Left)	Disabled Enabled With PXE boot	Control the Ethernet Devices and PXE boot.
ETH2 Configuration (Right)	Disabled Enabled With PXE boot	Control the Ethernet Devices and PXE boot.

Hardware Health Configuration

Phoenix SecureCore Technology Setup	
Advanced	
Hardware Health Configuration	Item Specific Help
Hardware Health Configuration System Temperature [27°C/ 80°F] CPU Temperature [33.07°C/ 91°F] System Fan Speed [0 RPM] System Temperature Ext Type [Disabled] Fan Cruise Control [Disabled] CPU Fan Speed [0 RPM] Fan Cruise Control [Disabled] Watchdog Function [0]	
F1 Help ↑↓ Select Item +/- Change Values F9 Setup Defaults Esc Exit ↔ Select Menu Enter Select ► Sub-Menu F10 Save and Exit	



System Temperature readout is the temperature measured by the selected sensor via System Temperature Ext Type. If disabled then the onboard sensor is used.

Function	Selection	Description
System Temperature Ext Type	Disabled (Note 1) LM75 @ 0x90 OneWire @ GPIO16	Use external connected sensor instead of onboard.
Fan Cruise Control (Note 2)	Disabled Thermal Speed	Disabled = Full speed. Thermal: does regulate fan speed according to specified temperature. Speed: does regulate according to specified RPM.
Fan Settings	10 – 90 (Note 3) 1000 – 10000 (Note 4)	
Fan Min limit (Note 5)	0 (Note 6)	Minimum PWM %, can be used to make sure fan is always active. Make sure Min limit < Max limit.
Fan Max limit (Note 5)	100 (Note 6)	Maximum PWM %, can be used to limit the fan noise. Make sure Min limit < Max limit.
Watchdog Function	0 – 255 (Note 7)	0 = Disabled. Enter the service interval in seconds before system will reset.



Note 1) When not Disabled the System Temperature readout will only be valid if the sensor is physically connected to the Feature connector.



Note 2) Two sets of settings (Fan Cruise Control, Fan Settings, Fan Min limit, Fan Max limit), one set for System Fan and one set for CPU Fan. The Fan Cruise Control is by default Disabled for System Fan and by default Thermal for CPU Fan.



Note 3) If Fan Cruise Control is Thermal, use either digit keys to enter value or +/- keys to increase/decrease value. Don't use mix of digit keys and +/- keys.



Note 4) RPM (if Fan Cruise Control is Speed) use either digit keys to enter value or +/- keys to increase/decrease value by 100. Don't use mix of digit keys and +/- keys.



Note 5) Only visible if Fan Cruise Control is Thermal.

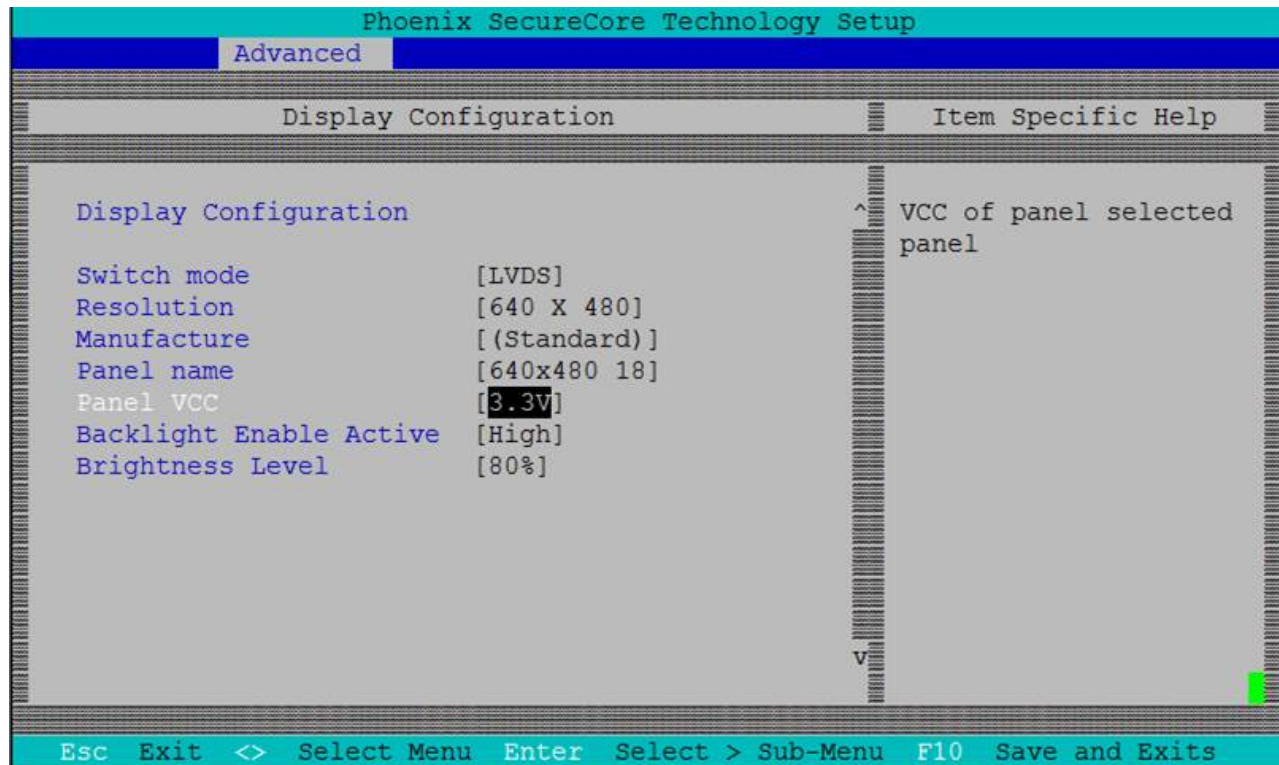


Note 6) Use number keys to enter value.



Note 7) Use digit keys to enter value. Value 0 means Watchdog is disabled. Refer to "KT-API-V2 User Guide" to control the Watchdog via API or refer to "KT-API-V2 User Guide DLL", How to control Watchdog via Windows DLL.

Digital Display Configuration



Function	Selection	Description
Switch Mode	LVDS DP	Enable/Disable onboard LVDS
Resolution	640 x 480 800 x 480 800 x 600 1024 x 600 1024 x 768 1280 x 800 1280 x 1024 1366 x 768 1600 x 1200 1920 x 1080 Custom	Resolution
Manufacture	(Standard) AUO Chi-Mei EDT KAHHSIUNG OPTO-ELECTRONIC NEC Philips Primeview Samsung ONation Corporation	Manufacture
Panel Name	640x480 18 640x480 24 N/A	Panel Name

Panel VCC	3.3V 5V	VCC of selected panel.
Backlight Enable Active	High Low	Inversion of backlight signal.
Brightness Level	0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%	Select LVDS Brightness Level



The Panel Name depends on the resolution and manufacture combination.
If the combination does not exist, then the Panel Name is N/A (Not Available).

SMBIOS Event Log

Phoenix SecureCore Technology Setup		
Advanced		
SMBIOS Event Log		Item Specific Help
Event Log Validity	Valid	Enable/Disable Event Log.
Event Log Capacity	Space Available	
Event Log	[Enabled]	
► View SMBIOS event log		
Mark SMBIOS events as read	[Enter]	
Clears SMBIOS events	[Enter]	
F1 Help ↑↓ Select Item +/- Change Values F9 Setup Defaults Esc Exit ↔ Select Menu Enter Select ► Sub-Menu F10 Save and Exit		



Entering View SMBIOS event log will show log only.

Function	Selection	Description
Event Log	Disabled Enabled	Enable/Disable Event Log.
Mark SMBIOS as read	Enter	Mark SMBIOS events as read. Marked SMBIOS events won't be displayed.
Clears SMBIOS events	Enter	Clears SMBIOS events.

ME Configuration

Phoenix SecureCore Technology Setup		
Advanced		
ME Configuration		Item Specific Help
ME FW Version	10.0.30.1072	Enable/Disable Intel(R) Management Engine.
ME Firmware	Intel(R) ME 1.5MB firmware	
Intel(R) ME	[Enabled]	
ME FW Downgrade	[Disabled]	
ME Debug Event Service	[Disabled]	
MDES for BIOS	[Disabled]	
ME IFR Feature	[Enabled]	
Firmware TPM Feature	[Disabled]	
F1 Help ↑↓ Select Item +/- Change Values F9 Setup Defaults Esc Exit ↔ Select Menu Enter Select ► Sub-Menu F10 Save and Exit		

Function	Selection	Description
Intel® ME	Disabled Enabled	Enable/Disable Intel® Management Engine.
ME FW Downgrade	Disabled Enabled	Enable/Disable ME FW Downgrade function.
ME Debug Event Service	Disabled Enabled	Enable/Disable ME Debug Event Service.
MDES for BIOS	Disabled Enabled	Enable/Disable ME Debug Event Service for BIOS events.
ME IFR Feature	Disabled Enabled	Enable/Disable Intel® ME Independent Firmware Recovery.
Firmware TPM Feature	Disabled Enabled	Enables or disables the Firmware TPM present in the ME.

Thermal Configuration

Phoenix SecureCore Technology Setup									
Advanced									
Thermal Configuration						Item Specific Help			
▶ CPU Thermal Configuration ▶ Platform Thermal Configuration						CPU Thermal Configuration Submenu.			

Thermal Configuration > CPU Thermal Configuration

Phoenix SecureCore Technology Setup		
Advanced		
CPU Thermal Configuration		Item Specific Help
Thermal Monitor	[Enabled]	Enable processor Thermal Monitor thermal control. Requires GV3.
Bi-directional PROCHOT#	[Enabled]	
PROCHOT# OUT	[Disabled]	
PROCHOT Response	[Disabled]	
Disable VR Thermal Alert	[Disabled]	
ACPI 3.0 T-States	[Disabled]	
DTS	[Disabled]	
F1 Help ↑↓ Select Item +/- Change Values F9 Setup Defaults Esc Exit ↔ Select Menu Enter Select ► Sub-Menu F10 Save and Exit		

Function	Selection	Description
Thermal Monitor	Disabled Enabled	Enable processor Thermal Monitor thermal control. Requires GV3.
Bi-directional PROCHOT#	Disabled Enabled	When a processor thermal sensor trips (either core), the PROCHOT# is driven. If bi-direction is enabled, external agents can drive PROCHOT# to throttle the processor.
PROCHOT# OUT	Disabled Enabled	If bi-directional PROCHOT# is enabled, PROCHOT# OUT can be disabled selectively.
PROCHOT# Response	Disabled Enabled	Enable/Disable PROCHOT Response.
Disable VR Thermal Alert	Disabled Enabled	Enable/Disable VR Thermal Alert.
ACPI 3.0 T-States	Disabled Enabled	Enable/Disable ACPI 3.0 T-States.
DTS	Disabled Enabled Out of Spec Only	Enable CPU Digital Thermal Sensor function.

Thermal Configuration > Platform Thermal Configuration

Phoenix SecureCore Technology Setup		
Advanced		
Platform Thermal Configuration		Item Specific Help
Automatic Thermal Reporting	[Enabled]	Configure _CRT, _PSU, and _AC0 automatically based on values recommended in BWG's Thermal Reporting for Thermal Management settings. Set to Disabled for manual configuration.
Critical Trip Point	[POR]	
Active Trip Point Hi Fan	[71 C]	
Active Trip Point Lo Fan	[55 C]	
Passive Trip Point	[95 C]	
Passive TC1 Value	[1]	
Passive TC2 Value	[5]	
Passive TSP Value	[10]	
Pch Thermal Device		
Thermal Sensor Device Enable	[Enabled]	
ME SMBus Thermal Reporting	[Disabled]	
F1 Help ↑↓ Select Item +/- Change Values F9 Setup Defaults Esc Exit ↔ Select Menu Enter Select ► Sub-Menu F10 Save and Exit		

Function	Selection	Description
Automatic Thermal Reporting	Disabled Enabled	Configure _CRT, _PSV, and _AC0 automatically based on values recommended in BWG's Thermal Reporting for Thermal Management settings. Set to Disabled for manual configuration.
Active Trip Point Lo Fan	Disabled 15, 23, ..., 55 , ..., 119	This value controls the temperature of the ACPI Active Trip Point – the point where the OS turns the processor fan on low.
Passive TC1 Value	1 , 2, ..., 16	This value sets the TC1 value for the ACPI Passive Cooling Formula. Use "+" and "-" keys to change value.
Passive TC2 Value	1, 2, ..., 5 , ..., 16	This value sets the TC2 value for the ACPI Passive Cooling Formula. Use "+" and "-" keys to change value.
Passive TSP Value	2, 4, ..., 10 , ..., 32	This value sets the TSP value for the ACPI Passive Cooling Formula. It represents in tenths of a second how often the OS reads the temperature when passive cooling is enabled. Use "+" and "-" keys to change value.
Thermal Sensor Device Enable	Disabled Enabled	Enable Thermal Sensor Device.
ME SMBus Thermal Reporting	Disabled Enabled	Enable/Disable ME SMBus Thermal Reporting Configuration.

ICC Configuration

Phoenix SecureCore Technology Setup	
Advanced	
ICC Configuration	Item Specific Help
ICC Profile [0] Use Watchdog Timer for ICC [Disabled] Clock Manipulation [ICC Failure] ICC Overclocking Library [9.0.0.1209] ▶ Clock 2	ICC Profile Selection
F1 Help ↑↓ Select Item +/- Change Values F9 Setup Defaults Esc Exit ↔ Select Menu Enter Select ▶ Sub-Menu F10 Save and Exit	

Function	Selection	Description
ICC Profile	0	ICC profile Selection
Use Watchdog Timer for ICC	Disabled Enabled	Enable Watchdog Timer operation for ICC. If enabled, Watchdog Timer will be started after ICC related changed. This timer detects platform instability caused by wrong clock settings.
Clock Manipulation	ICC Success ICC Failure	Status of the clock configuration.
Apply ICC settings after reboot	None Permanently after reboot	None: Change will not apply. Permanently: Changes will be applied permanently, starting after the next reboot. Use it to provide changes that are verified and safe.

ICC Configuration > Clock 2

Phoenix SecureCore Technology Setup	
Advanced	
Clock 2	Item Specific Help
BCLK, DMI, PEG, PCIe PCI33, SATA, USB3 Current frequency [100.0 MHz] Current SSC mode [down] Maximum supported SSC % [0.50] Current SSC % [0.50] New SSC spread percent [0.01%] 50	Clock spectrum spread in 0.01% increments. Determines spectrum deviation away from base frequency. Allowed range is limited by Max supported SSC%. Changes will not be applied unless 'Apply settings' is pressed.
F1 Help ↑↓ Select Item +/- Change Values F9 Setup Defaults Esc Exit ↔ Select Menu Enter Select ► Sub-Menu F10 Save and Exit	

Function	Selection	Description
New SSC spread percent [0.01 %]	0, 1, ..., 50	Clock spectrum spread in 0.01 % increments. Determines spectrum deviation away from base frequency. Allowed range is limited by Max supported SSC %. Changes will not be applied unless 'Apply settings' is pressed.

Intel® Smart Connect Technology

Phoenix SecureCore Technology Setup	
Advanced	
Intel(R) Smart Connect Technology	Item Specific Help
ISCT Configured Disabled	Enable ISCT
F1 Help ↑↓ Select Item +/- Change Values F9 Setup Defaults Esc Exit ↔ Select Menu Enter Select ► Sub-Menu F10 Save and Exit	

Function	Selection	Description
ISCT Configured	Disabled Enabled	Enable ISCT

10.3. Security

Phoenix SecureCore Technology Setup		
Main	Advanced	Security
Secure Boot Activation		[Disabled]
▶ Secure Boot Configuration		
Supervisor Password is:	Set	
User Password is:	Cleared	
Set Supervisor Password	[Enter]	
Supervisor Hint String	[	]
Set User Password	[Enter]	
User Hint String	[	]
Min. password length	[1]	
Authenticate User on Boot	[Disabled]	
HDD Password Select	[User Only]	
HDD Security Status		
HDD01 Password State	Frozen	
Trusted Platform Module (TPM)		
TPM Support	[Enabled]	
▶ TPM Configuration		

Item Specific Help	
Set or clear the Supervisor account's password.	

F1	Help	↑↓	Select Item	+/-	Change Values	F9	Setup Defaults
Esc	Exit	↔	Select Menu	Enter	Select ▶ Sub-Menu	F10	Save and Exit



"Secure Boot Configuration" and "TPM Configuration" see next pages.

Function	Selection	Description
Secure Boot Activation (Note1)	Disabled Enabled	Enable this option and the secure boot feature is activated. When the menu item is activated, it cannot be set to disabled.
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.
Set User Password (Note1)	(up to 20 characters)	Set or clear the User account's password.
User Hint String (Note1)	(up to 20 characters)	Press Enter to type User Hint String.
Min. password length	1, 2, ..., 20	Set the minimum number of characters for password (1-20).
Authenticate User on Boot (Note1)	Disabled Enabled	Enable/Disable User Authenticate Prompt on Boot.
HDD Password Select	User+Master User Only	Supports user only or both user and master password.
Set HDD01 User Password	Enter	Set HDD01 User Password.

Function	Selection	Description
TPM Support	Disabled Enabled	This is used to decide whether TPM support should be enabled or disabled.



Only selectable if "Supervisor Password" is set.

Secure Boot Configuration

Phoenix SecureCore Technology Setup		
Security		
Secure Boot Configuration		Item Specific Help
UEFI Secure Boot	Disabled	Enable or disable secure boot function.
Protected Signatures	Disabled (Setup Mode)	
Customized Signatures	Disabled (Standard Mode)	
CertNames	Win8 Certificates	
Secure Boot Option	Enabled	
Reset to Default	[Enter]	
Change to Customization	[Enter]	

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

Function	Selection	Description
Secure Boot Option	Disabled Enabled	Enable or disable secure boot function.
Reset to Defaults	Enter	Reset secure boot variables to manufacturing defaults.
Change to Customization	Enter	PK will be deleted, the platform will be changed to setup mode, and secure boot is disabled automatically.

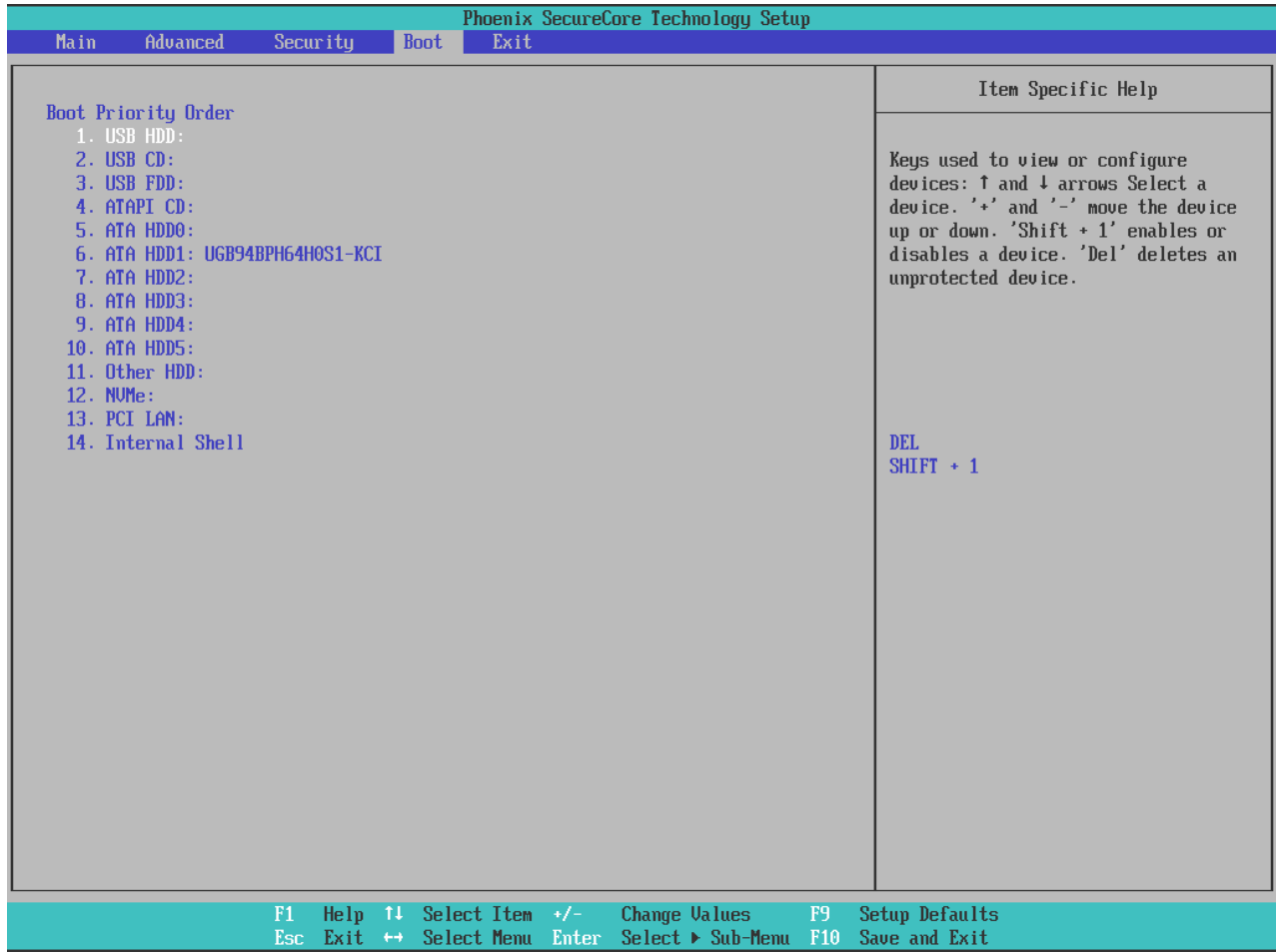
TPM Configuration

Phoenix SecureCore Technology Setup									
Security									
TPM Configuration					Item Specific Help				
Current TPM State	[Enabled and Activated]				Enact TPM Action. Note: Most TPM actions require TPM to be Enabled to take effect.				
TPM Action	[No Change]								
Omit Boot Measurements	[Disabled]								

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

Function	Selection	Description
TPM Action	No Change Enable Disable Activate Deactivate Clear Enable and Activate Disable and Deactivate Set Owner Install, with State=True Set Owner Install, with State=False Enable, Activate, and Set Owner Install, with State=True Disable, Deactivate, and Set Owner Install, with State=False Clear, Enable, and Activate Require PP for provisioning Do not require PP for provisioning Require PP for clear Do not require PP for clear Enable, Activate, and Clear Enable, Activate, Clear, Enable, and Activate	Enact TPM Action. Note: Most TPM actions require TPM to be Enabled to take effect.
TPM Support	Disabled Enabled	Enabling this option causes the system to omit recording boot device attempts in PCR[4].

10.4. Boot



10.5. Misc

Phoenix SecureCore Technology Setup

MainAdvancedSecurityBootMiscExit

Item Specific Help

Go to external device page.

► Intel® Ethernet Connection I218-LM – 00:E0:F4:2D:34:02
Intel® I211 Gigabit Network Connection - 00:E0:F4:2D:34:03

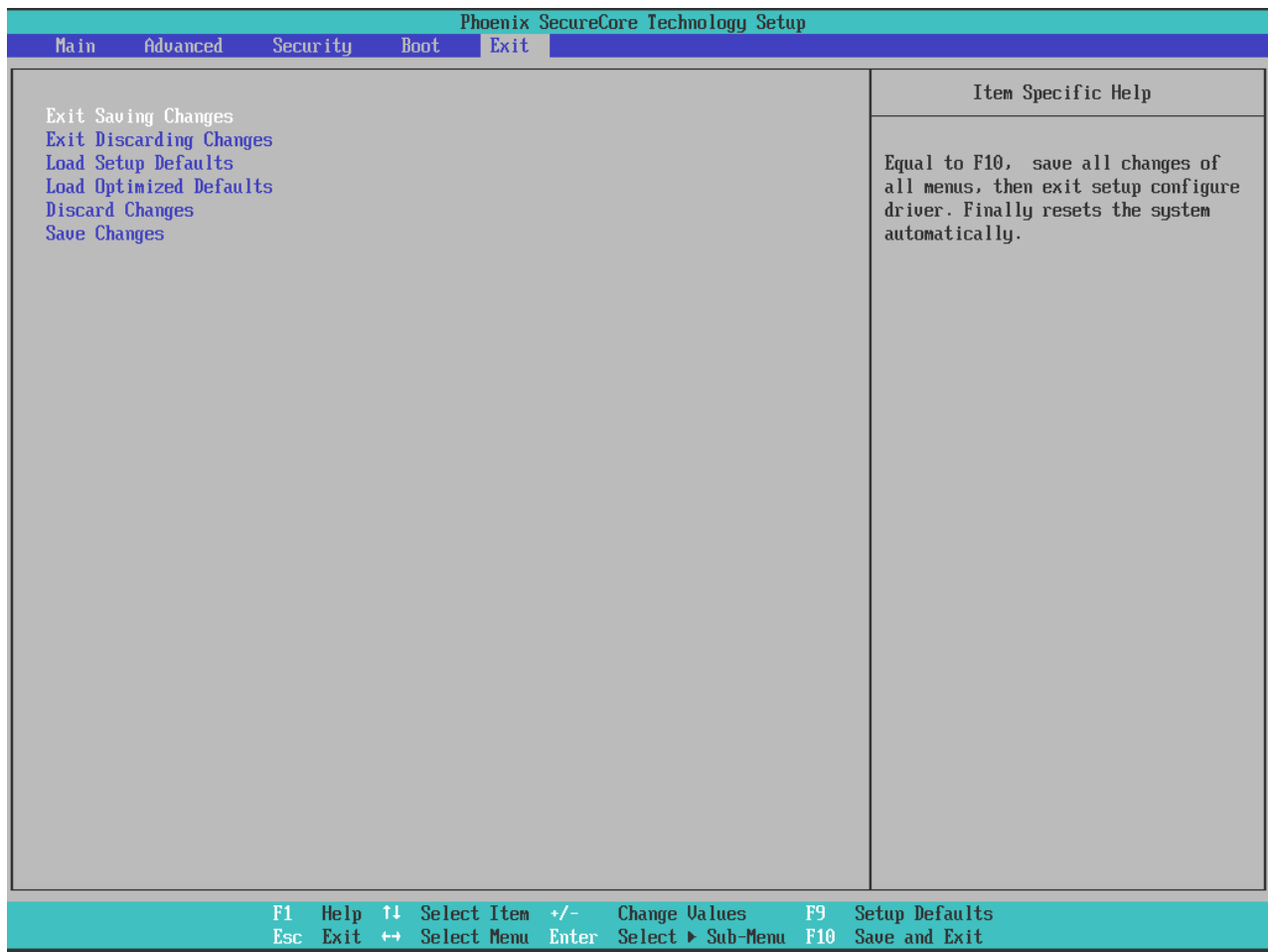
F1Help↑↓Select Item+/-Change ValuesF9Setup Defaults

EscExit←→Select MenuEnterSelect ► Sub-MenuF10Save and Exit



This menu contains dynamic driver settings and possibly other settings.
Don't change these settings.
This menu might be removed in future BIOS versions.

10.6. Exit



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

List of Acronyms



The following table does not contain the complete acronyms used in signal names, signal type definitions or similar. See chapter: 'Component Main Data' for more information.

ACPI	Advanced Configuration and Power Interface (standard that operating systems use to perform discovery and configuration of computer hardware components, to perform power management...)
ADC	Analog Digital Converter
AHCI	Advanced Host Controller Interface (technical standard that specifies the operation of Serial ATA (SATA) host bus adapters)
ATX	Advanced Technology Extended (motherboard configuration specification)
BIOS	Basic Input/Output System (type of firmware used to perform hardware initialization during the booting process)
BOB	Break-Out-Board
BSP	Board support package (implementation of specific support code (software) for a given (device motherboard) board that conforms to a given operating system)
CMOS	Complementary Metal Oxide Semiconductor (technology for constructing integrated circuits)
COM	Communication Equipment (Serial Bus)
CPU	Central Processing Unit
DAC	Digital Analog Converter
DDC	Display Data Channel
DDR3	Double Data Rate (SDRAM interface)
DIMM	Dual Inline Memory Module
DirectX	Collection of application programming interfaces (APIs) for handling tasks
DP	Display Port
ECC	Error Checking and Correction
EFI	Extensible Firmware Interface
EMI	Electromagnetic Interference
eMMC	Embedded Multimedia Card
EOL	End Of Life
ESD	Electrostatic discharge
EHCI	Enhanced Host Controller Interface
GB	Gigabyte
GBE	Gigabyte Ethernet
GND	Ground (Earthing)

GPIO	General-purpose input/output
GPU	Graphics Processing Unit
HDD	Harddisk Drive
HDMI	High-Definition Multimedia Interface
IPMI	Intelligent Platform Management Interface
LED	Light Emitting Diode
LPC	Low Pin Count (serial bus)
LVDS	Low-voltage differential signaling
MDI	Media Dependent Interface
microSD	micro SD card (form factor memory card)
mITX	MiniITX (form factor for motherboards)
mPCIe	Mini PCI Express (a small form factor expansion card utilizing serial PCI Express and USB interfaces)
mSATA	Mini SATA (interface to harddisk / solid state disk)
OpenGL	Application programming interface (API) for rendering vector graphics
PCB	Printed Circuit Board
PCH	The Platform Controller Hub
PCI	Peripheral Component Interconnect (local computer bus for attaching hardware devices)
PCIe	Peripheral Component Interconnect Express (high-speed serial computer expansion bus)
POST	Power On Self Test
PS/2	Interface for connecting keyboards and mice
PSU	Power Supply Unit
PWM	Pulse-width modulation
PXE	Preboot Execution Environment
RAID	Redundant Array of Independent Disks
RoHS	Restriction of Hazardous Substances
RTC	Real Time Clock
SATA	Serial ATA (bus interface)
SD	SD card, memory card form factor
SELV	Safety extra-low voltage
SIM	SIM card, subscriber identification module
SO-DIMM	Small outline dual in-line memory module

SPD	Serial Presence Detect
SPDIF	Sony/Philips Digital Interface Format (type of digital audio interconnection)
SPI	Serial Peripheral Interface
SPWG	Standard Panels Working Group, standard for transferring graphics and video
TBD	To Be Defined
TDG	Thermal Design Guideline
TPM	Trusted Platform Module (secure cryptoprocessor)
TRIM	Part of the ATA command set
uEFI	Unified Extensible Firmware Interface
USB	Universal Serial Bus
XHCI	Extensible Host controller Interface

About Kontron

Kontron is a global leader in embedded computing technology (ECT). As a part of technology group S&T, Kontron offers a combined portfolio of secure hardware, middleware and services for Internet of Things (IoT) and Industry 4.0 applications. With its standard products and tailor-made solutions based on highly reliable state-of-the-art embedded technologies, Kontron provides secure and innovative applications for a variety of industries. As a result, customers benefit from accelerated time-to-market, reduced total cost of ownership, product longevity and the best fully integrated applications overall. For more information, please visit: www.kontron.com



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