

NanoCOM-SKU

COM Express Module

User's Manual 3rd Ed

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Packing List

Before setting up your product, please make sure the following items have been shipped:

ltem		Quantity
•	NanoCOM-SKU	1

If any of these items are missing or damaged, please contact your distributor or sales representative immediately.

About this Document

This User's Manual contains all the essential information, such as detailed descriptions and explanations on the product's hardware and software features (if any), its specifications, dimensions, jumper/connector settings/definitions, and driver installation instructions (if any), to facilitate users in setting up their product.

Users may refer to the product page at AAEON.com for the latest version of this document.

Safety Precautions

Please read the following safety instructions carefully. It is advised that you keep this manual for future references

- 1. All cautions and warnings on the device should be noted.
- 2. Make sure the power source matches the power rating of the device.
- Position the power cord so that people cannot step on it. Do not place anything over the power cord.
- 4. Always completely disconnect the power before working on the system's hardware.
- 5. No connections should be made when the system is powered as a sudden rush of power may damage sensitive electronic components.
- If the device is not to be used for a long time, disconnect it from the power supply to avoid damage by transient over-voltage.
- 7. Always disconnect this device from any AC supply before cleaning.
- 8. While cleaning, use a damp cloth instead of liquid or spray detergents.
- 9. Make sure the device is installed near a power outlet and is easily accessible.
- 10. Keep this device away from humidity.
- 11. Place the device on a solid surface during installation to prevent falls
- 12. Do not cover the openings on the device to ensure optimal heat dissipation.
- 13. Watch out for high temperatures when the system is running.
- 14. Do not touch the heat sink or heat spreader when the system is running
- 15. Never pour any liquid into the openings. This could cause fire or electric shock.
- 16. As most electronic components are sensitive to static electrical charge, be sure to ground yourself to prevent static charge when installing the internal components. Use a grounding wrist strap and contain all electronic components in any static-shielded containers.

- 17. If any of the following situations arises, please the contact our service personnel:
 - i. Damaged power cord or plug
 - ii. Liquid intrusion to the device
 - iii. Exposure to moisture
 - iv. Device is not working as expected or in a manner as described in this manual
 - v. The device is dropped or damaged
 - vi. Any obvious signs of damage displayed on the device

DO NOT LEAVE THIS DEVICE IN AN UNCONTROLLED ENVIRONMENT WITH TEMPERATURES BEYOND THE DEVICE'S PERMITTED STORAGE TEMPERATURES (SEE CHAPTER 1) TO PREVENT DAMAGE.



This device complies with Part 15 FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received including interference that may cause undesired operation.

Caution:

There is a danger of explosion if the battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions and your local government's recycling or disposal directives.

Attention:

Il y a un risque d'explosion si la batterie est remplacée de façon incorrecte. Ne la remplacer qu'avec le même modèle ou équivalent recommandé par le constructeur. Recycler les batteries usées en accord avec les instructions du fabricant et les directives gouvernementales de recyclage. 产品中有毒有害物质或元素名称及含量

AAEON Main Board/ Daughter Board/ Backplane

	有毒有害物质或元素					
部件名称	铅	汞	镉	六价铬	多溴联苯	多溴二苯醚
	(Pb)	(Hg)	(Cd)	(Cr(VI))	(PBB)	(PBDE)
印刷电路板				0	0	0
及其电子组件	×	0	0	0	0	0
外部信号				0	0	0
连接器及线材	×	0	0	0	0	0
O: 表示该有毒有害物质在该部件所有均质材料中的含量均在 SJ/T 11363-2006 标准规定的限量要求以下。						
X: 表示该有毒有害物质至少在该部件的某一均质材料中的含量超出 SJ/T 11363-2006 标准规定的限量要求。						
备注:此产品所标示之环保使用期限,系指在一般正常使用状况下。						

Poisonous or Hazardous Substances or Elements in Products

AAEON Main Board/ Daughter Board/ Backplane

	Poisonous or Hazardous Substances or Elements						
Component	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent Chromium (Cr(VI))	Polybrominated Biphenyls (PBB)	Polybrominated Diphenyl Ethers (PBDE)	
PCB & Other Components	Х	0	0	0	0	0	
Wires & Connectors for External Connections	Х	0	0	0	0	0	

O: The quantity of poisonous or hazardous substances or elements found in each of the component's parts is below the SJ/T 11363-2006-stipulated requirement.

X: The quantity of poisonous or hazardous substances or elements found in at least one of the component's parts is beyond the SJ/T 11363-2006-stipulated requirement.

Note: The Environment Friendly Use Period as labeled on this product is applicable under normal usage only

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Chapter 1

Product Specifications

1.1 Specifications

System	
Form Factor	COM Express Mini size, Type 10
CPU	6th generation Intel® Core™ ULT Series
	Processor
CPU Frequency	Up to i7-6600U, 2c/4t, 2.6GHz up to 3.4GHz
Chipset	Onboard 6th Generation Intel® Core™
	U-series SoC
Memory Type	Onboard Non-ECC DDR4-2133
Max. Memory Capacity	4GB DDR4
BIOS	AMI BIOS, Legacy free
Wake on LAN	Yes
Watchdog Timer	255 Levels
Power Requirement	Normal: +12V
Power Supply Type	AT/ATX
Power Consumption (Typical)	i7-6600U, Onboard 12V@1.5A during 100%
	loading burn in test.
Dimension (L x W)	3.31" x 2.17" (84mm x 55mm)
Operating Temperature	32°F~ 140°F (0°C ~ 60°C)
	-40°F~ 185°F (-40°C ~ 85°C)
Storage Temperature	-40°F ~ 176°F (-40°C ~ 80°C)
Operating Humidity	0% ~ 90% relative humidity, noncondensing
MTBF (Hours)	80,000
Certification	CE/FCC Class A

Display	
VGA/LCD Controller	Intel [®] HD Graphics 520/510
Video Output	LVDS LCD (eDP Optional), DDI x 1
LVDS Interface	Supports 18-bit and 24-bit Single channel

I/O

Ethernet	Intel® I219-LM
Audio	High Definition Audio Interface
USB Port	USB 2.0 x 8
	USB 3.2 Gen 1 x 2
Serial Port	2-Wire UART (TX/RX) x 2
HDD Interface	SATA3 x 2
Onboard Storage	_
Expansion Interface	PCle[x1] x4 (up to four devices)
	LPC
	SMBus
	12C
GPIO	8-bit
ТРМ	fTPM optional

Chapter 2

Hardware Information

Component Side



Solder Side



With heat spreader



2.2 List of Switches and Connectors

Please refer to the table below for all of the board's jumpers that you can configure for your application

Label	Function
SW1	AT/ ATX switch
CN1	ROW A/B connector

2.2.1 AT/ATX Switch (SW1)

Pin	Function
1 (On)	AT Mode
1 (Off)	ATX Mode (Default)
2 (On)	RTC reset
2 (Off)	RTC Normal (Default)

2.2.2 ROW A/B Connector (CN1)

Row A		Row B	
A1	GND (FIXED)	B1	gnd (fixed)
A2	GBE0_MDI3-	B2	GBE0_ACT#
A3	GBE0_MDI3+	B3	LPC_FRAME#
A4	GBE0_LINK100#	B4	LPC_AD0
A5	GBE0_LINK1000#	B5	LPC_AD1
A6	GBE0_MDI2-	B6	LPC_AD2
A7	GBE0_MDI2+	B7	LPC_AD3
A8	GBE0_LINK#	B8	N.C
A9	GBE0_MDI1-	B9	N.C
A10	GBE0_MDI1+	B10	LPC_CLK
A11	GND (FIXED)	B11	gnd (Fixed)
A12	GBE0_MDI0-	B12	PWRBTN#
A13	GBE0_MDI0+	B13	SMB_CK
A14	N.C	B14	SMB_DAT
A15	SUS_S3#	B15	SMB_ALERT#
A16	SATA0_TX+	B16	SATA1_TX+

Row A		Row B	
A17	SATA0_TX-	B17	SATA1_TX-
A18	SUS_S4#	B18	SUS_STAT#
A19	SATA0_RX+	B19	SATA1_RX+
A20	SATAO_RX-	B20	SATA1_RX-
A21	GND (FIXED)	B21	gnd (Fixed)
A22	USB3_RXN0	B22	USB3_TXN0
A23	USB3_RXP0	B23	USB3_TXP0
A24	SUS_S5#	B24	PWR_OK
A25	USB3_RXN1	B25	USB3_TXN1
A26	USB3_RXP1	B26	USB3_TXP1
A27	BATLOW#	B27	WDT
A28	ATA_ACT#	B28	N.C
A29	AC_SYNC	B29	AC_SDIN1
A30	AC_RST#	B30	AC_SDIN0
A31	GND (FIXED)	B31	GND (FIXED)
A32	AC_BITCLK	B32	SPKR
A33	AC_SDOUT	B33	I2C_CK
A34	BIOS_DIS0#	B34	I2C_DAT
A35	THRMTRIP#	B35	THRM#
A36	USB6-	B36	USB7-
A37	USB6+	B37	USB7+
A38	USB_6_7_OC#	B38	USB_4_5_OC#
A39	USB4-	B39	USB5-
A40	USB4+	B40	USB5+
A41	GND (FIXED)	B41	GND (FIXED)
A42	USB2-	B42	USB3-

Chapter 2 – Hardware Information

Row A		Row B	
A43	USB2+	B43	USB3+
A44	USB_2_3_OC#	B44	USB_0_1_OC#
A45	USBO-	B45	USB1-
A46	USB0+	B46	USB1+
A47	VCC_RTC	B47	EXCD1_PERST#
A48	EXCD0_PERST#	B48	EXCD1_CPPE#
A49	EXCD0_CPPE#	B49	SYS_RESET#
A50	LPC_SERIRQ	B50	CB_RESET#
A51	GND (FIXED)	B51	gnd (Fixed)
A52	N.C	B52	N.C
A53	N.C	B53	N.C
A54	GPI0	B54	GPO1
A55	N.C	B55	N.C
A56	N.C	B56	N.C
A57	GND	B57	GPO2
A58	PCIE_TX3+	B58	PCIE_RX3+
A59	PCIE_TX3-	B59	PCIE_RX3-
A60	GND (FIXED)	B60	GND (FIXED)
A61	PCIE_TX2+	B61	PCIE_RX2+
A62	PCIE_TX2-	B62	PCIE_RX2-
A63	GPI1	B63	GPO3
A64	PCIE_TX1+	B64	PCIE_RX1+
A65	PCIE_TX1-	B65	PCIE_RX1-
A66	GND	B66	WAKE0#
A67	GPI2	B67	WAKE1#
A68	PCIE_TX0+	B68	PCIE_RX0+

Row A		Row B	
A69	PCIE_TX0-	B69	PCIE_RX0-
A70	GND (FIXED)	B70	gnd (fixed)
A71	LVDS_A0+	B71	DDI0_PAIR0+
A72	LVDS_A0-	B72	DDI0_PAIR0-
A73	LVDS_A1+	B73	DDI0_PAIR1+
A74	LVDS_A1-	B74	DDI0_PAIR1-
A75	LVDS_A2+	B75	DDI0_PAIR2+
A76	LVDS_A2-	B76	DDI0_PAIR2-
A77	LVDS_VDD_EN	B77	N.C
A78	LVDS_A3+	B78	N.C
A79	LVDS_A3-	B79	LVDS_BKLD_EN
A80	GND (FIXED)	B80	GND (FIXED)
A81	LVDS_A_CK+	B81	DDI0_PAIR3+
A82	LVDS_A_CK-	B82	DDI0_PAIR3-
A83	LVDS_I2C_CK	B83	LVDS_BKLT_CTRL
A84	LVDS_I2C_DAT	B84	VCC_5V_SBY
A85	GPI3	B85	VCC_5V_SBY
A86	N.C	B86	VCC_5V_SBY
A87	N.C	B87	VCC_5V_SBY
A88	PCIE0_CK_REF+	B88	BISO_DIS1#
A89	PCIE0_CK_REF-	B89	DDI0_HPD
A90	GND (FIXED)	B90	GND (FIXED)
A91	SPI_POWER	B91	N.C
A92	SPI_MISO	B92	N.C
A93	GPO0	B93	N.C
A94	SPI_CLK	B94	N.C

Row A		Row B	
A95	SPI_MOSI	B95	DDI0_DDC_AUX_SEL
A96	GND	B96	N.C
A97	TYPE10#	B97	SPI_CS#
	RS1_TX		DDI0_CTRL_CLK or
A98		B98	DDI0_AUX+
	RS1_RX		DDI0_CTRL_DATA or
A99		B99	DDI0_AUX-
A100	GND (FIXED)	B100	GND (FIXED)
A101	RS2_TX	B101	FAN_PWMOUT
A102	RS2_RX	B102	FAN_TACHIN
A103	LID#	B103	SLEEP#
A104	VCC_12V	B104	VCC_12V
A105	VCC_12V	B105	VCC_12V
A106	VCC_12V	B106	VCC_12V
A107	VCC_12V	B107	VCC_12V
A108	VCC_12V	B108	VCC_12V
A109	VCC_12V	B109	VCC_12V
A110	GND (FIXED)	B110	GND (FIXED)

Chapter 3

AMI BIOS Setup

3.1 System Test and Initialization

The board uses certain routines to perform testing and initialization. If an error, fatal or non-fatal, is encountered, a few short beeps or an error message will be outputted. The board can usually continue the boot up sequence with non-fatal errors.

The system configuration verification routines check the current system configuration against the values stored in the CMOS memory. If they do not match, an error message will be outputted, in which case you will need to run the BIOS setup program to set the configuration information in memory.

There are three situations in which you will need to change the CMOS settings:

- You are starting your system for the first time
- You have changed your system's hardware
- The CMOS memory has lost power and the configuration information is erased

The system's CMOS memory uses a backup battery for data retention, which is to be replaced once emptied.

3.2 AMI BIOS Setup

The AMI BIOS ROM has a pre-installed Setup program that allows users to modify basic system configurations, which is stored in the battery-backed CMOS RAM and BIOS NVRAM so that the information is retained when the power is turned off.

To enter BIOS Setup, press or <F2> immediately while your computer is powering up.

The function for each interface can be found below.

Main – Date and time can be set here. Press <Tab> to switch between date elements

Advanced – Enable/ Disable boot option for legacy network devices

Chipset - For hosting bridge parameters

Boot - Enable/ Disable quiet Boot Option

Security - The setup administrator password can be set here

Save & Exit – Save your changes and exit the program

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3.3 Setup submenu: Main

Aptio Setup Utility - Main Advanced Chipset Security	Copyright (C) 2016 American Boot Save & Exit	Megatrends, Inc.
BIOS Information		Set the Date. Use Tab to switch between Date elements.
BIOS Vendor Compliancy	American Megatrends UEFI 2.4; PI 1.3	
Firmware VENDOR Firmware Information Firmware Version Build Date	AAEON CPU Board	
System Date System Time	[Thu 01/01/2009] [00:11:06]	the Salast Sanan
Access Level	Administrator	14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version 2.17.1255. C	opyright (C) 2016 American M	egatrends, Inc.

3.4 Setup submenu: Advanced

Aptio Setup Main Advanced Chipset	Utility – Copyright (C) 2016 Amer Security Boot Save & Exit	rican Megatrends, Inc.
 CPU Configuration SATA Configuration SID Configuration On-Module H/M Monitor USB Configuration Digital ID Port Configurat Power Management 	: ion	CPU Configuration Parameters +*: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version 2	17 1255 Converget (C) 2016 Amerid	can Meratrande Inc

3.4.1 Advanced: CPU Configuration

CPU Configuration		Enabled for Windows XP and
Intel(R) Core(IM) i7-6600U CPU @	2 60687	Linux (US optimized for Huner-Threading Technology)
CPU Signature	406E3	and Disabled for other OS (OS
Microcode Patch	84	not optimized for
Max CPU Speed	2600 MHz	Huper-Threading Technology).
Min CPU Speed	400 MHz	When Disabled only one threat
CPU Speed	2600 MHz	per enabled core is enabled.
Processor Cores	2	
Hyper Threading Technology	Supported	
Intel VT-x Technology	Supported	
Intel SMX Technology	Supported	
64-bit	Supported	
EIST Technology	Supported	++: Select Screen
CPU C3 state	Supported	↑↓: Select Item
CPU C6 state	Supported	Enter: Select
CPU C7 state	Supported	+/-: Change Opt.
		F1: General Help
L1 Data Cache	32 kB x 2	Enter: Select
L1 Code Cache	32 kB x 2	+/-: Change Opt.
L2 Cache	256 kB x 2	F1: General Help
L3 Cache	4 MB	F2: Previous Values
L4 Cache	Not Present	F3: Optimized Defaults
		F4: Save & Exit
Hyper-threading	[Enabled]	ESC: Exit
Intel Virtualization Technology	[Enabled]	
Intel(R) SpeedStep(tm)	[Disabled]	
CPU C states		

Options summary:

Intel Virtualization	Disabled			
Technology	Enabled	Optimal Default, Failsafe Default		
When enabled, a VMM can utilize the additional hardware capabilities provided by				
Vanderpool Technolc	gy.			
Intel® SpeedStep™	Disabled	Optimal Default, Failsafe Default		
	Enabled			
Allows more then two frequency ranges to be supported.				

2	υ	
	1	

CPU C states	Disabled	Optimal Default, Failsafe Default	
	Enabled		
Enabled for Windows XP and Linux (OS optimized for Hyper-Threading Technology)			
and Disable for other OS (OS not optimized for Hyper-Threading Technology).			
When Disabled only one thread per enabled core is enabled.			

Chapter 3 – AMI BIOS Setup

3.4.2 Advanced: SATA Configuration

navancea		
		Enable or disable SATA Devic
Serial ATA Port O	Empty	
Port 0	[Enabled]	
HOT Plug Sonial ATA Post 1	[DISabled]	
Port 1	[Enabled]	
Hot Plug	[Disabled]	
		++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit

Options summary:

SATA Controller(s)	Enabled	Optimal Default, Failsafe Default
	Disabled	
Enable or disable SAT	A Device.	
Port x	Disabled	
	Enabled	Optimal Default, Failsafe Default
Enable or Disable SA	TA Port.	
Hot Plug	Disabled	Optimal Default, Failsafe Default
	Enabled	
Designates this port a	as Hot Pluggable.	

3.4.3 Advanced: SIO Configuration

Aptio Setup Utility – Copyright (C) 2016 American Advanced	n Megatrends, Inc.
 AMI SID Driver Version : A5.05.03 Super IO Chip Logical Device(s) Configuration [*#Active*] Serial Port 9 [*#Active*] Serial Port 10 WARNING: Logical Devices state on the left side of the control, reflects the current Logical Device state. Changes made during Setup Session will be shown after you restart the system. 	View and Set Basic properties of the SIO Logical device. Like IO Base, IRQ Range, DMA Channel and Device Mode.
	<pre>+: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>

3.4.3.1 SIO Configuration: Serial Port 9 Configuration

Aptio Setup Utility – Copyright (C) 2013 American Megatrends, Inc. Advanced		
Serial Port 9 Configuration		Enable or Disable this Logical
Logical Device Settings: Current : IO=2D8h; IRQ=11;		
Possible:	[Use Automatic Settings]	
WARNING: disabling SIO Logical Devid side effects. PROCEED WITH CAUTION.	ces may have unwanted	++: Select Screen T4: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit

Options summary:

Use This Device	Disabled	
	Enabled	Optimal Default, Failsafe Default
En/Disable Serial Port (COM)		
Possible:	Use Automatic Settings	Optimal Default, Failsafe Default
	10=2D8; IRQ=11;	
	10=2C8; IRQ=11;	
Select an optimal setting for IO device		

3.4.3.2 SIO Configuration: Serial Port 10 Configuration

Aptio Setup Utility – Copyright (C) 2013 American Megatrends, Inc. Advanced		
Serial Port 10 Configuration		Enable or Disable this Logical
		DEVELC.
Logical Device Settings: Current : IO=2C8h; IRQ=10;		
Possible:	[Use Automatic Settings]	
MARNING: disabling SIO Logical Devid side effects. PROCEED WITH CAUTION.	zes may have unwanted	<pre>++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. f1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>

Options summary:

Use This Device	Disabled	
	Enabled	Optimal Default, Failsafe Default
En/Disable Serial Port (COM)		
Possible:	Use Automatic Settings	Optimal Default, Failsafe Default
	10=2D8; IRQ=11;	
	10=2C8; IRQ=11;	
Select an optimal setting for IO device		

3.4.4 Advanced: Hardware Monitor

Aptio Setup Utility - Advanced	Copyright (C) 2016 American	Megatrends, Inc.
Pc Health Status		Smart Fan Configuration
CPU Temperature(DTS) Chassis Temperature(CPU) Chassis Temperature(PCH)	: +97 °c : +59 °c : +47 °c	
CPU FAN Speed	: NZA	
+12V +5V VMEM VCORE	: +12.239 V : +5.037 V : +1.362 V : +0.885 V	
▶ CPU Smart Fan Mode Configuration		++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
3.4.4.1 Hardware Monitor: CPU Smart Fan Mode Configuration

Aptio : Advanced	Setup Utility – Copyright (C) 2016 American	Megatrends, Inc.
CPU Smart Fan contro PWH signal	l [Full Mode] [Non-inverting]	++: Select Screen T1: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Versi	on 2.17.1255. Copyright (C) 2016 American M	egatrends, Inc.

CPU Smart Fan	Full Mode	Optimal Default, Failsafe Default
control	Manual Mode by PWM	
	Auto Mode by PWM	
PWM signal	Non-inverting	Optimal Default, Failsafe Default
	Inverting	
Select output PWM of inverting or non-inverting signal		



Manual Setting	70	Optimal Default, Failsafe Default
Set Fan at fixed Duty	/-Cycle Min=0 Max=100 Plea	se input Dec number:



Monitor Thermal	CPU Temperature(DTS)	Optimal Default, Failsafe Default
	Chassis Temperature(CPU)	
	Chassis Temperature(PCH)	
Select monitor therr	nal source	
Temperature of	30	Optimal Default, Failsafe Default
Start		
Temperature Of Star	ť	
Temperature Of Off	20	Optimal Default, Failsafe Default
Temperature Of Off		
Start PWM	40	Optimal Default, Failsafe Default
Start PWM		

Slope (PWM)	0 (PWM)	
	1 (PWM)	Optimal Default, Failsafe Default
	2 (PWM)	
	4 (PWM)	
	8 (PWM)	
	16 (PWM)	
	32 (PWM)	
	64 (PWM)	

Aptio Setup Utility Advanced	– Copyright (C) 2013 American	Megatrends, Inc.
USB Configuration		Enables Legacy USB support.
USB Devices: 1 Drive, 1 Keyboard, 1 Mouse	, 2 Hubs	support if no USB devices are connected. DISABLE option will keep USB devices available
Legacy USB Support		only for EFI applications.
		↔: Select Screen †↓: Select Item
		Enter: Select +/-: Change Opt. F1: General Help
		F2: Previous Values F3: Optimized Defaults
		ESC: Exit
Version 2.16.1242.	Copyright (C) 2013 American M	legatrends, Inc.

Options summary:

Legacy USB Support	Enabled	Optimal Default, Failsafe Default
	Disabled	
	Auto	

Enables BIOS Support for Legacy USB Support. When enabled, USB can be functional

in legacy environment like DOS.

AUTO option disables legacy support if no USB devices are connected

Device Name (Emulation	Auto	Optimal Default, Failsafe Default
Type)	Floppy	
	Forced FDD	
	Hard Disk	
	CDROM	

Auto. USB devices less than 530MB will be emulated as Floppy and remaining as			
loppy and remaining as hard drive. Forced FDD option can be used to force a HDD			
ormatted drive to boot as FDD(Ex. ZIP drive)			
USB Port 0/1 function	FCH USB port 8/9	Optimal Default, Failsafe Default	

FCH USB port 0/1

routing

3.4.6 Advanced: Digital IO Port Management

)igital IO Port Configurat	ion	Set DIO as Input or Output
DIO Port1 Output Level DIO Port2 Output Level DIO Port3 Output Level DIO Port4 Output Level DIO Port5 DIO Port5 DIO Port6 DIO Port8	[Output] [High] [Output] [High] [Output] [High] [Input] [Input] [Input] [Input]	++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit

DIO Port*	Output	
	Input	
Set DIO as Input or	Output	
Output Level	High	Optimal Default, Failsafe Default
	Low	
Set output level whe	en DIO pin is output	

3.4.7 Advanced: Power Management

Aptio Setup Uti Advanced	lity – Copyright (C) 2013 Am	erican Megatrends, Inc.
Power Management		Select power supply mode.
Power Mode AC Power Loss	[ATX Type] [Last State]	
Wake Configuration RTC wake system from S5	[Disabled]	
		++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit

Power Mode	АТХ Туре	Optimal Default, Failsafe Default	
	АТ Туре		
Select power supply mode.			
Restore on Power	Last State		
Loss	Power On		
	Power Off	Optimal Default, Failsafe Default	
Select power state when power is re-applied after a power failure.			
RTC wake system	Disabled	Optimal Default, Failsafe Default	
from S5	Fixed Time		
	Dynamic Time		

Enable or disable System wake on alarm event. When enabled, System will wake on the hr::min::sec specified

3.5 Setup submenu: Chipset

Main Ad	Aptio Setup vanced Chipset	Utility – Copyrig Security Boot S	(ht (C) 2016 A Gave & Exit	American Megatrends,	Inc.
▶ System Ag	ent (SA) Configur nfiguration	ration		System Ager ++: Select 14: Select Enter: Sele +/-: Change F1: General F2: Previou F3: Optimiz F4: Save & ESC: Exit	screen Item Screen Item Sct 9 Dpt. Help Is Values Evit Exit
		7.1255. Copyright	: (C) 2016 Ame	erican Megatrends, I	

3.5.1 Chipset: System Agent (SA) Configuration

Aptio Setup Utility – Copyright (C) 2016 American Megatrends, Inc. Chipset System Agent Bridge Name Skylake Maximum Value of TOLUD. Dynamic assignment would Memory Configuration adjust TOLUD automatically Memory Frequency 1333 MHz based on largest MMIO length Total Memory 2048 MB of installed graphic controller DIMM#1 2048 MB DIMM#2 Not Present Graphics Configuration ↔: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit Copyright (C) 2016 American Megatrends, Optimal Default, Failsafe Default Max TOLUD Dynamic 1 GB 1.25 GB 1.5 GB 1.75 GB 2 GB 2.25 GB 2.5 GB 2.75 GB 3 GB 3.25 GB

Chapter 3 – AMI BIOS Setup

Maximum Value of TOLUD Dynamic assignment would adjust TOLUD automatically based on largest MMIO length of installed graphic controller.

Chapter 3 – AMI BIOS Setup

3.5.1.1 System Agent (SA) Configuration: Graphics Configuration

Graphics Configuration		Select which of IGFX/PEG/PCI
Primary Display Primary IGFX Boot Display ▶ LVDS Panel Configuration	[Auto] [VBIOS Default]	Primary Display for select SG for Switchable Gfx.
		++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit

Options summary:

Primary Display	Auto	Optimal Default, Failsafe Default		
	IGFX			
	PCIE			
Select which of IGFX/PEG Graphics dvice should be Primary Display.				
Primary IGFX Boot	VBIOS Default	Optimal Default, Failsafe Default		
Display	DDI1/DP			
	LVDS/eDP			
Select the Video Device which will be activated during POST. This has no effect if				
external graphic present.				

Secondary boot display selection will appear based on your selection.

3.5.1.1.1 Graphics Configuration: LVDS Panel Configuration

LVDS Panel Configuration		Enable/Disabled this panel
LVDS LCD Panel Type Color Depth Backlight Type Backlight Level Backlight PWM Freq	[Enabled] [800x6000660Hz] [18-Bit] [Norma1] [80%] [220Hz]	
		++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit

LVDS	Disabled	
	Enabled	Optimal Default, Failsafe Default
Enable/Disabled this panel.		
LVDS Panel Type	640x480,18bit,60Hz	
	800x480,18bit,60Hz	
	800x600,18bit,60Hz	Optimal Default, Failsafe Default
	1024x600,18bit,60Hz	
	1024x768,18bit,60Hz	
	1024x768,24bit,60Hz	
	1280x768,24bit,60Hz	
	1366x768,24bit,60Hz	

Select LCD panel used	by Internal Graphic	s Device by selecting the appropriate setup
item.		
Color Depth	18-bit	Optimal Default, Failsafe Default
	24-bit	
Select panel type		
Backlight Type	Normal	Optimal Default, Failsafe Default
	Inverted	
Select backlight control	signal type	
Backlight Level	0%	
	10%	
	20%	
	30%	
	40%	
	50%	
	60%	
	70%	
	80%	Optimal Default, Failsafe Default
	90%	
	100%	
Select backlight control	level	
Backlight PWM Freq	100Hz	
	200Hz	
	220Hz	Optimal Default, Failsafe Default
	500Hz	
	1KHz	
	2.2KHz	
	6.5KHz	

3.5.2 Chipset: PCH-IO Configuration

PCH-IO Configuration		Control Detection of the
		HD-Audio device.
PCH LAN Controller	[Enabled]	unconditionally disabled
PCIe Lane0 Gen Speed	[Gen1]	unconditionally enabled
PCIe Lane1 Gen Speed	[Gen1]	Auto = HDA will be enabled
PCIe Lane2 Gen Speed	[Gen1]	present, disabled otherwise
PCIe Lane3 Gen Speed	[Gen1]	
		Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit

HD Audio	Disabled		
	Enabled	Optimal Default, Failsafe Default	
Control Detection of	the HD-Audio device.		
Disabled = HDA will	be unconditionally disabled		
Enabled = HDA will be unconditionally enabled			
Auto = HDA will be enabled if present, disabled otherwise.			
PCH LAN	Enabled	Optimal Default, Failsafe Default	
Controller	Disabled		
Enable or disable onboard NIC.			
PCle Lane* Gen	Auto		
Speed	Gen1	Optimal Default, Failsafe Default	

	Gen2
	Gen3
Select PCI Express p	ort speed.

3.6 Setup submenu: Security

Aptio Setup Ut. Main Advanced Chipset Se	ility – Copyright (C) 2013 American curity Boot Save & Exit	Megatrends, Inc.
Password Description		Set Administrator Password
If ONLY the Administrator's p then this only limits access only asked for when entering If ONLY the User's password is a power on password and m boot or enter Setup. In Setup have Administrator rights. The password length must be in the following range: Minimum length	bassword is set, to Setup and is Setup. is set, then this ust be entered to be the User will 3	
Maximum length	20	↔: Select Screen †↓: Select Item
Administrator Password User Password		Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version 2.16.	1242. Copyright (C) 2013 American M	egatrends, Inc.

Change User/Administrator Password

You can set a User Password once an Administrator Password is set. The password will be required during boot up, or when the user enters the Setup utility. Please Note that a User Password does not provide access to many of the features in the Setup utility.

Select the password you wish to set, press Enter to open a dialog box to enter your password (you can enter no more than six letters or numbers). Press Enter to confirm your entry, after which you will be prompted to retype your password for a final confirmation. Press Enter again after you have retyped it correctly.

Removing the Password

Highlight this item and type in the current password. At the next dialog box press Enter to disable password protection.

3.7 Setup submenu: Boot

Boot Configuration Quiet Boot Launch PXE ROM BIOS MODE	[Enabled] [Disabled] [UEFI]	Enables or disables Quiet Boot option
Boot Option Priorities Boot Option #1 Boot Option #2 Hand Drive BBS Priorities	[UEFI: SanDisk, Partition 1] [SanDisk]	
		++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit

Quiet Boot	Disabled		
	Enabled	Optimal Default, Failsafe Default	
En/Disable showing boot lo	go.		
Launch PXE ROM	Disabled	Optimal Default, Failsafe Default	
	Enabled		
Controls the execution of UEFI and Legacy PXE ROM			
BIOS MODE	UEFI	Optimal Default, Failsafe Default	
	Legacy		
Select using BIOS mode.			

3.7.1 Boot: BBS Priorities

Aptio Setup Utilit	y – Copyright (C) 2013 Americar Boot	Megatrends, Inc.
Boot Option #1	[Generic Flash Disk]	Sets the system boot order
		<pre>++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>

3.8 Setup submenu: Save & Exit

Aptio Setup Main Advanced Chipset	Utility – Copyright (C Security Boot Save &	2016 American H Exit	Megatrends, Inc.
Save Changes and Reset Discard Changes and Reset Restore Defaults			Reset the system after saving the changes.
			<pre>++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
Version 2.1	17.1255. Copyright (C) (2016 American Me	gatrends, Inc.

Chapter 4

Drivers Installation

4.1 Driver Download and Installation

Drivers for the NanoCOM-SKU can be downloaded from the product page on the AAEON website by following this link:

https://www.aaeon.com/en/p/com-express-modules-nanocom-sku

Download the driver(s) you need and follow the steps below to install them.

Step 1 – Install Chipset Drivers

- 1. Open the Step1 Chipset followed by SetupChipset.exe
- 2. Follow the instructions
- 3. Drivers will be installed automatically

Step 2 – Install Graphics Driver

- 1. Open the Step2 Graphic folder and select your OS
- 2. Open the Setup.exe file in the folder
- 3. Follow the instructions
- 4. Drivers will be installed automatically

Step 3 - Install LAN Drivers

- 1. Open the Step3 LAN folder followed by Autorun.exe file
- 2. Follow the instructions
- 3. Drivers will be installed automatically

Step 4 - Install Audio Drivers

- 1. Open the Step4 Audio folder followed by 0002-R276.exe file
- 2. Follow the instructions
- 3. Drivers will be installed automatically

Step 5 - Install USB 3.0 Driver (Windows 7 only)

- 1. Open the Step5 USB3.0 folder followed by Setup.exe
- 2. Follow the instructions
- 3. Drivers will be installed automatically

Appendix A

Watchdog Timer Programming

A.1 Watchdog Timer Initial Program

Table 1 : Embedded BRAM relative register table		
	Default Value	Note
Index	0x284(Note1)	BRAM Index Register
Data	0x285(Note2)	BRAM Data Register
Logical Davice Number	0xA8 (Note3)	Watch dog Logical Device
		Number
Function and Davisa Number	0x00 (Note4)	Watch dog Function/Device
		Number

Table 2 : Watchdog relative register table				
	Option Pegister	BitNum	Value	Note
Timer Counter	0x00 (Note5)		(Note10)	Time of watchdog timer (0~255)
Counting Unit	0x01 (Note6)	0 (Note7)	0 (Note11)	Select time unit. 0: second 1: minute
Watchdog RST pulse width	0x01 (Note8)	[3:2](Note9)	0 (Note12)	0: 20ms 1: 60ms 2: 100ms 3: 250ms

// Embedded BRAM relative definition (Please reference to Table 1) #define byte EcBRAMIndex //This parameter is represented from Note1 #define byte EcBRAMData //This parameter is represented from Note2 #define byte BRAMLDNReg //This parameter is represented from Note3 #define byte BRAMFnDataReg //This parameter is represented from Note4 #define void EcBRAMWriteByte(byte Offset, byte Value); #define byte EcBRAMReadByte(byte Offset); #define void IOWriteByte(byte Offset, byte Value); #define byte IOReadByte(byte Offset); // Watch Dog relative definition (Please reference to Table 2) #define byte TimerReg //This parameter is represented from Note5 #define byte TimerVal // This parameter is represented from Note10 #define byte UnitReg //This parameter is represented from Note6 #define byte UnitBit //This parameter is represented from Note7 #define byte UnitVal //This parameter is represented from Note11 #define byte RSTReg //This parameter is represented from Note8 #define byte RSTBit //This parameter is represented from Note9 #define byte RSTVal //This parameter is represented from Note12

VOID Main(){

- // Procedure : AaeonWDTConfig
- // (byte)Timer : Time of WDT timer.(0x00~0xFF)
- // (boolean)Unit : Select time unit(0: second, 1: minute).

AaeonWDTConfig();

// Procedure : AaeonWDTEnable

// This procudure will enable the WDT counting.

AaeonWDTEnable();

}

}

}

}

// Procedure : AaeonWDTEnable

VOID AaeonWDTEnable (){ WDTEnableDisable(1);

// Procedure : AaeonWDTConfig

VOID AaeonWDTConfig (){

// Disable WDT counting WDTEnableDisable(0); // WDT relative parameter setting WDTParameterSetting();

VOID WDTEnableDisable(byte Value){ ECBRAMWriteByte(TimerReg, Value);

VOID WDTParameterSetting(){

Byte TempByte;

// Watchdog Timer counter setting ECBRAMWriteByte(TimerReg, TimerVal); // WDT counting unit setting TempByte = ECBRAMReadByte(UnitReg); TempByte |= (UnitVal << UnitBit); ECBRAMWriteByte(UnitReg, TempByte); // WDT RST pulse width setting TempByte = ECBRAMReadByte(RSTReg);TempByte |= (RSTVal << RSTBit); ECBRAMWriteByte(RSTReg, TempByte);

VOID

}

Byte ECBRAMReadByte(byte OPReg){

IOWriteByte(EcBRAMIndex, 0x10);

IOWriteByte(EcBRAMIndex, 0x11);

IOWriteByte(EcBRAMData, Value);

IOWriteByte(EcBRAMIndex, 0x12); IOWriteByte(EcBRAMData, 0x30);

IOWriteByte(EcBRAMData, BRAMLDNReg);

IOWriteByte(EcBRAMData, BRAMFnDataReg);

IOWriteByte(EcBRAMIndex, 0x13 + OPReg);

IOWriteByte(EcBRAMIndex, 0x10); IOWriteByte(EcBRAMData, BRAMLDNReg); IOWriteByte(EcBRAMIndex, 0x11); IOWriteByte(EcBRAMData, BRAMFnDataReg);

IOWriteByte(EcBRAMIndex, 0x12); IOWriteByte(EcBRAMData, 0x10);

//Read start

//Write start

IOWriteByte(EcBRAMIndex, 0x13 + OPReg); Return IOReadByte(EcBRAMData, Value);

ECBRAMWriteByte(byte OPReg, byte OPBit, byte Value){

Appendix B

I/O Information

B.1 I/O Address Map

V III Input/output (IQ)
International Control (19) [International Control (19)
[0000000000000000000000000000000000000
[0000000000000000000000000000000000000
[000000000000024 - 00000000000025] Programmable interrupt controller
[00000000000024 - 00000000000025] Programmable interrupt controller
[000000000000028 - 0000000000000029] Programmable interrupt controller
[000000000000028 - 00000000000029] Programmable interrupt controller
[0000000000002C - 000000000002D] Programmable interrupt controller
[00000000000002C - 0000000000000000000000
[00000000000022 - 00000000000022] Motherboard resources
Interview Controller
[0000000000000000 - 0000000000000000000
[000000000000034 - 000000000000035] Programmable interrupt controller
[000000000000034 - 000000000000035] Programmable interrupt controller
[00000000000038 - 0000000000033] Programmable interrupt controller
[0000000000000038 - 00000000000039] Programmable interrupt controller
[0000000000000000] - 0000000000000000000
[0000000000000000000000000000000000000
[0000000000000000000000000000000000000
[0000000000000000000000000000000000000
[00000000000046 - 00000000000045] System timer
[00000000000042 - 000000000047] Motherboard resources
[0000000000000000 - 0000000000000000000
[000000000000000 - 00000000000000] Standard P3/2 Reyboard
[00000000000004 - 00000000004 - 322 Keyboard
[000000000000000000000000000000000000
[000000000000000000 - 00000000000000000
[000000000000000000000000000000000000
[000000000000000000000000000000000000
[0000000000000000000000000000000000000
[UUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU
[UUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU
[0000000000044 - 00000000000000000000000
[000000000004 - 000000000000000000000000
[0000000000000000000000000000000000000
[0000000000000000000000000000000000000
[000000000000C - 0000000000000000 Programmable interrupt controller
[000000000000AC - 0000000000AD] Programmable interrupt controller
IUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU
IUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU
U000000000B2 - 0000000000B3 Motherboard resources
[UUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU
[U00000000084 - 000000000085] Programmable interrupt controller
U000000000B8 - 00000000000099 Programmable interrupt controller
[U0000000000B8 - 0000000000000B9] Programmable interrupt controller
I0000000000000 - 0000000000000000000000

	[0000000000000067 - 000000000000067] Motherboard resources	
	[00000000000000070 - 0000000000000000] Motherboard resources	
	💻 [000000000000070 - 000000000000077] System CMOS/real time clock	
	[0000000000000070 - 00000000000077] System CMOS/real time clock	
	[0000000000000080 - 00000000000080] Motherboard resources	
	💻 [000000000000092 - 000000000000092] Motherboard resources	
	💻 [00000000000000A0 - 0000000000000A1] Programmable interrupt controller	
	💻 [00000000000000A0 - 000000000000A1] Programmable interrupt controller	
	💻 [00000000000000A4 - 000000000000A5] Programmable interrupt controller	
	💻 [0000000000000A4 - 000000000000A5] Programmable interrupt controller	
	💻 [0000000000000A8 - 000000000000A9] Programmable interrupt controller	
	💻 [0000000000000A8 - 0000000000000A9] Programmable interrupt controller	
	💻 [0000000000000AC - 000000000000AD] Programmable interrupt controller	
	💻 [0000000000000AC - 000000000000AD] Programmable interrupt controller	
	💻 [00000000000000B0 - 000000000000B1] Programmable interrupt controller	
	💻 [00000000000000B0 - 000000000000B1] Programmable interrupt controller	
	[0000000000000082 - 0000000000083] Motherboard resources	
	💻 [0000000000000B4 - 000000000000B5] Programmable interrupt controller	
	💻 [0000000000000B4 - 000000000000B5] Programmable interrupt controller	
	💻 [0000000000000B8 - 000000000000B9] Programmable interrupt controller	
	📃 [0000000000000B8 - 000000000000B9] Programmable interrupt controller	
	💻 [0000000000000BC - 000000000000BD] Programmable interrupt controller	
	💻 [0000000000000BC - 000000000000BD] Programmable interrupt controller	
	[00000000000002C8 - 000000000002CF] Communications Port (COM10)	
	[00000000000002D8 - 000000000002DF] Communications Port (COM9)	
	[0000000000002F8 - 000000000002FF] Communications Port (COM2)	
	[0000000000003F8 - 00000000003FF] Communications Port (COM1)	
	💻 [0000000000004D0 - 000000000004D1] Programmable interrupt controller	
	💻 [0000000000004D0 - 000000000004D1] Programmable interrupt controller	
	💻 [000000000000680 - 0000000000069F] Motherboard resources	
	💻 [0000000000000D00 - 00000000000FFFF] PCI Express Root Complex	
	💻 [00000000000164E - 00000000000164F] Motherboard resources	
	💻 [000000000001800 - 0000000000018FE] Motherboard resources	
	💻 [000000000001854 - 000000000001857] Motherboard resources	
	[00000000000000000 - 000000000000000000	
	[000000000000000000000000000000000000	
	ICO00000000000000000 - 000000000000000000	
	💻 [000000000000F040 - 0000000000F05F] Mobile 6th Generation Intel(R) Processor F	amily I/O SMBUS - 9D23
	[000000000000000000000000000000000000	
	i [000000000000000000 - 0000000000000000	
	i [000000000000000000 - 0000000000000000	
	i [000000000000000000000000000000000000	
	i [000000000000000000 - 0000000000000000	
	a [00000000000000000 - 00000000000000000	
	a [00000000000000000 - 00000000000000000	
	💻 [00000000000FF00 - 0000000000FFFE] Motherboard resources	
	[00000000000FFFF - 0000000000FFFF] Motherboard resources	
	[00000000000FFFF - 0000000000FFFF] Motherboard resources	
	[000000000000FFFF - 0000000000FFFF] Motherboard resources	
> 🔟	Interrupt request (IRQ)	
> 🗎	Memory	

B.2 Memory Address Map

m	Memory
_	[000000000000000000000000000000000000
	[000000008000000 - 00000008FFFFFF] Microsoft Basic Display Adapter
	[00000009000000 - 000000090FFFFF] Microsoft Basic Display Adapter
	[00000009000000 - 0000000DFFFFFF] PCI Express Root Complex
	[0000000091000000 - 0000000910FFFF] High Definition Audio Controller
	[000000091100000 - 0000000911FFFFF] PCI Express Root Port
	[0000000091200000 - 000000009120FFFF] Intel(R) USB 3.0 eXtensible Host Controller - 1.0 (Microsoft)
	[0000000091210000 - 0000000091213FFF] High Definition Audio Controller
	a [000000091214000 - 000000091215FFF] Standard SATA AHCI Controller
	🌇 [000000091218000 - 0000000912180FF] SM Bus Controller
	a [0000000091219000 - 00000000912197FF] Standard SATA AHCI Controller
	a [00000009121A000 - 00000009121A0FF] Standard SATA AHCI Controller
	[000000009121E000 - 000000009121EFFF] PCI Simple Communications Controller
	[0000000C0000000 - 0000000CFFFFFF] Intel(R) HD Graphics 520
	b [0000000D0C00000 - 0000000D0C00653] Unknown device
	b [0000000D0C40000 - 0000000D0C40763] Unknown device
	I0000000D0C50000 - 0000000D0C5076B] Unknown device
	[]0000000D0C70000 - 0000000D0C70673] Unknown device
	20000000DE000000 - 0000000DEFFFFF] Intel(R) HD Graphics 520
	[0000000DF000000 - 0000000DF01FFFF] Intel(R) Ethernet Connection I219-LM
	[0000000DF020000 - 0000000DF02FFFF] High Definition Audio Controller
	[00000000DF030000 - 0000000DF03FFFF] Intel(R) USB 3.0 eXtensible Host Controller - 1.0 (Microsoft)
	[0000000DF040000 - 0000000DF043FFF] High Definition Audio Controller
	[00000000DF044000 - 0000000DF04/FFF] Mobile 6th Generation Intel(R) Processor Family I/O PMC - 9D21
	G [0000000DF048000 - 0000000DF049FF] Standard SAIA AHCI Controller
	[00000000DF04A000 - 0000000DF04A0FF] Mobile bth Generation Intel(K) Processor Family I/O SMBUS - 9D23
	IO00000000F048000 - 00000000F048/FFJ Standard SATA AHCI Controller
	International Control - Contro
	[00000000DFFF0000 - 000000DFFFF1 Mobile otn deneration intel(k) Processor Pamily I/O Thermal subsystem - 9031
	I00000000EDB000000 - 0000000EDEFEFEFI Motherboard resources
	I0000000EE000000 - 0000000EE01EEEE1 Motherboard resources
	00000000FE028000 - 0000000FE028FFF1 Motherboard resources
	00000000FE029000 - 00000000FE029FFF] Motherboard resources

~

-	[00000000000000 - 0000000DFFFFFF] PCI Express Root Complex
-	[000000091000000 - 00000000910FFFF] High Definition Audio Controller
	[000000091100000 - 00000000911FFFF] PCI Express Root Port
ψ.	[000000091200000 - 00000009120FFFF] Intel(R) USB 3.0 eXtensible Host Controller - 1.0 (Microsoft)
-	[0000000091210000 - 0000000091213FFF] High Definition Audio Controller
-	[000000091214000 - 000000091215FFF] Standard SATA AHCI Controller
	[000000091218000 - 0000000912180FF] SM Bus Controller
	[000000091219000 - 00000000912197FF] Standard SATA AHCI Controller
6	[000000009121A000 - 000000009121A0FF] Standard SATA AHCI Controller
	[00000009121E000 - 000000009121EFFF] PCI Simple Communications Controller
87) 1	[00000000C0000000 - 00000000CFFFFFFF] Intel(R) HD Graphics 520
	[0000000D0C00000 - 0000000D0C00653] Unknown device
	[0000000D0C40000 - 0000000D0C40763] Unknown device
	[0000000D0C50000 - 0000000D0C5076B] Unknown device
b	[0000000D0C70000 - 0000000D0C70673] Unknown device
	[0000000DE000000 - 0000000DEFFFFF] Intel(R) HD Graphics 520
	[0000000DF000000 - 0000000DF01FFFF] Intel(R) Ethernet Connection I219-LM
-	[0000000DF020000 - 0000000DF02FFFF] High Definition Audio Controller
Ψ.	[0000000DF030000 - 0000000DF03FFFF] Intel(R) USB 3.0 eXtensible Host Controller - 1.0 (Microsoft)
	[0000000DF040000 - 0000000DF043FFF] High Definition Audio Controller
-	[0000000DF044000 - 0000000DF047FFF] Mobile 6th Generation Intel(R) Processor Family I/O PMC - 9D21
C gi	[0000000DF048000 - 0000000DF049FFF] Standard SATA AHCI Controller
- 10-10	[0000000DF04A000 - 0000000DF04A0FF] Mobile 6th Generation Intel(R) Processor Family I/O SMBUS - 9D23
1	[0000000DF04B000 - 0000000DF04B7FF] Standard SATA AHCI Controller
-	[0000000DF04C000 - 0000000DF04C0FF] Standard SATA AHCI Controller
	[0000000DF04D000 - 0000000DF04DFFF] Mobile 6th Generation Intel(R) Processor Family I/O Thermal subsystem - 9D31
	[0000000DFFE0000 - 0000000DFFFFFF] Motherboard resources
-	[0000000E0000000 - 0000000EFFFFFF] Motherboard resources
-	[0000000FD000000 - 0000000FDABFFF] Motherboard resources
-	[0000000FD000000 - 0000000FE/FFFF] PCI Express Root Complex
-	[0000000FDAC0000 - 0000000FDACFFFF] Motherboard resources
-	[0000000FDAD0000 - 0000000FDADFFF] Motherboard resources
-	[00000000FDAE0000 - 0000000FDAEFFF] Motherboard resources
-	[00000000FDAF0000 - 0000000FDAFFFF] Motherboard resources
-	[0000000FDB00000 - 0000000FDFFFFF] Motherboard resources
-	[0000000FE000000 - 0000000FE01FFFF] Motherboard resources
Ξ	[UUUUUUUFEU28UUU - UUUUUUUFEU28FF] Motherboard resources
Ξ	
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Ξ	[0000000EED00000_000000EED002EE] Ligh provision quest times
-	
-	700000000FFB10000 0000000FFB17FFF111.1.1.1.1.
B.3 IRQ Mapping Chart

Interrupt request (IRQ)	
(ISA) 0x00000000 (00)	System timer
(ISA) 0x00000000 (00)	System timer
(ISA) 0x00000001 (01)	Standard PS/2 Keyboard
🖤 (ISA) 0x0000003 (03)	Communications Port (COM2)
(ISA) 0x00000003 (03)	PCI Express Root Port
(ISA) 0x00000003 (03)	PCI Express Root Port
isA) 0x00000003 (03)	Standard SATA AHCI Controller
👘 (ISA) 0x0000004 (04)	Communications Port (COM1)
(ISA) 0x0000004 (04)	PCI Express Root Port
(ISA) 0x0000004 (04)	PCI Express Root Port
(ISA) 0x00000005 (05)	PCI Express Root Port
ISA) 0x0000007 (07)	PCI Simple Communications Controller
(ISA) 0x0000008 (08)	System CMOS/real time clock
🖤 (ISA) 0x0000000A (10)	Communications Port (COM10)
(ISA) 0x000000B (11)	Communications Port (COM9)
ISA) 0x000000B (11)	Microsoft Basic Display Adapter
(ISA) 0x0000000B (11)	PCI Express Root Port
(ISA) 0x000000C (12)	PS/2 Compatible Mouse
(ISA) 0x000000E (14)	Motherboard resources
ISA) 0x000000E (14)	Unknown device
🍦 (ISA) 0x00000011 (17)	Intel(R) USB 3.0 eXtensible Host Controller - 1.0 (Microsoft)
(ISA) 0x00000019 (25)	High Definition Audio Controller
💻 (ISA) 0x0000036 (54)	Microsoft ACPI-Compliant System
💻 (ISA) 0x0000037 (55)	Microsoft ACPI-Compliant System
💻 (ISA) 0x0000038 (56)	Microsoft ACPI-Compliant System
💻 (ISA) 0x0000039 (57)	Microsoft ACPI-Compliant System
(ISA) 0x000003A (58)	Microsoft ACPI-Compliant System
(ISA) 0x000003B (59)	Microsoft ACPI-Compliant System
(ISA) 0x000003C (60)	Microsoft ACPI-Compliant System
(ISA) 0x000003D (61)	Microsoft ACPI-Compliant System
(ISA) 0x000003E (62)	Microsoft ACPI-Compliant System
(ISA) 0x000003F (63)	Microsoft ACPI-Compliant System
(ISA) 0x0000040 (64)	Microsoft ACPI-Compliant System
(ISA) 0x0000041 (65)	Microsoft ACPI-Compliant System
(ISA) 0x0000042 (66)	Microsoft ACPI-Compliant System
(ISA) 0x0000043 (67)	Microsoft ACPI-Compliant System
(ISA) 0x0000044 (68)	Microsoft ACPI-Compliant System
(ISA) 0x00000045 (69)	Microsoft ACPI-Compliant System

1	(ISA) 0x000001D5 (469)	Microsoft ACPI-Compliant System
-	(ISA) 0x000001D6 (470)	Microsoft ACPI-Compliant System
-	(ISA) 0x000001D7 (471)	Microsoft ACPI-Compliant System
-	(ISA) 0x000001D8 (472)	Microsoft ACPI-Compliant System
-	(ISA) 0x000001D9 (473)	Microsoft ACPI-Compliant System
_	(ISA) 0x000001DA (474)	Microsoft ACPI-Compliant System
	(ISA) 0x000001DB (475)	Microsoft ACPI-Compliant System
-	(ISA) 0x000001DC (476)	Microsoft ACPI-Compliant System
_	(ISA) 0x000001DD (477)	Microsoft ACPI-Compliant System
	(ISA) 0x000001DE (478)	Microsoft ACPI-Compliant System
	(ISA) 0x000001DF (479)	Microsoft ACPI-Compliant System
-	(ISA) 0x000001E0 (480)	Microsoft ACPI-Compliant System
_	(ISA) 0x000001E1 (481)	Microsoft ACPI-Compliant System
_	(ISA) 0x000001E2 (482)	Microsoft ACPI-Compliant System
-	(ISA) 0x000001E3 (483)	Microsoft ACPI-Compliant System
_	(ISA) 0x000001E4 (484)	Microsoft ACPI-Compliant System
_	(ISA) 0x000001E5 (485)	Microsoft ACPI-Compliant System
	(ISA) 0x000001E6 (486)	Microsoft ACPI-Compliant System
_	(ISA) 0x000001E7 (487)	Microsoft ACPI-Compliant System
_	(ISA) 0x000001E8 (488)	Microsoft ACPI-Compliant System
-	(ISA) 0x000001E9 (489)	Microsoft ACPI-Compliant System
-	(ISA) 0x000001EA (490)	Microsoft ACPI-Compliant System
_	(ISA) 0x000001EB (491)	Microsoft ACPI-Compliant System
_	(ISA) 0x000001EC (492)	Microsoft ACPI-Compliant System
_	(ISA) 0x000001ED (493)	Microsoft ACPI-Compliant System
_	(ISA) 0x000001EE (494)	Microsoft ACPI-Compliant System
_	(ISA) 0x000001EF (495)	Microsoft ACPI-Compliant System
	(ISA) 0x000001F0 (496)	Microsoft ACPI-Compliant System
_	(ISA) 0x000001F1 (497)	Microsoft ACPI-Compliant System
_	(ISA) 0x000001F2 (498)	Microsoft ACPI-Compliant System
	(ISA) 0x000001F3 (499)	Microsoft ACPI-Compliant System
-	(ISA) 0x000001F4 (500)	Microsoft ACPI-Compliant System
_	(ISA) 0x000001F5 (501)	Microsoft ACPI-Compliant System
_	(ISA) 0x000001F6 (502)	Microsoft ACPI-Compliant System
	(ISA) 0x000001F7 (503)	Microsoft ACPI-Compliant System
-	(ISA) 0x000001F8 (504)	Microsoft ACPI-Compliant System
_	(ISA) 0x000001F9 (505)	Microsoft ACPI-Compliant System
	(ISA) 0x000001FA (506)	Microsoft ACPI-Compliant System
-	(ISA) 0x000001FB (507)	Microsoft ACPI-Compliant System
-	(ISA) 0x000001FC (508)	Microsoft ACPI-Compliant System
_	(ISA) 0x000001FD (509)	Microsoft ACPI-Compliant System
-	(ISA) 0x000001FE (510)	Microsoft ACPI-Compliant System
	1043 0 000004EE (E44)	the strength in the state

Appendix C

Programming Digital I/O

C.1 DI/O Programming

NanoCOM-SKU utilizes AAEON chipset as its Digital I/O controller.

Below are the procedures to complete its configuration which you can develop customized program to fit your application.

C.2 Digital I/O Register

Table 1 : Embedded BRAM relative register table					
	Default Value	Note			
Index	0x284(Note1)	BRAM Index Register			
Data	0x285(Note2)	BRAM Data Register			
Logical Device Number	0xA2(Note3)	Watch dog Logical Device Number			
Input/Output	0.00(N + 1)	DIO Input/Output Function/Device			
Function and Device Number	0x00 (Note4)	Number			
Output Data		DIO Output Data Function/Device			
Function and Device Number	UXUI(NOLES)	Number			

Table 2 : Digital I/O relative register table				
	Register			
	Option Register	BitNum	Value	Note
GPI0 Pin Status	0x00 (Note6)	0 (Note7)	(Note15)	GPA2
GPI1 Pin Status	0x00 (Note6)	1 (Note8)	(Note16)	GPA3
GPI2 Pin Status	0x00 (Note6)	2 (Note9)	(Note17)	GPA4
GPI3 Pin Status	0x00 (Note6)	3 (Note10)	(Note18)	GPA5
GPO0 Pin Status	0x00 (Note6)	4 (Note11)	(Note19)	GPJ0
GPO1 Pin Status	0x00 (Note6)	5 (Note12)	(Note20)	GPJ1
GPO2 Pin Status	0x00 (Note6)	6 (Note13)	(Note21)	GPJ2
GPO3 Pin Status	0x00 (Note6)	7 (Note14)	(Note22)	GPJ3

C.3 Digital I/O Sample Program

***** ***** // Embedded BRAM relative definition (Please reference to Table 1) #define byte EcBRAMIndex //This parameter is represented from Note1 EcBRAMData //This parameter is represented from Note2 #define byte BRAMLDNReg //This parameter is represented from Note3 #define bvte #define byte BRAMFnDataOReg //This parameter is represented from Note4 #define byte BRAMFnData1Reg //This parameter is represented from Note5 #define void EcBRAMWriteByte(byte Offset, byte Value); EcBRAMReadByte(**byte** Offset); #define byte #define void IOWriteByte(byte Offset, byte Value); IOReadByte(byte Offset); #define bvte // Digital Input Status relative definition (Please reference to Table 2) #define byte DIO0ToDIO7Reg // This parameter is represented from Note6 DIOOBit // This parameter is represented from Note7 #define byte // This parameter is represented from Note8 #define byte DIO1Bit // This parameter is represented from **Note9** #define byte DIO2Bit // This parameter is represented from Note10 #define byte DIO3Bit #define byte DIO4Bit // This parameter is represented from Note11 // This parameter is represented from Note12 #define byte DIO5Bit // This parameter is represented from Note13 #define byte DIO6Bit // This parameter is represented from Note14 #define byte DIO7Bit // This parameter is represented from Note15 #define byte DIO0Val #define byte DIO1Val // This parameter is represented from Note16 // This parameter is represented from Note17 #define byte DIO2Val // This parameter is represented from Note18 #define byte DIO3Val DIO4Val // This parameter is represented from Note19 #define byte // This parameter is represented from Note20 #define byte DIO5Val #define byte DIO6Val // This parameter is represented from Note21 // This parameter is represented from Note22 #define byte DIO7Val

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VOID Main(){

Boolean PinStatus ;

// Procedure : AaeonReadPinStatus

// Input :

Example, Read Digital I/O Pin 3 status

// Output :

InputStatus :

0: Digital I/O Pin level is low

1: Digital I/O Pin level is High

PinStatus = AaeonReadPinStatus(DIO0ToDIO7Reg, DIO3Bit);

// Procedure : AaeonSetOutputLevel

// Input :

Example, Set Digital I/O Pin 6 level

AaeonSetOutputLevel(DIO0ToDIO7Reg, DIO6Bit, DIO6Val);

Boolean AaeonReadPinStatus(byte OptionReg, byte BitNum){

Byte TempByte;

TempByte = ECBRAMReadByte(BRAMFnData1Reg, OptionReg); If (TempByte & BitNum == 0) Return 0; Return 1;

VOID AaeonSetOutputLevel(byte OptionReg, byte BitNum, byte Value){ Byte TempByte;

TempByte = ECBRAMReadByte(BRAMFnData1Reg, OptionReg); TempByte |= (Value << BitNum); ECBRAMWriteByte(OptionReg, BitNum, Value);

}

}

Byte	ECBRAMReadByte(byte FnDataReg, byte OPReg){

VOID ECBRAMWriteByte(byte OPReg, byte OPBit, byte Value){

IOWriteByte(EcBRAMData, BRAMLDNReg);

IOWriteByte(EcBRAMData, BRAMFnDataReg);

IOWriteByte(EcBRAMIndex, 0x13 + OPReg);

IOWriteByte(EcBRAMIndex, 0x10);

IOWriteByte(EcBRAMIndex, 0x11);

IOWriteByte(EcBRAMData, Value);

IOWriteByte(EcBRAMIndex, 0x12); IOWriteByte(EcBRAMData, 0x30);

IOWriteByte(EcBRAMIndex, 0x10); IOWriteByte(EcBRAMData, BRAMLDNReg); IOWriteByte(EcBRAMIndex, 0x11); IOWriteByte(EcBRAMData, FnDataReg);

IOWriteByte(EcBRAMIndex, 0x12); IOWriteByte(EcBRAMData, 0x10);

//Read start

//Write start

IOWriteByte(EcBRAMIndex, 0x13 + OPReg); Return IOReadByte(EcBRAMData, Value);

}

Appendix C – Programming Digital I/O

Appendix D

Note for Users

D.1 Notes for Users – HSIO configurations

PICMG Config 2* Config 1 (Custom BIOS only) PCle No. (Default) PCIe#0 PCle[x1] PCle#1 PCIe[x1] PCIe[x4] PCIe#2 PCle[x1] PCle[x1] PCIe#3 GbE GbE GbE SATA#0 SATA#0 SATA#0 SATA#1 SATA#1 SATA#1

NANOCOM-SKU's HSIO has specific settings as follow.

*Config 2 can be requested through your AAEON contact.

D.2 Notes for Users – Display Mode

	BIOS or DOS	Under OS
UEFI Mode	Single Display only, default is DP via DDI0.	2 display ok
Legacy	Single Display only, default is DP via DDI0.	2 display ok

*NANOCOM-SKU supports either LVDS + DDI0 (DP/HDMI) or option for eDP + DDI0 (DP/HDMI)

**Please reach your AAEON contact for eDP support