

» Kontron User's Guide «





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» Table of Contents «

1	<u>User Information</u>	5
1.1	About This Document	5
1.2	Copyright Notice	5
1.3	Trademarks	5
1.4	<u>Standards</u>	5
1.5	Warranty	6
1.6	Technical Support	6
2	Introduction.	7
2.1	Product Description	7
2.2	Naming clarification	7
2.3	Understanding COM Express® Functionality	7
2.4	<u>COM Express® Documentation</u>	8
2.5	COM Express® Benefits	8
3	Product Specification	9
3.1	Modules Definition	9
3.2	Functional Specification	
3.3	Block Diagram	15
3.4	Accessories	
3.5	Electrical Specification	
3.5.1	Supply Voltage.	
3.5.2 3.5.3	<u>Power Supply Rise Time</u> <u>Supply Voltage Ripple</u>	
3.5.4	Power Consumption	
3.5.5	ATX Mode	
3.5.6 3.6	Single Supply Mode	
	Power Control	
3.7 3.7.1	Environmental Specification	
3.7.2	Humidity	
3.8	<u>Standards and Certifications</u>	
3.9	<u>MTBF</u>	23
3.10	Mechanical Specification	24
3.11	Module Dimensions	25
3.12	Onboard Fan Connector	26
3.13	Thermal Management, Heatspreader and Cooling Solutions	27
4	Features and Interfaces	28
4.1	<u>Onboard eMMC Flash</u>	28
4.2	Secure Digital Card	
4.3	<u>S5 Eco Mode</u>	

4.4	<u>LPC</u>
4.5	Serial Peripheral Interface (SPI)
4.6	<u>SPI boot</u>
4.7	<u>M.A.R.S.</u>
4.8	<u>UART</u>
4.9	<u>Fast I2C</u>
4.10	Dual Staged Watchdog Timer
4.11	Speedstep Technology
4.12	<u>C-States</u>
4.13	Graphics Features
4.14	ACPI Suspend Modes and Resume Events
4.15	<u>USB</u>
5	<u>System Resources</u>
5.1	Interrupt Request (IRQ) Lines
5.2	Memory Area
5.3	I/O Address Map45
5.4	Peripheral Component Interconnect (PCI) Devices
5.5	LPC addresses
5.6	<u>I2C Bus</u>
5.7	<u>System Management (SM) Bus</u>
6	<u>Pinout List</u> 48
6.1	General Signal Description
6.2	Connector X1A Row A
6.3	Connector X1A Row B51
6.4	Connector X1B Row C
6.5	Connector X1B Row D55
7	BIOS Operation
7.1	Determining the BIOS Version
7.2	BIOS Update
7.3	POST Codes
7.4	Setup Guide
7.5	BIOS Setup
7.5.1	Main
7.5.2 7.5.3	Advanced
7.5.4	<u>Boot</u>
7.5.5	<u>Exit</u>

1 User Information

1.1 About This Document

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1.4 Standards

Kontron Europe GmbH is certified to ISO 9000 standards.

1.5 Warranty

For this Kontron Europe GmbH product warranty for defects in material and workmanship exists as long as the warranty period, beginning with the date of shipment, lasts. During the warranty period, Kontron Europe GmbH will decide on its discretion if defective products are to be repaired or replaced.

Within the warranty period, the repair of products is free of charge as long as warranty conditions are observed.

Warranty does not apply for defects arising/resulting from improper or inadequate maintenance or handling by the buyer, unauthorized modification or misuse, as well as the operation outside of the product's environmental specifications and improper installation and maintenance.

Kontron Europe GmbH will not be responsible for any defects or damages to other products not supplied by Kontron Europe GmbH that are caused by a faulty Kontron Europe GmbH product.

1.6 Technical Support

Technicians and engineers from Kontron Europe GmbH and/or its subsidiaries are available for technical support. We are committed to make our product easy to use and will help you use our products in your systems.

Please consult our Website at http://www.kontron.com/support for the latest product documentation, utilities, drivers and support contacts. Consult our customer section http://emdcustomersection.kontron.com for the latest BIOS downloads, Product Change Notifications, Board Support Packages, DemoImages, 3D drawings and additional tools and software. In any case you can always contact your board supplier for technical support.

2 Introduction

2.1 **Product Description**

The standard design of the COM Express® compact modules – Kontron COMe-cBT6 – supports the entire portfolio of the Intel® Atom™ E3800 processors (COMe-cBTi6) and Intel® Celeron® processors N2800/N2900 and J1900 (COMe-cBTc6), whereby the E3800 variants are designed for the extended temperature range of -40°C to +85°C. The memory of up to 2x 8GB has been laid out as dual-channel DDR3L SODIMM. With eMMC Flash, SD card slot and 2x SATA, ample storage options for OS and application code are available. Substantial USB support is also offered with 1x USB 3.0 and up to 8x USB 2.0.

2.2 Naming clarification

COM Express® defines a Computer-On-Module, or COM, with all components necessary for a bootable host computer, packaged as a super component.

- » COMe-bXX# modules are Kontron's COM Express® modules in basic form factor (125mm x 95mm)
- » COMe-cXX# modules are Kontron's COM Express® modules in compact form factor (95mm x 95mm)
- » COMe-mXX# modules are Kontron's COM Express® modules in mini form factor (55mm x 84mm)

The product names for Kontron COM Express® Computer-on-Modules consist of a short form of the industry standard (**COMe-**), the form factor (**b**=basic, **c**=compact, **m**=mini), the capital letters for the CPU and Chipset Codenames (**XX**) and the pin-out type (**#**) followed by the CPU Name.

2.3 Understanding COM Express® Functionality

All Kontron COM Express® basic and compact modules contain two 220pin connectors; each of it has two rows called Row A & B on primary connector and Row C & D on secondary connector. COM Express® Computer-on-modules feature the following maximum amount of interfaces according to the PICMG module Pin-out type:

Feature	Pin-Out Type 1	Pin-Out Type 10	Pin-Out Type 2	Pin-Out Type 6
HD Audio	1x	1x	1x	1x
Gbit Ethernet	1x	1x	1x	1x
Serial ATA	4x	4x	4x	4x
Parallel ATA	-	-	1x	-
PCI	-	-	1x	-
PCI Express x1	бх	6х	бх	8x
PCI Express x16 (PEG)	-	-	1x	1x
USB Client	1x	1x	-	-
USB 2.0	8x	8x	8x	8x
USB 3.0	-	2x	-	4x
VGA	1x	-	1x	1x
LVDS	Dual Channel	Single Channel	Dual Channel	Dual Channel
DP++ (SDVO/DP/HDMI/DVI)	1x optional	1x	3x shared with PEG	3x
LPC	1x	1x	1x	1x
External SMB	1x	1x	1x	1x
External I2C	1x	1x	1x	1x
GPIO	8x	8x	8x	8x
SDIO shared w/GPIO	1x optional	1x optional	-	1x optional
UART (2-wire COM)	-	2x	-	2x
FAN PWM out	-	1x	-	1x

2.4 COM Express® Documentation

This product manual serves as one of three principal references for a COM Express® design. It documents the specifications and features of COMe-cBT6. Additional references are available at your Kontron Support or at PICMG®:

» The COM Express® Specification defines the COM Express® module form factor, pin-out, and signals. This document is available at the PICMG® website by filling out the order form.

» The COM Express® Design Guide by PICMG® serves as a general guide for baseboard design, with a focus on maximum flexibility to accommodate a wide range of COM Express® modules.



Some of the information contained within this product manual applies only to certain product revisions (CE: xxx). If certain information applies to specific product revisions (CE: xxx) it will be stated. Please check the product revision of your module to see if this information is applicable.

2.5 COM Express® Benefits

COM Express® modules are very compact, highly integrated computers. All Kontron COM Express® modules feature a standardized form factor and a standardized connector layout which carry a specified set of signals. Each COM is based on the COM Express® specification. This standardization allows designers to create a single-system baseboard that can accept present and future COM Express® modules.

The baseboard designer can optimize exactly how each of these functions implements physically. Designers can place connectors precisely where needed for the application on a baseboard designed to optimally fit a system's packaging.

A single baseboard design can use a range of COM Express® modules with different sizes and pin-outs. This flexibility can differentiate products at various price/performance points, or when designing future proof systems that have a built-in upgrade path. The modularity of a COM Express® solution also ensures against obsolescence when computer technology evolves. A properly designed COM Express® baseboard can work with several successive generations of COM Express® modules.

A COM Express® baseboard design has many advantages of a customized computer-board design and, additionally, delivers better obsolescence protection, heavily reduced engineering effort, and faster time to market.

3 Product Specification

3.1 Modules Definition

The COM Express® compact sized Computer-on-Module COMe-cBT6 (CVV6) follows pin-out Type 6 and is compatible to PICMG specification COM.0 Rev 2.1. The COMe-cBT6, based on Intel's Bay Trail platform, is available in different variants to cover the demand of different performance, price and power:

Industrial temperature grade modules (E2: -40°C to +85°C operating)

Part Number	Product Name	Processor	Memory	eMMC	ТРМ	mSD Socket	Ethernet	USB 2.0
36015-0016-19-4	COMe-cBTi6 E3845 16GB	Intel® Atom E3845	2x SODIMM	16GB MLC	YES	YES	Intel® i210IT	8x
36015-0000-19-4	COMe-cBTi6 E3845	Intel® Atom E3845	2x SODIMM	-	-	YES	Intel® i210IT	8x
36015-0000-17-2	COMe-cBTi6 E3827	Intel® Atom E3827	2x SODIMM	-	-	YES	Intel® i210IT	8x
36015-0000-15-2	COMe-cBTi6 E3826	Intel® Atom E3826	2x SODIMM	-	-	YES	Intel® i210IT	8x
36015-0000-13-2	COMe-cBTi6 E3825	Intel® Atom E3825	1x SODIMM	-	-	YES	Intel® i210IT	8x
36015-0000-15-1	COMe-cBTi6 E3815	Intel® Atom E3815	1x SODIMM	-	-	YES	Intel® i210IT	8x

Commercial temperature grade modules (0°C to +60°C operating)

Part Number	Product Name	Processor	Memory	eMMC	ТРМ	mSD Socket	Ethernet	USB 2.0
36017-0000-20-4	COMe-cBTc6 J1900	Intel® Celeron J1900	2x SODIMM	-	-	-	Intel® i211AT	4x
36017-0000-18-4	COMe-cBTc6 N2930	Intel® Celeron N2930	2x SODIMM	-	-	-	Intel® i211AT	4x
36017-0000-16-2	COMe-cBTc6 N2807	Intel® Celeron N2807	1x SODIMM	-	-	-	Intel® i211AT	4x
36017-0000-15-1	COMe-cBTc6 E3815	Intel® Atom E3815	1x SODIMM	-	-	YES	Intel® i211AT	4x

Onboard Flash configurations, available on E3800 variants only (36015-00FF-xx-x)

- » FF = 00: without eMMC Flash
- » FF = 20: 2GB onboard eMMC Flash
- » FF = 40: 4GB onboard eMMC Flash
- » FF = 80: 8GB onboard eMMC Flash
- » FF = 16: 16GB onboard eMMC Flash
- » FF = 32: 32GB onboard eMMC Flash
- » FF = 64: 64GB onboard eMMC Flash

Optional hardware features for E3800 Series CPU

- » TPM
- » eMMC Flash
- » eDP on COMe

Optional hardware features for Celeron Series CPU

- » TPM
- » eDP on COMe
- » USB Hub for USB #4-7 support on COMe

Optional BIOS/Software features:

» TXE Firmware with Encryption support (AES, PAVP ...)



Optional hardware and BIOS features are available project based only for variants not listed above. Please contact your local sales for customized articles.

3.2 Functional Specification

Processor

The 32nm Intel® Atom™ E3800 / Celeron® (BayTrail-I/M/D) CPU family supports:

- » Intel® 64
- » Enhanced Intel SpeedStep® Technology
- » Thermal Monitoring Technologies
- » Execute Disable Bit
- » Virtualization Technology VT-x
- » 2 Display Pipes for dual independent displays

CPU specifications

Intel®	Atom™	Atom™	Atom™	Atom™	Atom™	Atom™	Celeron®	Celeron®	Celeron®
-	E3845	E3827	E3826	E3825	E3815	E3805	J1900	N2930	N2807
Stepping	DO	DO	DO	DO	DO	DO	CO	CO	CO
# of Cores	4	2	2	2	1	2	4	4	2
# of Threads	4	2	2	2	1	2	4	4	2
CPU Nominal frequency	1.91GHz	1.75GHz	1.46GHz	1.33GHz	1.46GHz	1.33GHz	2.00GHz	1.83GHz	1.58GHz
CPU Burst frequency	-	-	-	-	-	-	2.42GHz	2.16GHz	2.16GHz
LFM/LPM Frequency	533MHz	533MHz	533MHz	533MHz	533MHz	533MHz	1333MHz	500MHz	533MHz
Tjunction	110°C	110°C	110°C	110°C	110°C	110°C	105°C	105°C	105°C
Thermal Design Power (TDP)	10W	8W	7W	6W	5W	3W	10W	7.5W	4.3W
SDP	-	-	-	-	-	-	-	4.5W	2.5W
C-States	C1/C1E/C6	C1/C1E/C6/C7	C1/C1E/C6/C7						
Smart Cache	2x1MB	2x512kB	2x512kB	2x512kB	512kB	512kB	2x1MB	2x1MB	2x512kB
Memory Type	DDR3L-1333	DDR3L-1333	DDR3L-1066	DDR3L-1066	DDR3L-1066	DDR3L-1066	DDR3L-1333	DDR3L-1333	DDR3L-1333
Max Memory Size	2x8GB	2x8GB	2x8GB	1x8GB	1x8GB	1x8GB	2x8GB	2x8GB	1x8GB
ECC Memory(optional)	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No
Graphics Model	Intel HD®	-	Intel HD®	Intel HD®	Intel HD®				
GFX Base Frequency	542MHz	542MHz	533MHz	533MHz	400MHz	-	688MHz	313MHz	313MHz
GFX Max Dynamic Frequ.	792MHz	792MHz	667MHz	-	-	-	854MHz	854MHz	750MHz
GFX Technology	GT1 4EU	-	GT1 4EU	GT1 4EU	GT1 4EU				
SDIO	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No
eMMC	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No
AES-NI (optional)	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No

Memory

Sockets	2x DDR3L SO-DIMM			
Метогу Туре	DDR3L-1066/1333			
Maximum Size	2x8GB			
Technology	Dual Channel			

Graphics Core

The integrated Intel® HD Graphics (Gen 7) supports:

Graphics Core Render Clock	Intel® HD Graphics (Gen 7) 311-542MHz Clock 667-854MHz Turbo
Execution Units / Pixel Pipelines	4
Max Graphics Memory	2048MB
GFX Memory Bandwidth (GB/s)	up to 21.3
GFX Memory Technology	DVMT
API (DirectX/OpenGL)	11 / 3.0 + OCL 1.1
Shader Model	3.0
Hardware accelerated Video	H.264 / MPEG1,2,4 / VC1 / WMV9 / Blu-ray
Independent/Simultaneous Displays	2
Display Port	DP 1.1a / eDP 1.3
HDCP support	HDCP / PAVP 2 (optional)

Monitor output

CRT max Resolution	2560x1600
TV out:	-

LVDS

LVDS Bits/Pixel	1x18/24, 2x18/24 with DP2LVDS
LVDS Bits/Pixel with dithering	-
LVDS max Resolution:	1920x1200
PWM Backlight Control:	YES
Supported Panel Data:	EDID/DID

Display Interfaces

Discrete Graphics	-
Digital Display Interface DDI1	DP++
Digital Display Interface DDI2	DP++ muxed with LVDS
Digital Display Interface DDI3	-
Maximum Resolution on DDI	2560x1600@60Hz

Storage

onboard SSD	2-64GB eMMC (w/E3800 CPU only)				
SD Card support	1x mSD Socket onboard (w/E3800 CPU only)				
IDE Interface	-				
Serial-ATA	2x SATA 3Gb/s				
SATA AHCI	AHCI with NCQ, HotPlug, Staggered Spinup,				
SATA RAID					

Connectivity

USB	up to 8x USB 2.0			
USB 3.0	1x USB 3.0			
USB Client	-			
PCI	-			
PCI External Masters	-			
PCI Express	3x PCIe x1 Gen2			
Max PCI Express	4x PCIe x1 without LAN			
PCI Express x2/x4 configuration	YES			
Ethernet	10/100/1000 Mbit			
Ethernet controller	Intel® i210IT / i211AT			

Feature OS Support Matrix

-	Wind	ows 8	Wind	ows 7	W	EC	Tizen	Fedora	a/Yocto	And	roid
-	E3800	Celeron	E3800	Celeron	E3800	Celeron	E3800	E3800	Celeron	E3800	Celeron
eMMC Storage	Х	Х	-	-	Х	-	Х	Х	-	-	-
eMMC Boot	Х	Х	-	-	Х	-	Х	Х	-	Х	Х
SD Storage	Х	Х	Х	-	Х	-	Х	Х	-	Х	Х
SD Boot	-	-	Х	-	Х	-	Х	Х	-	Х	Х
MIPI-CSI	-	-	-	-	-	-	-	Х	-	-	-

PCI Express Configuration

By default, the COMe-cBT6 supports x1 PCIexpress lane configuration only (Configuration 0). Following x2/x4 configurations are available via Management Engine Softstrap Options with a customized Flash Descriptor.

PCIe	Port #0	Port #1	Port #2	Port #3	
Default	x1	x1	x1	LAN	
Configuration 1	>	2	x1	x1	
Configuration 2	x1	x1	x1	x1	
Configuration 3	>	<2	x1	x1	
Configuration 4	>	(2	x2		
Configuration 5	x4				



Configuration 1 - 5 are available with customized BIOS versions only

Ethernet

The Intel® i210IT / i211AT ethernet supports:

- » Jumbo Frames
- » Time Sync Protocol Indicator
- » WOL (Wake On LAN)
- » PXE (Preboot eXecution Environment)

Misc Interfaces and Features

Supported BIOS Size/Type	8MB SPI			
Audio	HD Audio			
Onboard Hardware Monitor	Nuvoton NCT7802Y			
Trusted Platform Module	Atmel AT97SC3204 optional			
Miscellaneous	2x UART / PWM FAN			

Kontron Features

External I2C Bus	Fast I2C, MultiMaster capable
M.A.R.S. support	YES
Embedded API	KEAPI3
Custom BIOS Settings / Flash Backup	YES
Watchdog support	Dual Staged

Additional features

- » All solid capacitors (POSCAP). No tantalum capacitors used.
- » Optimized RTC Battery monitoring to secure highest longevity
- » Real fast I2C with transfer rates up to 40kB/s.
- » Discharge logic on all onboard voltages for highest reliability

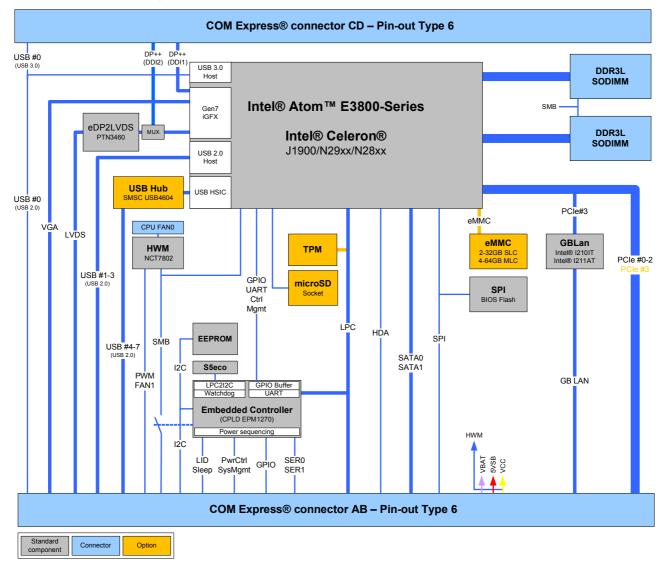
Power Features

Singly Supply Support	YES
Supply Voltage	4.75 - 20V
ACPI	ACPI 3.0
S-States	S0, S3, S4, S5
S5 Eco Mode	YES
Misc Power Management	DPST 4.0, iFFS

Power Consumption and Performance

Full Load Power Consumption	3.5 - 13.5W
Kontron Performance Index	9323 - 27747
Kontron Performance/Watt	1944 - 2986

Detailed Power Consumption measurements in all states and bechmarks for CPU, Graphics and Memory performance are available in Application Note <u>KEMAP054</u> at <u>EMD Customer</u> <u>Section</u>.



3.3 Block Diagram

3.4 Accessories

Product specific accessories

Product Number	Heatspreader and Cooling Solutions	Comment
36015-0000-99-0	HSP COMe-cBT6 thread	For all CPUs and temperature grades
36015-0000-99-1	HSP COMe-cBT6 through	For all CPUs and temperature grades

General accessories

Part Number	COMe pin-out Type 6 compatible accessories	Project Code	Comment	
38114-0000-00-0	COM Express® Reference Carrier Type 6	ADAS	mITX Carrier with 8mm COMe connector	
38106-0000-00-0	COM Express® Eval Carrier Type 6	Topanga Canyon	ATX Carrier with 5mm COMe connector	
96007-0000-00-3	ADA-PCIe-DP	APDP	PCIe x16 to DP Adapter for Evaluation Carrier	
96007-0000-00-7	ADA-Type6-DP3	DV06	(sandwich) Adapter Card for 3x DisplayPort	
96006-0000-00-2	COMe POST T6	NFCB	POST Code / Debug Card	
38019-0000-00-0	ADA-COMe-Height-dual	EERC	Height Adapter	
38106-0000-00-S	COMe Eval Starterkit T6	Topanga Canyon	Starterkit with COMe Evaluation Carrier T6	
38114-0000-00-S	COMe Ref. Starterkit T6	ADAS	Starterkit with COMe Reference Carrier T6	
Part Number	Mounting	Comment		
38017-0000-00-5	COMe Mount KIT 5mm 1set	Mounting Kit for 1	module including screws for 5mm connectors	
38017-0100-00-5	COMe Mount KIT 5mm 100sets	Mounting Kit for 1	00 modules including screws for 5mm connectors	
38017-0000-00-0	COMe Mount KIT 8mm 1set	Mounting Kit for 1	module including screws for 8mm connectors	
38017-0100-00-0	COMe Mount Kit 8mm 100sets	Mounting Kit for 1	00 modules including screws for 8mm connectors	
Part Number	Cooling Solutions	Comment		
36099-0000-99-0	COMe Active Uni Cooler	for CPUs up to 20W TDP, to be mounted on HSP		
36099-0000-99-1	COMe Passive Uni Cooler	for CPUs up to 10W TDP, to be mounted on HSP		
Part Number	Display Adapter	Comment		
9-5000-0352	ADA-LVDS-DVI 18bit	LVDS to DVI conve	rter	
9-5000-0353	ADA-LVDS-DVI 24bit	LVDS to DVI conve	rter	
96006-0000-00-8	ADA-DP-LVDS	DP to LVDS adapte	r	
96082-0000-00-0	KAB-ADAPT-DP-DVI	DP to DVI adapter	cable	
96083-0000-00-0	KAB-ADAPT-DP-VGA	DP to VGA adapter	cable	
96084-0000-00-0	KAB-ADAPT-DP-HDMI	DP to HDMI adapte	er cable	
Part Number	Cables	Comment		
96079-0000-00-0	KAB-HSP 200mm	Cable adapter to connect FAN to module (COMe basic/compact)		
96079-0000-00-2	KAB-HSP 40mm	Cable adapter to connect FAN to module (COMe basic/compact)		
Part Number	Miscellaneous	Comment		
18029-0000-00-0	MARS Smart Battery Kit	Starterkit Kontron Mobile Application platform for Rechargeable Systems		

Compatible Memory

Part Number	DDR3L SODIMM, commercial temperature grade
97015-1024-16-1	DDR3L-1600 SODIMM 1GB
97015-2048-16-1	DDR3L-1600 SODIMM 2GB
97015-4096-16-1	DDR3L-1600 SODIMM 4GB
97015-8192-16-1	DDR3L-1600 SODIMM 8GB
Part Number	DDR3L SODIMM, industrial temperature grade
97015-1024-16-3	DDR3L-1600 SODIMM 1GB E2
97015-2048-16-3	DDR3L-1600 SODIMM 2GB E2
97015-4096-16-3	DDR3L-1600 SODIMM 4GB E2
97015-8192-16-3	DDR3L-1600 SODIMM 8GB E2

3.5 Electrical Specification

3.5.1 Supply Voltage

Following supply voltage is specified at the COM Express® connector:

VCC:	4.75 - 20V
Standby:	5V DC +/- 5%
RTC:	2.5V - 3.47V



- 5V Standby voltage is not mandatory for operation.

- Extended Temperature (E1) variants are validated for 12V supply only

3.5.2 Power Supply Rise Time

» The input voltages shall rise from <10% of nominal to within the regulation ranges within 0.1ms to 20ms.

» There must be a smooth and continuous ramp of each DC input voltage from 10% to 90% of its final set-point following the ATX specification

3.5.3 Supply Voltage Ripple

» Maximum 100 mV peak to peak 0 – 20 MHz

3.5.4 Power Consumption

The maximum Power Consumption of the different COMe-cBT6 variants is 3.5 - 13.5W (100% CPU load on all cores; 90°C CPU temperature). Further information with detailed measurements are available in Application Note KEMAP054 available on <u>EMD Customer Section</u>. Information there is available after registration.

3.5.5 ATX Mode

By connecting an ATX power supply with VCC and 5VSB, PWR_OK is set to low level and VCC is off. Press the Power Button to enable the ATX PSU setting PWR_OK to high level and powering on VCC. The ATX PSU is controlled by the PS_ON# signal which is generated by SUS_S3# via inversion. VCC can be 4.75 - 20V in ATX Mode. On Computer-on-Modules supporting a wide range input down to 4.75V the input voltage shall always be higher than 5V Standby (VCC > 5VSB).

State	PWRBTN#	PWR_OK	V5_StdBy	PS_ON#	VCC
G3	x	x	OV	x	OV
S5	high	low	5V	high	0V
$S5 \rightarrow S0$	PWRBTN Event	$low \rightarrow high$	5V	high → low	$0 V \rightarrow VCC$
S0	high	high	5V	low	VCC

3.5.6 Single Supply Mode

In single supply mode (or automatic power on after power loss) without 5V Standby the module will start automatically when VCC power is connected and Power Good input is open or at high level (internal PU to 3.3V). PS_ON# is not used in this mode and VCC can be 4.75 - 20V.

To power on the module from S5 state press the power button or reconnect VCC. Suspend/Standby States are not supported in Single Supply Mode.

State	PWRBTN#	PWR_OK	V5_StdBy	VCC
G3	x	x	x	0
$G3 \rightarrow S0$	high	open/high	x	connecting VCC
S5	high	open/high	x	VCC
$S5 \rightarrow S0$	PWRBTN Event	open/high	x	reconnecting VCC



Signals marked with "x" are not important for the specific power state. There is no difference if connected or open.

All ground pins have to be tied to the ground plane of the carrier board.

3.6 Power Control

Power Supply

The COMe-cBT6 supports a power input from 4.75 - 20V. The supply voltage is applied through the VCC pins (VCC) of the module connector.

Power Button (PWRBTN#)

The power button (Pin B12) is available through the module connector described in the pinout list. To start the module via Power Button the PWRBTN# signal must be at least 50ms ($50ms \le t < 4s$, typical 400ms) at low level (Power Button Event).

Pressing the power button for at least 4seconds will turn off power to the module (Power Button Override).

Power Good (PWR_OK)

The COMe-cBT6 provides an external input for a power-good signal (Pin B24). The implementation of this subsystem complies with the COM Express® Specification. PWR_OK is internally pulled up to 3.3V and must be high level to power on the module.

Reset Button (SYS_RESET#)

The reset button (Pin B49) is available through the module connector described in the pinout list. The module will stay in reset as long as SYS_RESET# is grounded. If available, the BIOS setting for "Reset Behavior" must be set to "Power Cycle".



Modules with Intel® Chipset and active Management Engine do not allow to hold the module in Reset out of S0 for a long time. At about 10s holding the reset button the ME will reboot the module automatically

SM-Bus Alert (SMB_ALERT#)

With an external battery manager present and SMB_ALERT# (Pin B15) connected the module always powers on even if BIOS switch "After Power Fail" is set to "Stay Off".

3.7 Environmental Specification

3.7.1 Temperature Specification

Kontron defines following temperature grades for Computer-on-Modules in general. Please see chapter 'Product Specification' for available temperature grades for the COMe-cBT6

Temperature Specification	Operating	Non-operating	Validated Input Voltage
Commercial grade	0°C to +60°C	-30°C to +85°C	VCC: 4.75 - 20V
Extended Temperature (E1)	-25°C to +75°C	-30°C to +85°C	VCC: 12V
Industrial grade by Screening (XT)	-40°C to +85°C	-40°C to +85°C	VCC: 12V
Industrial grade by Design (E2)	-40°C to +85°C	-40°C to +85°C	VCC: 4.75 - 20V

Operating with Kontron heatspreader plate assembly

The operating temperature defines two requirements:

- » the maximum ambient temperature with ambient being the air surrounding the module.
- » the maximum measurable temperature on any spot on the heatspreader's surface

Test specification:

Temperature Grade	Validation requirements
Commercial grade	at 60°C HSP temperature the CPU @ 100% load needs to run at nominal frequency
Extended Temperature (E1)	at 75°C HSP temperature the CPU @ 75% load is allowed to start speedstepping for thermal protection
Industrial grade by Screening (XT)	at 85°C HSP temperature the CPU @ 50% load is allowed to start throttling for thermal protection
Industrial grade by Design (E2)	at 85°C HSP temperature the CPU @ 50% load is allowed to start throttling for thermal protection

Operating without Kontron heatspreader plate assembly

The operating temperature is the maximum measurable temperature on any spot on the module's surface.

3.7.2 Humidity

» 93% relative Humidity at 40°C, non-condensing (according to IEC 60068-2-78)

3.8 Standards and Certifications

RoHS II

The **COMe-cBT6** is compliant to the directive 2011/65/EU on the Restriction of the use of certain Hazardous Substances (RoHS II) in electrical and electronic equipment



Component Recognition UL 60950-1

The **COM Express® compact** form factor Computer-on-Modules are Recognized by Underwriters Laboratories Inc. Representative samples of this component have been evaluated by UL and meet applicable UL requirements.

UL Listings:

- » <u>NWGQ2.E304278</u>
- » <u>NWGQ8.E304278</u>



WEEE Directive

WEEE Directive 2002/96/EC is not applicable for Computer-on-Modules.

Conformal Coating

Conformal Coating is available for Kontron Computer-on-Modules and for validated SO-DIMM memory modules. Please contact your local sales or support for further details.

Shock & Vibration

The COM Express® compact form factor Computer-on-Modules successfully passed shock and vibration tests according to

- » IEC/EN 60068-2-6 (Non operating Vibration, sinusoidal, 10Hz-4000Hz, +/-0.15mm, 2g)
- » IEC/EN 60068-2-27 (Non operating Shock Test, half-sinusoidal, 11ms, 15g)

EMC

Validated in Kontron reference housing for EMC the **COMe-cBT6** follows the requirements for electromagnetic compatibility standards

» EN55022

3.9 MTBF

The following MTBF (Mean Time Before Failure) values were calculated using a combination of manufacturer's test data, if the data was available, and the Telcordia (Bellcore) issue 2 calculation for the remaining parts.

The calculation method used is "Telcordia Issue 2 Method 1 Case 3" in a ground benign, controlled environment (GB,GC). This particular method takes into account varying temperature and stress data and the system is assumed to have not been burned in.

Other environmental stresses (extreme altitude, vibration, salt water exposure, etc) lower MTBF values.

System MTBF (hours): tbd



Fans usually shipped with Kontron Europe GmbH products have 50,000-hour typical operating life. The above estimates assume no fan, but a passive heat sinking arrangement Estimated RTC battery life (as opposed to battery failures) is not accounted for in the above figures and need to be considered separately. Battery life depends on both temperature and operating conditions. When the Kontron unit has external power; the only battery drain is from leakage paths.

3.10 Mechanical Specification

Dimension

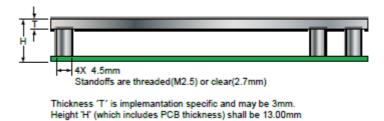
- » 95.0 mm x 95.0 mm (3.75" x 3.75")
- » Height approx. 12mm (0.4")



CAD drawings are available at EMD CustomerSection

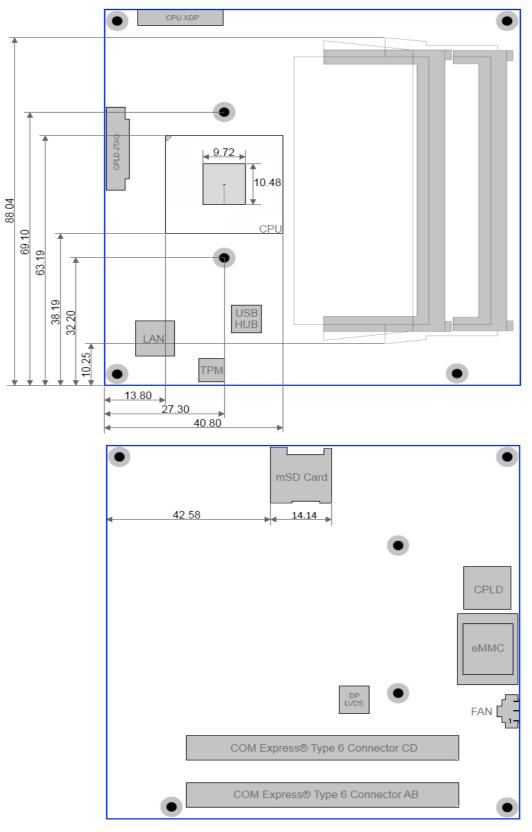
Height

The COM Express® specification defines a module height of 13mm from bottom to heatspreader top:



Cooling solutions provided from Kontron Europe GmbH for compact sized Computer-on-Modules are 27mm in height from module bottom to Heatsink top. Universal Cooling solutions to be mounted on the HSP (36099-0000-00-x) are 14.3mm in height for an overall height of 27.3mm from module bottom to Heatsink top.





All dimensions in mm

3.12 Onboard Fan Connector

Specification

- » Part number (Molex) J3: 53261-0371
- » Mates with: 51021-0300
- » Crimp terminals: 50079-8100

Pin assignment

» Pin1: Tacho, Pin2: VCC, Pin3: GND

Electrical characteristic

Module Input Voltage	4.75 - 13V	>13
FAN Output Voltage	4.75 - 13V	13V
Max. FAN Output Current	350mA	150mA

3.13 Thermal Management, Heatspreader and Cooling Solutions

A heatspreader plate assembly is available from Kontron Europe GmbH for the COMe-cBT6. The heatspreader plate on top of this assembly is NOT a heat sink. It works as a COM Express®-standard thermal interface to use with a heat sink or external cooling devices.

External cooling must be provided to maintain the heatspreader plate at proper operating temperatures. Under worstcase conditions, the cooling mechanism must maintain an ambient air and heatspreader plate temperature on any spot of the heatspreader's surface according the module specifications:

- » 60°C for commercial grade modules
- » 75°C for extended temperature grade modules (E1)
- » 85°C for industrial temperature grade modules (E2/XT)

The aluminum slugs and thermal pads or the heat-pipe on the underside of the heatspreader assembly implement thermal interfaces between the heatspreader plate and the major heat-generating components on the COMe-cBT6. About 80 percent of the power dissipated within the module is conducted to the heatspreader plate and can be removed by the cooling solution.

You can use many thermal-management solutions with the heatspreader plates, including active and passive approaches. The optimum cooling solution varies, depending on the COM Express® application and environmental conditions. Active or passive cooling solutions provided from Kontron Europe GmbH for the COMe-cBT6 are usually designed to cover the power and thermal dissipation for a commercial grade temperature range used in a housing with proper air flow.

Documentation and CAD drawings of COMe-cBT6 heatspreader and cooling solutions are provided at http://emdcustomersection.kontron.com.

4 Features and Interfaces

4.1 Onboard eMMC Flash

The COMe-cBT6 features a 12x16mm onboard Kingston NAND Flash drive with capacities of 2-64GB eMMC (w/E3800 CPU only). The Flash drive supports:

- » Compliant to JEDEC/eMMC standard version 4.4, 4.41 & 4.5
- » 1 bit, 4 bits or 8 bits data bus width support
- » Data transfer rate up to 52Mbyte/s using 8 parallel data lines at 52MHz
- » Single data rate up to 200Mbyte/s @ HS200 mode with 200MHz Host clock
- » Dual data rate up to 104Mbyte/s @ 52MHz
- » Error free memory access (ECC and enhanced data management)
- » TRIM support
- » Multi-Level-Cell (MLC) technology
- » Single-Level-Cell (SLC) technology
- » Industrial temperature grade -45 to +85°C

Flash Part No.	KE4CN2H5C-xxx	KE4CN3H5C-xxx	KE4CN4K6C-xxx	KE4CN5B6C-xxx	KE4CN6C6C-xxx
Nominal Flash Size MLC	4GByte	8GByte	16GByte	32GByte	64GByte
Nominal Flash Size pSLC	2GByte	4GByte	8GByte	16GByte	32GByte
JEDEC Standard	eMMC 4.5				
Flash Technology	19nm	19nm	19nm	19nm	19nm
Sequential Read	85 MB/s	160 MB/s	166 MB/s	166 MB/s	166 MB/s
Sequential Write	12 MB/s	25 MB/s	25 MB/s	45 MB/s	25 MB/s
I/O Performance read/write	5000/1050 IOPS	5000/1350 IOPS	5000/1350 IOPS	4600/1450 IOPS	4600/1450 IOPS
Operating Temperature	-40 to +85°C	-40 to +85°C	-40 to +85°C	-40 to +85°C	-25 to +85°C
Package	FBGA153	FBGA153	FBGA169	FBGA169	FBGA169
Endurance (# of P/E cycles)	MLC 3k, SLC 30k				

- » Compliant to JEDEC/eMMC standard version 4.4, 4.41, 4.5 & 5.0
- » 1 bit, 4 bits or 8 bits data bus width support
- » Data transfer rate up to 52Mbyte/s using 8 parallel data lines at 52MHz
- $\ensuremath{\mathsf{s}}$ » Single data rate up to 200Mbyte/s @ HS200 mode with 200MHz Host clock
- » Dual data rate up to 104Mbyte/s @ 52MHz
- » Error free memory access (ECC and enhanced data management)
- » TRIM support
- » Multi-Level-Cell (MLC) technology
- » Single-Level-Cell (SLC) technology
- » Industrial temperature grade -45 to +85°C

Flash Part No.	eMMC04G-W100-xxx	eMMC08G-W100-xxx	eMMC16G-W100-xxx	eMMC32G-W100-xxx	eMMC64G-W100-xxx
Nominal Flash Size MLC	4GByte	8GByte	16GByte	32GByte	64GByte
Nominal Flash Size SLC	2GByte	4GByte	8GByte	16GByte	32GByte
JEDEC Standard	eMMC 4.5+	eMMC 4.5+	eMMC 4.5+	eMMC 4.5+	eMMC 5.0
Flash Technology	A19nm	A19nm	A19nm	A19nm	A19nm
Sequential Read	100 MB/s	130 MB/s	135 MB/s	145 MB/s	tbd
Sequential Write	12 MB/s	24 MB/s	24 MB/s	45 MB/s	tbd
I/O Performance read/write	6300/1250 IOPS	6300/1250 IOPS	6300/1500 IOPS	5500/1600 IOPS	tbd
Operating Temperature	-40 to +85°C				
Package	FBGA153	FBGA153	FBGA153	FBGA153	FBGA153
Endurance (# of P/E cycles)	MLC 3k, SLC 30k				



Note: the onboard eMMC Flash requires pre-configuration via EFI Shell before OS installation (e.g. diskpart utility)

4.2 Secure Digital Card

The COMe-cBT6 supports an SDIO Interface to be used for micro/mini/standard SD Card sockets. Following SD Cards are validated from Kontron and recommended for use:

swissbit® S-200U & S-300U Series Industrial microSD Card

- » compliant to SD Card specification 2.0
- » Wear Leveling of static and dynamic data
- » High reliability (MTBF >3,000,000 hours, > 10,000 insertions)
- » Extended or Industrial Temperature range
- » up to 25MB/s data transfer speed

Delkin Devices Inc. MicroSD

- » compliant to SD Card specification 2.0
- » Wear Leveling and ECC
- » High reliability (MTBF >2,000,000 hours, > 2,000,000 write/erase cycles)
- » Industrial Temperature range
- » up to 17MB/s data transfer speed

Order information

Density	Manufacturerer & Part.No.	Temperature range	mSD-SD Adapter
1GB SD1.1	swissbit SFSD1024N1BN1T0-I-DF-151-STD	-40°C to 85°C	No
2GB SD1.1	swissbit SFSD2048N1BW1MT-E-ME-111-STD	-25°C to 85°C	No
2GB SD1.1	Delkin SD02GHMSH-S2047-B	-40°C to 85°C	No
2GB SDHC	Delkin SD02GHMSH-S2000-B	-40°C to 85°C	Yes
4GB SDHC	swissbit SFSD4096N1BW1MT-E-DF-111-STD	-25°C to 85°C	No
4GB SDHC	Delkin SD04GHMSH-S2647-B	-40°C to 85°C	No
4GB SDHC	Delkin SD04GHMSH-S2600-B	-40°C to 85°C	Yes
8GB SDHC	Delkin SD08GHMSH-S2647-B	-40°C to 85°C	No
8GB SDHC	Delkin SD08GHMSH-S2600-B	-40°C to 85°C	Yes

4.3 S5 Eco Mode

Kontron's new high-efficient power-off state S5 Eco enables lowest power-consumption in soft-off state – less than 1 mA compared to the regular S5 state this means a reduction by at least factor 200!

In the "normal" S5 mode the board is supplied by 5V_Stb and needs usually up to 300mA just to stay off. This mode allows to be switched on by power button, RTC event and WakeOnLan, even when it is not necessary. The new S5 Eco mode reduces the current enormous.

The S5 Eco Mode can be enabled in BIOS Setup, when the BIOS supports this feature.

Following prerequisites and consequences occur when S5 Eco Mode is enabled

- » The power button must be pressed at least for 200ms to switch on.
- » Wake via Power button only.
- » "Power On After Power Fail"/"State after G3": only "stay off" is possible

4.4 LPC

The Low Pin Count (LPC) Interface signals are connected to the LPC Bus bridge located in the CPU or chipset. The LPC low speed interface can be used for peripheral circuits such as an external Super I/O Controller, which typically combines legacy-device support into a single IC. The implementation of this subsystem complies with the COM Express® Specification. Implementation information is provided in the COM Express® Design Guide maintained by PICMG. Please refer to the official PICMG documentation for additional information.

The LPC bus does not support DMA (Direct Memory Access) and a clock buffer is required when more than one device is used on LPC. This leads to limitations for ISA bus and SIO (standard I/O´s like Floppy or LPT interfaces) implementations.

All Kontron COM Express® Computer-on-Modules imply BIOS support for following external baseboard LPC Super I/O controller features for the **Winbond/Nuvoton 5V 83627HF/G and 3.3V 83627DHG-P**:

83627HF/G	Phoenix BIOS	AMI CORE8	AMI / Phoenix EFI
PS/2	YES	YES	YES
COM1/COM2	YES	YES	YES
LPT	YES	YES	YES
HWM	YES	YES	NO
Floppy	NO	NO	NO
GPIO	NO	NO	NO
83627DHG-P	Phoenix BIOS	AMI CORE8	AMI / Phoenix EFI
PS/2	YES	YES	YES
r 5/2	163	ILS	ILJ
COM1/COM2	YES	YES	YES
COM1/COM2	YES	YES	YES
COM1/COM2 LPT	YES YES	YES YES	YES YES

Features marked as not supported do not exclude OS support (e.g. HWM can be accessed via SMB). For any other LPC Super I/O additional BIOS implementations are necessary. Please contact your local sales or support for further details.

4.5 Serial Peripheral Interface (SPI)

The Serial Peripheral Interface Bus or SPI bus is a synchronous serial data link standard named by Motorola that operates in full duplex mode. Devices communicate in master/slave mode where the master device initiates the data frame. Multiple slave devices are allowed with individual slave select (chip select) lines. Sometimes SPI is called a "four wire" serial bus, contrasting with three, two, and one wire serial buses.



The SPI interface can only be used with a SPI flash device to boot from external BIOS on the baseboard.

4.6 SPI boot

The COMe-cBT6 supports boot from an external SPI Flash. It can be configured by pin A34 (BIOS_DIS#0) and pin B88 (BIOS_DIS1#) in following configuration:

BIOS_DISO#	BIOS_DIS1#	Function
open	open	Boot on-module BIOS
GND	open	Boot baseboard LPC FWH
open	GND	Baseboard SPI = Boot Device 1, on-module SPI = Boot Device 2
GND	GND	Baseboard SPI = Boot Device 2, on-module SPI = Boot Device 1



By default only SPI Boot Device 1 is used in configuration 3 & 4. Both SPI Boot Devices are used by splitting the BIOS with modified descriptor table in customized versions only

Recommended SPI boot flash types for 8-SOIC package

Size	Manufacturer	Part Number	Device ID
16Mbit	Atmel	AT26DF161	0x1F4600
16Mbit	Atmel	AT26DF161A	0x1F4601
16Mbit	Atmel	AT25DF161	0x1F4602
16Mbit	Atmel	AT25DQ161	0x1F8600
16Mbit	Macronix	MX25L1605A(D)(36E)(06E)	0xC22015
16Mbit	Macronix	MX25L1635D	0xC22415
16Mbit	SST/Microchip	SST25VF016B	0xBF2541
16Mbit	Winbond	W25X16BV	0xEF3015
16Mbit	Winbond	W25Q16BV(CV)	0xEF4015
Size	Manufacturer	Part Number	Device ID
32Mbit	Atmel	AT25/26DF321	0x1F4700
32Mbit	Atmel	AT25DF321A	0x1F4701
32Mbit	Macronix	MX25L3205A(D)(06E)	0xC22016
32Mbit	Macronix	MX25L3225D(35D)(36D)	0xC25E16
32Mbit	SST/Microchip	SST25VF032B	0XBF254A
32Mbit	Winbond	W25X32BV	0xEF3016
32Mbit	Winbond	W25Q32BV,	0xEF4016
Size	Manufacturer	Part Number	Device ID
64Mbit	Atmel	AT25DF641(A)	0x1F4800
64Mbit	Atmel	AT25DQ641	0x1F8800
64Mbit	Macronix	MX25L6405D(45E)(36E)(06E)(73E)	0xC22017
64Mbit	Macronix	MX25L6455E	0xC22617
64Mbit	Macronix	MX25U6435F	0xC22537
64Mbit	SST/Microchip	SST25VF064C	0xBF254B
64Mbit	Winbond	W25X64BV	0xEF3017
64Mbit	Winbond	W25Q64BV(CV)(FV)	0xEF4017
64Mbit	Winbond	W25Q64DW	0XEF6017
64Mbit	Winbond	W25Q64FW	0XEF6017

Using an external SPI flash

To program an external SPI flash follow these steps:

- » Connect a SPI flash with correct size (similar to BIOS ROM file size) to the module SPI interface
- » Open pin A34 and B88 to boot from the module BIOS

» Boot the module to DOS/EFI-Shell with access to the BIOS image and Firmware Update Utility provided on EMD Customer Section

- » Connect pin B88 (BIOS_DIS1#) to ground to enable the external SPI flash
- » Execute Flash.bat/Flash.efi to program the complete BIOS image to the external SPI flash
- » reboot

Your module will now boot from the external SPI flash when BIOS_DIS1# is grounded.

External SPI flash on Modules with Intel® ME

If booting from the external (baseboard mounted) SPI flash then exchanging the COM Express® module for another one of the same type will cause the Intel® Management Engine to fail during next start. This is by design of the ME because it bounds itself to the very module it has been flashed to. In the case of an external SPI flash this is the module present at flash time.

To avoid this issue please make sure to conduct a complete flash of the external SPI flash device after changing the COMexpress module for another one. If disconnecting and reconnecting the same module again this step is not necessary.

4.7 M.A.R.S.

The Smart Battery implementation for Kontron Computer-on-Modules called Mobile Application for Rechargeable Systems is a BIOS extension for external Smart Battery Manager or Charger. It includes support for SMBus charger/selector (e.g. Linear Technology LTC1760 Dual Smart Battery System Manager) and provides ACPI compatibility to report battery information to the Operating System.

Reserved SM-Bus addresses for Smart Battery Solutions on the carrier:

8-bit Address	7-bit Address	Device
12h	0x09	SMART_CHARGER
14h	0x0A	SMART_SELECTOR
16h	0x0B	SMART_BATTERY

4.8 **UART**

The COMe-cBT6 supports up to two Serial RX/TX only Ports defined in COM Express® specification on Pins A98/A99 for UART0 and Pins A101/A102 for UART1. The implementation of the UART is compatible to 16450 and is supported by default from most operating systems. Resources are subordinated to other UARTS e.g. from external LPC Super I/O.

UART features:

- » 450 to 115.2k Baud (except 56000)
- » 5, 6, 7 or 8bit characters
- » 1 or 2 Stop bit generation
- » Even, odd or no-parity generation/detection
- » Complete status reporting capabilities
- » Line break generation and detection
- » Full prioritized interrupt system control
- » No FIFO
- » One additional shift register for transmit and one for receive
- » No Flow Control
- » No FCR register due to unavailability of FIFO
- » MCR and MSR registers only implemented in loopback mode for compatibility with existing drivers and APIs
- » Initialized per default to COM3 3F8h/IRQ4 and COM4 2F8/IRQ3 without external SIO
- » Initialized per default to COM3 3E8h/IRQ5 and COM4 2E8/IRQ10 with external SIO present

The UART clock is generated by the 33MHz LPC clock which results in an accuracy of 0.5% on all UART timings

- Due to the protection circuitry required according COM Express® specification the transfer speed can only be guaranteed for 9600 Baud. Please contact your local sales or support for customized versions without protection circuitry

note

- Legacy console redirection via onboard serial ports may be restricted in terms of serial input stream. Since they're only emulating a 16450 device (w/o FIFO) an input stream generated by a program may lose characters. Inputs from a keyboard via terminal program will be safe.

4.9 Fast I2C

The COMe-cBT6 supports a CPLD implemented LPC to I2C bridge using the WISHBONE I2C Master Core provided from opencores.org. The I2C Interface supports transfer rates up to 40kB/s and can be configured in Setup

Specification for external I2C:

- » Speed up to 400kHz
- » Compatible to Philips I2C bus standard
- » Multi-Master capable
- » Clock stretching support and wait state generation
- » Interrupt or bit-polling driven byte-by-byte data-transfers
- » Arbitration lost interrupt with automatic transfer cancellation
- » Start/Stop signal generation/detection
- » Bus busy detection
- » 7bit and 10bit addressing

4.10 Dual Staged Watchdog Timer

Basics

A watchdog timer (or computer operating properly (COP) timer) is a computer hardware or software timer that triggers a system reset or other corrective action if the main program, due to some fault condition, such as a hang, neglects to regularly service the watchdog (writing a "service pulse" to it, also referred to as "kicking the dog", "petting the dog", "feeding the watchdog" or "triggering the watchdog"). The intention is to bring the system back from the nonresponsive state into normal operation.

The COMe-cBT6 offers a watchdog which works with two stages that can be programmed independently and used one by one.

Time-out events

Reset	A reset will restart the module and starts POST and operating system new.
NMI	A non-maskable interrupt (NMI) is a computer processor interrupt that cannot be ignored by standard interrupt masking techniques in the system. It is typically used to signal attention for non-recoverable hardware errors.
SCI	A system control interrupt (SCI) is a OS-visible interrupt to be handled by the OS using AML code
Delay	Might be necessary when an operating system must be started and the time for the first trigger pulse must extended. (Only available in the first stage)
WDT Signal only	This setting triggers the WDT Pin on baseboard connector (COM Express® Pin B27) only
Cascade:	Does nothing, but enables the 2nd stage after the entered time-out.

WDT Signal

B27 on COM Express® Connector offers a signal that can be asserted when a watchdog timer has not been triggered within time. It can be configured to any of the 2 stages. Deassertion of the signal is automatically done after reset. If deassertion during runtime is necessary please ask your Kontron technical support for further help.

4.11 Speedstep Technology

The Intel® processors offer the Intel® Enhanced SpeedStep[™] technology that automatically switches between maximum performance mode and battery-optimized mode, depending on the needs of the application being run. It enables you to adapt high performance computing on your applications. When powered by a battery or running in idle mode, the processor drops to lower frequencies (by changing the CPU ratios) and voltage, conserving battery life while maintaining a high level of performance. The frequency is set back automatically to the high frequency, allowing you to customize performance.

In order to use the Intel® Enhanced SpeedStep™ technology the operating system must support SpeedStep™ technology.

By deactivating the SpeedStep feature in the BIOS, manual control/modification of CPU performance is possible. Setup the CPU Performance State in the BIOS Setup or use 3rd party software to control CPU Performance States.

4.12 C-States

New generation platforms include power saving features like SuperLFM, EIST (P-States) or C-States in O/S idle mode.

Activated C-States are able to dramatically decrease power consumption in idle mode by reducing the Core Voltage or switching of parts of the CPU Core, the Core Clocks or the CPU Cache.

Following C-States are defined:

C-State	Description	Function	
C0	Operating	CPU fully turned on	
C1	Halt State	Stops CPU main internal clocks via software	
C1E	Enhanced Halt	Similar to C1, additionally reduces CPU voltage	
C2	Stop Grant	Stops CPU internal and external clocks via hardware	
C2E	Extended Stop Grant	Similar to C2, additionally reduces CPU voltage	
C3	Deep Sleep	Stops all CPU internal and external clocks	
C3E	Extended Stop Grant	iimilar to C3, additionally reduces CPU voltage	
C4	Deeper Sleep	Reduces CPU voltage	
C4E	Enhanced Deeper Sleep	Reduces CPU voltage even more and turns off the memory cache	
C6	Deep Power Down	Reduces the CPU internal voltage to any value, including OV	
C7	Deep Power Down	Similar to C6, additionally LLC (LastLevelCache) is switched off	

C-States are usually enabled by default for low power consumption, but active C-States my influence performance sensitive applications or real-time systems.

» Active C6-State may influence data transfer on external Serial Ports

» Active C7-State may cause lower CPU and Graphics performance

It's recommended to disable C-States / Enhanced C-States in BIOS Setup if any problems occur.

4.13 Graphics Features

0/S	Win8 / WES8	Win7 / WES7	WEC7	Linux (F18/Yocto1.6)	Linux (Tizen IVI 32b)	Android 4.2/4.4	
DisplayPort	DP 1.1a up to 2560×1600					not supported	
HDMI (via external LS)	HDMI 1.4a up to 1920×1200					·	
VGA (COMe-compact only)			up to 256	0×1600	not supported		
eDP			eDP 1.3 up to 256	eDP 1.3 up to 2560×1600 or LVDS up to 1920×1080 via eDP-LVDS Bridge			
Dual Independent Display				Yes			
2D HW acceleration		DirectDraw	,	X Server Wayland Compositor		OpenGL Renderer	
3D HW acceleration	0GL4.0, D)	X11.1/10/9	OGLES 2.0	0GL3.2/0GLES2.0		OGLES 1.1/2.0 in 4.2 OGLES 1.1/2.0/3.0 in 4.4 KitKat	
HW Media Acceleration	DXV	/A 2	DirectShow	VAAPI 0GL3.2/0GLES2.0		OpenMax	
HW Video Decode	H.264,MPE	G2,VC1,VP8	H.264,MPEG2,VC1	H.264,MPEG2,VC1,VP8 H.264,MPEG2,VC1,VP8		H.264,H.263,VC1,WMV9,VP8,MPEG4 in 4.2 H.264, VC1 in 4.4	
HW Video Encode	H.264	,MPEG2	not supported	ed H.264,MPEG2 H.264,MPEG2		H.264	
Blu-Ray	v2.0		not s			not supported	
Media players		ledia Player erDVD	CEPlayer GStreamer - VAAPI			Gallery, Widevine	
Content Protection*	PAVP	HDCP		not supported		Widevine L1	

The integrated Intel® HD Graphics (Gen 7) graphics supports following OS dependent featureset:

* Supported with active TXE Engine only (available with custom BIOS only)

4.14 ACPI Suspend Modes and Resume Events

The COMe-cBT6 supports the S-states S0, S3, S4, S5. S5eco Support: YES

The following events resume the system from S3:

- » USB Keyboard (1)
- » USB Mouse (1)
- » Power Button
- » WakeOnLan (2)

The following events resume the system from S4:

- » Power Button
- » WakeOnLan (2)

The following events resume the system from S5:

- » Power Button
- » WakeOnLan (2)

The following events resume the system from S5Eco:

» Power Button

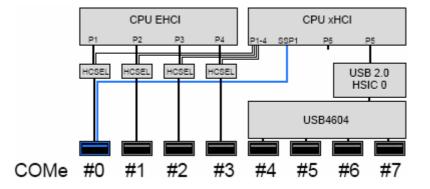


(1) OS must support wake up via USB devices and baseboard must power the USB Port with StBy-Voltage

(2) Depending on the Used Ethernet MAC/Phy WakeOnLan must be enabled in BIOS setup and driver options

4.15 USB

The COMe-cBT6 supports up to 8x USB 2.0/1x USB 3.0 with following internal EHCI/xHCI configuration:





Note: The USB Ports provided by the HSIC USB Hub requires xHCI enabled in Setup and full USB 3.0 OS Support

5 System Resources

5.1 Interrupt Request (IRQ) Lines

IRQ #	Used For
0	Timer0
1	Keyboard
2	Redirected secondary PIC
3	Onboard - COM2
4	Onboard - COM1
5	SIO COM3 or 4
6	SIO COM3 or 4
7	SIO LPT or COM3/4
8	RTC
9	Free for PCI devices
10	Free for PCI devices
11	Free for PCI devices
12	PS/2 mouse or free for PCI devices
13	FPU
14	not used
15	not used

5.2 Memory Area

Address range (hex)	Size	Usage
0000000-0009FFFF	640 KB	DOS- (Real mode-) memory
000A0000-000BFFFF	128 KB	Display memory
000C0000-000CBFFF	48 KB	VGA BIOS
000CC000-000DFFFF	80 KB	Option ROM or XMS
000E0000-000EFFFF	64 KB	System BIOS extended space
000F0000-000FFFFF	64 KB	System BIOS base segment
0x20000000 00100000-7FFFFFFF	2 GB – 1 MB	System memory (Low DRAM)
0x2000000-0x20001000	4KB	Minimum mapping for chipset LPE device
8000000-FFF00000	2 GB – 1 MB	PCI memory, other extensions (Low MMIO)
FEC00000-FEC00040	64 Bytes	IOxAPIC
FED00000-FED003FF	1 KB	HPET (Timer)
FED1C000-FED1CFFF	4KB	Chipset internal register space
FED40000-FED4B000	44 KB	TPM hard coded memory
FFFF0000-FFFFFFF	64 KB	Mapping space for BIOS ROM/Boot vector
10000000-17FFFFFF	2 GB	System memory (High DRAM)
18000000-F0000000	58 GB	High MMIO

5.3 I/O Address Map

The I/O-port addresses of the are functionally identical to a standard PC/AT. All addresses not mentioned in this table should be available. We recommend that you do not use I/O addresses below 0100h with additional hardware for compatibility reasons, even if available.

I/O Address	Usage
0000-000F	DMA-Controller Master (8237)
0020-0021 024-025 028-029 02C-02D 030-031 034-035 038-039 03C-03D	Interrupt-Controller Master (8259)
002E-002F	External SuperI/O
040-043 050-053	Programmable Interrupt Timer (8253)
04E-04F	ТРМ
060, 064	KBD Interface-Controller (8042)
061, 063, 065, 067	NMI Controller
070-071	RTC CMOS / NMI mask
072-073	RTC Extended CMOS
080-083	Debug port
0A0-0A1 0A4-0A5 0A8-0A9 0AC-0AD 0B0-0B1 0B4-0B5 0B8-0B9 0BC-0BD	Interrupt-Controller Slave (8259)
0B2-0B3	APM control
279	ISA PnP
295-296	External Hardware monitor, optionally used by external SuperIO if present
2E8-2EF	Serial port COM4 (SIO COM2)
2F8-2FF	Serial port COM2 (onboard COM2)
370-377	Floppy disk controller, optionally used by external SuperIO if present (370h to 371h)
378-37F	Parallel port LPT 1, optionally used by external SuperIO if present
3C0-3CF	VGA/EGA
3E8-3EF	Serial port COM3 (SIO COM1)
3F8-3FF	Serial Port COM1 (onboard COM1)
400-4FF	Chipset internal register I/O area
4D0-4D1	Interrupt-Controller (Slave)
500-5FF	Chipset internal register I/O area
A80-A81	Kontron CPLD control port
CF8	PCI configuration address
CF9	Reset control
CFC-CFF	PCI configuration data

5.4 Peripheral Component Interconnect (PCI) Devices

All devices follow the Peripheral Component Interconnect 2.3 (PCI 2.3) respectivily the PCI Express Base 1.0a specification. The BIOS and OS control memory and I/O resources. Please see the PCI 2.3 specification for details.

Device	Bus/Device/Function	VID/DID default	Comment
Transaction Router (former host bridge)	0/0/0	8086h/0F00h	-
Graphics & display	0/2/0	8086h/0F31h	-
Camera image signal processor	0/3/0	8086h/0F38h	Not used
eMMC	0/16/0	8086h/0F14h	-
SDIO	0/17/0	8086h/0F15h	Not used
SD	0/18/0	8086h/0F16h	-
SATA	0/19/0	8086h/0F23h	-
xHCI	0/20/0	8086h/8C31h	-
Low-power Audio	0/21/0	8086h/0F28h	-
I2S port 0	0/21/1	-	-
I2S port 1	0/21/2	-	-
I2S port 2	0/21/3	-	-
USB3.0 device	0/22/0	8086h	-
SIO I2C DMA Configuration	0/24/0	8086h/0F40h	-
I2C1 Configuration	0/24/1	8086h/0F41h	-
I2C2 Configuration	0/24/2	8086h/0F42h	-
I2C3 Configuration	0/24/3	8086h/0F43h	-
I2C4 Configuration	0/24/4	8086h/0F44h	-
I2C5 Configuration	0/24/5	8086h/0F45h	-
I2C6 Configuration	0/24/6	8086h/0F46h	-
I2C7 Configuration	0/24/7	8086h/0F47h	-
Trusted Execution engine	0/26/0	8086h/0F18h	-
HD Audio	0/27/0	8086h/0F04h	-
PCIExpress Root port 0	0/28/0	8086h	-
PCIExpress Root port 1	0/28/1	-	-
PCIExpress Root port 2	0/28/2	-	-
PCIExpress Root port 3	0/28/3	-	-
EHCI	0/29/0	8086h/0F34h	-
SerialIO HSUART / PWM / SPI DMA	0/30/0	8086h/0F06h	-
PWM Port 1	0/30/1	8086h	-
PWM Port 2	0/30/2	8086h	-
HSUART1	0/30/3	8086h/0F0Ah	-
HSUART2	0/30/4	8086h/0F0Ch	-
SPI	0/30/5	8086h/0F0Eh	-
PCU LPC	0/31/0	8086h/0F1Ch	-

5.5 LPC addresses

I/O address	Device
2Eh/2Fh	external SuperI/O Winbond/Nuvoton 83627
4Eh/4Fh	ТРМ
0A80h/0A81h	CPLD

5.6 I2C Bus

8-bit Address	7-bit Address	Device	Bus
58h	0x2C	S5eco resistor	internal
5Ah	0x2D	USB HSIC Hub	internal
C0h	0x60	DP2LVDS bridge	internal
A0h	0x50	LVDS EEPROM	internal
A0h	0x50	Module / JIDA EEPROM	external
AEh	0x57	Carrier EEPROM	external

5.7 System Management (SM) Bus

8-bit Address	7-bit Address	Device	Bus
10h	0x08	HSIC	internal
30h	0x18	DDR3L 0 Thermal sensor option	internal
32h	0x19	DDR3L 1 Thermal sensor option	internal
5Ah	0x2D	onboard HWMonitor	internal
A0h	0x50	DDR3L SPD 0	internal
A2h	0x51	DDR3L SPD 1	internal
C8h	0x64	Ethernet	internal
12h	0x09	SMART_CHARGER	external
14h	0x0A	SMART_SELECTOR	external
16h	0x0B	SMART_BATTERY	external
58h	0x2C	SIO HWMonitor	external



Do not use any reserved addresses mentioned above for other devices

6 Pinout List

6.1 General Signal Description

Туре	Description
I/0-3,3	Bi-directional 3,3 V IO-Signal
I/0-5T	Bi-dir. 3,3V I/O (5V Tolerance)
I/0-5	Bi-directional 5V I/O-Signal
I-3,3	3,3V Input
I/OD	Bi-directional Input/Output Open Drain
I-5T	3,3V Input (5V Tolerance)
0A	Output Analog
OD	Output Open Drain
0-1,8	1,8V Output
0-3,3	3,3V Output
0-5	5V Output
DP-I/0	Differential Pair Input/Output
DP-I	Differential Pair Input
DP-0	Differential Pair Output
PU	Pull-Up Resistor
PD	Pull-Down Resistor
PWR	Power Connection



To protect external power lines of peripheral devices, make sure that: the wires have the right diameter to withstand the maximum available current the enclosure of the peripheral device fulfills the fire-protection requirements of IEC/EN60950

6.2 Connector X1A Row A

A1 640 Parer Ground PMR 640 - - A2 6680, M013+ Ethernet Media Dependent Interface 3 + 0P-1/0 - - A3 6680, M013+ Ethernet Media Dependent Interface 3 + 0P-1/0 - - A4 6680, M012+ Ethernet Media Dependent Interface 2 + 0P-1/0 - - A5 6680, M012+ Ethernet Media Dependent Interface 2 + 0P-1/0 - - A6 6680, M012+ Ethernet Media Dependent Interface 2 + 0P-1/0 - - A7 6680, M011+ Ethernet Media Dependent Interface 1 + 0P-1/0 - - A11 6680, M011+ Ethernet Media Dependent Interface 0 + 0P-1/0 - - A12 6680, M010+ Ethernet Media Dependent Interface 0 + 0P-1/0 - - A13 6680, M010+ Ethernet Media Dependent Interface 0 + 0P-1/0 - - A14 6680, M010+ Ethernet Media Dependent Interface 0 + 0P-1/0 - - A14 <th></th> <th>Comment</th> <th>Termination</th> <th>Туре</th> <th>Description</th> <th>Signal</th> <th>Pin</th>		Comment	Termination	Туре	Description	Signal	Pin
A2 660, M012- 680, M012- 6		-	-				
A3 GBED_MDI3+ Ethernet Media Dependent Interface 3+ DP-1/0 - - A4 GBED_LINK1000F Ethernet Speed LID 00 - - A5 GBED_LINK1000F Ethernet Speed LID 00 - - A6 GBED_MDI2- Ethernet Media Dependent Interface 2- DP-1/0 - - A6 GBED_MDI2- Ethernet Media Dependent Interface 2- DP-1/0 - - A7 GBED_MDI2- Ethernet Media Dependent Interface 1- DP-1/0 - - A11 GBED_MDI2- Ethernet Media Dependent Interface 0- DP-1/0 - - A13 GBED_MDI2- Ethernet Media Dependent Interface 0- DP-1/0 - - A14 GBED_MDI2- Ethernet Media Dependent Interface 0- DP-1/0 - - A15 SSS SSS SSS SSS SSS SSS SSS SSS SSSS SSSS SSSS SSSS SSSS SSSS SSSS SSSSS SSSSSS SSSSSS		-	-	-			
A4 G6B0_LINK1000 Ethernet Speed LED OD - - A5 G6B0_LINK1000 Ethernet Nedia Dependent Interface 2 - DP-1/0 - - A7 G6B0_MD12 - Ethernet Media Dependent Interface 2 - DP-1/0 - - A8 G6B0_LND12 - Ethernet Media Dependent Interface 1 - DP-1/0 - - A10 G6B0_MD11 - Ethernet Media Dependent Interface 1 - DP-1/0 - - A10 G6B0_MD11 - Ethernet Media Dependent Interface 1 - DP-1/0 - - A13 G6B0_MD10 - Ethernet Media Dependent Interface 0 - DP-1/0 - - A14 G6B0_CRB1 - Kelia Dependent Interface 0 - DP-1/0 - - A13 SUS_S38 Supend To KAM (or depend Indicator 0 - 3.3 P1 10k - A15 SKAD_TX- SKAA Transmit Pari 0 - DP-0 - - A14 G8B0_CR4 SAAA Review Pair 0 - DP-1 - - A15 SAAA_ZX+ <		-	-	,			
A5 66E0_LINK1000# Ethernet Speed LED 00 - - A6 68E0_M012- Ethernet Media Dependent Interface 2 - DP-I/0 - - A7 68E0_LINK# LAN Link LED 00 - - - A8 68E0_LINK# LAN Link LED 00 - - - A10 68E0_M01+ Ethernet Media Dependent Interface 1 - 0P-I/0 - - A11 68E0_M010- Ethernet Media Dependent Interface 1 - 0P-I/0 - - A12 68E0_M010+ Ethernet Media Dependent Interface 0 + 0P-I/0 - - A13 68E0_M010+ Ethernet Media Dependent Interface 0 + 0P-I/0 - - A14 68E0_LINE SANA_DIX+ SANA Imamit Pair 0 + 0P-1/0 - - A15 SSLS_54F Suspend To Disk (or deeper) Indicator 0-3.3 - - A18 SUS_54F Suspend To Disk (or deeper) Indicator 0-3.3 - - A22 SANA		-	-	,	•		
A6 6800_MD2+ Ethernet Media Dependent Interface 2 - DP-I/0 - - A7 6800_MD2+ Ethernet Media Dependent Interface 2 + DP-I/0 - - A8 6800_MD1+ Ethernet Media Dependent Interface 1 + DP-I/0 - - A10 6800_MD1+ Ethernet Media Dependent Interface 1 + DP-I/0 - - A11 600 Power Ground PWK GND - - A13 6800_MD0+ Ethernet Media Dependent Interface 0 + DP-I/0 - - A14 6800_CREF Center Tab Reference Voltage 0 - - A14 6800_CREF Center Tab Reference Voltage 0P-0 - - A15 SUS_S48 Suspend To Disk (or depen) Indicator 0-3.3 - - A15 SUS_S48 Suspend To Disk (or depen) Indicator 0-3.3 - - A16 SATA_D.TK SATA Receive Pair 0 + DP-1 - - A17 SATA_D.TK SATA Receive Pair 0 + DP-1 - - <		-	-			_	
A7 GBE0_LINK# Ethernet Media Dependent Interface 2 + 0P-1/0 - - A8 GBE0_LINK# LAN Link LED 00 - - A9 GBE0_MD1- Ethernet Media Dependent Interface 1 + 0P-1/0 - - A10 GBE0_MD1- Ethernet Media Dependent Interface 1 + 0P-1/0 - - A11 GND Power Ground PWR GND - - A13 GBE0_MD10- Ethernet Media Dependent Interface 0 + 0P-1/0 - - A14 GBE0_CTREF Center Tab Reference Voltage 0 - 100nf capacitor to GND A15 SSLS.51I Suppend To Disk (or deeper) Indicator 0-3.3 - - A15 SSLS.54II Suppend To Disk (or deeper) Indicator 0-3.3 - - A12 SAND_RX+ SANA Framsmit Pair 0 + DP-1 - - A12 SAND_RX+ SANA Review Pair 0 - DP-1 - - A22 SANA_ZN+ USB 3.0 Receive Pair 0 + DP-1 - -		-	-		•	_	
AB 6BE0_LINK# LAN Link LED 00 · · · A9 6BE0_M011- Ethernet Media Dependent Interface 1 - DP-1/0 · · A11 6BE0_M012+ Ethernet Media Dependent Interface 1 - DP-1/0 · · A12 6BE0_M010- Ethernet Media Dependent Interface 0 - DP-1/0 · · A13 6BE0_M010- Ethernet Media Dependent Interface 0 - DP-1/0 · · A14 6BE0_LM010- Ethernet Media Dependent Interface 0 + DP-1/0 · · A14 6BE0_LM010- Ethernet Media Dependent Interface 1 + DP-0 · · A15 SLS_S3# Supend To RAM (or deeper) Indicator 0-3.3 · · A15 SAIA0_TX- SAIA Trammit Pair 0 - DP-1 · · A20 SAIA0_DX- SAIA Receive Pair 0 + DP-1 · · A21 GND Power Ground PPW KGND · · · A22 SAIA2_TX- U		-	-	,		_	
A9 GBED_MD11- Ethernet Media Dependent Interface 1- DF1/0 DP-1/0 - - A10 GRE0_MD14- Ethernet Media Dependent Interface 1- DF1/0 DP-1/0 - - A12 GRE0_MD10- Ethernet Media Dependent Interface 0- DF1/0 DP-1/0 - - A12 GRE0_MD10- Ethernet Media Dependent Interface 0- DF1/0 DP-1/0 - - A13 GRE0_KD10- Ethernet Media Dependent Interface 0+ DF1/0 DP-0 - - A14 GRE0_KD12+ SUS_S3# Suspend To RMA (or deeper) Indicator D-3.3 PD 10k - A15 SATA0_TX+ SATA0_TX+ SATA0_RX+ SATA Receive Pair0 - DP-0 - - - A15 SATA0_TX+ SATA0_RX+ SATA Receive Pair0 - DP-1 - - - A22 SATA_TX+ USB 3.0 Receive Pair0 - SATA2_TX+ USB 3.0 Receive Pair0 - DP-1 - - - A22 SATA2_TX- USB 3.0 Receive Pair0 - DP-1 - - - - A23 SATA2_TX- USB 3.0 Receive Pair0 + DP-1 - - - - A24 SATA2_TX- USB 3.0 Receive Pair0 + DP-1 - - <td></td> <th>-</th> <td>-</td> <td>,</td> <td>•</td> <td>_</td> <td></td>		-	-	,	•	_	
Ato GBED_MDI1+ Ethernet Media Dependent Interface 1 + DP-1/0 - - At1 GBEO_MDI0- Ethernet Media Dependent Interface 0 + DP-1/0 - - At3 GBEO_MDI0+ Ethernet Media Dependent Interface 0 + DP-1/0 - - At3 GBEO_CREF Center Tab Beference Voltage 0 - 100 fc apacitor to GND At3 SATA_Transmit Pair 0 - DP-0 - - - At3 SATA_Transmit Pair 0 - DP-0 - - - At3 SATA_Transmit Pair 0 - DP-0 - - - At3 SATA_RE Sevice Pair 0 - DP-1 - - - At3 SATA_RE Revice Pair 0 - DP-1 - - - At3 SATA_TA USB 3.0 Receive Pair 0 - DP-1 - - - At4 USB 3.0 Receive Pair 0 - DP-1 - - - - - - - - - - - <		-	-	DP-I/O			
A11 GND Power Ground PWR GND - - A12 GBE0_MDIO- Ethernet Media Dependent Interface 0 - DP-1/0 - - A13 GBE0_MDIO- Ethernet Media Dependent Interface 0 + DP-1/0 - - A14 GBE0_CIREF Center Tab Reference Voltage O - 100nF capacitor to GND A15 SIAD_DIX+ SIAI Transmit Pair 0 - DP-0 - - A15 SIAD_RX+ SIAI Receive Pair 0 - DP-1 - - A15 SIAD_RX+ SIAI Receive Pair 0 - DP-1 - - A20 SIAD_RX+ SIAI Receive Pair 0 - DP-1 - - A22 SIAD_TX+ USB 3.0 Receive Pair 0 - DP-1 - - A23 SIAT_ZTX+ USB 3.0 Receive Pair 0 - DP-1 - - A24 SIAD_ZTX+ USB 3.0 Receive Pair 1 - DP-1 - - A24 SIAD_ZTX+ USB 3.0 Receive Pair 1 - DP-1 - -		-	-	,			
A13 GBE0_MDI0+ Ethernet Media Dependent Interface 0 + DP-I/0 - IDONG capacitor to GND A14 GBE0_CIREF Center Tab Reference Voltage 0 - 1000 fr capacitor to GND A15 SUS_S3# Suspend To RAM (or deeper) Indicator 0-3.3 PD 10k - A17 SATAO_TX+ SATA Transmit Pair 0 + DP-0 - - A18 SUS_S4# Suspend To Disk (or deeper) Indicator 0-3.3 - - A18 SATAO_TX+ SATA Receive Pair 0 + DP-1 - - A20 SATAO_TX+ SATA Receive Pair 0 + DP-1 - - A21 GND Power Ground PWR GND - - A22 SATA_2_TX+ USB 3.0 Receive Pair 0 + DP-1 - - A22 SATA_2_R4 USB 3.0 Receive Pair 1 + DP-1 - - A23 SATA2_R4 USB 3.0 Receive Pair 1 + DP-1 - - A24 BALQM# BATA CIT SATA2_TX+ <t< td=""><td></td><th>-</th><td>-</td><td>,</td><td>•</td><td></td><td>A11</td></t<>		-	-	,	•		A11
A13 GBE0_MDI0+ Ethernet Media Dependent Interface 0 + DP-I/0 - IDONG capacitor to GND A14 GBE0_CIREF Center Tab Reference Voltage 0 - 1000 fr capacitor to GND A15 SUS_S3# Suspend To RAM (or deeper) Indicator 0-3.3 PD 10k - A17 SATAO_TX+ SATA Transmit Pair 0 + DP-0 - - A18 SUS_S4# Suspend To Disk (or deeper) Indicator 0-3.3 - - A18 SATAO_TX+ SATA Receive Pair 0 + DP-1 - - A20 SATAO_TX+ SATA Receive Pair 0 + DP-1 - - A21 GND Power Ground PWR GND - - A22 SATA_2_TX+ USB 3.0 Receive Pair 0 + DP-1 - - A22 SATA_2_R4 USB 3.0 Receive Pair 1 + DP-1 - - A23 SATA2_R4 USB 3.0 Receive Pair 1 + DP-1 - - A24 BALQM# BATA CIT SATA2_TX+ <t< td=""><td></td><th>-</th><td>-</td><td>DP-I/O</td><td>Ethernet Media Dependent Interface 0 -</td><td>GBE0 MDI0-</td><td>A12</td></t<>		-	-	DP-I/O	Ethernet Media Dependent Interface 0 -	GBE0 MDI0-	A12
A15 SUS_53# Suspend To RAM (or deeper) Indicator 0-3.3 PD 10k - A16 SATAQ_TX+ SATA Transmit Pair 0 + DP-0 - - A17 SATAQ_TX+ SATA Transmit Pair 0 + DP-0 - - A17 SATAQ_TX+ SATA Transmit Pair 0 + DP-1 - - A19 SATAQ_RX+ SATA Receive Pair 0 + DP-1 - - A20 SATAQ_RX+ SATA Receive Pair 0 + DP-1 - - A21 GND Power Ground PWR GND - - A22 SATAZ_TX+ USB 3.0 Receive Pair 0 + DP-1 - - A24 SUS_55# SOT (Off Indicator O-3.3 - - A25 SATAZ_RX+ USB 3.0 Receive Pair 1 + DP-1 - - A25 SATAZ_RX+ USB 3.0 Receive Pair 1 + DP-1 - - A26 ATA_ACT# Serial ATA activity LED OD-3.3 PU 10k 3.3V (S0) cansirk 15mA		-	-	DP-I/O	Ethernet Media Dependent Interface 0 +	GBE0_MDI0+	A13
A15 SUS_53# Suspend To RAM (or deeper) Indicator 0-3.3 PD 10k - A16 SATAQ_TX+ SATA Transmit Pair 0 + DP-0 - - A17 SATAQ_TX+ SATA Transmit Pair 0 + DP-0 - - A17 SATAQ_TX+ SATA Transmit Pair 0 + DP-1 - - A19 SATAQ_RX+ SATA Receive Pair 0 + DP-1 - - A20 SATAQ_RX+ SATA Receive Pair 0 + DP-1 - - A21 GND Power Ground PWR GND - - A22 SATAZ_TX+ USB 3.0 Receive Pair 0 + DP-1 - - A24 SUS_55# SOT (Off Indicator O-3.3 - - A25 SATAZ_RX+ USB 3.0 Receive Pair 1 + DP-1 - - A25 SATAZ_RX+ USB 3.0 Receive Pair 1 + DP-1 - - A26 ATA_ACT# Serial ATA activity LED OD-3.3 PU 10k 3.3V (S0) cansirk 15mA		100nF capacitor to GND	-	0	Center Tab Reference Voltage	GBE0 CTREF	A14
A16 SATA (Transmit Pair 0 + DP-0 - - A17 SATA (Transmit Pair 0 - DP-0 - - A18 SUS_54# Suspend To Disk (or deper) Indicator O-3.3 - - A19 SATAO_RX+ SATA Receive Pair 0 + DP-I - - A20 SATAO_RX- SATA Receive Pair 0 - DP-I - - A21 GND Power Ground PWR GND - - A22 SATA_Z.TX- USB 3.0 Receive Pair 0 - DP-I - - A22 SATA_Z.TX- USB 3.0 Receive Pair 0 + DP-I - - A23 SATA_RX- USB 3.0 Receive Pair 1 + DP-I - - A25 SATA_Z.RX- USB 3.0 Receive Pair 1 + DP-I - - A25 SATA_Z.RX- USB 3.0 Receive Pair 1 + DP-I - - A26 MATA_C.RK- USB 3.0 Receive Pair 1 + DP-I - - A26 SATA_Z.RX- USB 3.0		· · · · · · · · · · · · · · · · · · ·	PD 10k	0-3.3	U		A15
A17 SATA D_TX- SATA transmit Pair 0 - DP-0 - - A18 SUS_S4# Suspend To Disk (or deeper) Indicator 0-3.3 - - A19 SATA0_EX+ SATA Receive Pair 0 - DP-I - - A20 SATA0_EX+ SATA Receive Pair 0 - DP-I - - A21 GND Power Ground PWR GND - - A22 SATA_Z_TX- USB 3.0 Receive Pair 0 + DP-I - - A22 SATA_Z_TX- USB 3.0 Receive Pair 1 + DP-I - - A25 SATA_Z_RX- USB 3.0 Receive Pair 1 + DP-I - - A26 SATA_EXX- USB 3.0 Receive Pair 1 + DP-I - - A26 SATA_CTX- USB 3.0 Receive Pair 1 + DP-I - - A27 RATA_OT# Serial ATA activity LED OD-3.3 PU 20k 3.3V (SO) can sink 15mA A28 ATA_ACT# Serial ATA activity LED OD-3.3 PD 20k in CPU -		-	-	DP-0			A16
A18 SUS_54# Suspend To Disk (or deeper) Indicator 0-3.3 - - A19 SATAO_RX+ SATA Receive Pair 0 + DP-I - - A20 SATAO_RX+ SATA Receive Pair 0 - DP-I - - A21 GND Power Ground PWR GND - - A22 SATA2_TX+ USB 3.0 Receive Pair 0 + DP-I - - A23 SATA2_TX+ USB 3.0 Receive Pair 1 + DP-I - - A24 SUS_55# Soft Off Indicator 0-3.3 - - A24 SUS_75# Soft Off Indicator 0-3.3 - - A25 SATA2_RX+ USB 3.0 Receive Pair 1 + DP-I - - A27 RATLOW# Battery Low I-3.3 PU 10k 3.3V (S0) cassertion will prevent wake from S3-S5 st A28 HAA_CT# Machastivy LED Ob-3.3 PD 20k in CPU - A30 HDA_STWC HD Audio St Clock Output O-3.3 PD 20k in CPU		-	-	DP-0	SATA Transmit Pair 0 -		A17
A20 SATAO_RX- SATA Receive Pair 0 - DP-I - - A21 GND Power Ground PWR GND - - A22 SATA2_TX- USB 3.0 Receive Pair 0 - DP-I - - A23 SATA2_TX- USB 3.0 Receive Pair 0 + DP-I - - A24 SUS_S5# Soft Off Indicator 0-3.3 - - A25 SATA2_RX- USB 3.0 Receive Pair 1 - DP-I - - A26 SATA2_RX- USB 3.0 Receive Pair 1 + DP-I - - A27 BATLOW# Battery Low I-3.3 PU 10k 3.3V (S0) can sink 15mA A28 ATA_ACT# Serial ATA activity LED 0D-3.3 PU 20k in CPU - A30 HDA_CIX HD Audio Sync 0-3.3 PD 20k in CPU - A31 GND Power Ground PWR RND - - A31 GND Power Ground PWR CND - - A33 HDA_		-	-	0-3.3	Suspend To Disk (or deeper) Indicator		A18
A21 GND Power Ground PWR GND - - A22 SATA2_TX+ USB 3.0 Receive Pair 0 - DP-I - - A23 SATA2_TX- USB 3.0 Receive Pair 0 + DP-I - - A24 SUS_S5# Soft Off Indicator 0-3.3 - - A25 SATA2_RX+ USB 3.0 Receive Pair 1 + DP-I - - A26 SATA2_RX+ USB 3.0 Receive Pair 1 + DP-I - - A27 BATLOW# Battery Low I-3.3 PU 10k 3.3V (SO) can sink 15mA A29 HDA_STNC HD Audio Sync 0-3.3 PD 20k in CPU - A30 HDA_RST# HD Audio Bit Clock Output 0-3.3 PD 20k in CPU - A33 HDA_SDUJT HD Audio Strap 0 I-3.3 PD 20k in CPU - A33 HDA_SDUJT HD Audio Strap 0 I-3.3 PD 20k in CPU - A34 BIOS_DISD# BIOS Selection Strap 0 I-3.3 PU 10k 3.3V (SO) - </td <td></td> <th>-</th> <td>-</td> <td>DP-I</td> <td>1 (1)</td> <td>SATA0_RX+</td> <td>A19</td>		-	-	DP-I	1 (1)	SATA0_RX+	A19
A21 GND Power Ground PWR GND - - A22 SATA2_TX+ USB 3.0 Receive Pair 0 - DP-I - - A23 SATA2_TX- USB 3.0 Receive Pair 0 + DP-I - - A24 SUS_55# Soft Off Indicator 0-3.3 - - A25 SATA2_RX+ USB 3.0 Receive Pair 1 + DP-I - - A26 SATA2_RX+ USB 3.0 Receive Pair 1 + DP-I - - A27 BATLOW# Battery Low I-3.3 PU 10k 3.3V (S0) can sink 15mA A28 HAL_XT# Serial ATA activity LED OD-3.3 PD 20k in CPU - A30 HDA_SYNC HD Audio Reset O-3.3 PD 20k in CPU - A31 GND Power Ground PWR GND - - A31 HDA_STI# HD Audio Serial Data Out O-3.3 PD 20k in CPU - A33 HDA_SDUJT HD Audio Serial Data Out O-3.3 PD 20k in CPU -		-	-	DP-I	SATA Receive Pair 0 -	_	A20
A22 SATA2_TX+ USB 3.0 Receive Pair 0 - DP-I - - A23 SATA2_TX- USB 3.0 Receive Pair 0 + DP-I - - A24 SUS_S5# Soft Off Indicator O-3.3 - - A25 SATA2_TX- USB 3.0 Receive Pair 1 - DP-I - - A26 SATA2_RX- USB 3.0 Receive Pair 1 + DP-I - - A27 BATLOW# Battery Low I-3.3 PU 10k 3.3V (SD) can sink 15mA A28 ATA_ACT# Serial ATA activity LED OD-3.3 PD 20k in CPU - A30 HDA_RST# HD Audio Sync O-3.3 PD 20k in CPU - A31 GND Power Ground PWR GND - - A34 BIOS_DISO# BIOS Selection Strap 0 I-3.3 PU 10k 3.3V (SO) - A34 BIOS_DISO# BIOS Selection Strap 0 I-3.3 PU 10k 3.3V (SO) - A34 BIOS_DISO# BIOS Selection Strap 0 I-3.3 PU 10k 3.3V (SO) - A35 THRNIRIP# Thermal Trip O-3.3		-	-			_	
A23 SATA2_TX- USB 3.0 Receive Pair 0 + DP-I - - A24 SUS_S5# Soft Off Indicator 0-3.3 - - A25 SATA2_RX- USB 3.0 Receive Pair 1 - DP-I - - A26 SATA2_RX- USB 3.0 Receive Pair 1 + DP-I - - A27 BATLOW# Battery Low I-3.3 PU 10k 3.3V (S0) can sink 15mA A28 ATA_ACT# Serial ATA activity LED OD-3.3 PU 20k in CPU - A30 HDA_SYNC HD Audio Reset O-3.3 PD 20k in CPU - A31 GND Power Ground PWR GND - - A31 HDA_CLK HD Audio Serial Data Out O-3.3 PD 20k in CPU - A33 HDA_SDUT HD Audio Serial Data Out O-3.3 PD 20k in CPU - A34 BIOS_DISO# BIOS Selection Strap 0 I-3.3 PU 10k 3.3V (S0) - A35 THRMTRIP# Thermal Trip O-3.3 PU 10k 3.3V (S0) <td></td> <th>-</th> <td>-</td> <td></td> <td></td> <td></td> <td></td>		-	-				
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A26 SATA2_RX- USB 3.0 Receive Pair 1 + DP-I - - A27 BATLOW# Battery Low I-3.3 PU 10k 3.3V (S5) assertion will prevent wake from S3-S5 st A28 ATA_ACT# Serial ATA activity LED OD-3.3 PU 10k 3.3V (S0) can sink 15mA A29 HDA_SYNC HD Audio Sync O-3.3 PD 20k in CPU - A30 HDA_RST# HD Audio Reset O-3.3 PD 20k in CPU - A31 GND Power Ground PWR GND - - A31 HDA_SDUT HD Audio Serial Data Out O-3.3 PD 20k in CPU - A33 HDA_SDUT HD Audio Serial Data Out O-3.3 PD 20k in CPU - A34 BIOS_DISO# BIOS Selection Strap O I-3.3 PU 10k 3.3V (S0) - A35 THRMTRIP# Thermal Trip O-3.3 PU 10k 3.3V (S0) - and over-temperature shutdown A36 USB6- USB 2.0 Data Pair Port 6 - DP-I/O PD/PU in CPU PD 15kOhm +/-5% on Downstream Facing Port <td></td> <th>-</th> <td>-</td> <td>0-3.3</td> <td>Soft Off Indicator</td> <td></td> <td>A24</td>		-	-	0-3.3	Soft Off Indicator		A24
A27BATLOW#Battery LowI-3.3PU 10k 3.3V (S5)assertion will prevent wake from S3-S5 siA28ATA_ACT#Serial ATA activity LEDOD-3.3PU 10k 3.3V (S0)can sink 15mAA29HDA_SYNCHD Audio SyncO-3.3PD 20k in CPU-A30HDA_RST#HD Audio ResetO-3.3PD 20k in CPU-A31GNDPower GroundPWR GNDA32HDA_CLKHD Audio Bit Clock OutputO-3.3PD 20k in CPU-A34BIOS_DISO#BIOS Selection Strap 0I-3.3PU 20k in CPU-A35THRMTRIP#Thermal TripO-3.3PU 10k 3.3V (S0)-A36USB6-USB 2.0 Data Pair Port 6 -DP-I/OPD/PU in CPUPD 15kOhm +/-5% on Downstream Facing PortA37USB6+USB 2.0 Data Pair Port 6 +DP-I/OPD/PU in CPUPD 15kOhm +/-5% on Downstream Facing PortA38USB_6_7_OC#USB 2.0 Data Pair Port 4 -DP-I/OPD/PU in CPUPD 15kOhm +/-5% on Downstream Facing PortA39USB4+USB 2.0 Data Pair Port 4 +DP-I/OPD/PU in CPUPD 15kOhm +/-5% on Downstream Facing PortA41GNDPower GroundPWR GNDA42USB2-USB 2.0 Data Pair Port 2 -DP-I/OPD/PU in CPUPD 15kOhm +/-5% on Downstream Facing PortA44USB2-USB 2.0 Data Pair Port 2 +DP-I/OPD/PU in CPUPD 15kOhm +/-5% on Downstream Facing PortA44USB2-USB 2.0 Data Pair Port 2 +DP-I/O <t< td=""><td></td><th>-</th><td>-</td><td>DP-I</td><td>USB 3.0 Receive Pair 1 -</td><td></td><td></td></t<>		-	-	DP-I	USB 3.0 Receive Pair 1 -		
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A28ATA_ACT#Serial ATA activity LEDOD-3.3PU 10k 3.3V (SO)can sink 15mAA29HDA_SYNCHD Audio SyncO-3.3PD 20k in CPU-A30HDA_RST#HD Audio ResetO-3.3PD 20k in CPU-A31GNDPower GroundPWR GNDA32HDA_CLKHD Audio Bit Clock OutputO-3.3PD 20k in CPU-A33HDA_SDOUTHD Audio Serial Data OutO-3.3PD 20k in CPU-A34BIOS_DISO#BIOS Selection Strap 0I-3.3PD 10k 3.3V (SO)-A35THRMTRIP#Thermal TripO-3.3PU 10k 3.3V (SO)-A36USB6-USB 2.0 Data Pair Port 6 -DP-I/OPD/PU in CPUPD 15kOhm +/-5% on Downstream Facing 1.5kOhm +/-5% on Upstream Facing PortA37USB6+USB 2.0 Data Pair Port 6 +DP-I/OPD/PU in CPUPD 15kOhm +/-5% on Downstream Facing PortA38USB_6_7_OC#USB 2.0 Data Pair Port 6 /7I-3.3PU 10k 3.3V (S5)-A39USB4-USB 2.0 Data Pair Port 4 +DP-I/OPD/PU in CPUPD 15kOhm +/-5% on Downstream Facing PortA40USB2-USB 2.0 Data Pair Port 2 -DP-I/OPD/PU in CPUPD 15kOhm +/-5% on Downstream Facing PortA41GNDPower GroundPWR GNDA42USB 2.0 Data Pair Port 2 +DP-I/OPD/PU in CPUPD 15kOhm +/-5% on Downstream Facing PortA43USB2+USB 2.0 Data Pair Port 2 +DP-I/OPD/PU in CPUPD 15kOhm +/-5% on	55 state	assertion will prevent wake from S3-S5 state	PU 10k 3.3V (S5)	I-3.3	Battery Low		A27
A29HDA_SYNCHD Audio SyncO-3.3PD 20k in CPU-A30HDA_RST#HD Audio ResetO-3.3PD 20k in CPU-A31GNDPower GroundPWR GNDA32HDA_CLKHD Audio Bit Clock OutputO-3.3PD 20k in CPU-A33HDA_SDOUTHD Audio Serial Data OutO-3.3PD 20k in CPU-A34BIOS_DISO#BIOS Selection Strap 0I-3.3PU 10k 3.3V (S0)-A35THRMTRIP#Thermal TripO-3.3PU 10k 3.3V (S0)-A36USB6-USB 2.0 Data Pair Port 6 -DP-I/OPD/PU in CPUPD 15k0hm +/-5% on Downstream Facing PortA37USB6+USB 2.0 Data Pair Port 6 +DP-I/OPD/PU in CPUPD 15k0hm +/-5% on Upstream Facing PortA38USB_6_7_OC#USB 0vercurrent Indicator Port 6/7I-3.3PU 10k 3.3V (S5)-A39USB4-USB 2.0 Data Pair Port 4 -DP-I/OPD/PU in CPUPD 15k0hm +/-5% on Downstream Facing PortA40USB4+USB 2.0 Data Pair Port 4 +DP-I/OPD/PU in CPUPD 15k0hm +/-5% on Upstream Facing PortA41GNDPower GroundPWR GNDA42USB2-USB 2.0 Data Pair Port 2 -DP-I/OPD/PU in CPUPD 15k0hm +/-5% on Downstream Facing PortA43USB2+USB 2.0 Data Pair Port 2 +DP-I/OPD/PU in CPUPD 15k0hm +/-5% on Downstream Facing PortA43USB2+USB 2.0 Data Pair Port 2 +DP-I/OPD/PU in CPUPD 15k0hm +			. ,		v		
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A36USB 2.0 Data Pair Port 6 -DP-I/0PD/PU in CPUPD 15k0hm +/-5% on Downstream Facing PortA37USB 4USB 2.0 Data Pair Port 6 +DP-I/0PD/PU in CPUPD 15k0hm +/-5% on Downstream Facing PortA38USB_6_7_0C#USB 0vercurrent Indicator Port 6/7I-3.3PU 10k 3.3V (S5)-A39USB4-USB 2.0 Data Pair Port 4 -DP-I/0PD/PU in CPUPD 15k0hm +/-5% on Downstream Facing PortA40USB4+USB 2.0 Data Pair Port 4 +DP-I/0PD/PU in CPUPD 15k0hm +/-5% on Downstream Facing PortA41GNDPower GroundPWR GNDA42USB2-USB 2.0 Data Pair Port 2 -DP-I/0PD/PU in CPUPD 15k0hm +/-5% on Downstream Facing PortA43USB2+USB 2.0 Data Pair Port 2 +DP-I/0PD/PU in CPUPD 15k0hm +/-5% on Downstream Facing PortA44USB 2.3_0C#USB 0vercurrent Indicator Port 2/3I-3.3PU 15k in CPLD (S5)resistor value can range from 5k0hm to 2	fer between regular	do not use as this signal does not differ betwee		0-3.3	Thermal Trip		A35
A37USB 6+USB 2.0 Data Pair Port 6 +DP-I/0PD/PU in CPUPD 15k0hm +/-5% on Downstream Facing PortA38USB_6_7_0C#USB 0vercurrent Indicator Port 6/7I-3.3PU 10k 3.3V (S5)-A39USB4-USB 2.0 Data Pair Port 4 -DP-I/0PD/PU in CPUPD 15k0hm +/-5% on Downstream Facing PortA40USB4+USB 2.0 Data Pair Port 4 +DP-I/0PD/PU in CPUPD 15k0hm +/-5% on Upstream Facing PortA41GNDPower GroundPWR GNDA42USB2-USB 2.0 Data Pair Port 2 -DP-I/0PD/PU in CPUPD 15k0hm +/-5% on Downstream Facing PortA43USB2+USB 2.0 Data Pair Port 2 +DP-I/0PD/PU in CPUPD 15k0hm +/-5% on Upstream Facing PortA44USB 2.3_0C#USB 0vercurrent Indicator Port 2/3I-3.3PU 15k in CPLD (S5)resistor value can range from 5k0hm to 2		and over-temperature shutdown					
A37USB 2.0 Data Pair Port 6 +DP-I/0PD/PU in CPUPD 15k0hm +/-5% on Downstream Facing PortA38USB_6_7_0C#USB 0vercurrent Indicator Port 6/7I-3.3PU 10k 3.3V (S5)-A39USB4-USB 2.0 Data Pair Port 4 -DP-I/0PD/PU in CPUPD 15k0hm +/-5% on Downstream Facing PortA40USB4+USB 2.0 Data Pair Port 4 +DP-I/0PD/PU in CPUPD 15k0hm +/-5% on Upstream Facing PortA40USB4+USB 2.0 Data Pair Port 4 +DP-I/0PD/PU in CPUPD 15k0hm +/-5% on Upstream Facing PortA41GNDPower GroundPWR GNDA42USB2-USB 2.0 Data Pair Port 2 -DP-I/0PD/PU in CPUPD 15k0hm +/-5% on Upstream Facing PortA43USB2+USB 2.0 Data Pair Port 2 +DP-I/0PD/PU in CPUPD 15k0hm +/-5% on Upstream Facing PortA44USB_2_3_0C#USB 0vercurrent Indicator Port 2/3I-3.3PU 15k in CPLD (S5)resistor value can range from 5k0hm to 2		PD 15k0hm +/-5% on Downstream Facing Port;	PD/PU in CPU	DP-I/O	USB 2.0 Data Pair Port 6 –	USB6-	A36
A38USB_6_7_0C#USB Overcurrent Indicator Port 6/7I-3.3PU 10k 3.3V (S5)-A39USB4-USB 2.0 Data Pair Port 4 -DP-I/0PD/PU in CPUPD 15k0hm +/-5% on Downstream Facing PortA40USB4+USB 2.0 Data Pair Port 4 +DP-I/0PD/PU in CPUPD 15k0hm +/-5% on Downstream Facing PortA41GNDPower GroundPWR GNDA42USB2-USB 2.0 Data Pair Port 2 -DP-I/0PD/PU in CPUPD 15k0hm +/-5% on Downstream Facing PortA43USB2+USB 2.0 Data Pair Port 2 +DP-I/0PD/PU in CPUPD 15k0hm +/-5% on Upstream Facing PortA44USB_2_3_0C#USB 0vercurrent Indicator Port 2/3I-3.3PU 15k in CPLD (S5)resistor value can range from 5k0hm to 2		, , ,				LICDC	4.07
A38USB_6_7_0C#USB Overcurrent Indicator Port 6/7I-3.3PU 10k 3.3V (S5)-A39USB4-USB 2.0 Data Pair Port 4 -DP-I/0PD/PU in CPUPD 15k0hm +/-5% on Downstream Facing PortA40USB4+USB 2.0 Data Pair Port 4 +DP-I/0PD/PU in CPUPD 15k0hm +/-5% on Downstream Facing PortA41GNDPower GroundPWR GNDA42USB2-USB 2.0 Data Pair Port 2 -DP-I/0PD/PU in CPUPD 15k0hm +/-5% on Downstream Facing PortA43USB2+USB 2.0 Data Pair Port 2 +DP-I/0PD/PU in CPUPD 15k0hm +/-5% on Upstream Facing PortA44USB_2_3_0C#USB 0vercurrent Indicator Port 2/3I-3.3PU 15k in CPLD (S5)resistor value can range from 5k0hm to 2/10			PD/P0 1n CP0	DP-1/0	USB 2.0 Data Pair Port 6 +	0280+	A37
A39USB 4USB 2.0 Data Pair Port 4 -DP-I/0PD/PU in CPUPD 15k0hm +/-5% on Downstream Facing PortA40USB 4+USB 2.0 Data Pair Port 4 +DP-I/0PD/PU in CPUPD 15k0hm +/-5% on Upstream Facing PortA41GNDPower GroundPWR GNDA42USB 2-USB 2.0 Data Pair Port 2 -DP-I/0PD/PU in CPUPD 15k0hm +/-5% on Downstream Facing PortA43USB2+USB 2.0 Data Pair Port 2 +DP-I/0PD/PU in CPUPD 15k0hm +/-5% on Downstream Facing PortA44USB 2.3_0C#USB 0vercurrent Indicator Port 2/3I-3.3PU 15k in CPLD (S5)resistor value can range from 5k0hm to 2		-	PU 10k 3, 3V (S5)	I-3.3	USB Overcurrent Indicator Port 6/7	USB 6 7 0C#	A38
A40 USB 2.0 Data Pair Port 4 + DP-I/0 PD/PU in CPU PD 15k0hm +/-5% on Downstream Facing Port 1.5k0hm +/-5% on Downstream Facing Port 1.5k0hm +/-5% on Upstream Facing Port 1.5k0hm +/-5% on Upstream Facing Port 4.41 A41 GND Power Ground PWR GND - A42 USB 2.0 Data Pair Port 2 - DP-I/0 PD/PU in CPU PD 15k0hm +/-5% on Downstream Facing Port 1.5k0hm +/-5% on Upstream Facing Port 1.5k0hm +/-5% on Upstre	cina Port: PU	PD 15k0hm +/-5% on Downstream Facing Port:	. ,		,		
A41 GND Power Ground PWR GND - - A42 USB 2- USB 2.0 Data Pair Port 2 - DP-I/O PD/PU in CPU PD 15k0hm +/-5% on Downstream Facing Port A43 USB 2+ USB 2.0 Data Pair Port 2 + DP-I/O PD/PU in CPU PD 15k0hm +/-5% on Downstream Facing Port A44 USB 2_3_0C# USB 0vercurrent Indicator Port 2/3 I-3.3 PU 15k in CPLD (S5) resistor value can range from 5k0hm to 2		1.5kOhm +/-5% on Upstream Facing Port		5. 40		0001	1.55
A41 GND Power Ground PWR GND - - A42 USB2- USB 2.0 Data Pair Port 2 - DP-I/O PD/PU in CPU PD 15k0hm +/-5% on Downstream Facing Port 1.5k0hm +/-5% on Upstream F	cing Port; PU	PD 15k0hm +/-5% on Downstream Facing Port;	PD/PU in CPU	DP-I/O	USB 2.0 Data Pair Port 4 +	USB4+	A40
A42 USB 2.0 Data Pair Port 2 - DP-I/0 PD/PU in CPU PD 15k0hm +/-5% on Downstream Facing Port 1.5k0hm +/-5% on Upstream Facing Port	Port	1.5k0hm +/-5% on Upstream Facing Port					
A43 USB 2.0 Data Pair Port 2 + DP-I/0 PD/PU in CPU PD 15k0hm +/-5% on Upstream Facing Port 1.5k0hm +/-5% on Upstream Facing Port 1.		-		-			
A43 USB 2.0 Data Pair Port 2 + DP-I/0 PD/PU in CPU PD 15k0hm +/-5% on Downstream Facing Port 1.5k0hm +/-5% on Upstream Facing Port 1.5k0hm +/-5% on Upstr		PD 15k0hm +/-5% on Downstream Facing Port;	PD/PU in CPU	DP-I/O	USB 2.0 Data Pair Port 2 –	USB2-	A42
A44 USB_2_3_0C# USB Overcurrent Indicator Port 2/3 I-3.3 PU 15k in CPLD (S5) resistor value can range from 5k0hm to 2		, , -					A/2
A44 USB_2_3_0C# USB Overcurrent Indicator Port 2/3 I-3.3 PU 15k in CPLD (S5) resistor value can range from 5k0hm to 2			PU/PU IN CPU	DP-1/0	USD 2.0 Data Pair Port 2 +	0282+	A43
		resistor value can range from 5k0hm to 25k0hr	PU 15k in CPLD (S5)	I-3.3	USB Overcurrent Indicator Port 2/3	USB 2 3 0C#	A44
A45 USB0- USB 2.0 Data Pair Port 0 – IDP-I/O PD/PU in CPU PD 15k0hm +/-5% on Downstream Facing		PD 15k0hm +/-5% on Downstream Facing Port;	PD/PU in CPU	DP-I/0	USB 2.0 Data Pair Port 0 –	USBO-	A45
	J .	1.5k0hm +/-5% on Upstream Facing Port	,	-, -			
		PD 15k0hm +/-5% on Downstream Facing Port;	PD/PU in CPU	DP-I/0	USB 2.0 Data Pair Port 0 +	USB0+	A46
	Port	1.5k0hm +/-5% on Upstream Facing Port					
A47 VCC_RTC Real-Time Clock Circuit Power Input PWR 3V - voltage range 2.8-3.47V		voltage range 2.8-3.47V	-	-	· · · ·		
A48 EXCD0_PERST# Express Card Reset Port 0 0-3.3 -		-					
A49 EXCD0_CPPE# Express Card Capable Card Request Port 0 I-3.3 PU 10k 3.3V (S0) -		-					
A50 LPC_SERIRQ Serial Interrupt Request I/OD-3.3 PU 20k in CPU -		-	PU 20k in CPU	,			
A51 GND Power Ground PWR GND		-		PWR GND			
A52 PCIE_TX5+ Not Connected nc		-	-	nc			A52
A53 PCIE_TX5- Not Connected nc		-	-				A53
A54 GPIO General Purpose Input 0 I-3.3 PU 100k 3.3V (S0) -		-	PU 100k 3.3V (SO)	I-3.3			
A55 PCIE_TX4+ Not Connected nc		-	-	nc			A55
A56 PCIE_TX4- Not Connected nc							
A57 GND Power Ground PWR GND		-	-	PWR GND	Power Ground	GND	A57

A58	PCIE_TX3+	PCI Express Lane 3 Transmit +	DP-0	-	only available on no-LAN var.
A59	PCIE_TX3-	PCI Express Lane 3 Transmit -	DP-0	-	only available on no-LAN var.
A60	GND	Power Ground	PWR GND	-	-
A61	PCIE_TX2+	PCI Express Lane 2 Transmit +	DP-0	-	-
A62	PCIE_TX2-	PCI Express Lane 2 Transmit -	DP-0	-	
A63	GPI1	General Purpose Input 1	I-3.3	PU 100k 3.3V (S0)	-
A64	PCIE_TX1+	PCI Express Lane 1 Transmit +	DP-0	-	
A65	PCIE_TX1-	PCI Express Lane 1 Transmit -	DP-0	-	-
A66	GND	Power Ground	PWR GND	-	
A67	GPI2	General Purpose Input 2	I-3.3	PU 100k 3.3V (S0)	-
A68	PCIE_TX0+	PCI Express Lane 0 Transmit +	DP-0	-	-
A69	PCIE_TX0-	PCI Express Lane 0 Transmit -	DP-0	-	-
A70	GND	Power Ground	PWR GND	-	-
A70	LVDS_A0+	LVDS Channel A DATO+	DP-0	-	-
	—				-
A72	LVDS_A0-	LVDS Channel A DATO-	DP-0	-	-
A73	LVDS_A1+	LVDS Channel A DAT1+	DP-0	-	-
A74	LVDS_A1-	LVDS Channel A DAT1-	DP-0	-	-
A75	LVDS_A2+	LVDS Channel A DAT2+	DP-0	-	-
A76	LVDS_A2-	LVDS Channel A DAT2-	DP-0	-	-
A77	LVDS_VDD_EN	LVDS Panel Power Control	0-3.3	PD 100k	-
A78	LVDS_A3+	LVDS Channel A DAT3+	DP-0	-	-
A79	LVDS_A3-	LVDS Channel A DAT3+	DP-0	-	-
A80	GND	Power Ground	PWR GND	-	-
A81	LVDS_A_CK+	LVDS Channel A Clock+	DP-0	-	20-80MHz
A82	LVDS_A_CK-	LVDS Channel A Clock-	DP-0	-	20-80MHz
A83	LVDS_I2C_CK	LVDS I2C Clock (DDC)	IO-3.3	PU 2k21 3.3V (SO)	-
A84	LVDS_I2C_DAT	LVDS I2C Data (DDC)	IO-3.3	PU 2k21 3.3V (SO)	-
A85	GPI3	General Purpose Input 3	I/0-3.3	PU 100k 3.3V (SO)	-
A86	RSVD	Reserved for future use	nc	-	-
A87	RSVD	Reserved for future use	nc	-	-
A88	PCIEO_CK_REF+	Reference PCI Express Clock +	DP-0	-	100MHz
A89	PCIEO_CK_REF-	Reference PCI Express Clock -	DP-0	-	100MHz
A90	GND	Power Ground	PWR GND	-	-
A91	SPI_POWER	3.3V Power Output Pin for external SPI flash	0-3.3	-	100mA (max.)
A92	SPI_MISO	SPI Master IN Slave OUT	I-3.3	PD 20k in CPU (SPI)	All SPI signals are tri-stated with 20k ohm CPU internal weak pull-up until reset is deasserted
A93	GP00	General Purpose Output 0	0-3.3	PD 100k	-
A94	SPI_CLK	SPI Clock	0-3.3	PD 20k in CPU (SPI)	All SPI signals are tri-stated with 20k ohm CPU internal weak pull-up until reset is deasserted
A95	SPI_MOSI	SPI Master Out Slave In	0-3.3	PD 20k in CPU (SPI)	All SPI signals are tri-stated with 20k ohm CPU internal weak pull-up until reset is deasserted
A96	TPM_PP	TPM Physical Presence	nc	-	TPM_PP not supported by used TPM
A97	TYPE10#	Indicates TYPE10# to carrier board	nc	-	-
A98	SER0_TX	Serial Port 0 TXD	0-3.3	-	20V protection circuit implemented on module, PD on carrier board needed for proper operation
A99	SER0_RX	Serial Port 0 RXD	I-5T	PU 47k 3.3V (S0)	20V protection circuit implemented on module
A100	GND	Power Ground	PWR GND	-	-
A101	SER1_TX	Serial Port 1 TXD	0-3.3	-	20V protection circuit implemented on module, PD on carrier board needed for proper operation
A102	SER1_RX	Serial Port 1 RXD	I-5T	PU 47k 3.3V (SO)	20V protection circuit implemented on module
A103	LID#	LID Switch Input	I-3.3	PU 47k 3.3V (S5)	20V protection circuit implemented on module
A104	VCC_12V	Main Input Voltage (8.5-20V)	PWR 8.5-20V	-	-
A105	VCC_12V	Main Input Voltage (8.5-20V)	PWR 8.5-20V	-	-
A106	VCC_12V	Main Input Voltage (8.5-20V)	PWR 8.5-20V	-	-
A107	VCC_12V	Main Input Voltage (8.5-20V)	PWR 8.5-20V	-	-
A108	VCC_12V	Main Input Voltage (8.5-20V)	PWR 8.5-20V	-	-
A100	VCC_12V	Main Input Voltage (8.5-20V)	PWR 8.5-20V	-	-
A103	GND	Power Ground	PWR GND	-	-
ATTO N	GND	rower dround	I WILCHUD		

6.3 Connector X1A Row B

Pin	Signal	Description	Туре	Termination	Comment
B1	GND	Power Ground	PWR GND	-	-
B2	GBE0_ACT#	Ethernet Activity LED	OD	-	-
B3	LPC_FRAME#	LPC Frame Indicator	0-3.3	PU 20k in CPU (SO)	-
B4	LPC_AD0	LPC Multiplexed Command, Address & Data 0	I/0-3.3	PU 20k in CPU (SO)	-
B5	LPC_AD1	LPC Multiplexed Command, Address & Data 1	/ I/0-3.3	PU 20k in CPU (SO)	-
B6	LPC_AD2	LPC Multiplexed Command, Address & Data 2	/ I/0-3.3	PU 20k in CPU (SO)	-
B7	LPC_AD3	LPC Multiplexed Command, Address & Data 3	I/0-3.3	PU 20k in CPU (SO)	-
B8	LPC_DRQ0#	LPC Serial DMA/Master Request 0	I-3.3	PU 15k in CPLD (S5)	resistor value can range from 5k0hm to 25k0hm
B9	LPC_DRQ1#	LPC Serial DMA/Master Request 1	I-3.3	PU 15k in CPLD (S5)	resistor value can range from 5k0hm to 25k0hm
B10	LPC_CLK	33MHz LPC clock	0-3.3	PD 20k in CPU	33MHz at E38xx CPUs and 25MHz at other CPUs
B11	GND	Power Ground	PWR GND	-	-
B12	PWRBTN#	Power Button	I-3.3	PU 10k 3.3V (S5eco)	-
B13	SMB_CLK	SMBUS Clock	0-3.3	PU 2k9 3.3V (S5)	-
B14	SMB_DAT	SMBUS Data	I/0-3.3	PU 2k9 3.3V (S5)	-
B15	SMB_ALERT#	SMBUS Alert	I/0-3.3	PU 10k 3.3V (S5)	-
B16	SATA1_TX+	SATA 1 Transmit Pair +	DP-0	-	-
B17	SATA1_TX-	SATA 1 Transmit Pair -	DP-0	-	-
B18	SUS_STAT#	Suspend Status	0-3.3	-	-
B19	SATA1_RX+	SATA 1 Receive Pair +	DP-I	-	-
B20	SATA1_RX-	SATA 1 Receive Pair -	DP-I	-	-
B21	GND	Power Ground	PWR GND	-	-
B22	SATA3_TX+	Not Connected	nc	-	-
B23	SATA3_TX-	Not Connected	nc	-	-
B24	PWR_OK	Power OK	I-5T	PU 61k 3.3V	pullup voltage is S0 in ATX mode/ S5 in single supply mode / 5V tolerant
B25	SATA3_RX+	Not Connected	nc	-	-
B26	SATA3_RX-	Not Connected	nc	-	-
B27	WDT	Watch Dog Time-Out event	0-3.3	-	-
B28	HDA_SDIN2	Not Connected	nc	-	not supported
B29	HDA_SDIN1	Audio Codec Serial Data in 1	I-3.3	PD 20k in CPU	-
B30	HDA_SDIN0	Audio Codec Serial Data in 0	I-3.3	PD 20k in CPU	-
B31	GND	Power Ground	PWR GND	-	-
B32	SPKR	Speaker	0-3.3	PU 20k in CPU (SO)	-
B33	I2C_CK	I2C Clock	0-3.3	PU 2k21 3.3V (S5)	-
B34	I2C_DAT	I2C Data	I/0-3.3	PU 2k21 3.3V (S5)	-
B35	THRM#	Over Temperature Input	I-3.3	PU 10k 3.3V (S0)	no function implemented
B36	USB7-	USB 2.0 Data Pair Port 7 –	DP-I/O	PD/PU in CPU	PD 15k0hm +/-5% on Downstream Facing Port; PU 1.5k0hm +/-5% on Upstream Facing Port
B37	USB7+	USB 2.0 Data Pair Port 7 +	DP-I/O	PD/PU in CPU	PD 15k0hm +/-5% on Downstream Facing Port; PU 1.5k0hm +/-5% on Upstream Facing Port
B38	USB_4_5_0C#	USB Overcurrent Indicator Port 4/5	I-3.3	PU 10k 3.3V (S5)	-
B39	USB5-	USB 2.0 Data Pair Port 5 –	DP-I/O	PD/PU in CPU	PD 15k0hm +/-5% on Downstream Facing Port; PU 1.5k0hm +/-5% on Upstream Facing Port
B40	USB5+	USB 2.0 Data Pair Port 5 +	DP-I/O	PD/PU in CPU	PD 15k0hm +/-5% on Downstream Facing Port; PU 1.5k0hm +/-5% on Upstream Facing Port
B41	GND	Power Ground	PWR GND	-	
B42	USB3-	USB 2.0 Data Pair Port 3 –	DP-I/O	PD/PU in CPU	PD 15k0hm +/-5% on Downstream Facing Port; PU 1.5k0hm +/-5% on Upstream Facing Port
B43	USB3+	USB 2.0 Data Pair Port 3 +	DP-I/O	PD/PU in CPU	PD 15k0hm +/-5% on Downstream Facing Port; PU 1.5k0hm +/-5% on Upstream Facing Port
B44	USB_0_1_0C#	USB Overcurrent Indicator Port 0/1	I-3.3	PU 15k in CPLD (S5)	resistor value can range from 5k0hm to 25k0hm
B44 B45	USB1-	USB 2.0 Data Pair Port 1 –	DP-I/O	PD/PU in CPU	PD 15k0hm +/-5% on Downstream Facing Port; PU 1.5k0hm +/-5% on Upstream Facing Port
B46	USB1+	USB 2.0 Data Pair Port 1 +	DP-I/O	PD/PU in CPU	PD 15k0hm +/-5% on Downstream Facing Port; PU 1.5k0hm +/-5% on Upstream Facing Port
B47	EXCD1_PERST#	Express Card Reset Port 1	0-3.3	-	-
B48	EXCD1_CPPE#	Express Card Capable Card Request Port 1	I-3.3	PU 10k 3.3V (S0)	-
B49	SYS_RESET#	Reset Button Input	I-3.3	PU 10k 3.3V (S5)	-
B50	CB_RESET#	Carrier Board Reset	0-3.3		-
B51	GND	Power Ground	PWR GND	-	-
B51 B52	PCIE_RX5+	Not Connected	nc	-	-
B53	PCIE_RX5-	Not Connected	nc	-	
B54	GP01	General Purpose Output 1	0-3.3	PD 100k	
	PCIE_RX4+	Not Connected	nc	-	-
B55					
B55 B56	PCIE_RX4-	Not Connected	nc	-	-

B58	PCIE_RX3+	PCI Express Lane 3 Receive +	DP-I	-	only available on no-LAN var.
B59	PCIE_RX3-	PCI Express Lane 3 Receive -	DP-I	-	only available on no-LAN var.
B60	GND	Power Ground	PWR GND	-	-
B61	PCIE_RX2+	PCI Express Lane 2 Receive +	DP-I	-	-
B62	PCIE_RX2-	PCI Express Lane 2 Receive -	DP-I	-	-
B63	 GP03	General Purpose Output 3	0-3.3	PD 100k	-
B64	PCIE_RX1+	PCI Express Lane 1 Receive +	DP-I	-	-
B65	PCIE_RX1-	PCI Express Lane 1 Receive -	DP-I	-	-
B66	WAKEO#	PCI Express Wake Event	I-3.3	PU 10k 3.3V (S5)	-
B67	WAKE1#	General Purpose Wake Event	I-3.3	PU 10k 3.3V (S5)	-
B68	PCIE_RX0+	PCI Express Lane 0 Receive +	DP-I	-	-
B69	PCIE_RX0-	PCI Express Lane 0 Receive -	DP-I	-	-
B70	GND	Power Ground	PWR GND	-	-
B71	LVDS_B0+	LVDS Channel B DATO+	DP-0	-	-
B72	 LVDS_B0-	LVDS Channel B DATO-	DP-0	-	-
B73	 LVDS_B1+	LVDS Channel B DAT1+	DP-0	-	-
B74	LVDS_B1-	LVDS Channel B DAT1-	DP-0	-	-
B75	LVDS_B2+	LVDS Channel B DAT2+	DP-0	-	-
B76	LVDS_B2-	LVDS Channel B DAT2-	DP-0	-	-
B77	 LVDS_B3+	LVDS Channel B DAT3+	DP-0	-	-
B78	 LVDS_B3-	LVDS Channel B DAT3-	DP-0	-	-
B79	 LVDS_BKLT_EN	Panel Backlight On	0-3.3	PD 100k	-
B80	 GND	Power Ground	PWR GND	-	-
B81	LVDS_B_CK+	LVDS Channel B Clock+	DP-0	-	-
B82	LVDS_B_CK-	LVDS Channel B Clock-	DP-0	-	-
B83	LVDS_BKLT_CTRL	Backlight Brightness Control	0-3.3	-	-
B84	VCC_5V_SBY	5V Standby	PWR 5V (S5)	-	optional (not neccessary in single supply mode)
B85	VCC_5V_SBY	5V Standby	PWR 5V (S5)	-	optional (not neccessary in single supply mode)
B86	VCC_5V_SBY	5V Standby	PWR 5V (S5)	-	optional (not neccessary in single supply mode)
B87	VCC_5V_SBY	5V Standby	PWR 5V (S5)	-	optional (not neccessary in single supply mode)
B88	BIOS_DIS1#	BIOS Selection Strap 1	I-3.3	PU 10k 3.3V (SPI)	PU might be powered during suspend
B89	CRT_RED	CRT_RED / Analog Video RGB-RED	0A	PD 150R	-
B90	GND	Power Ground	PWR GND	-	-
B91	CRT_GREEN	CRT_GREEN / Analog Video RGB-GREEN	0A OA	PD 150R	-
B92	CRT_BLUE	CRT_BLUE / Analog Video RGB-BLUE	0A OA	PD 150R	-
B93	CRT_HSYNC	CRT HSYNC / Analog Video H-Sync	0-3.3	-	-
B94	CRT_VSYNC	CRT_VSYNC / Analog Video V-Sync	0-3.3	-	-
B95	CRT_DDC_CLK	CRT_DDC_CLK / Display Data Channel Clock	I/0-5	PU 2k21 5.0V_S0	-
B96	CRT_DDC_DATA	CRT_DDC_DATA / Display Data Channel Data	I/0-5	PU 2k21 5.0V_S0	-
B97	SPI_CS#	SPI Chip Select	0-3.3		-
B98	RSVD	Reserved for future use	nc	-	-
B99	RSVD	Reserved for future use	nc	-	-
B100	GND	Power Ground	PWR GND	-	-
B101	FAN_PWMOUT	Fan PWM Output	0-3.3	-	20V protection circuit implemented on module, PD on carrier board needed for proper operation
B102	FAN_TACHIN	Fan Tach Input	I-3.3	PU 47k 3.3V (S0)	20V protection circuit implemented on module
B103	SLEEP#	Sleep Button Input	I-3.3	PU 47k 3.3V (S5)	20V protection circuit implemented on module
B104	VCC_12V	Main Input Voltage (8.5-20V)	PWR 8.5-20V	-	-
B105		Main Input Voltage (8.5-20V)	PWR 8.5-20V	-	-
B106		Main Input Voltage (8.5-20V)	PWR 8.5-20V	-	-
B107	VCC_12V	Main Input Voltage (8.5-20V)	PWR 8.5-20V	-	-
B108	VCC_12V	Main Input Voltage (8.5-20V)	PWR 8.5-20V	-	-
B109	VCC_12V	Main Input Voltage (8.5-20V)	PWR 8.5-20V	-	-
B110	GND	Power Ground	PWR GND	-	-

6.4 Connector X1B Row C

Image Digital Digital Distantion Distantion 10 1000000 10000000 10000000 10000000 10 10000000 100000000 10000000 100000000 10 10000000 10000000000 100000000 1000000000000000000000000000000000000	Pin	Signal	Description	Tuno	Termination	Comment
i ab. ab. ab. i ab ab ab i ab				Туре		comment
CIIIIIICUSUSUSUSVVVVVCUSUSUSUSVVVVVCUSUSUSVVVVVVCUSUSUSUSVVVVVVCUSUSUSUSVV						-
Ide S. SX00. US Sign Speed Renov () PAT - - Ide S. SX01. Nor Connected nc - - - Ide S. SX01. Nor Connected nc - - - Ide S. SX02. Nor Connected nc - - - Ide S. SX02. Nor Connected nc - - - Ide S. SX03. Nor Connected nc - - - Ide S. SX03. Nor Connected nc - - - Ide S. SX03. Nor Connected nc - - - Ide S. SX03. Nor Connected nc - - - Ide S. SX04. Nor Connected nc - - - Ide S. SX04. Nor Connected nc - - - Ide S. SX04. Nor Connected nc - - - Ide S. SX04. Nor Connected nc - - -						
60 000 0000 0 0 60 USB SSN1- NatConsetsd nC - - 60 USB SSN2- NatConsetsd nC - - 60 USB SSN2- NatConsetsd nC - - 70 USB SSN2- NatConsetsd nC - - 71 USB SSN2- NatConsetsd						
Image: Constraint of			1 1 ()			
ID SUM0 Non-Constant nec nec 00 Non-Sometriel nec nec nec 01 SUS.SUM0 Non-Sometriel nec nec nec nec 01 SUS.SUM0 Non-Sometriel nec						
Gen Power formed PNE 600 - GU USLS XS02- No Gonerated nc - - GU USLS XS02- No Gonerated nc - - GU USLS XS03- No Gonerated nc - - GU USLS XS04- N						-
Gen Not Connected nc n C10 USB_SSN2 Not Connected nc n C11 USB_SSN3 Not Connected nc n C11 NSB_SSN3 Not Connected nc n C11 NSB_SSN3 Not Connected nc n n C11 NSB_SSN3 Not Connected nc n n C11 NST_SSN3 Not Connected nc n n C12 NST_SSN3 Not Connected nc n n C12 NST_SSN3 Not Connected nc n n C12 NST_SSN3 Not Connected nc n n C14 NOT Not Connected nc n n C14						-
101 100 Now formeted nc - 112 105 SSR0- Not formeted nc - 113 100 Now formeted nc - - 114 101 Not formeted nc - - 115 0011, Mils+ Not formeted nc - - 116 0011, Mils+ Not formeted nc - - 117 Ris Not formeted nc - - 118 Not formeted nc - - 119 Ris Not formeted nc - - 119 Ris Not formeted nc - - 119 Not formeted nc - - 119 Not formeted nc - - 119 Not formeted nc - - 119 Not formeted						
Int Power Gound PNR MD - 121 USB_STRO- Net Connected rc - 141 MoR_STRO- Net Connected rc - 142 GAD Net Connected rc - 143 MoR_STRO- Net Connected rc - 144 GAD Net Connected rc - 145 DOIL_PAISA Net Connected rc - 146 SND Reserved for future ace rc - 147 RXD Reserved for future ace rc - 148 SND Reserved for future ace rc - 149 PLT_ERG- Net Connected rc - 140 RVT_RG Net Connected rc - 141 NPT_MD DOIL Happing Detect 16.3 PD 100k 142 PLT_ERG- Net Connected rc - 143 DRT_ERG- Net Connected rc - 144 Net Connected rc - 145 DRT_ERG- Net Connected rc 145 NRT_ERG- Net Connected rc 146 DRT_ERGA- Net Connected <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td></t<>						
121 191. SN03- Net Gamended ref - - 131 193. SN03- Net Gamended ref - - 131 NTL. SNA- Net Gamended ref - - 131 NTL. SNA- Net Gamended ref - - 132 NTL. SNA- Net Gamended ref - - - 132 NTL. SNA- Net Gamended ref - - - - 133 NTL. SNA- Net Gamended ref -<						
131 194, SNR3-M Nat Connected ne - 155 1011, PMR8- Nat Connected ne - - 156 1011, PMR8- Nat Connected ne - - 157 RSU- Reserved for future use nc - - 158 RSU- Reserved for future use nc - - 159 RTE, RAC- Nat Connected nc - - 150 RTE, RAC- Nat Connected nc - - 150 RTE, RAC- Nat Connected nc - - 151 RTE, RAC- Nat Connected nc - - 152 RTE, RAC- Nat Connected nc - - 152 RTE, RAC- Nat Connected nc - - 153 RTE, RAC- Nat Connected nc - - 154 RAC Nat Connected nc - - 155<						
CitA OND Power Ground PRR DD - CitA DD1_NNRe- Nat Cannetad nc - CitA Nov Reserved for future use nc - CitA Nov Reserved for future use nc - CitA RES_ROA Nat Cannetad nc - - CitA RES_ROA Nat Cannetad nc - - CitA ROIL_INIA- Nat Cannetad nc - -						
1011_MIN6- Not_ometed nc - 1011_MIN6- Net Connected nc 1011_MIN6-						
161 NDLL_NIM6- Not Connected nc - 171 FS00 Reserved for future use nc - - 171 RS00 Reserved for future use nc - - 171 RS00 Reserved for future use nc - - 171 RS10 Not Connected nc - - 172 RS12, RS4- Not Connected nc - - 173 RS10 Not Connected nc - - 174 RS10 Not Connected nc - - 174 Not Connected nc - - - 175 Not Connected nc - - - 176 S001_NIR4- Not Connected nc - - 176 NOD Reserved for future use nc - - 178 Not Connected nc - - 179 D01_NIR4- Not Connected nc - 170 D01_NIR4- Not Connected nc - 170 D01_NIR4- Not Connected nc - 170 D01_NIR4- Not Connected nc <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>						
171SVDReserved for hture usenc173RGL,R64Not Connectednc174RGL,R64Not Connectednc176RCL,R64Not Connectednc177RCL,R64Not Connectednc178RCL,R64Not Connectednc179RCL,R64Not Connectednc179RCL,R64Not Connectednc179RCL,R64Not Connectednc170RCL,R64Not Connectednc170Not Connectednc171Not Connectednc172NSVReserved for future usenc173Not Connectednc174Not Connectednc175Not Connectednc174Not Connectednc175Not Connectednc175Not Connectednc175Not Connectednc175Not Connectednc176Not Connectednc176 </td <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>						
C13 FSVD Reserved for future use nc - C13 PCLL_RX6- Not Connected nc - C14 RVL_RX6- Not Connected nc - C21 CNL_RX7- Not Connected nc - C21 CNL_RX7- Not Connected nc - C21 CNL_RX7- Not Connected nc - C31 DD1_PNIR4- Not Connected nc - C42 DD1_PNIR4- Not Connected nc - C43 DD1_PNIR4- Not Connected nc - C44 DD1_PNIR4- Not Connected nc - C45 DD1_PNIR5- Not Connected nc - C46 DD1_PNIR5- Not Connected nc - C41 DD1_PNIR5- Not Connected nc - C43 DD1_PNIR5- Not Connected nc - C43 DD1_PNIR5- Not Connected nc						
C19 PCIE (Noise Not Connected nc - C20 PCIE (Noise Not Connected nc - C21 CML (Noise Not Connected nc - C22 PCIE (Noise) Not Connected nc - C23 PCIE (Noise) Not Connected nc - C24 DOI1, PNIP DOI1 Holping Detect 1-3.3 PD 100k - C25 DOI1, PNIR- Not Connected nc - - C26 DOI1, PNIR- Not Connected nc - - C27 RSVD Reserved for future use nc - - C30 DOI1, PNIR- Not Connected nc - - C31 DNIR Not Connected nc - - C32 DOI1, PNIR- Not Connected nc - - C33 DOI2, CRILL(ALMA DOI2 CRILL(ALMA I/0-3.3 PD 100k - C34 DOI2, CRILL(ALMA Not Connected nc - - C35 BOI2, CRILL(ALMA Not Connected nc - - C36 DOI2, CRILL(ALMA Not Connected nc - - <						-
120PUTL B06-Not Connectedn c-121FUTL B07-Not Connectedn c-123PUTL B07-Not Connectedn c-124PUTL B07-Not Connectedn c-125D011, PID-D01 boliga bylett1-3.3P0 100k-126D011, PID-Not Connectedn c127BX00Reserved for future usen c128NVDReserved for future usen c129D011, PID-Not Connectedn c120D011, PID-Not Connectedn c120D011, PID-Not Connectedn c120D011, PID-Not Connectedn c121D011, PID-Not Connectedn c123D011, PID-Not Connectedn c124D012, CIRLUK JAJAD02, CIRLUK JAJAJ/D-3.3PU 100k 3.9V (50)-123D012, CIRLUK JAJAD012, DUT, DAJA/JAUCJ/D-3.3PU 100k 3.9V (50)-124D012, DUT, DUT, DUT, DUT, DUT, DUT, DUT, DUT						
121 KMD Power Ground PWR GND - 122 KEL RX7- Not Connected nc - 124 DD11_HPD DD1 Holyap Detect 1-3.3 PD Dobk 125 DD11_RMA+ Not Connected nc - 126 DD11_RMA+ Not Connected nc - 127 RSVD Reserved for future use nc - 128 KSVD Reserved for future use nc - 129 DD11_RMB+ Not Connected nc - 130 DD11_RMB+ Not Connected nc - 141 CMD Power Ground PMR GND - 131 GMD Power Ground PMR GND - 132 DD1_CTRLCLK_ADA DD12 CTRLCLK_ADA I/0-3.3 PD 10M 133 DD12_CTRLCLK_ADA DD12 CTRLCLK_ADA I/0-3.3 PD 10M 134 DD12_CTRLCLK_ADA DD12 CTRLCLK_ADA I/0-3.3 PD 10M 135 RSVD Reserved for future use nc - 135 DD1_CTRLCLK_ADA Not Connected nc - 136 DD13_CTRLDK_ADA Not Connected nc - 137					-	-
G22 PCIE, RX- Net Connected nc - - G3 PCIE, RX- Net Connected nc - - G4 DDII, PMB DB1 thylug Dett F13.8 Net Connected nc - G5 DDII, PAIRA+ Net Connected nc - - G26 DDII, PAIRA+ Net Connected nc - - G28 RSVD Reserved for future use nc - - G30 DDII, PAIRA+ Net Connected nc - - G30 DDII, PAIRA+ Net Connected nc - - G31 GND Power Ground PMR GND - - G31 DDII, CIRLIX, AUX+ DDII CIRLIX/AUX+ I/O-3.3 PD 100k - G33 DDII, CIRLIX, AUX+ DDII CIRLIX/AUX+ I/O-3.3 PD 100k - G34 DDII, CIRLIX, AUX+ Not Connected nc - - G35 DDII, CIRLIX, AUX+		_			-	-
C23 PUE KV7- Met Connected nc - C24 D011 JAHA Not Connected nc - C25 D011 JAHA Not Connected nc - C26 D011 JAHA Not Connected nc - C27 SND Reserved for future use nc - C28 D011 JAHA Not Connected nc - C29 D011 JAHA Not Connected nc - C30 D011 JAHA Not Connected nc - C31 D011 CRUKA Not Connected nc - C30 D012 CRUKA/AW Not Connected nc - C31 D012 CRUKA/AW Not Connected nc - C32 D012 CRUKA/AW Not CRUKA/AW 1/0-3.3 P0 100 - C33 D012 CRUKA/AW Not Connected nc - - C34 D012 CRUKA/AW Not Connected nc - - C35 NS0 Reserved for future use nc - - C36 D013 CRUKA/AW Not Connected nc - - C37 D013 CRUKA/AW Not Connected nc - - </td <td></td> <td></td> <td></td> <td></td> <td></td> <td>-</td>						-
C24 DDI1, HPD DDI1 Hoplug Detect F.3.3 PD 100k • C25 DDI1, PAIR4- Nct Connected nc - • C26 DDI1, PAIR4- Nct Connected nc - • C27 BSVD Reserved for future use nc - • C28 BSVD Reserved for future use nc - • C30 DDI1, PAIR5+ Nct Connected nc - • C31 ODI1, PAIR5+ Nct Connected nc - • C32 DDI2, CRECK, AUK+ DDI2 CREAL/AUK+ L/O-3.3 PD 100k • C33 DDI2, CREAL/AUK+ DDI2 CREAL/AUK+ L/O-3.3 PD 100k • C34 DDI2, CREAL/AUK+ DDI2 CREAL/AUK+ L/O-3.3 PD 100k • C35 BSVD Reserved for future use nc - • C36 DDI3, CREAL/AUK+ Nct Connected nc - • C37 DDI3, CREAL/AUK+ Nct Connected nc - • C38 DDI3, PAR0+ Nct Connected nc - • C40 DDI3, PAR0+ Nct Connected nc - • <t< td=""><td></td><td></td><td></td><td>nc</td><td>-</td><td>-</td></t<>				nc	-	-
C25 DDI1_PAIR4+ Not Connected nc - - C26 DDI1_PAIR4- Not Connected nc - - C27 RSVD Reserved for future use nc - - C28 RSVD Reserved for future use nc - - C29 DD11_PAIR5- Not Connected nc - - C30 DD11_PAIR5- Not Connected nc - - C31 GN0 Power Ground PWR GND - - C32 DD12_CTRLIX_IAUX DD12_CTRLIX_IAUX I/O-3.3 PU 100k 3.3V (S0) - C34 DD12_DC_AUX_SEL DD12_DD2_CTRLIX_IAUX Not Connected nc - - C35 DD13_CTRLIX_AUX Not Connected nc - - - C36 DD13_CTRLIX_AUX Not Connected nc - - - C37 DD13_PAR0+ Not Connected nc - - -						-
C26 D011_PAIR4- Net Connected nc - - C27 RSVD Reserved for future use nc - - C28 RSVD Reserved for future use nc - - C30 D011_PAIR5- Net Connected nc - - C31 GND Power Ground PWR GND - - C32 D012_CTRLUX_AUX D012 CTRLUX_AUX I/O-3.3 PD 100k - C33 D012_CTRLUX_AUX D012 CTRLUAT_AUX I/O-3.3 PD 100k - C33 D012_CTRLUAT_AUX D012 CTRLUAT_AUX I/O-3.3 PD 100k - C34 D012_CTRLUAT_AUX D012 CTRLUAT_AUX I/O-3.3 PD 100k - C35 DSVD Reserved for future use nc - - C36 D013_CTRLUAT_AUX Net Connected nc - - C38 D013_PARD+ Net Connected nc - - C40 D013_PARD+			1 5	I-3.3	PD 100k	-
G27 RSVD Reserved for future use nc - - G28 D011_PAIR5+ Not Connected nc - - G30 D011_PAIR5+ Not Connected nc - - G31 GND Power Ground PW RGND - - G31 GND Power Ground PW RGND - - G33 D012_CTRLICK_AUX D0-3.3 PU 1006 3.3V(S0) - G34 D012_CTRLICK_AUX D012_CDDC/AUX selact 1-3.3 PU 100 3.3V(S0) - G35 RSVD Reserved for future use nc - - - G36 D012_CTRLICK_AUX+ Not Connected nc - - - G30 D013_PAR0+ Not Connected nc - - - G41 DND Power Ground PWR GND - - - G42 D013_PAR0+ Not Connected nc - - - G44			Not Connected	nc	-	-
C28 RSVD Reserved for future use nc - - C30 DD11_PAR5+ Not Connected nc - - C31 GMD Power Ground PWR GMD - - C31 GMD Power Ground PWR GMD - - C32 DD12_CTRLCK_AUX+ DD12_CTRLCK_AUX+ I/O-3.3 PD 100K - 33(S0) - C34 DD12_CTRLCK_AUX+ DD12_CTRLCM_AUX- I/O-3.3 PD 100K - 33(S0) - C35 RSVD Reserved for future use nc - - - C36 DD13_CTRLCK_AUX- Not Connected nc - - - C38 DD13_DRLNA+ Not Connected nc - - - C40 DD13_PAIR0+ Not Connected nc - - - C41 DD13_PAIR0+ Not Connected nc - - - C42 DD13_PAIR1+ Not Connected nc - -	C26	DDI1_PAIR4-	Not Connected	nc	-	-
C29 DDI1_PARS+ Not Connected nc - - C30 DD1_PARS- Not Connected nc - - C31 GAD Power forund PMK GAD - - C32 DDI2_CTRLLIK_AUX+ DDI2 CTRLLIK/AUX+ I/0-3.3 PD 100k - C33 DDI2_CTRLLIK_AUX+ DDI2 CTRLLIK/AUX+ I/0-3.3 PD 100k - C34 DDI2_CDC_AUX_SEL DDI2 CDI2/AUX-select 1-3.3 PD 14 - C35 RSVD Reserved for future use nc - - - C36 DDI3_CTRLUK_AUX+ Not Connected nc - - - C38 DDI3_DOC_AUX_SEL Not Connected nc - - - C40 DDI3_FAIR0- Not Connected nc - - - C41 GMD Power forund PWR GMD - - - C42 DDI3_FAIR1- Not Connected nc - -	C27	RSVD	Reserved for future use	nc	-	-
G30 DDI1_PAIR5- Not Connected nc - - G31 GND Power Ground PW R GND - - G31 DDI2_CTRLUK_AUX- DDI2 CRLUK_AUX+ DDI2-33 PD 100k - G31 DDI2_CTRLUK_AUX- DDI2 CRLUK_AUX+ DDI2-33 PD 100k - G36 DDI2_CTRLUX_AUX+ DDI2 CRLUK_AUX+ Not Connected nc - G36 DDI3_CTRLUATA_AUX+ Not Connected nc - - G37 DDI3_CTRLUATA_AUX+ Not Connected nc - - G39 DDI3_CAUX_SE Not Connected nc - - G40 DDI3_PAIR0+ Not Connected nc - - G42 DDI3_PAIR1+ Not Connected nc - - G43 DDI3_PAIR1+ Not Connected nc - - G44 DDI3_PAIR1+ Not Connected nc - - G44 DDI3_PAIR2+ Not Connec	C28		Reserved for future use	nc	-	-
G11 GND Power Ground PWR GND - - G22 DD12_CTRLCLK_AUX+ DD12 CTRLDATA_AUX- I/O-3.3 PD 100k - G3 DD12_CTRLDATA_AUX- DD12 CTRLDATA_AUX- I/O-3.3 PD 100k 0.3.3V (S0) - G3 DD12_CTRLDATA_AUX- DD12 CTRLDATA_AUX- I/O-3.3 PD 10M - G3 DD12_CTRLDATA_AUX- Not Connected nc - - G3 DD13_CTRLDATA_AUX- Not Connected nc - - G3 DD13_PAIR0- Not Connected nc - - G40 DD13_PAIR0- Not Connected nc - - G41 GND Power Ground PWR GND - - G42 DD13_PAIR0- Not Connected nc - - G44 DD13_PAIR1- Not Connected nc - - G44 DD13_PAIR2+ Not Connected nc - - G45 DD13_PAIR2+ <	C29	DDI1_PAIR5+	Not Connected	nc	-	-
G22 DDI2_CTRLOX_AUX+ DDI2 CTRLOXA_AUX+ I/0-3.3 PD 100k - G33 DDI2_DC_AUX_SEL DDI2 DDC/AUX_SEL DI2 DDC/AUX_SEL DDI2 DDC/AUX_SEL DI2 DDC/AUX_SEL Not Connected nc - - G36 DDI3_CTRLCLK_AUX+ Not Connected nc - - - G37 DDI3_CTRLCLK_AUX+ Not Connected nc - - - G39 DDI3_CAUX_SEL Not Connected nc - - - G30 DDI3_DCAUX_SEL Not Connected nc - - - G40 DDI3_FAIR0- Not Connected nc - - - G41 GND Power Ground PWR GND - - - G42 DDI3_FAIR1+ Not Connected nc - - - G43 DDI3_FAIR2+ Not Connected nc <t< td=""><td>C30</td><td>DDI1_PAIR5-</td><td>Not Connected</td><td>nc</td><td>-</td><td>-</td></t<>	C30	DDI1_PAIR5-	Not Connected	nc	-	-
G33 DDI2_CTRLDATA_AUX DDI2 DC_AUX_SEL DDI2 CRLDATA_AUX Not Connected nc - G36 BVD Reserved for future use nc - - - G36 DDI3_CTRLDATA_AUX Not Connected nc - - - G38 DDI3_DC_AUX_SEL Not Connected nc - - - G39 DDI3_PATR0- Not Connected nc - - - G40 DDI3_PATR0- Not Connected nc - - - G41 DDI3_PATR1- Not Connected nc - - - G42 DDI3_PATR1- Not Connected nc - - - - G43 DDI3_PATR2- Not Connected nc - - - - - - - - - - - - -	C31	GND	Power Ground	PWR GND	-	-
C34 DDI2_DDC_AUX_SEL DDI2_DDC_AUX_Select I-3.3 PD 1M - C35 RSVD Reserved for future use nc - - C36 DDI3_CTRLCLK_AUX+ Not Connected nc - - C38 DDI3_CTRLDATA_AUX- Not Connected nc - - C38 DDI3_DC_AUX_SEL Not Connected nc - - C39 DDI3_ARR+ Not Connected nc - - C40 DDI3_PAIR0+ Not Connected nc - - C41 GND Power Ground PWR GND - - C42 DDI3_PAIR1+ Not Connected nc - - C43 DDI3_PAIR2+ Not Connected nc - - C44 DDI3_PAIR2+ Not Connected nc - - C45 RSVD Reserved for future use nc - - C46 DDI3_PAIR2+ Not Connected nc	C32	DDI2_CTRLCLK_AUX+	DDI2 CTRLCLK/AUX+	I/0-3.3	PD 100k	-
C35RSVDReserved for future usencC36DDI3_CTRLCLK_AUX+Not ConnectedncC37DDI3_CTRLCLK_AUX+Not ConnectedncC38DDI3_DOC_AUX_SELNot ConnectedncC39DDI3_PAIR0+Not ConnectedncC40DDI3_PAIR0+Not ConnectedncC41GNDPower GroundPWR GNDC42DDI3_PAIR1+Not ConnectedncC43DDI3_PAIR1+Not ConnectedncC44DDI3_PAIR1+Not ConnectedncC45RSVDReserved for future usencC44DDI3_PAIR2+Not ConnectedncC45RSVDReserved for future usencC46DDI3_PAIR2+Not ConnectedncC47DDI3_PAIR2+Not ConnectedncC48RSVDReserved for future usencC49DDI3_PAIR3+Not ConnectedncC50DDI3_PAIR3+Not ConnectedncC51GNDPower GroundPWR GNDC52PEG_RX0+Not ConnectedncC53PEG_RX0+Not ConnectedncC54TPFE0#n.c. for type	C33	DDI2_CTRLDATA_AUX-	,	I/0-3.3	PU 100k 3.3V (S0)	-
C36DDI3_CTRLOK_AUX+Not Connectednc-(37DDI3_CTRLOTA_AUX-Not Connectednc-(38DDI3_DDC_AUX_SELNot Connectednc-(39DDI3_PAIR0+Not Connectednc-(40DDI3_PAIR0+Not Connectednc-(41GNDPower GroundPWR GND-(42DDI3_PAIR1+Not Connectednc-(43DDI3_PAIR1+Not Connectednc-(44DDI3_PAIR1+Not Connectednc-(45RSVDReserved for future usenc-(44DDI3_PAIR2+Not Connectednc-(45RSVDReserved for future usenc-(46DDI3_PAIR2+Not Connectednc-(47DDI3_PAIR2+Not Connectednc-(48RSVDReserved for future usenc-(49DDI3_PAIR3+Not Connectednc-(50DDI3_PAIR3+Not Connectednc-(51GNDPower GroundPWR GND-(52PEG_RX0+Not Connectednc-(54TYPE0#n.c. for type 6 modulenc-(55PEG_RX1+Not Connectednc-(56PEG_RX1+Not Connectednc-(57TYPE1#n.c. for type 6 modulenc-(58PEG_RX2+Not Connectednc-(C34	DDI2_DDC_AUX_SEL	DDI2 DDC/AUX select	I-3.3	PD 1M	-
G37DD3_CTRLDATA_AUX-Not ConnectedncC38DD3_DDC_AUX_SELNot ConnectedncC39DD3_PAIR0+Not ConnectedncC40DD3_PAIR0+Not ConnectedncC41GN0Power forundPWR GNDC42DD13_PAIR1+Not ConnectedncC43DD13_PAIR1+Not ConnectedncC44DD13_PAIR1+Not ConnectedncC44DD13_PAIR1+Not ConnectedncC44DD13_PAIR2+Not ConnectedncC45RSVDReserved for future usencC46DD13_PAIR2+Not ConnectedncC47DD13_PAIR2+Not ConnectedncC48RSVDReserved for future usencC48RSVDReserved for future usencC49DD13_PAIR3+Not ConnectedncC50DD13_PAIR3+Not ConnectedncC51GNDPower forundPWR GNDC52PE6_RX0+Not ConnectedncC53PE5_RX1+Not ConnectedncC54TYPE0#n.c. fortype 6 modulencC55PE6_RX1+Not Connected <td< td=""><td>C35</td><td></td><td>Reserved for future use</td><td>nc</td><td>-</td><td>-</td></td<>	C35		Reserved for future use	nc	-	-
C38DDI3_DDC_AUX_SELNot ConnectedncC40DDI3_PAIR0-Not ConnectedncC41GNDPower GroundPWR GNDC42DDI3_PAIR1-Not ConnectedncC43DDI3_PAIR1-Not ConnectedncC44DDI3_PAIR1-Not ConnectedncC43DDI3_PAIR1-Not ConnectedncC44DDI3_PAIR1-Not ConnectedncC44DDI3_PAIR2+Not ConnectedncC44DDI3_PAIR2+Not ConnectedncC44DDI3_PAIR2+Not ConnectedncC45RSVDReserved for future usencC46DDI3_PAIR2+Not ConnectedncC47DDI3_PAIR3+Not ConnectedncC48RSVDReserved for future usencC50DDI3_PAIR3+Not ConnectedncC51GNDPower GroundPWR GNDC52PEG_RX0+Not ConnectedncC53PEG_RX0+Not ConnectedncC54TYPE0#n.c. for type 6 modulencC55PEG_RX1+Not ConnectedncC58PEG_RX2+Not Connected<	C36	DDI3_CTRLCLK_AUX+	Not Connected	nc	-	-
C39DDI3_PAIR0-Not Connectednc-C40DDI3_PAIR0-Not Connectednc-C41KNDPower GroundPWR GND-C42DDI3_PAIR1+Not Connectednc-C43DDI3_PAIR1-Not Connectednc-C44DDI3_PAIR1-Not Connectednc-C44DDI3_PAIR2+Not Connectednc-C44DDI3_PAIR2+Not Connectednc-C45RSVDReserved for future usenc-C46DDI3_PAIR2+Not Connectednc-C47DDI3_PAIR2-Not Connectednc-C48RSVDReserved for future usenc-C49DDI3_PAIR3-Not Connectednc-C50DDI3_PAIR3-Not Connectednc-C51GNDPower GroundPWR GNDC52PEG_RX0-Not ConnectedncC53PEG_RX0-Not ConnectedncC54TYPE0#n.c. for type 6 modulencC55PEG_RX1-Not ConnectedncC56PEG_RX1-Not ConnectedncC57TYPE1#n.c. for type 6 modulencC58PEG_RX2-Not ConnectedncC59PEG_RX2-Not ConnectedncC59PEG_RX2-	C37	DDI3_CTRLDATA_AUX-	Not Connected	nc	-	-
C40DD13_PAIR0-Not ConnectedncC41GNDPower GroundPWR GNDC42DD13_PAIR1+Not ConnectedncC43DD13_PAIR1-Not ConnectedncC44DD13_PAIR2+Not ConnectedncC45RSVDReserved for future usencC46DD13_PAIR2+Not ConnectedncC47DD13_PAIR2+Not ConnectedncC48RSVDReserved for future usencC48RSVDReserved for future usencC49DD13_PAIR3+Not ConnectedncC50DD13_PAIR3+Not ConnectedncC51GNDPower GroundPWR GNDC52PEG_RX0+Not ConnectedncC53FFG_RX0-Not ConnectedncC54TYPE0#n.c. for type 6 modulencC55FFG_RX1+Not ConnectedncC56FFG_RX2+Not ConnectedncC57TYPE1#n.c. for type 6 modulencC58PEG_RX2+Not ConnectedncC59FFG_RX2+Not ConnectedncC50FFG_RX2+Not Connectednc- </td <td>C38</td> <td>DDI3_DDC_AUX_SEL</td> <td>Not Connected</td> <td>nc</td> <td>-</td> <td>-</td>	C38	DDI3_DDC_AUX_SEL	Not Connected	nc	-	-
C41GNDPower GroundPWR GNDC42DD13_PAIR1+Not ConnectedncC43DD13_PAIR1-Not ConnectedncC44DD13_HPDNot ConnectedncC44DD13_HPDNot ConnectedncC45RSVDReserved for future usencC46DD13_PAIR2+Not ConnectedncC47DD13_PAIR2-Not ConnectedncC48RSVDReserved for future usencC49DD13_PAIR3+Not ConnectedncC50DD13_PAIR3-Not ConnectedncC51GNDPower GroundPWR GNDC52PEG_RX0+Not ConnectedncC53PFG_RX0-Not ConnectedncC54TYPE0#n.c. for type 6 modulencC55PEG_RX1+Not ConnectedncC56PEG_RX2+Not ConnectedncC57TYPE1#n.c. for type 6 modulencC58PEG_RX2+Not ConnectedncC59PEG_RX2+Not ConnectedncC51GNDPower GroundPWR GNDC55PEG_RX2+Not Connectednc	C39			nc	-	-
C42DDI3_PAIR1+Not Connectednc-C43DDI3_PAIR1-Not Connectednc-C44DDI3_HPDNot Connectednc-C45RSVDReserved for future usenc-C46DDI3_PAIR2+Not Connectednc-C47DDI3_PAIR2-Not Connectednc-C48RSVDReserved for future usenc-C49DDI3_PAIR3+Not Connectednc-C49DDI3_PAIR3+Not Connectednc-C50DDI3_PAIR3-Not Connectednc-C51GNDPower GroundPWR GND-C52PE6_RX0+Not Connectednc-C53PE6_RX0-Not Connectednc-C54TYPE0#n.c. for type 6 modulenc-C55PE6_RX1+Not Connectednc-C56PE6_RX1-Not Connectednc-C57TYPE1#n.c. for type 6 modulenc-C58PE6_RX2+Not Connectednc-C59PE6_RX2+Not Connectednc-C51FF6_RX2+Not Connectednc-C52PE6_RX2+Not Connectednc-C53PE6_RX2+Not Connectednc-C54TYPE1#n.c. for type 6 modulenc-C55FE6_RX2+Not Connectednc-C56FE6_RX2+Not	C40	DDI3_PAIR0-	Not Connected	nc	-	-
C43DDI3_PAIR1-Not ConnectedncC44DDI3_HPDNot ConnectedncC45RSVDReserved for future usencC46DDI3_PAIR2+Not ConnectedncC47DDI3_PAIR2-Not ConnectedncC48RSVDReserved for future usencC49DDI3_PAIR3+Not ConnectedncC50DDI3_PAIR3-Not ConnectedncC51GNDPower GroundPWR GNDC52PEG_RX0-Not ConnectedncC53PEG_RX0-Not ConnectedncC54TYPE0#n.c. for type 6 modulencC55PEG_RX1-Not ConnectedncC56PEG_RX1-Not ConnectedncC57TYPE1#n.c. for type 6 modulencC58PEG_RX1-Not ConnectedncC57TYPE1#n.c. for type 6 modulencC58PEG_RX2-Not ConnectedncC59PEG_RX2-Not ConnectedncC51GNDPower GroundPWR GNDC52PEG_RX2-Not ConnectedncC53PEG_RX2-Not Connectednc	C41	GND	Power Ground	PWR GND	-	-
C44DDIHPDNot ConnectedncC45RSVDReserved for future usencC46DDI3_PAIR2+Not ConnectedncC47DDI3_PAIR2-Not ConnectedncC48RSVDReserved for future usencC49DDI3_PAIR3+Not ConnectedncC50DDI3_PAIR3-Not ConnectedncC51GNDPower GroundPWR GNDC52PEG_RX0+Not ConnectedncC53PEG_RX0-Not ConnectedncC54TYPE0#n.c. for type 6 modulencC55PEG_RX1+Not ConnectedncC56PEG_RX1-Not ConnectedncC57TYPE1#n.c. for type 6 modulencC58PEG_RX2+Not ConnectedncC56PEG_RX2+Not ConnectedncC57TYPE1#n.c. for type 6 modulencC58PEG_RX2+Not ConnectedncC59PEG_RX2+Not ConnectedncC50GNDPower GroundPWR GNDC60GNDPower GroundPWR GNDC61PEG_RX3+Not Connectednc <td>C42</td> <td>DDI3_PAIR1+</td> <td>Not Connected</td> <td>nc</td> <td>-</td> <td>-</td>	C42	DDI3_PAIR1+	Not Connected	nc	-	-
C45RSVDReserved for future usencC46DD13_PAIR2+Not ConnectedncC47DD13_PAIR2-Not ConnectedncC48RSVDReserved for future usencC49DD13_PAIR3+Not ConnectedncC50DD13_PAIR3-Not ConnectedncC51GNDPower GroundPWR GNDC52PEG_RX0+Not ConnectedncC53PEG_RX0-Not ConnectedncC54TYPE0#n.c. for type 6 modulencC55PEG_RX1+Not ConnectedncC56PEG_RX1-Not ConnectedncC57TYPE1#n.c. for type 6 modulencC58PEG_RX2+Not ConnectedncC59PEG_RX2-Not ConnectedncC60GNDPower GroundPWR GNDC61PEG_RX3+Not ConnectedncC62PEG_RX3+Not ConnectedncC63RSVDReserved for future usencC63RSVDReserved for future usenc	C43	DDI3_PAIR1-	Not Connected	nc	-	-
C46DDI3_PAIR2+Not ConnectedncC47DDI3_PAIR2-Not ConnectedncC48RSVDReserved for future usencC49DDI3_PAIR3+Not ConnectedncC50DDI3_PAIR3-Not ConnectedncC51GNDPower GroundPWR GNDC52PEG_RX0+Not ConnectedncC53PEG_RX0-Not ConnectedncC54TYPE0#n.c. for type 6 modulencC55PEG_RX1+Not ConnectedncC56PEG_RX1-Not ConnectedncC57TYPE1#n.c. for type 6 modulencC58PEG_RX2+Not ConnectedncC59PEG_RX2-Not ConnectedncC60GNDPower GroundPWR GNDC61PEG_RX3+Not ConnectedncC62PEG_RX3+Not ConnectedncC63RSVDReserved for future usencC63RSVDReserved for future usenc	C44	DDI3_HPD	Not Connected	nc	-	-
C47DDI3_PAIR2-Not ConnectedncC48RSVDReserved for future usencC49DDI3_PAIR3+Not ConnectedncC50DDI3_PAIR3-Not ConnectedncC51GNDPower GroundPWR GNDC52PEG_RX0+Not ConnectedncC53PEG_RX0-Not ConnectedncC54TYPE0#n.c. for type 6 modulencC55PEG_RX1+Not ConnectedncC56PEG_RX1-Not ConnectedncC57TYPE0#n.c. for type 6 modulencC58PEG_RX2+Not ConnectedncC59PEG_RX2-Not ConnectedncC59PEG_RX2-Not ConnectedncC59PEG_RX2-Not ConnectedncC50GNDPower GroundPWR GNDC51PEG_RX3+Not ConnectedncC52PEG_RX3+Not ConnectedncC53PEG_RX3+Not ConnectedncC54TYPE1#Not ConnectedncC55PEG_RX3+Not ConnectedncC56PEG_RX3+Not ConnectedncC57	C45	RSVD	Reserved for future use	nc	-	-
C48RSVDReserved for future usencC49DD13_PAIR3+Not ConnectedncC50DD13_PAIR3-Not ConnectedncC51GNDPower GroundPWR GNDC52PEG_RX0+Not ConnectedncC53PEG_RX0-Not ConnectedncC54TYPE0#n.c. for type 6 modulencC55PEG_RX1+Not ConnectedncC56PEG_RX1+Not ConnectedncC57TYPE1#n.c. for type 6 modulencC58PEG_RX2+Not ConnectedncC59PEG_RX2+Not ConnectedncC59PEG_RX2-Not ConnectedncC60GNDPower GroundPWR GNDC61PEG_RX3+Not ConnectedncC62PEG_RX3-Not ConnectedncC63RSVDReserved for future usenc	C46	DDI3_PAIR2+	Not Connected	nc	-	-
C49DDI3_PAIR3+Not ConnectedncC50DDI3_PAIR3-Not ConnectedncC51GNDPower GroundPWR GNDC52PEG_RX0+Not ConnectedncC53PEG_RX0-Not ConnectedncC54TYPE0#n.c. for type 6 modulencC55PEG_RX1+Not ConnectedncC56PEG_RX1+Not ConnectedncC57TYPE1#n.c. for type 6 modulencC58PEG_RX2+Not ConnectedncC59PEG_RX2+Not ConnectedncC59PEG_RX2-Not ConnectedncC60GNDPower GroundPWR GNDC61PEG_RX3+Not ConnectedncC62PEG_RX3-Not ConnectedncC63RSVDReserved for future usenc	C47	DDI3_PAIR2-	Not Connected	nc	-	-
C50DDI3_PAIR3-Not ConnectedncC51GNDPower GroundPWR GNDC52PEG_RX0+Not ConnectedncC53PEG_RX0-Not ConnectedncC54TYPE0#n.c. for type 6 modulencC55PEG_RX1+Not ConnectedncC56PEG_RX1+Not ConnectedncC57TYPE1#n.c. for type 6 modulencC58PEG_RX2+Not ConnectedncC59PEG_RX2-Not ConnectedncC59PEG_RX2-Not ConnectedncC60GNDPower GroundPWR GNDC61PEG_RX3+Not ConnectedncC62PEG_RX3-Not ConnectedncC63RSVDReserved for future usenc	C48	RSVD	Reserved for future use	nc	-	-
C51GNDPower GroundPWR GNDC52PEG_RX0+Not ConnectedncC53PEG_RX0-Not ConnectedncC54TYPE0#n.c. for type 6 modulencC55PEG_RX1+Not ConnectedncC56PEG_RX1-Not ConnectedncC57TYPE1#n.c. for type 6 modulencC58PEG_RX2+Not ConnectedncC59PEG_RX2-Not ConnectedncC60GNDPower GroundPWR GNDC61PEG_RX3+Not ConnectedncC62PEG_RX3-Not ConnectedncC63RSVDReserved for future usenc	C49	DDI3_PAIR3+	Not Connected	nc	-	-
C52PEG_RX0+Not ConnectedncC53PEG_RX0-Not ConnectedncC54TYPE0#n.c. for type 6 modulencC55PEG_RX1+Not ConnectedncC56PEG_RX1-Not ConnectedncC57TYPE1#n.c. for type 6 modulencC58PEG_RX2+Not ConnectedncC59PEG_RX2-Not ConnectedncC60GNDPower GroundPWR GNDC61PEG_RX3+Not ConnectedncC62PEG_RX3-Not ConnectedncC63RSVDReserved for future usenc	C50	DDI3_PAIR3-	Not Connected	nc	-	-
C53PEG_RX0-Not ConnectedncC54TYPE0#n.c. for type 6 modulencC55PEG_RX1+Not ConnectedncC56PEG_RX1-Not ConnectedncC57TYPE1#n.c. for type 6 modulencC58PEG_RX2+Not ConnectedncC59PEG_RX2-Not ConnectedncC60GNDPower GroundPWR GNDC61PEG_RX3+Not ConnectedncC62PEG_RX3-Not ConnectedncC63RSVDReserved for future usenc	C51	GND	Power Ground	PWR GND	-	-
C54TYPE0#n.c. for type 6 modulencC55PEG_RX1+Not ConnectedncC56PEG_RX1-Not ConnectedncC57TYPE1#n.c. for type 6 modulencC58PEG_RX2+Not ConnectedncC59PEG_RX2-Not ConnectedncC60GNDPower GroundPWR GNDC61PEG_RX3+Not ConnectedncC62PEG_RX3-Not ConnectedncC63RSVDReserved for future usenc	C52	PEG_RX0+	Not Connected	nc	-	-
C55PEG_RX1+Not ConnectedncC56PEG_RX1-Not ConnectedncC57TYPE1#n.c. for type 6 modulencC58PEG_RX2+Not ConnectedncC59PEG_RX2-Not ConnectedncC60GNDPower GroundPWR GNDC61PEG_RX3+Not ConnectedncC62PEG_RX3-Not ConnectedncC63RSVDReserved for future usenc	C53	PEG_RX0-	Not Connected	nc	-	-
C56PEG_RX1-Not ConnectedncC57TYPE1#n.c. for type 6 modulencC58PEG_RX2+Not ConnectedncC59PEG_RX2-Not ConnectedncC60GNDPower GroundPWR GNDC61PEG_RX3+Not ConnectedncC62PEG_RX3-Not ConnectedncC63RSVDReserved for future usenc	C54	TYPE0#	n.c. for type 6 module	nc	-	-
C57TYPE1#n.c. for type 6 modulencC58PEG_RX2+Not ConnectedncC59PEG_RX2-Not ConnectedncC60GNDPower GroundPWR GNDC61PEG_RX3+Not ConnectedncC62PEG_RX3-Not ConnectedncC63RSVDReserved for future usenc	C55	PEG_RX1+	Not Connected	nc	-	-
C58PEG_RX2+Not Connectednc-C59PEG_RX2-Not Connectednc-C60GNDPower GroundPWR GND-C61PEG_RX3+Not Connectednc-C62PEG_RX3-Not Connectednc-C63RSVDReserved for future usenc-	C56	PEG_RX1-	Not Connected	nc	-	-
C59PEG_RX2-Not Connectednc-C60GNDPower GroundPWR GNDC61PEG_RX3+Not ConnectedncC62PEG_RX3-Not ConnectedncC63RSVDReserved for future usenc	C57	TYPE1#	n.c. for type 6 module	nc	-	-
C60GNDPower GroundPWR GNDC61PEG_RX3+Not ConnectedncC62PEG_RX3-Not ConnectedncC63RSVDReserved for future usenc	C58	PEG_RX2+	Not Connected	nc	-	-
C61PEG_RX3+Not Connectednc-C62PEG_RX3-Not Connectednc-C63RSVDReserved for future usenc-	C59	PEG_RX2-	Not Connected	nc	-	-
C62 PEG_RX3- Not Connected nc - C63 RSVD Reserved for future use nc -	C60	GND	Power Ground	PWR GND	-	-
C63 RSVD Reserved for future use nc	C61	PEG_RX3+	Not Connected	nc	-	-
	C62	PEG_RX3-	Not Connected	nc	-	-
C64 RSVD Reserved for future use nc	C63	RSVD	Reserved for future use	nc	-	-
	C64	RSVD	Reserved for future use	nc	-	-

C65	PEG_RX4+	Not Connected	nc	-	-
C66	PEG_RX4-	Not Connected	nc	-	-
C67	RSVD	Reserved for future use	nc	-	-
C68	PEG_RX5+	Not Connected	nc	-	-
C69	PEG_RX5-	Not Connected	nc	-	-
C70	GND	Power Ground	PWR GND	-	-
C71	PEG_RX6+	Not Connected	nc	-	-
C72	PEG_RX6-	Not Connected	nc	-	-
C73	GND	Power Ground	PWR GND	-	-
C74	PEG_RX7+	Not Connected	nc	-	-
C75	PEG_RX7-	Not Connected	nc	-	-
C76	GND	Power Ground	PWR GND	-	-
C77	RSVD	Reserved for future use	nc	-	-
C78	PEG_RX8+	Not Connected	nc	-	-
C79	PEG_RX8-	Not Connected	nc	-	-
C80	GND	Power Ground	PWR GND	-	-
C81	PEG_RX9+	Not Connected	nc	-	-
C82	PEG_RX9-	Not Connected	nc	-	-
C83	RSVD	Reserved for future use	nc	-	-
C84	GND	Power Ground	PWR GND	-	-
C85	PEG_RX10+	Not Connected	nc	-	-
C86	PEG_RX10-	Not Connected	nc	-	-
C87	GND	Power Ground	PWR GND	-	-
C88	PEG_RX11+	Not Connected	nc	-	-
C89	PEG_RX11-	Not Connected	nc	-	-
C90	GND	Power Ground	PWR GND	-	-
C91	PEG_RX12+	Not Connected	nc	-	-
C92	PEG_RX12-	Not Connected	nc	-	-
C93	GND	Power Ground	PWR GND	-	-
C94	PEG_RX13+	Not Connected	nc	-	-
C95	PEG_RX13-	Not Connected	nc	-	-
C96	GND	Power Ground	PWR GND	-	-
C97	RSVD	Reserved for future use	nc	-	-
C98	PEG_RX14+	Not Connected	nc	-	-
C99	PEG_RX14-	Not Connected	nc	-	-
C100	GND	Power Ground	PWR GND	-	-
C101	PEG_RX15+	Not Connected	nc	-	-
C102	PEG_RX15-	Not Connected	nc	-	-
C103	GND	Power Ground	PWR GND	-	-
C104	VCC_12V	Main Input Voltage (8.5-20V)	PWR 8.5-20V	-	-
C105		Main Input Voltage (8.5-20V)	PWR 8.5-20V	-	-
C106		Main Input Voltage (8.5-20V)	PWR 8.5-20V	-	-
C107		Main Input Voltage (8.5-20V)	PWR 8.5-20V	-	-
C108	VCC_12V	Main Input Voltage (8.5-20V)	PWR 8.5-20V	-	-
C109	VCC_12V	Main Input Voltage (8.5-20V)	PWR 8.5-20V	-	-
C110	GND	Power Ground	PWR GND	-	-
	-				

6.5 Connector X1B Row D

Pin	Signal	Description	Туре	Termination	Comment
D1	GND	Power Ground	PWR GND	Termination	comment
	GND	Power Ground	PWR GND PWR GND	-	-
D2 D3			DP-0	-	
D3	USB_SSTX0-	USB Super Speed Transmit - (0) USB Super Speed Transmit + (0)	DP-0 DP-0	-	-
D4	USB_SSTX0+ GND	Power Ground	PWR GND	-	-
D5	USB_SSTX1-	Not Connected		-	-
D0		Not Connected	nc	-	-
	USB_SSTX1+ GND		nc PWR GND	-	-
D8		Power Ground Not Connected			-
D9	USB_SSTX2-		nc	-	-
D10	USB_SSTX2+	Not Connected		-	
D11	GND	Power Ground	PWR GND	-	-
D12	USB_SSTX3-	Not Connected	nc	-	-
D13	USB_SSTX3+	Not Connected	nc	-	-
D14	GND	Power Ground	PWR GND	-	-
D15	DDI1_CTRLCLK_AUX+	DDI1 CTRLCLK/AUX+	I/0-3.3	PD 100k	-
D16	DDI1_CTRLDATA_AUX-	DDI1 CTRLDATA/AUX-	I/0-3.3	PU 100k 3.3V (S0)	-
D17	RSVD	Reserved for future use	nc	-	-
D18	RSVD	Reserved for future use	nc	-	-
D19	PCIE_TX6+	Not Connected	nc	-	-
D20	PCIE_TX6-	Not Connected	nc	-	-
D21	GND	Power Ground	PWR GND	-	-
D22	PCIE_TX7+	Not Connected	nc	-	-
D23	PCIE_TX7-	Not Connected	nc	-	-
D24	RSVD	Reserved for future use	nc	-	-
D25	RSVD	Reserved for future use	nc	-	-
D26	DDI1_PAIR0+	DDI1 Pair 0 +	DP-0	-	-
D27	DDI1_PAIR0-	DDI1 Pair 0 -	DP-0	-	-
D28	RSVD	Reserved for future use	nc	-	-
D29	DDI1_PAIR1+	DDI1 Pair 1 +	DP-0	-	-
D30	DDI1_PAIR1-	DDI1 Pair 1 -	DP-0	-	-
D31	GND	Power Ground	PWR GND	-	-
D32	DDI1_PAIR2+	DDI1 Pair 2 +	DP-0	-	-
D33	DDI1_PAIR2-	DDI1 Pair 2 -	DP-0	-	-
D34	DDI1_DDC_AUX_SEL	DDI1 DDC/AUX select	I-3,3	PD 1M	-
D35	RSVD	Reserved for future use	nc	-	-
D36	DDI1_PAIR3+	DDI1 Pair 3 +	DP-0	-	-
D37	DDI1_PAIR3-	DDI1 Pair 3 -	DP-0	-	-
D38	RSVD	Reserved for future use	nc	-	-
D39	DDI2_PAIR0+	DDI2 Pair 0 +	DP-0	-	-
D40	DDI2_PAIR0-	DDI2 Pair 0 -	DP-0	-	-
D41	GND	Power Ground	PWR GND	-	-
D42	DDI2_PAIR1+	DDI2 Pair 1 +	DP-0	-	-
D43	DDI2_PAIR1-	DDI2 Pair 1 -	DP-0	-	-
D44	DDI2_HPD	DDI2 Hotplug Detect	I-3,3	PD 100k	-
D45	RSVD	Reserved for future use	nc	-	-
D46	DDI2_PAIR2+	DDI2 Pair 2 +	DP-0	-	-
D47	DDI2_PAIR2-	DDI2 Pair 2 -	DP-0	-	-
D48	RSVD	Reserved for future use	nc	-	-
D49	DDI2_PAIR3+	DDI2 Pair 3 +	DP-0	-	-
D50	 DDI2_PAIR3-	DDI2 Pair 3 -	DP-0	-	-
D51	GND	Power Ground	PWR GND	-	-
D52	PEG_TX0+	Not Connected	nc	-	-
D53	PEG_TX0-	Not Connected	nc	-	-
D54	PEG_LANE_RV#	Not Connected	nc	-	-
D55	PEG_TX1+	Not Connected	nc	-	-
D56	PEG_TX1-	Not Connected	nc	-	-
D57	TYPE2#	GND for type 6 module	PWR	-	-
D57	PEG_TX2+	Not Connected	nc	-	-
D58	PEG_TX2-	Not Connected	nc	-	-
D59	GND	Power Ground	PWR GND	-	-
D60	PEG_TX3+	Not Connected		-	
			nc	-	-
D62	PEG_TX3- RSVD	Not Connected	nc	-	-
D63		Reserved for future use	nc		
D64	RSVD	Reserved for future use	nc	-	-

D65	PEG_TX4+	Not Connected	nc	_	_
D66	PEG_TX4-	Not Connected	nc	-	_
D67	GND	Power Ground	PWR GND	-	-
D68	PEG_TX5+	Not Connected	nc	-	
D69	PEG_TX5-	Not Connected	nc	-	-
D70	GND	Power Ground	PWR GND	-	-
D70		Not Connected		-	
	PEG_TX6+		nc	-	-
D72	PEG_TX6-	Not Connected			-
D73	GND	Power Ground	PWR GND	-	-
D74	PEG_TX7+	Not Connected	nc	-	-
D75	PEG_TX7-	Not Connected	nc	-	-
D76	GND	Power Ground	PWR GND	-	-
D77	RSVD	Reserved for future use	nc	-	-
D78	PEG_TX8+	Not Connected	nc	-	-
D79	PEG_TX8-	Not Connected	nc	-	-
D80	GND	Power Ground	PWR GND	-	-
D81	PEG_TX9+	Not Connected	nc	-	-
D82	PEG_TX9-	Not Connected	nc	-	-
D83	RSVD	Reserved for future use	nc	-	-
D84	GND	Power Ground	PWR GND	-	-
D85	PEG_TX10+	Not Connected	nc	-	-
D86	PEG_TX10-	Not Connected	nc	-	-
D87	GND	Power Ground	PWR GND	-	-
D88	PEG_TX11+	Not Connected	nc	-	-
D89	PEG_TX11-	Not Connected	nc	-	-
D90	GND	Power Ground	PWR GND	-	-
D91	PEG_TX12+	Not Connected	nc	-	-
D92	PEG_TX12-	Not Connected	nc	-	-
D93	GND	Power Ground	PWR GND	-	-
D94	PEG_TX13+	Not Connected	nc	-	-
D95	PEG_TX13-	Not Connected	nc	-	-
D96	GND	Power Ground	PWR GND	-	-
D97	RSVD	Reserved for future use	nc	-	-
D98	PEG_TX14+	Not Connected	nc	-	-
D99	PEG_TX14-	Not Connected	nc	-	-
D100	GND	Power Ground	PWR GND	-	-
D101	PEG_TX15+	Not Connected	nc	-	-
D102	PEG_TX15-	Not Connected	nc	-	-
D103	GND	Power Ground	PWR GND	-	-
D104	VCC_12V	Main Input Voltage (8.5-20V)	PWR 8.5-20V	-	-
D104	VCC_12V	Main Input Voltage (8.5-20V)	PWR 8.5-20V	-	-
D105	VCC_12V	Main Input Voltage (8.5-20V)	PWR 8.5-20V	-	-
D100	VCC_12V	Main Input Voltage (8.5-20V)	PWR 8.5-20V	-	-
D107	VCC_12V	Main Input Voltage (8.5-20V)	PWR 8.5-20V	-	-
D108	VCC_12V	Main Input Voltage (8.5-20V)	PWR 8.5-20V	-	-
D109	GND	Power Ground	PWR GND	-	-
0110	UND	rower urbunu			



The termination resistors in these tables are already mounted on the module. Refer to the design guide for information about additional termination resistors.

7 **BIOS Operation**

The BIOS (Basic Input and Output System) or UEFI (Unified Extensible Firmware Interface) records hardware parameters of the system in the CMOS on the Computer-on-Module. It's major functions include execution of the POST(Power-On-Self-Test) during system start-up, saving system parameters and loading the operating system. The BIOS includes a BIOS Setup programm that allows to modify system configuration settings. The module is equipped with Phoenix SecureCore, which is located in an onboard SPI serial flash memory.

7.1 Determining the BIOS Version

To determine the BIOS version currently used on the Computer-on-Modules please check System Information Page inside Setup

7.2 BIOS Update

Kontron provides continuous BIOS updates for Computer-on-Modules. The updates are provided for download on <u>http://emdcustomersection.kontron.com</u> with detailed change descriptions within the according Product Change Notification (PCN). Please register for EMD Customer Section to get access to BIOS downloads and PCN service.

Modules with BIOS Region/Setup only inside the flash can be updated with AFU utilities (usually 1-3MB BIOS binary file size) directly. Modules with Intel® Management Engine, Ethernet, Flash Descriptor and other options additionally to the BIOS Region (usually 4-16MB BIOS binary file size) requires a different update process with Intel Flash Utility FPT and a wrapper to backup and restore configurations and the MAC address. Therefore it is strongly recommended to use the batch file inside the BIOS download package available on EMD Customer Section.

» Boot the module to DOS/EFI Shell with access to the BIOS image and Firmware Update Utility provided on EMD Customer Section

» Execute Flash.bat in DOS or Flash.nsh in EFI Shell



Any modification of the update process may damage your module!

7.3 POST Codes

Important POST codes during boot-up

8B	Booted to DOS
68	Booted to Setup / EFI Shell
00	Booted to Windows

7.4 Setup Guide

The Setup Utility changes system behavior by modifying the Firmware configuration. The setup program uses a number of menus to make changes and turn features on or off.

Functional keystrokes in POST:

[F2]	Enter Setup
[F5]	Boot Menu
[ESC] + [2]	Enter Setup via Remote Keyboard in Console Redirection Mode (depending on console Settings F2 may not be supported)
Functional keystrokes in Setup:	

[F1]	Help
[F9]	Load default settings
[F10]	Save and Exit

Menu Bar

The menu bar at the top of the window lists different menus. Use the left/right arrow keys to make a selection.

Legend Bar

Use the keys listed in the legend bar on the bottom to make your selections or exit the current menu. The table below describes the legend keys and their alternates.

Кеу	Function			
$\leftarrow \text{ or } \rightarrow \text{Arrow key}$	Select a menu.			
↑ or ↓ Arrow key Select fields in current menu.				
<home> or <end> Move cursor to top or bottom of current window.</end></home>				
<pgup> or <pgdn> Move cursor to next or previous page.</pgdn></pgup>				
+/- or F5/F6 Change Option				
<enter> Execute command or select submenu.</enter>				

Selecting an Item

Use the \uparrow or \downarrow key to move the cursor to the field you want. Then use the + and – keys to select a value for that field. The Save Value commands in the Exit menu save the values displayed in all the menus.

Displaying Submenus

Use the \leftarrow or \rightarrow key to move the cursor to the submenu you want. Then press <Enter>. A pointer (\succ) marks all submenus.

Item Specific Help Window

The Help window on the right side of each menu displays the Help text for the selected item. It updates as you move the cursor to each field.

General Help Window

Pressing <F1> on a menu brings up the General Help window that describes the legend keys and their alternates. Press <Esc> to exit the General Help window.

7.5 BIOS Setup

7.5.1 Main

Phoenix SecureCore Technology Setup						
Main Advanced	Security	Boot	Exit			
Main Advanced System Date System Time System Information Boot Features Platform Information	[<mark>01</mark> /01/2010 [00:23:20]		Exit	Item Specific Help View or set system date.		
Esc Exit → Selec	t Menu Enter	Select 🕨	Sub-Menu	F10 Save and Exits		

Feature	Options	Description
System Date	[mm/dd/yyyy]	Set the Date. Use 'Tab' to switch between Date elements
System Time	[hh:mm:ss]	Set the Time. Use 'Tab' to switch between Time elements

System Information

Ph	Phoenix SecureCore Technology Setup			
	System Information			
BIOS Version	CVV6R112 X64			
Build Time	12/01/2014			
Processor Type	Intel(R) Atom(TM) CPU E3845 @ 1.91GHz			
Processor Speed	1.925 GHz			
System Memory Speed	1333 MHz			
L2 Cache RAM	2048 KB			
Total Memory	8192 MB			
[1]	4096 MB (DDR3- 1333) @ DIMMO			
[2]	4096 MB (DDR3- 1333) @ DIMM1			
Esc Exit Select	Menu Enter Select > Sub-Menu F10 Save and Exits			

Boot Features

Phoenix SecureCore Technology Setup Main			
Boot Feat	ures	Item Specific Help	
NumLock: Timeout CSM Support Quick Boot Dark Boot Diagnostic Splash Screen Diagnostic Summary Screen BIOS Level USB Console Redirection Allow Hotkey in S4 resume UEFI Boot Legacy Boot Boot in Legacy Video Mode Load OPROM Boot Priority	[Disabled] [Enabled] [Disabled] [Enabled] [Enabled] [Enabled]	Selects Power-on state for NumLock.	
Esc Exit ↔ Select Menu	Enter Select > Sub-Men	u F10 Save and Exits	

NumLockOn OffSelects Power-on state for NumLockTimeout1Number of seconds that P.O.S.T will wait for the user input before bootingCSM SupportYes NoEnables of Disable the UEFI CSM (Compatibility Support Module) to support legacy PC boot process. Bot legacy and UEFI boots are feasibleQuick BootDisabled EnabledEnable or Disable the UEFI CSM (Compatibility Support Module) to support legacy PC boot process. Bot legacy and UEFI boots are feasibleDisabled EnabledEnable or Disable the Dispostic Splash Screen EnabledEnable or Disable the Dispostic Splash Screen EnabledDisgnostic Splash ScreenDisabled EnabledEnable or Disable the Dispostic Splash Screen EnabledDisgnostic Summary ScreenDisabled EnabledEnable or Disable the Dispostic Summary Screen during boot EnabledDisgnostic Summary ScreenDisabled EnabledEnable or Disable the Dispostic Summary Screen during boot EnabledUSB Level USBEnabled DisabledEnabledEnable/Disable USB Morder to reduce board maxes to cord access to screen, but does not prevent the operating system from supporting system such as DOSConsole RedirectionDisabled EnabledEnable/Disable USB 200S MM support for muse, keyboard in setup?- Console PortAll Onboard COM1 Onboard COM1 Onboard COM1 DisabledSet terminal type of UCR Stroen Stroen Stroen endirection- Terminal TypeANSI 2000 35000 35000 35000 35000 35000Set terminal type of UCR- Row ControlNoreNoreSet terminal type of UCR <th>Feature</th> <th>Options</th> <th>Description</th>	Feature	Options	Description
*** input before booting CSM Support Yes No Enables or Disables the UEFI CSM (Compatibility Support Module) to support Heavy PC boot process. Both Heavy and UEFI boots are feasible Quick Boot Disabled Enabled Enable or Disable Quick Boot Dark Boot Disabled Enabled Enable or Disable Dark Boot Diagnostic Splash Screen Disabled Enabled Enabled Diagnostic Summary Screen Disabled Enabled Display the Diagnostic Summary Screen during boot Disabled Enabled Enabled Display the Diagnostic Summary Screen during boot BIOS Level USB Disabled Disabled Enabled Disabled Disabled USB Legacy Enabled Enabled Enabled Onsole Redirection Disabled Disabled Enabled Enabled/Disable USB BIOS SM support for uSB in order to reduce boot time. Note that this will provent using a USB Legacy Console Redirection Disabled Enabled Enabled Enabled/Disable USB BIOS SM support for uses, keyboard in setup and uses a program final support for uses, keyboard in setup and uses a DOS Enabled/Disable USB BIOS SM support for mouse, keyboard in setup and uses a DOS Console Redirection Disabled Enabled Enabled/Disable Universal Console Redirection	NumLock		Selects Power-on state for NumLock
NoSupport Module)to support legacy PC bot process. Both legacy and UET boots are feasibleQuick BootDisabled EnabledEnable or Disable Quick Boot EnabledDark BootDisabled EnabledEnable or Disable Dark Boot EnabledDiagnostic Splash ScreenDisabled EnabledEnable or Disable the Diagnostic Summary Screen during bootDiagnostic Summary ScreenDisabled EnabledDisabled EnabledDiSo Level USBEnabledDisabled EnabledBIOS Level USBEnabledEnabled Disabled EnabledUSB LegacyEnabled Disabled Disabled Disabled EnabledEnabled/Disable UsB BIOS SMM support for mouse, keyboard in setup or a USB biometric scanner supporting support for usB in order to enduce boot time. Note that this will prevent using a USB LegacyConsole PortDisabled Disabled DisabledEnabled/Disable UsB BIOS SMM support for mouse, keyboard, mass storage, etc., in legacy operating system such as DOS- Console PortAll Onboard COM1 Onboard COM2 STIO COM1 STIO COM2 STIO COM2 STIO COM1 STIO COM2 STIO COM1 STIO COM2 STIO COM1 STIO COM2 STIO COM1 STIO COM2 STIO COM1 STIO COM2 STIO COM1 STIO COM2 STIO COM2 	Timeout	1	
IndexEnabledIndexDark BootDisabled EnabledEnabled on Disable Dark BootDiagnostic Splash ScreenDisabled EnabledEnable on Disable the Diagnostic Summary Screen during bootDiagnostic Summary ScreenDisabled EnabledDislay the Diagnostic Summary Screen during bootBIOS Level USBDisabled Disabled DisabledDislay the Diagnostic Summary Screen during bootBIOS Level USBEnabledDislayBIOS Level USBEnabledDislayBIOS Level USBEnabledDisabled Disabled DisabledDisabledDisabled DisabledDislay the Diagnostic Summary Screen during boot reduce boot time. Note that this will prevent using a USB keyboard in setup or a USB biometric scanner such as a fingerprint reader to control access to setup, but does not prevent the operating system from supporting systems such as DOSUSB LegacyDisabled Disabled EnabledEnable/Disable USB BIOS SMM support for mouse, keyboard mass storage, etc., in legacy operating systems such as DOSConsole PortAll Onboard COM1 Onboard COM2 SIO COM1 SIO COM2Select Port for console redirection. Note: the respective por thas to be enabled in setup!- Terminal TypeANSI VT100- VT100- VT100- VT100- NOTASet terminal type of UCR- Baudrate9600 19200 38400 37600 115200Set terminal type of UCR	CSM Support		Support Module)to support legacy PC boot process.
EnabledEnabledDiagnostic Splash ScreenDisabled EnabledEnabled or Disable the Diagnostic Splash ScreenDiagnostic Summary ScreenDisabled EnabledDisplay the Diagnostic Summary Screen during bootBIOS Level USBEnabledEnabledEnabledBIOS Level USBEnabledEnabledEnabledBIOS Level USBEnabledEnabledEnabled/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 fingerrint reader to control access to setup, but does not prevent the operating system from supporting such hardwareUSB LegacyEnabled Disabled EnabledEnable/Disable USB BIOS SMM support for mouse, keyboard, mass storage, etc, in legacy operating systems such as DOSConsole RedirectionDisabled Enabled Enabled/Disable USB IDO SMM support for Mouse (Disabled COM1 Onboard COM2 SID COM2 <br< td=""><td>Quick Boot</td><td></td><td>Enable or Disable Quick Boot</td></br<>	Quick Boot		Enable or Disable Quick Boot
EnabledEnabledDiganostic Summary ScreenDisabledEnabledDisplay the Diagnostic Summary Screen during bootBIOS Level USBEnabledDisabledDisabledDisabledDisabledDisabledUSB keyboard in setup or a USB biometric scanner such as a fingerprint reader to control access to setup, but does not prevent the operating system from supporting such hardwareUSB LegacyEnabledDisabledEnabledConsole RedirectionDisabled- Console PortAll Onboard COM1 Onboard COM2 SIO COM2- Terminal TypeANSI VT100+ UTB8- Baudrate0600 19200 38400 38400 38400 38400 38400 38400 38400 38400 38400 38400 38400 38400 38400 38400 stored	Dark Boot		Enable or Disable Dark Boot
Enabled Enabled BIOS Level USB Enabled Disabled Disabled Disabled Disabled USB Legacy Enable/Disabled USB Legacy Enable/Disabled Console Redirection Disabled - Console Port Onioard COM1 Onboard COM1 Onboard COM2 SIO COM2 - Terminal Type ANSI VT100- UT8200 38400 S7600 115200	Diagnostic Splash Screen		Enable or Disable the Diagnostic Splash Screen
DisabledDisabledreduce boot time. Note that this will prevent using a USB keyboard in setup or a USB biometric scanner such as a fingerrin treader to control access to setup, but does not prevent the operating system from supporting such hardwareUSB LegacyEnabled DisabledEnabled/Disable USB BIOS SMM support for mouse, keyboard, mass storage, etc. in legacy operating systems such as DOSConsole RedirectionDisabled Enabled EnabledEnable/Disable USB BIOS SMM support for mouse, keyboard, mass storage, etc. in legacy operating systems such as DOS- Console PortAll Onboard COM1 Onboard COM2 SIO COM2Select Port for console redirection. Note: the respective port has to be enabled in setup!- Terminal TypeANSI VT100 VT100+ UTR8Set terminal type of UCR- Baudrate9600 19220 38400 57600 115200Set terminal type of UCR	Diagnostic Summary Screen		Display the Diagnostic Summary Screen during boot
Disabledkeyboard, mass storage, etc, in legacy operating systems such as DOSConsole RedirectionDisabled EnabledEnable/Disable Universal Console Redirection- Console PortAll Onboard COM1 Onboard COM2 SID COM1 SID COM2Select Port for console redirection. Note: the respective port has to be enabled in setup!- Terminal TypeANSI VT100 VT100-t UTF8Set terminal type of UCR- Baudrate9600 19200 38400 57600 115200Set terminal type of UCR	BIOS Level USB		reduce boot time. Note that this will prevent using a USB keyboard in setup or a USB biometric scanner such as a fingerprint reader to control access to setup, but does not prevent the operating system from supporting
Enabled Enabled - Console Port All Onboard COM1 Onboard COM2 SID COM1 SID COM2 Select Port for console redirection. Note: the respective port has to be enabled in setup! - Terminal Type ANSI VT100 VT100+ UTF8 Set terminal type of UCR - Baudrate 9600 19200 38400 57600 115200 Set terminal type of UCR	USB Legacy		keyboard, mass storage, etc, in legacy operating
Onboard COM1 Onboard COM2 SID COM1 SID COM2 port has to be enabled in setup! - Terminal Type ANSI VT100+ UTF8 Set terminal type of UCR - Baudrate 9600 19200 38400 57600 115200 Set terminal type of UCR	Console Redirection		Enable/Disable Universal Console Redirection
VT100 VT100+ UTF8 Set terminal type of UCR - Baudrate 9600 19200 38400 57600 115200 Set terminal type of UCR	- Console Port	Onboard COM1 Onboard COM2 SIO COM1	
19200 38400 57600 115200	- Terminal Type	VT100 VT100+	Set terminal type of UCR
- Flow Control None Set flow control method for UCR. None = No flow	- Baudrate	19200 38400 57600	Set terminal type of UCR
	- Flow Control	None	Set flow control method for UCR. None = No flow

Downloaded from Arrow.com.

	RTS/CTS XON/XOFF	control, RTS/CTS = Hardware flow control, XON/XOFF = Software flow control
- Continue C.R. after POST	Enabled Disabled	Enables Console Redirection after OS has loaded
Allow Hotkey in S4 resume	Enabled Disabled	Enable hotkey detection when system resuming from Hybernate state
UEFI Boot	Enabled Disabled	Enable the UEFI boot
Legacy Boot	Enabled \Disabled	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	On Demand All	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

Platform Information

Phoenix SecureCore Technology Setup		
nain		
Pla	tform Information	Item Specific Help
Module Informati	on	
Product Name	COMe-cBTi6	
Revision	1.0.0	
Serial #	LHD0H0023	
MAC Address	00:E0:4B:3F:11:3C	
CPLD Rev	P101.0002 Release	
Boot Counter	63	
Esc Exit → Se	lect Menu Enter Select > Sub	-Menu F10 Save and Exits

7.5.2 Advanced

Phoenix SecureCore Technology Setup				
Main Advan	ced Security	Boot	Exit	
	n this screen to e system to malfu			Item Specific Help Miscellaneous Configuration
 H/W Monitor CPU Configuration Uncore Configuration System Component LAN Configuration South Cluster Construction SMBIOS Event Loop Onboard UART Construction 	ation t on onfiguration g			
OS Selection	[Wi	ndows]		
Esc Exit Se	elect Menu Enter	Select 🕨 :	Sub-Menu	1 F10 Save and Exits

Feature	Options	Description
OS Selection	Windows	Select the Operating System family to be booted
	Linux Android	

Miscellaneous

Phoenix SecureCore Technology Setup Advanced			
Miscellaneo	us	Item Specific Help	
Miscellaneous Configuration		Watchdog Configuration.	
I2C Speed S5 Eco	[100] [Disabled]		
Smart Battery Configuration	[Disabled]		
Reset Button Behavior	[Chipset Reset]		
Esc Exit Select Menu E	nter Select 🕨 Sub-Menu	1 F10 Save and Exits	

Feature	Options	Description
I2C Speed	100	Select I2C Bus Speed in kHz from 1kHz to 400kHz
S5 Eco	Disabled Enabled	Enable/Disable Kontron S5 Eco mode. Reduces supply current in Soft Off (S5) to less than 1mA. If enabled, power button is the only wake-up source in S5! See chapter S5 Eco for further details
Smart Battery Configuration	Disabled Auto Charger Manager	Enable/Disable Smart Battery System Support (e.g. Kontron M.A.R.S.)
Reset Button Behavior	Chipset Reset Power Cycle	Select the system behavior on reset button event

Watchdog

Phoenix SecureCore Technology Set	up
Advanced	
Watchdog	Item Specific Help
Watchdog Configuration. Auto-reload [Disabled] Global Lock [Disabled] Stage 1 Mode [Disabled]	Enable automatic reload of watchdog timers on timeout.
Esc Exit Select Menu Enter Select 🕨 Sub-Menu	a F10 Save and Exits

Feature	Options	Description
Auto-reload	Disabled Enabled	Enable automatic reload of watchdog timers on timeout
Global Lock	Disabled Enabled	If set to enabled, all Watchdog registers (except WD_KICK) become read only until the board is reset
Stage 1 Mode	Disabled Reset NMI SCI Delay	Select Action for first Watchdog stage
- Assert WDT Signal	Enabled Disabled	Enable/Disable assertion of WDT signal to baseboard on stage timeout
- Stage 1 Timeout	1s 5s 10s 30s 1m 3m 10m 30m	Select Timeout value for first watchdog stage
Stage 2 Mode	Disabled Reset NMI SCI	Select Action for second Watchdog stage
- Assert WDT Signal	Disabled Enabled	Enable/Disable assertion of WDT signal to baseboard on stage timeout
- Stage 2 Timeout	1s 5s 10s 30s 1m 3m 10m 30m	Select Timeout value for second watchdog stage

H/W Monitor

H/W Monitor NCT7802Y Item Specific Hel		Item Specific Help
Temperature Measurement	•	Number of pulses the
CPU Temperature (Analog)	[+31 C]	fan produces during
CPU Temperature (DTS)	[+39 C]	one revolution.
Module Temperature	[+30 C]	Range: 1-4
Fan Measurement		
CPU Fan	[N/A]	
Fan Pulse	[2]	
Fan Control	[Auto]	
Fan Trip Point	[45]	
Trip Point Speed	[50]	
Reference Temperature	[CPU Temperature (Ana]	
External Fan	[1265 RPM]	
Fan Pulse	[2]	
Fan Control	[Auto]	
Fan Trip Point	[45]	
Trip Point Speed	[50]	
Reference Temperature	[CPU Temperature (Ana]	
Voltage Measurement		
Widerange Vcc	[+12.03 V]	
5.0V Standby	[+5.16 V]	
Batt volt at COMe pin	[+2.96 V]	

Feature	Value/Options	Description
CPU Temperature (Analog)	xx°C	Shows the measured temperature of the CPU Diode with onboard HWM
CPU Temperature (DTS)	xx°C	Shows the internal digital CPU temperature (DTS)
Module Temperature	xx°C	Shows the internal hardware-monitor temperature
CPU FAN	xxxx rpm	Shows the fan speed of onboard FAN connector
Fan Pulse	2	Number of pulses the CPU fan produces during one revolution. Range 1-4
FAN Control	Disabled Manual Auto	Set fan control mode. 'Disable' will totally stop the fan
Fan Trip Point	45	Temperature where fan accelerates. Range 20 - 80°C
Fan Speed	70	Manual fan speed in %. Minimum value is 30 (in Manual mode only)
Trip Point Speed	50	Fan speed at trip point in %. Minimum value is 30. Fan always runs at 100% at Tjmax - 10°C
Reference Temperature	CPU Temperature (Analog) Module Temperature	Determines the temperature source which is used for automatic fan control
External FAN	xxxx rpm	Shows the fan speed of external COMe FAN
Fan Pulse	2	Select the number of pulses the external fan produces during one revolution. Range 1-4
FAN Control	Disabled Manual Auto	Set fan control mode. 'Disable' will totally stop the fan
Fan Trip Point	45	Temperature where fan accelerates. Range 20 - 80°C
Fan Speed	70	Manual fan speed in %. Minimum value is 30 (in Manual mode only)
Trip Point Speed	50	Fan speed at trip point in %. Minimum value is 30. Fan

		always runs at 100% at Tjmax - 10°C
Reference Temperature	CPU Temperature (Analog) Module Temperature	Determines the temperature source which is used for automatic fan control
Widerange Vcc	x.xx V	Shows the Module Main Input Voltage
5.0V Standby	x.xx V	Shows the 5V Standby Voltage input
Batt volt at COMe pin	x.xx V	Shows the RTC Battery Voltage input measured at COMe connector

CPU Configuration

Phoenix SecureCore Technology Setup Advanced		
CPU Configuration		Item Specific Help
CPU Configuration Execute Disable Bit Limit CPUID Maximum Bi-directional PROCHOT# VTX-2 TM1 DTS Intel® Hyper-Threading Technology	[Enable] [Disable] [Enable] [Enable] [Enable] [Enable] Not Supported	Execute Disable Bit prevent certain classes of malicious buffer overflow attacks when combined with a supporting OS
▶ CPU Power Management		
Esc Exit ↔ Select Menu Enter	Select 🕨 Sub-Menu	F10 Save and Exits

Feature	Options	Description
Execute Disable Bit	Enable Disable	Execute Disable Bit prevent certain classes of malicious buffer overflow attacks when combined with a supporting OS
Limit CPUID Maximum	Enable Disable	Disabled for Windows XP
Bi-directional PROCHOT#	Enable Disable	When a processor thermal sensor trips (either core), the PROCHOT# will be driven. If bi-direction is enabled, external agents can drive PROCHOT# to throttle the processor
VTX-2	Enable Disable	Enables or Disables the VT-x2 Mode support
TM1	Enable Disable	Enables or Disables the Thermal Management 1 support
DTS	Enable Disable	Enables or Disables the Digital Thermal Sensor

CPU Power Management

Phoenix SecureCore Technology Setup Advanced	
CPU Power Management	Item Specific Help
System Power Options Intel(R) SpeedStep(tm) [Enable] Boot performance mode [Max Performance] Intel® Turbo Boost Technology [Enable] C-States [Enable] Enhanced C-states [Enable] Max C State [C7]	Enable processor performance states (P-States).
Esc Exit Select Menu Enter Select 🕨 Sub-Menu	1 F10 Save and Exits

Feature	Options	Description
Intel® SpeedStep(TM)	Enabled Disabled	Enable/Disable processor performance states (P- States)
Boot Performance Mode	Max Performance Max Battery	Select the performance state that the BIOS sets before OS hand-off
Intel® Turbo Boost Technology	Enabled Disabled	Enable to automatically allow processor cores to run faster then the base operating frequency if it's operating below power, current, and temperature specification limits. This option is only valid for CPUs supporting Intel® Turbo Boost Technology
C-States	Enabled Disabled	Enable processor idle power saving states
Enhanced C-States	Enabled Disabled	Enables or Disables C1E/C2E/C4E. When enabled, CPU will switch to minimum speed when all cores enter C- State
Max C-State	C7 C6 C1	Controls the maximum C-State allowed for the processor

Uncore Configuration

Phoenix SecureCore Technology Setup Advanced		
Uncore Configu	ration	Item Specific Help
<pre>IGD Configuration Integrated Graphics Device Primary Display RC6(Render Standby) GTT Size Aperture Size DVMT Pre-Allocated IGD Turbo Spread Spectrum clock</pre> IGD - LCD Control	[Enable] [Auto] [Enable] [2MB] [256MB] [64M] [Auto] [Disable]	Enable : Enable Integrated Graphics Device (IGD) when selected as the Primary Video Adaptor. Disable: Always disable IGD
Esc Exit Select Menu	Enter Select 🕨 Sub-Menu	1 F10 Save and Exits

Feature	Options	Description
Integrated Graphics Device	Disable Enable	Enable: enable Integrated Graphics Device (IGD) when selected as the Primary Video Adaptor. Disable: Always disable IGD
Primary Display	Auto IGD PCIe SG	Select which of IGD/PCIe Graphics Devices should be Primary Display or select SG for Switchable/Hybrid Graphics
RC6 (Render Standby)	Disable Enable	Enable or Disable Render Standby support
G∏ Size	1MB 2MB	Select the GTT Memory Size of IGD
Aperture Size	128MB 256MB 512MB	Select the Graphics Aperture Size
DVMT Pre-Allocated	64M 96M 128M 160M 192M 224M 256M 288M 320M 352M 384M 416M 448M 448M 4512M	Select DVMT 5.0 Pre-Allocated (fixed) Graphics Memory size used by the Internal Graphics device
IGD Turbo	Auto Enable Disable	Select the IGD Turbo feature
Spread Spectrum clock	Disable Enable	Enable or Disable clock chip Spread Spectrum feature

IGD - LCD Control

Phoenix SecureCore Technology Setup Advanced			
IGD Configura	IGD Configuration Item Speci		
IGD managed by: Legacy Video BIOS [3777] IGD - Boot Type Backlight Control Backlight Value Module switch LVDS - DDI2 LVDS Clock Center Spreading EFP1 Type Mode Persistence Center Mode	-	Select the Video Device activated during POST. This has no effect if external graphics are present.	
Esc Exit Select Menu E	nter Select 🕨 Sub-Menu	1 F10 Save and Exits	

Feature	Options	Description
IGD - Boot Type	Auto CRT EFP LFP EFP2	Select the Integrated Graphics Video Device activated during POST. LFP = Local Flat Panel (LVDS/eDP). EFP = External Flat Panel (Display Port 1), EFP2 = External Flat Panel 2 (Display Port 2)
IGD - Secondary Boot Type	Disabled CRT EFP LFP EFP2	Select Secondary Display Device
LFP Туре	AUTO VGA 640×480 1×18 WVGA 800×480 1×18 SVGA 800×600 1×18 XGA 1024×768 1×18 XGA 1024×768 1×24 WXGA 1280×768 1×24 WXGA 1280×800 1×18 WXGA 1366×768 1×24 WSVGA 1024×600 1×18 WSVGA 1024×600 1×24 Custom PAID	Select LFP used by Internal Graphics Device by selecting the appropriate panel setup item
Backlight Control	None/External PWM PWM Inverted 12C I2C Inverted	Backlight Control Setting
Backlight Value	128	Set LCD backlight brightness (0-255)
Module switch LVDS-DDI2	Activate LVDS Activate DDI2	Choose between LVDS and DDI2 display option
LVDS Clock Center Spreading	No Spreading 0.5% 1.0% 1.5% 2.0% 2.5%	Select LVDS clock frequency center spreading depth
EFP1 Type	DisplayPort Only DP with HDMI/DVI HDMI/DVI	Integrated HDMI/DisplayPort Configuration with External Connectors
EFP2 Type	DisplayPort Only DP with HDMI/DVI HDMI/DVI	Integrated HDMI/DisplayPort Configuration with External Connectors

Mode Persistence	Disabled Enabled	Enables/Disables Mode Persistence
Center Mode	Disabled EFP	Select the Display Device that should be centered

System Component

Phoenix SecureCore Technology Setup		
Advanced		
System Component	Item Specific Help	
PMIC Configuration PNP Setting [Power&Performance]	Select PNP setting mode, Disable, Performance, Power or Power&Performance mode	
Esc Exit Select Menu Enter Select 🕨 Sub-Menu	F10 Save and Exits	

Feature	Options	Description
PNP Setting	Disable	Select PNP setting mode, Disable, Performance, Power
	Power & Performance	or Power&Performance mode
	Ax Stepping	
	Bx Stepping	

LAN Configuration

Phoenix SecureCore Technology Setup		
Advanced		
LAN Configuration	Item Specific Help	
PXEROM [Disabled]	Enable/Disable PXE Option ROM execution for onboard LAN	
Esc Exit Select Menu Enter Select 🕨 Sub-Menu	I F10 Save and Exits	

Feature	Options	Description
PXE ROM	Disabled Onboard only Addon only Both	Enable/Disable PXE Option ROM execution for onboard LAN

South Cluster Configuration

Phoenix SecureCore Technology Setup Advanced		
South Cluster Configuration	Item Specific Help	
 PCI Express Configuration USB Configuration Audio Configuration SATA Drives LPSS & SCC Configuration Miscellaneous Configuration 	PCI Express Configuration Settings	
Esc Exit → Select Menu Enter Select ► Sub-Men	u F10 Save and Exits	

PCI Express Configuration

Phoenix SecureCore Technology Setup Advanced		
PCI Express Configuration	Item Specific Help	
PCIe 0 Speed[Auto]PCIe 1 Speed[Auto]PCIe 2 Speed[Auto]PCIe 3 Speed[Auto]PCI Express Root Port 0 [Enable]PCI Express Root Port 1 [Enable]PCI Express Root Port 2 [Enable]PCI Express Root Port 3 [Enable]	Configure PCIe Speed	
Esc Exit Select Menu Enter Select > Sub-Menu	a F10 Save and Exits	

Feature	Options	Description
PCIe Speed	Auto	Select PCIe Speed to Gen1 or Gen2
	Gen1	
	Gen2	
PCI Express Root Port	Disable	Control the PCI Express Root Port
	Enable	

USB Configuration

Phoenix SecureCore Technology Setup Advanced		
USB Co	nfiguration	Item Specific Help
xHCI Mode EHCI Controller USB Per-Port Control USB Port #0 USB Port #1 USB Port #2 USB Port #3	[Smart Auto] [Enable] [Enable] [Enable] [Enable] [Enable] [Enable]	Mode of operation of xHCI controller. This will also influence EHCI controller settings since certain combinations of those modes are not allowed. 'Smart Auto' mode is supposed to solve USB issues under Windows 7
Esc Exit Select	Menu Enter Select 🕨 Sub-Men	u F10 Save and Exits

Feature	Options	Description
xHCI Mode	Smart Auto Enable Disable	Mode of operation of xHCI controller. This will also influence EHCI controller settings since certain combinations of those modes are not allowed. 'SMART Auto' Mode is requied for OS with external Driver (e.g. Windows 7), 'Enabled' is recommended for OS with integrated USB 3.0 Support (e.g. Windows 8). Please note, the USB HSIC Hub for COMe USB Ports #4-7 is linked to xHCI controller which allows operation of these USB ports in OS with USB 3.0 driver only (no support in DOS or EFI Shell)
USB Per-Port Control	Disable Enable	Controls each of the CPU USB ports (COMe USB #0-3)
- USB Port #0 - USB Port #1 - USB Port #2 - USB Port #3	Disabled Enabled	Enable/Disable USB port

Audio Configuration

Phoenix SecureCore Technology Setup Advanced		
Audio Configuration		Item Specific Help
Audio Configuration Audio Controller HDAudio VCi Enable HDAudio Docking Support Enable HDAudio PME Enable HDAudio HDMI Codec HDA_SDI0 HDA_SDI1	[Enable] [Enable] [Disable] [Enable] [HDA_SDI0] [Disable]	Control Detection of the HDAudio device. Disabled = Azalia will be unconditionally disabled Enabled = Azalia will be unconditionally Enabled Auto = Azalia will be enabled if present, disabled otherwise
Esc Exit ↔ Select Menu Enter	Select 🕨 Sub-Menu	1 F10 Save and Exits

Feature	Options	Description
Audio Controller	Enable Disable	Enable / Disable High Definition Audio interface
- HDAudio VCi Enable	Enable Disable	Enable / Disable Virtual Channel 1 of Audio Controller
- HDAudio Docking Support Enable	Enable Disable	Enable / Disable HDAudio Docking Support of Audio Controller
- HDAudio PMCE Enable	Enable Disable	Enable / Disable Power Management capability of Audio Controller
- HDAudio HDMI Codec	Enable Disable	Enable / Disable internal HDMI codec for HDAudio
HDA_SDI0	HDA_SDIO Disable	HDAudio Codec connected on HDA_SDI0 signal
HDA_SDI1	HDA_SDI1 Disable	HDAudio Codec connected on HDA_SDI1 signal

SATA Drives

SATA Drives		Item Specific Help
SATA Drives Chipset-SATA Controller Configurat Chipset SATA SATA Test Mode Chipset SATA Mode SATA Port 0 Hot Plug Capability SATA Port 1 Hot Plug Capability	[Enable] [Disable] [AHCI] [Disable]	Enables or Disables the Chipset SATA Controller. The Chipset SATA controller supports the 2 black internal SATA ports (up to 3Gb/s supported per port).

Feature	Options	Description
Chipset SATA	Enable Disable	Enables or Disables the Chipset SATA Controller. The Chipset SATA controller supports the 2 internal SATA ports (up to 3Gb/s supported per port)
SATA Test Mode	Disable Enable	Enables or Disables the SATA Test Mode
Chipset SATA Mode	IDE AHCI	IDE: compatibility mode, disables AHCI. AHCI: supports advanced SATA features such as NCQ. Warning: do not change after OS install
SATA Port 0 Hot Plug Capability	Enable Disable	If enabled, SATA port will be reported as HotPlug capable
SATA Port 1 Hot Plug Capability	Enable Disable	If enabled, SATA port will be reported as HotPlug capable

LPSS & SCC Configuration

Phoenix Se Advanced	cureCore Technology Se	tup
LPSS & SCC Config	uration	Item Specific Help
LPSS & SCC Devices Mode	[PCI Mode]	LPSS & SCC Devices Mode Settigs
SCC Configuration SCC eMMC Boot Controller eMMC 4.5 Support eMMC DDR50 Support eMMC HS200 Support eMMC retune timer value	[Enable] [Disable] [Disable]	
	[Enable] [Enable] [Enable]	
Esc Exit → Select Menu E	nter Select > Sub-Men	u F10 Save and Exits

Feature	Options	Description
LPSS & SCC Devices Mode	ACPI Mode PCI Mode	Select operation mode for Low Power Super Speed LPSS devices eMMC/SDCard. For eMMC full speed operation the LPSS mode should be set to "ACPI"
SCC eMMC Boot Controller	Disable Auto Detect eMMC 4.41 eMMC 4.5	Disable or select eMMC Boot mode
eMMC 4.5 support	Disable Enable	Enabled: eMMC 4.5, Disabled: eMMC 4.41
eMMC DDR50 Support	Disable Enable	Enable / Disable DDR50 speed mode for eMMC
eMMC HS200 Support	Disable Enable	Enable / Disable HS200 speed mode for eMMC. For eMMC full speed operation the HS200 mode should be enabled.
- eMMC retune timer value	8	Select the retune timer in HS200 mode
SCC SD Card Support	Disable Enable	Enable/Disable onboard SD Card socket
SD SDR 25 Support	Disable Enable	Enable bus speed operation up to 25MB/s for SDCard (High Speed). Disable limits bus speed to 12.5MB/s (normal speed)
SD SDR 50 Support	Disable Enable	Enable bus speed operation up to 50MB/s for SDCard (Ultra High Speed). Disabled activates SDR25 mode setting

Miscellaneous Configuration

Phoenix SecureCore Technology Setup Advanced		
Miscellaneous Conf	iguration	Item Specific Help
Boot Time with HPET Timer	[Enable] [Disable] [S0 State] [Enable] [2GB]	Enable or Disable the High Precision Event Timer
Esc Exit Select Menu E	Inter Select 🕨 Sub-Menu	1 F10 Save and Exits

Feature	Options	Description
High Precision Timer	Disable Enable	Enables or Disables the High Precision Event Timer
Boot Time with HPET Timer	Disable Enable	Boot time calculation with High Precision Event Timer enabled
State After G3	SO State S5 State	Specify what state to go to when power is re-applied after a power failure (G3 state). S0 = Power on, S5 = Stay off
SMM LOCK	Disable Enable	Enables or Disables the SMM Lock feature. It will lock the SMRAM and unable load SMM driver any more
Pci Mmio Size	2GB 1.5GB 1.25GB 1GB	Select PCI MMIO Size

SMBIOS Event Log

Phoenix SecureCore Technology Setup		
Advanced		
		[]
SMBIOS Event	Log	Item Specific Help
Event Log Validity	Valid	Enable/Disable Event
Event Log Capacity	Space Available	Log.
Event Log	[Disabled]	
View SMBIOS event log		
Mark SMBIOS events as read	[Enter]	
Clears SMBIOS events	[Enter]	
L		
Esc Exit 🏎 Select Menu	Enter Select 🕨 Sub-Menu	1 F10 Save and Exits

Feature	Options	Description
Event Log	Disable Enable	Enables or Disables the SMBIOS Event Log
Mark SMBIOS events as read	Enter	Mark SMBIOS events as read. Marked SMBIOS events won't be displayed
Clears SMBIOS events	Enter	Clear SMBIOS events

View SMBIOS event log

Advanced	
View SMBIOS event log	
	_
Event Log is empty.	
Esc Exit Select Menu Enter Select > Sub-Menu F10 Save and Exits	

SuperIO Configuration

This setup option is only available with LPC SuperI/O Nuvoton 83627 present on the carrier board. By default the COMecBT6 supports the legacy interfaces of a 5V 83627HF(J) or 3.3V 83627DHG-P on external LPC. The SIO hardware monitor is not supported in setup.

Phoenix SecureCore Technology Setup Advanced		
LPC SIO Configuration	Item Specific Help	
SIO Serial Port 0 [Disabled]	Enable/Disable SIO Serial Port.	
SIO Serial Port 1 [Disabled]		
SIO Parallel Port [Disabled]		

Feature	Options	Description
SIO Serial Port 0	Disabled Enabled	Enable or Disable SIO Serial Port
- Base Address	3F8 2F8 3E8 2E8	Configure Serial Port Base Address
- IRQ	3 4 5 6 7 12	Configure Serial Port IRQ
SIO Serial Port 1	Disabled Enabled	Enable or Disable SIO Serial Port
- Base Address	3F8 2F8 3E8 2E8	Configure Serial Port Base Address
- IRQ	3 4 5 6 7 12	Configure Serial Port IRQ
SIO Parallel Port	Disabled Enabled	Enable or Disable SIO Parallel Port
- Device Mode	Standard Parallel Port EPP EPP & ECP	Configure Parallel Port Mode
- Base Address	378 278 3BC	Configure Parallel Port Base Address

Onboard UART Configuration

Phoenix SecureCore Technology Setup		
Advanced		
Onboard UART configuration	Item Specific Help	
Serial Port 0 [Enabled] Base Address [3F8] IRQ [4] Serial Port 1 [Enabled] Base Address [2F8] IRQ [3]	Enable/Disable Serial Port.	
Esc Exit 🛶 Select Menu Enter Select 🕨 Sub-Menu	1 F10 Save and Exits	

Feature	Options	Description
Serial Port 0	Disabled Enabled	Enable or Disable Serial Port (COM) 0
Base Address	3F8 2F8 3E8 2E8	Configure Serial Port Base Address
IRQ	3 4 5 6 7 12	Configure Serial Port IRQ
Serial Port 1	Disabled Enabled	Enable or Disable Serial Port (COM) 1
Base Address	3F8 2F8 3E8 2E8	Configure Serial Port Base Address
IRQ	3 4 5 6 7 12	Configure Serial Port IRQ

7.5.3 Security

Main Advanced Secur	rity Boot	Exit	
Superviser Descured is	Cleared		Item Specific Help
User Password is:	Cleared		a
			Set or clear the
Set Supervisor Password	[Enter]		Supervisor account's
Supervisor Hint String	[1	password.
Set User Password	[Enter]		
User Hint String	[1	
Min. password length	[1]		
Authenticate User on Boot	[Disabled]		
HDD Security Status			
No HDD detected			
Trusted Platform Module (TPM	()	T	

Feature	Options	Description
Set Supervisor Password	Enter	Set or clear the Supervisor account's password
Supervisor Hint String	-	Press Enter to type Supervisor Hint String
Min. password length	1	Set the minimum number of characters for password (1-20)
TPM Support	Disabled Enabled	This is used to decide whether TPM support should be enabled or disabled

TPM Options

Feature	Options	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 Enable, Activate, and Clear Enable, Activate, Clear, Enable, and Activate	Enact TPM Action
Omit Boot Measurements	Disabled Enabled	Enabling this option causes the system to omit recording boot device attempts in PCR[4]

7.5.4 Boot

	Ph	oenix SecureO	lore Techn	ology Set	up
Main	Advanced	Security	Boot	Exit	
	riority Order			-	Item Specific Help
2. 3. 4. 5. 6. 7. 8. 9.	ATAPI CD: SATA HDDO: SATA HDD1: USB HDD: USB CD: USB FDD: eMMC Card0: D SD Card1: Internal Shel PCI LAN:				Keys used to view or configure devices: † and ↓ arrows Select a device. '+' and '-' move the device up or down. 'Shift + 1' enables or disables a device. 'Del' deletes an unprotected device.
Esc Ex	it 🏎 Select	Menu Enter	Select 🕨	• Sub-Menu	F10 Save and Exits

7.5.5 Exit

	Pho	enix Secure	ore Techno	logy Set	up
Main	Advanced	Security	Boot	Exit	
					Item Specific Help
Exit Sav	ving Changes				
Exit Dis	carding Chang	ges			
Load Set	up Defaults				Equal to F10, save
Discard	Changes				all changes of all
Save Cha	anges				menus, then exit
					setup configure
					driver. Finally
					resets the system
					automatically.
Esc Exit	: 🛶 Select	Menu Enter	Select 🕨	Sub-Menu	1 F10 Save and Exits

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