USER'S MANUAL



CT-XSL01 Series Mini-ITX Industrial Motherboard

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Prefaces

Revision

Revision	Description	Date
1.0	Manual Released	2016/10/18

Disclaimer

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Environmental Protection Announcement

Do not dispose this electronic device into the trash while discarding. Please recycle to minimize pollution and ensure environment protection.



Safety Precautions

Before installing and using the equipment, please read the following precautions:

- Put this equipment on a reliable surface during installation. Dropping it or letting it fall could cause damage.
- The power outlet shall be installed near the equipment and shall be easily accessible.
- Turn off the system power and disconnect the power cord from its source before making any installation. Be sure both the system and the external devices are turned OFF. Sudden surge
- of power could ruin sensitive components. Make sure the equipment is properly grounded.
- When the power is connected, never open the equipment. The equipment should be opened only by qualified service personnel.
- Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
- Disconnect this equipment from the power before cleaning. Use a damp cloth. Do not use liquid or spray detergents for cleaning.
- Avoid the dusty, humidity and temperature extremes.
- Do not place heavy objects on the equipment.
- If the equipment is not used for long time, disconnect it from the power to avoid being damaged by transient over-voltage.
- The storage temperature shall be above -40°C and below 80°C.
- The computer is provided with a battery-powered real-time clock circuit. There is a danger of explosion if incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer.
- If one of the following situation arises, get the equipment checked be service personnel:
 - The power cord or plug is damaged.
 - Liquid has penetrated into the equipment.
 - The equipment has been exposed to moisture.
 - The equipment does not work well or it cannot work according the user's manual.
 - The equipment has been dropped and damaged.
 - The equipment has obvious signs of breakage.

Technical Support and Assistance

- Visit the C&T Solution Inc website at <u>www.premioinc.com</u> where you can find the latest information about the product.
- 2. Contact your distributor, our technical support team or sales representative for technical support if you need additional assistance. Please have following information ready before you call:
 - Model name and serial number
 - Description of your peripheral attachments
 - Description of your software (operating system, version, application software, etc.)
 - A complete description of the problem
 - The exact wording of any error messages

Conventions Used in this Manual



This indication alerts operators to an operation that, if not strictly observed, may result in severe injury.



This indication alerts operators to an operation that, if not strictly observed, may result in safety hazards to personnel or damage to equipment.



VOT

This indication provides additional information to complete a task easily.

Package Contents

Before installation, please ensure all the items listed in the following table are included in the package.

ltem	Description	Q'ty
1	CT-XSL01 Mini-ITX Industrial Motherboard	1
2	I/O Port Bracket	1
3	SATA Cable	1

Ordering Information

Model No.	Product Description
CT-XSL01	Mini-ITX Industrial Motherboard with LGA 1151 Socket for 6th Gen. Intel® Core™ i7/i5/i3 Processor, Q170 PCH

Chapter 1

Product Introductions

1.1 Overview

CT-XSL01 is a mini-ITX industrial motherboard with LGA1151 socket to support Intel 6th Generation Core i7/i5/i3, Celeron, and Pentium Processor. Two DDR4 SODIMM memory sockets enables a maximum of 32GB. The Intel 9th Generation Graphic integrated with the processor supports three independent displays from the DVI, DisplayPort, HDMI, or LVDS onboard.

The I/O interface of the board gives the users rich connectivity. It supports 2x Gigabit Ethernet, USB3.0/2.0, COM, GPIO, SATA, mSATA, M.2 for various different applications. The mini PCIe and PCIex16 slots also enables flexibility and expandability.



1.1.1 Key Features

- Intel[®] 6th Gen. Core[™] i7 / i5/ i3 Processor (LGA1151) with Q170 PCH
- 2x DDR4 SO-DIMM support up to 32GB
- 2x Intel[®] GbE supporting Wake-on-LAN and PXE
- Supports triple displays from DVI / DisplayPort / HDMI / LVDS
- Supports 1x PCIe x16, 1x Mini PCIe
- Supports 1x mSATA (shared by 1x Mini PCI Express), 1x M.2, and 4x SATA 6.0Gb/s
- Supports up to 5x COM port, 6x USB 3.0, 4x USB 2.0
- 1x 8-bit GPIO (4-in / 4-out)
- Support Intel[®] AMT 11.0
- Supports TPM 2.0 (optional)

1.2 Hardware Specification

System

- Processor: LGA 1151 socket supporting 6th Gen Intel[®] Core[™] i3/i5/i7 Desktop Processor
 - Intel[®] Core[™] i7-6700TE, Quad Core, up to 3.4 GHz
 - Intel[®] Core[™] i5-6500TE, Quad Core, up to 3.3 GHz
 - Intel[®] Core[™] i3-6100TE, Dual Core, 2.7 GHz
- System Chipset: Intel[®] Q170 PCH
- LAN Chipset:
 - 1x Intel[®] I219LM GbE PHY
 - 1x Intel[®] I211AT GbE controller
- Audio Codec: Realtek ALC892 HD Audio Codec
- Memory: 2x 260-Pin DDR4 1866/2133MHz SODIMM
- Max. Size: 32GB
- BIOS: AMI uEFI 128MB SPI flash
- Watchdog:
 - Software Programmable Supports 1~255 sec.
 - System Reset
- TPM: TPM2.0 supported (optional)
- iAMT: Intel[®] AMT 11.0 supported

Display

- Chipset: Intel[®] 9th Generation Graphic
- Interface: 1x DVI-D, 1x 2-ch 24-bit LVDS, 1x
 DisplayPort, 1x HDMI
- Multiple Display: Triple Display

Storage

- SATA: 4 x SATA 6.0Gb/s
- mSATA: 1x mSATA (shared by 1x Mini PCI Express)
- M.2: 1x M.2 (M-Key, Type: 2280)

Expansion

- Mini PCI Express: 1x Full-size Mini PCIe
- PCI Express: 1x PCIe x16

Rear I/O

- Display: 1x DVI-D, 1x DisplayPort, 1x HDMI
- COM: 1x RS-232/422/485
- USB: 4x USB 3.0, 2x USB 2.0
- LAN: 2x RJ45
- Audio: 1x Line-out, 1x Mic-in
- PS/2: 1x PS/2 KB/MS

Internal I/O

- Display: 1x 2-ch 24-bit LVDS
- COM: 4x RS-232
- USB: 2x USB 3.0, 2x USB 2.0
- SATA: 4 x SATA 6.0Gb/s
- Audio: 1x Front panel audio
- GPIO: 1x 8-bit GPIO (4-in/4-out)
- Others:
 - 1x LPC
 - 1x Front panel
 - 1x CPU fan
 - 1x System fan

Operating System

- Windows: Windows 10, Windows 8.1, WES8.1, Windows 7, WES7
- Linux: Linux kernel 4.X

Power

- Power Connector: 2x12-pin and 2x2-pin power connector
- Power Input: ATX power
- Management: ACPI 5.0 compliant

Mechanical & Environment

- Form Factor: Mini-ITX
- Dimension: 170mm x 170mm
- Operating Temp.: 0°C ~ 60°C
- Storage Temp.: -40°C ~ 80°C
- Relative humidity: 10% ~ 90% relative humidity, non-condensing

1.3 Block Diagram



1.4 Board Dimensions





Jumper and Connectors

2.1 Switch & Connector Locations

2.1.1 Top View



2.1.2 Bottom View



2.1.3 Back Panel View



2.2 Connectors Definition

List of Connectors

Connectors Location	Definition
KBMS1_USB910	PS/2 and USB2.0 Ports
HDMI1_DP1	HDMI and DisplayPort Ports
DVI-D1	DVI-D Connector
COM1	Serial Port
LAN1_USB12	LAN1 and USB3.0 Ports
LAN2_USB34	LAN2 and USB3.0 Ports
AUDIO1	Line-out Jack and Microphone Jack
PCIEX16_1	PCI-Express X16 Slot
JLVDS1	LVDS Connector
JBKL1	Panel Power Connector
USB78	Front Panel USB2.0 Header
SATA1, SATA2, SATA3, SATA4	SATA Connector
СОМ2, СОМ3, СОМ4, СОМ5	Serial Port Connector
FP_AUDIO1	Front Panel Audio Header
CPU_FAN1, SYS_FAN1	FAN Connector
F_PANEL1	Front Panel Header
EATXPWR1	Main Power Supply Connector
ATX12V1	Processor Power Supply Connector
JLPC1	Debug Header
SPI1	SPI Header
JDIO1	GPIO Connector
TPM1	TPM Header
MINI_CARD1_1	Mini PCI-Express / mSATA Socket
NGFF1	M.2 Socket
USB56	USB3.0 Connector

KBMS1_USB910: PS/2 and USB2.0 Ports

Connector Type: 6-pin Mini-DIN and dual USB 2.0 ports

Pin	Definition	Pin	Definition	Pin	Definition
1	+5V_DUAL	5	+5V_DUAL	9	GND
2	USB2_D10-	6	USB2_D9-	10	KB_DATA
3	USB2_D10+	7	USB2_D9+	11	MS_DATA
4	GND	8	GND	12	+5V_DUAL
				13	KB_CLK
				14	MS_CLK



HDMI1_DP1: HDMI and DisplayPort Ports

Pin	Definition	Pin	Definition
1	DP_DP0	21	HDMI_DP2
2	GND	22	GND
3	DP_DN0	23	HDMI_DN2
4	DP_DP1	24	HDMI_DP1
5	GND	25	GND
6	DP_DN1	26	HDMI_DN1
7	DP_DP2	27	HDMI_DP0
8	GND	28	GND
9	DP_DN2	29	HDMI_DN0
10	DP_DP3	30	HDMI_CKP
11	GND	31	GND
12	DP_DN3	32	HDMI_CKN
13	DP / HDMI Singnal Switch	33	NC
14	GND	34	NC
15	DP_AUXP	35	HDMI_DDC_CLK
16	GND	36	HDMI_DDC_DATA
17	DP_AUXN	37	GND
18	DP_Hot Plug	38	HDMI_PWR
19	GND	39 HDMI_Hot Plug	
20	DP_PWR		



DVI-D1: DVI-D Connector

Pin	Definition	Pin	Definition
1	DVI_TX2-	16	DVI Hot Plug
2	DVI_TX2+	17	DVI_TX0-
3	GND	18	DVI_TX0+
4	NC	19	GND
5	NC	20	NC
6	DVI_DDC_CLOCK	21	NC
7	DVI_DDC_DATA	22	GND
8	NC	23	DVI_CLK+
9	DVI_TX1-	24	DVI_CLK-
10	DVI_TX1+	C1	NC
11	GND	C2	NC
12	NC	C3	NC
13	NC	C4	NC
14	+5V	C5	GND
15	GND		



COM1: Serial Port

Connector Type: 9-pin D-Sub

Pin	Definition			
1	DCD1			
2	RXD1			
3	TXD1			
4	DTR1			
5	GND			
6	DSR1			
7	RTS1			
8	CTS1			
9	RI1			



LAN1_USB12: LAN1 and USB3.0 Ports

Connector Type: RJ45 port with LEDs and dual USB3.0 ports

		_			
Pin	Definition	Pin	Definition	Pin	Definition
1	+5V	10	+5V	20	LAN1_MDIOP
2	USB2_D1-	11	USB2_D2-	21	LAN1_MDI0N
3	USB2_D1+	12	USB2_D2+	22	LAN1_MDI1P
4	GND	13	GND	23	LAN1_MDI2P
5	USB3_RX1-	14	USB3_RX2-	24	LAN1_MDI2N
6	USB3_RX1+	15	USB3_RX2+	25	LAN1_MDI1N
7	GND	16	GND	26	LAN1_MDI3P
8	USB3_TX1-	17	USB3_TX2-	27	LAN1_MDI3N
9	USB3_TX1+	18	USB3_TX2+		



LAN2_USB34: LAN2 and USB3.0 Ports

Connector Type: RJ45 port with LEDs and dual USB3.0 ports

Pin	Definition	Pin	Definition	Pin	Definition
1	+5V	10	+5V	20	LAN2_MDI0P
2	USB2_D3-	11	USB2_D4-	21	LAN2_MDION
3	USB2_D3+	12	USB2_D4+	22	LAN2_MDI1P
4	GND	13	GND	23	LAN2_MDI2P
5	USB3_RX3-	14	USB3_RX4-	24	LAN2_MDI2N
6	USB3_RX3+	15	USB3_RX4+	25	LAN2_MDI1N
7	GND	16	GND	26	LAN2_MDI3P
8	USB3_TX3-	17	USB3_TX4-	27	LAN2_MDI3N
9	USB3_TX3+	18	USB3_TX4+		



AUDIO1: Line-out Jack (Green) and Microphone Jack (Pink)

Connector Type: 5-pin Phone Jack

Pin	Definition	Pin	Definition
1	GND	22	LINE-OUT_L
2	MIC-IN_L	23	GND
3	GND	24	LINE-OUT_Jack Detect
4	MIC-IN_Jack Detect	25	LINE-OUT_R
5	MIC-IN_R		



PCIEX16_1: PCI-Express X16 Socket

Connector Type: PCI-Express X16 Slot

Pin	Definition	Pin	Definition	Pin	Definition	Pin	Definition
A1	PRSNT#1	A42	GND	B1	+12v	B42	HSOn(6)
A2	+12v	A43	HSIp(6)	B2	+12v	B43	GND
A3	+12v	A44	HSIn(6)	B3	+12v	B44	GND
A4	GND	A45	GND	B4	GND	B45	HSOp(7)
A5	JTAG2	A46	GND	B5	SMCLK	B46	HSOn(7)
A6	JTAG3	A47	HSIp(7)	B6	SMDAT	B47	GND
A7	JTAG4	A48	HSIn(7)	B7	GND	B48	PRSNT#2
A8	JTAG5	A49	GND	B8	+3.3v	B49	GND
A9	+3.3v	A50	RSVD	B9	JTAG1	B50	HSOp(8)
A10	+3.3v	A51	GND	B10	3.3Vaux	B51	HSOn(8)
A11	PWRGD	A52	HSIp(8)	B11	WAKE#	B52	GND
A12	GND	A53	HSIn(8)	B12	RSVD	B53	GND
A13	REFCLK+	A54	GND	B13	GND	B54	HSOp(9)
A14	REFCLK-	A55	GND	B14	HSOp(0)	B55	HSOn(9)
A15	GND	A56	HSIp(9)	B15	HSOn(0)	A56	GND
A16	HSIp(0)	A57	HSIn(9)	B16	GND	B57	GND
A17	HSIn(0)	A58	GND	B17	PRSNT#2	B58	HSOp(10)
A18	GND	A59	GND	B18	GND	B59	HSOn(10)
A19	RSVD	A60	HSIp(10)	B19	HSOp(1)	B60	GND
A20	GND	A61	HSIn(10)	B20	HSOn(1)	B61	GND
A21	HSIp(1)	A62	GND	B21	GND	B62	HSOp(11)
A22	HSIn(1)	A63	GND	B22	GND	B63	HSOn(11)
A23	GND	A64	HSIp(11)	B23	HSOp(2)	B64	GND
A24	GND	A65	HSIn(11)	B24	HSOn(2)	B65	GND
A25	HSIp(2)	A66	GND	B25	GND	B66	HSOp(12)
A26	HSIn(2)	A67	GND	B26	GND	B67	HSOn(12)
A27	GND	A68	HSIp(12)	B27	HSOp(3)	B68	GND
A28	GND	A69	HSIn(12)	B28	HSOn(3)	B69	GND
A29	HSIp(3)	A70	GND	B29	GND	B70	HSOp(13)
A30	HSIn(3)	A71	GND	B30	RSVD	B71	HSOn(13)
A31	GND	A72	HSIp(13)	B31	PRSNT#2	B72	GND
A32	RSVD	A73	HSIn(13)	B32	GND	B73	GND
A33	RSVD	A74	GND	B33	HSOp(4)	B74	HSOp(14)
A34	GND	A75	GND	B34	HSOn(4)	B75	HSOn(14)
A35	HSIp(4)	A76	HSIp(14)	B35	GND	B76	GND
A36	HSIn(4)	A77	HSIn(14)	B36	GND	B77	GND
A37	GND	A78	GND	B37	HSOp(5)	B78	HSOp(15)
A38	GND	A79	GND	B38	HSOn(5)	B79	HSOn(15)
A39	HSIp(5)	A80	HSIp(15)	B39	GND	B80	GND
A40	HSIn(5)	A81	HSIn(15)	B40	GND	B81	PRSNT#2
A41	GND	A82	GND	B41	HSOp(6)	B82	RSVD#2

A11 A12 B1 B11 B12

A1

A82 B82

JLVDS1: LVDS Connector

Connector Type: 2x20-pin pitch1.25mm LVDS connector

Pin	Definition	Pin	Definition
1	VDD_LVDS	2	VDD_LVDS
3	GND	4	GND
5	VDD_LVDS	6	VDD_LVDS
7	LVDS_A0-	8	LVDS_B0-
9	LVDS_A0+	10	LVDS_B0+
11	GND	12	GND
13	LVDS_A1-	14	LVDS_B1-
15	LVDS_A1+	16	LVDS_B1+
17	GND	18	GND
19	LVDS_A2-	20	LVDS_B2-
21	LVDS_A2+	22	LVDS_B2+
23	GND	24	GND
25	LVDS_A_CLK-	26	LVDS_B_CLK-
27	LVDS_A_CLK+	28	LVDS_B_CLK+
29	GND	30	GND
31	DDC_CLK	32	DDC_DATA
33	GND	34	GND
35	LVDS_A3-	36	LVDS_B3-
37	LVDS_A3+	38	LVDS_B3+
39	VDD_+12V	40	NC

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JBKL1: Panel Power Connector

Connector Type: 1X8-pin Wafer, 2.0mm pitch

Pin	Definition	Pin	Definition
1	Backlight Enable	6	GND
2	Backlight Control	7	GND
3	Backlight Power	8	Brightness UP
4	Backlight Power	9	Brightness Down



USB78: Front Panel USB2.0 Header

Pin Header Type: 2X5-pin header, 2.54mm pitch

Pin	Definition	Pin	Definition
1	+5V	2	+5V
3	USB2_D7-	4	USB2_D8-
5	USB2_D7+	6	USB2_D8+
7	GND	8	GND
9	NC	10	GND

2 П	4	6 []	8 	10 П
	3	5	U T	

SATA1, SATA2, SATA3, SATA4: SATA Connector

Pin	SATA1 Definition	Pin	SATA2 Definition	Pin	SATA3 Definition	Pin	SATA4 Definition
1	GND	1	GND	1	GND	1	GND
2	SATA_TXP0	2	SATA_TXP1	2	SATA_TXP2	2	SATA_TXP3
3	SATA_TXN0	3	SATA_TXN1	3	SATA_TXN2	3	SATA_TXN3
4	GND	4	GND	4	GND	4	GND
5	SATA_RXN0	5	SATA_RXN1	5	SATA_RXN2	5	SATA_RXN3
6	SATA_RXP0	6	SATA_RXP1	6	SATA_RXP2	6	SATA_RXP3
7	GND	7	GND	7	GND	7	GND

COM2, COM3, COM4, COM5: Serial Port Connector

Connector Type: Connector Type: 2X5-pin Wafer, 2.0mm pitch

Pin	COM2 Definition	Pin	COM3 Definition	Pin	COM4 Definition	Pin	COM5 Definition
1	DCD2	1	DCD3	1	DCD4	1	DCD5
2	DSR2	2	DSR3	2	DSR4	2	DSR5
3	RXD2	3	RXD3	3	RXD4	3	RXD5
4	RTS2	4	RTS3	4	RTS4	4	RTS5
5	TXD2	5	TXD3	5	TXD4	5	TXD5
6	CTS2	6	CTS3	6	CTS4	6	CTS5
7	DTR2	7	DTR3	7	DTR4	7	DTR5
8	RI2	8	RI3	8	RI4	8	RI5
9	GND2	9	GND3	9	GND4	9	GND5
10	NC		NC		NC		NC



10 	8	6 	4	2 П
Т	Π			Π
9	7	5	3	∆ 1

Pin	Definition	Pin	Definition
1	MIC2-IN_L	2	GND
3	MIC2-IN_R	4	PRESENCE# (Dongle present)
5	LINE2-IN_R	6	MIC2-IN SENSE_RETURN
7	Jack Detect	8	NC
9	LINE2-IN_L	10	LINE2-IN SENSE_RETURN

2	4	6 		10 П
Å	3	5	U T	9

CPU_FAN1, SYS_FAN1: FAN Connector

Pin	Definition
1	GND
2	+12V
3	FAN Tachometer
4	FAN PWM

0	0	0	
			1

F_PANEL1: Front Panel Header

Pin Header Type: 2X5-pin header, 2.54mm pitch

Pin	Definition	Pin	Definition
1	NC	2	NC
3	GND	4	RESET
5	POWER SWITCH	6	GND
7	SUSPEND LED -	8	HDD LED -
9	POWER LED +	10	HDD LED +

2 	4	6 П	8 П	10 П
$\frac{\Delta}{1}$	3	5	7	9

EATXPWR1: Main Power Supply Connector (24pin)

Pin	Definition	Pin	Definition
1	+3.3V	13	+3.3V
2	+3.3V	14	-12V
3	GND	15	GND
4	+5V	16	PS-ON
5	GND	17	GND
6	+5V	18	GND
7	GND	19	GND
8	PWRGD	20	-5V
9	+5VSB	21	+5V
10	+12V	22	+5V
11	+12V	23	+5V
12	+3.3V	24	GND



ATX12V1: Processor Power Supply Connector (4pin)

Pin	Definition
1	GND
2	GND
3	+12V
4	+12V



JLPC1: Debug Header

Pin Header Type: 2X5-pin header, 2.0mm pitch

Pin	Definition	Pin	Definition
1	GND	2	+3.3V
3	LPC_AD3	4	NC
5	LPC_AD2	6	RESET
7	LPC_AD1	8	CLK_24MHz
9	LPC_AD0	10	LPC_FRAME#

2	4 ∏	6 П	8 П	10 П
				•
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	 3	5	U T	9

SPI1: SPI Header

Pin Header Type: 2X4-pin header, 2.0mm pitch

Pin	Definition	Pin	Definition
1	+3.3V	2	GND
3	SPI_CS#	4	SPI_CLK
5	SPI_MISO	6	SPI_MOSI
7	HOLD#	8	NC

2	4	6	
4	3	5	7

JDIO1: GPIO Connector (8 bits)

Connector Type: Connector Type: 2X5-pin Wafer, 2.0mm pitch

Pin	Definition	Pin	Definition
1	+5V	2	GND
3	GPO0	4	GPI0
5	GPO1	6	GPI1
7	GPO2	8	GPI2
9	GPO3	10	GPI3

10	8 П	б П	4 ∏	2 П
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Т 9	Т	5	1 3	Ţ

TPM1: TPM Header

Pin Header Type: 2X10-pin header, 2.0mm pitch

Pin	Definition	Pin	Definition
1	CLK_24MHz	2	GND
3	LPC_FRAME#	4	NC
5	RESET	6	NC
7	LPC_AD3	8	LPC_AD2
9	+3.3V	10	LPC_AD1
11	LPC_AD0	12	GND
13	NC	14	NC
15	+3.3V_DUAL	16	SERIRQ
17	GND	18	GND
19	LPC_PD#	20	NC

2	4	6 П	8 П	10 П	12 	14 П	16 П	18 П	20 П
	3	5	U T	9	U 11	 13	 15	 17	 19

MINI_CARD1_1: Mini PCI-Express / mSATA Socket

Pin	Definition	Pin	Definition
1	WAKE#	27	GND
2	+3.3VSB	28	+1.5V
3	NC	29	GND
4	GND	30	SMB_CLK
5	NC	31	MINIPCIE_TXN (SATA_TXN4)
6	+1.5V	32	SMB_DATA
7	CLKREQ#	33	MINIPCIE_TXP (SATA_TXP4)
8	NC	34	GND
9	GND	35	GND
10	NC	36	USB2_D11-
11	MINIPCIE_CLKN	37	GND
12	NC	38	USB2_D11+
13	MINIPCIE_CLKP	39	+3.3V
14	NC	40	GND
15	GND	41	+3.3V
16	NC	42	NC
17	NC	43	GND
18	GND	44	NC
19	NC	45	NC
20	NC	46	NC
21	GND	47	NC
22	RESET	48	+1.5V
23	MINIPCIE_RXN (SATA_RXN4)	49	NC
24	+3.3V	50	GND
25	MINIPCIE_RXP (SATA_RXP4)	51	Presence Detection
26	GND	52	+3.3V



NGFF1: M.2 Socket

Pin	Definition	Pin	Definition
1	GND	2	+3.3V
3	GND	4	+3.3V
5	NC	6	NC
7	NC	8	NC
9	GND	10	NC
11	NC	12	+3.3V
13	NC	14	+3.3V
15	GND	16	+3.3V
17	NC	18	+3.3V
19	NC	20	NC
21	GND	22	NC
23	NC	24	NC
25	NC	26	NC
27	GND	28	NC
29	NC	30	NC
31	NC	32	NC
33	GND	34	NC
35	NC	36	NC
37	NC	38	SATA_DEVSLP
39	GND	40	NC
41	SATA_RXP5	42	NC
43	SATA_RXN5	44	NC
45	GND	46	NC
47	SATA_TXN5	48	NC
49	SATA_TXP5	50	RESET
51	GND	52	M2_CLKREQ#
53	M2_CLKN	54	WAKE#
55	M2_CLKP	56	NC
57	GND	58	NC
59	NC	60	NC
61	NC	62	NC
63	NC	64	NC
65	NC	66	NC
67	NC	68	PCH_SUSCLK
69	SATA/PCIE_Detection	70	+3.3V
71	GND	72	+3.3V
73	GND	74	+3.3V
75	GND	76	



USB56: USB3.0 Connector

Connector Type: 2X10 20-pin box header, 2.0mm pitch

Pin	Definition	Pin	Definition
1	+5V_DUAL	11	USB2_D6+
2	USB3_RX5-	12	USB2_D6-
3	USB3_RX5+	13	GND
4	GND	14	USB3_TX6+
5	USB3_TX5-	15	USB3_TX6-
6	USB3_TX5+	16	GND
7	GND	17	USB3_RX6+
8	USB2_D5-	18	USB3_RX6-
9	USB_D5+	19	+5V_DUAL
10	NC	20	NC

11	20
00000	00000
	<u> </u>
1	10

2.3 Jumpers Definition

When setting the jumpers, ensure that the jumper caps are placed on the correct pins. When the jumper cap is placed on both pins, the jumper is **short**. If you remove the jumper cap, or place the jumper cap on just one pin, the jumper is **open**. Refer to below for examples of the 2-pin and 3-pin jumpers when they are short (on) and open (off).



List of Jumpers

Connectors Location	Definition
JLVDS2	Backlight Power Select Header
JPSON1	AT / ATX Mode Select Header
CLCMOS1	Clear CMOS Select Header
JSATA1	Mini PCI-Express / mSATA Select Header

JLVDS2: Backlight Power Select Header

Pin Header Type: 2X3-pin header, 2.0mm pitch

Pin	Definition	2 П	4	6 П
1-3 (Short)	+5V			
3-5 (Short)	+3.3V			
3-4 (Short)	+12V	$\stackrel{\square}{\Delta}_1$	$\frac{1}{3}$	∐ 5

JPSON1: AT / ATX Mode Select Header

Pin Header Type: 1X3-pin header, 2.54mm pitch

Pin	Definition
1-2 (Short)	ATX Mode
2-3 (Short)	AT Mode



CLCMOS1: Clear CMOS Select Header

Pin Header Type: 1X3-pin header, 2.0mm pitch

Pin	Definition
1-2 (Short)	Normal
2-3 (Short)	Clear CMOS



JSATA1: Mini PCI-Express / mSATA Select Header

Pin Header Type: 1X3-pin header, 2.0mm pitch

Pin	Definition
1-2 (Short)	Auto
2-3 (Short)	mSATA
NC	Mini PCI-Express



Chapter 3

Features & Interface

3.1 General Purpose Input Output (GPIO)

GPI and GPO pins may be implemented as GPIO. GPI and GPO pins may be implemented as SDIO.

Signal	I/O	Description
GPO[0:3]	0	General purpose output pins. Upon a hardware reset, these outputs should be low.
GPI[0:3]	I	General purpose input pins. Pulled high internally on the Module.

3.1.1 GPIO Configuration

Board Design

Pin#	GPIO#	Default Configuration
1	—	+5V
2	—	GND
3	SIO_OUT0	GPO0
4	SIO_IN0	GPI0
5	SIO_OUT1	GPO1
6	SIO_IN1	GPI1
7	SIO_OUT2	GPO2
8	SIO_IN2	GPI2
9	SIO_OUT3	GPO3
10	SIO_IN3	GPI3

Notes

1. Output pin default setting is "HIGH"

The GPIO function is provided by Nuvoton NCT6106D, and it can be accessed through its GPIO index/data port. To access the GPIO register, write index to the index port, and then read/write from/to data port. The configuration on the CT-XSL01 is described as below.

SIO_CONFIG_INDEX_PORT	0x2Eh
SIO_CONFIG_DATA_PORT	0x2Fh

Registers Description

GPIO I/O Select

I/O Register: 0xEC

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit O
GPO3	GPO2	GPO1	GPO0	GPI3	GPI2	GPI1	GPI0

Note.

Bit X = 0 means Input Mode

Bit X = 1 means Output Mode

The GPIO function is provided by Nuvoton NCT6106D, and it can be accessed through its GPIO index/data port. To access the GPIO register, write index to the index port, and then read/write from/to data port. The configuration on the CT-XSL01 is described as below.

GPIO I/O Select

Data Register: 0xED

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit O
GPO3	GPO2	GPO1	GPO0	GPI3	GPI2	GPI1	GPI0

Note.

Bit X = 0 outputs 0 when in output mode Bit X = 1 outputs 1 when in output mode

3.2 Watchdog Timer

3.2.1 Board Design

The Watchdog Timer (WDT) is implemented by Nuvoton NCT6106D.

Register	Address
WDT Base Address	0xF0h

3.2.2 Psuedo Code

Enter_Config

Step1: outportb(0x2e, 0x87);

Step2: outportb(0x2e, 0x87);

Select Logical Device: 8

Step1: outportb(0x2e, 0x07);

Step2: outportb(0x2e, 0x07);

Set WDT Time Unit (Second Unit)

Step1: outportb(0x2e, 0xf0);	
Step2: buf2 = inportb(0x2f) & 0xf4;	//clear "Select Watchdog Timer I count mode"
Step3: buf2 = 0x02;	//Enable the Watchdog Timer I output low pulse to the KBRST# pin
Step4: // buf2	//Bit3 = (1:Minute Mode/0:Second Mode)
Step5: outportb (0x2f, buf2);	//Write back

Set WDT Time Value

Step1: outportb (0x2e, 0xf1)	//Set watch dog time value
Step2: outportb (0x2f, Time)	//Set watch dog time value

Exit_Config

Г

Step1: outportb(0x2e, 0xaa);

Watchdog Timer:

Logical Device: 8

CR F0h. Watchdog Timer I (WDT1) and KBC P20 Control Mode Register

Location: Address F0h Attribute: Read/Write Power Well: VCC Reset by: LRESET# or PWROK Default: 00h Size: 8 bits

BIT	READ / WRITE	DESCRIPTION
7/5	Reserved.	
4	R/W	Watchdog Timer count mode is 1000 times faster. 0: Disable. 1: Enable. (If bit-3 is 0, the count mode is 1/1000 second mode.) (If bit-3 is 1, the count mode is 1/1000 minutes mode.)
3	R/W	Select Watchdog Timer count mode. 0: Second Mode. 1: Minute Mode.
2	R/W	Enable the rising edge of KBC reset (P20) to issue a time-out event. 0: Disable. 1: Enable.
1	R/W	Disable / Enable the Watchdog Timer output low pulse to the KBRST# pin (PIN59) 0: Disable. 1: Enable.
0	Reserved.	

CR F1h. Watchdog Timer I (WDT1) Counter Register

Location: Address F1h Attribute: Read/Write Power Well: VCC Reset by: LRESET# or PWROK Default: 04h Size: 8 bits

BIT	READ / WRITE	DESCRIPTION
7/0	R/W	Watchdog Timer I Time-out value. Writing a non-zero value to this register causes the counter to load the value into the Watch Dog Counter and start counting down. If CR F2h, bits 7 and 6 are set, any Mouse Interrupt or Keyboard Interrupt event causes the previously-loaded, non-zero value to be reloaded to the Watch Dog Counter and the count down resumes. Reading this register returns the current value in the Watch Dot Counter, not the Watch Dog Timer Time-out value. 00h: Time-out Disable 01h: Time-out occurs after 5.03×10^7 CLKIN cycle time, by analogy. $(5.03 \times 10^7 \times (1/48 \text{MHz}) = 1.046\text{s})$



BIOS Setup

4.1 BIOS Introduction

The system BIOS software is stored on EEPROM. The BIOS provides an interface to modify the configuration. When the battery is removed, all the parameters will be reset.

BIOS Setup

Power on the embedded system and by pressing or <F2> immediately allows you to enter the setup screens. If the message disappears before you respond and you still wish to enter the Setup, restart the system by turning it OFF and ON or pressing the RESET button.

You may also restart the system by simultaneously pressing <Ctrl>, <Alt>, and <Delete> keys.

Control Keys				
<←> <→>	Select Screen			
<↑> <↓>	Select Item			
<enter></enter>	Select			
<page +="" up=""></page>	Increases the numeric value or makes changes			
<page -="" down=""></page>	Decreases the numeric value or makes changes			
<f1></f1>	General Help			
<f2></f2>	Previous Value			
<f3></f3>	Load Optimized Defaults			
<f4></f4>	Save Configuration and Exit			
<tab></tab>	Select Setup Fields			
<esc></esc>	Exit BIOS Setup			

Main Setup

The main menu lists the setup functions you can make changes to. You can use the arrow keys ($\uparrow \downarrow$) to select the item. The on-line description of the highlighted setup function is displayed at the bottom of the screen.

General Help <F1>

The BIOS setup program provides a General Help screen. You can call up this screen from any menu by simply pressing <F1>. The Help screen lists the appropriate keys to use and the possible selections for the highlighted item. Press <Esc> to exit the Help screen.

4.2 Main Setup

Press to enter BIOS CMOS Setup Utility. The Main setup screen is showed as following when the setup utility is entered. System Date/Time is set up in the Main Menu.

Main Advanced Chipset Security	Boot Save & Exit	megatrenus, Inc.
Main Advanced Chipset Security BIOS Information BIOS Vendor Core Version Compliancy Project Version Build Date and Time System Date System Time	American Megatrends 5.11 UEFI 2.4; PI 1.3 SLACOOOSO60V111 1.11 x64 03/23/2016 18:32:13 [Thu 01/01/2015] [00:05:15]	Set the Date. Use Tab to switch between Date elements. ++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version 2.17.1255. Cr	pouright (C) 2016 American Mu	egatrends. Inc.

4.2.1 System Date

Set the system date. Please use <Tab> to switch between data elements.

4.2.2 System Time

Set the system time. Please use <Tab> to switch between time elements.

4.3 Advanced Setup

Select the Advanced tab from the setup screen to enter the Advanced BIOS Setup screen. You can select any of the items in the left frame of the screen, such as Chipset configuration, to go to the sub menu for that item. You can display an Advanced BIOS Setup option by highlighting it using the <Arrow> keys. All Advanced BIOS Setup options are described in this section. The Advanced BIOS Setup screen is shown below. The sub menus are described on the following pages.

	Aptio Setup Utility – Copyright (C) 2016 American Main Advanced Chipset Security Boot Save & Exit	Megatrends, Inc.
· · · · · · · · · · · · · · · · · · ·	Trusted Computing ACPI Settings AMT Configuration PCH-FW Configuration NCT6106D Super IO Configuration NCT6106D HW Monitor S5 RTC Wake Settings Serial Port Console Redirection CPU Configuration Intel TXT Information SATA Configuration NATA Configuration Network Stack Configuration CSM Configuration USB Configuration	Trusted Computing Settings ++: 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. Copyright (C) 2016 American M	egatrends, Inc.

Take caution when changing the settings of the Advanced menu items. Incorrect field values can cause the system to malfunction.

4.3.1 Trusted Computing

Aptio Setup Utility Advanced	y – Copyright (C) 2016 A	merican Megatrends, Inc.
Configuration Security Device Support NO Security Device Found	[Enable]	Enables or Disables BIOS support for security device. O.S. will not show Security Device. TCG EFI protocol and INT1A interface will not be available.
		<pre>++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
Version 2.17.1255	. Copyright (C) 2016 Ame	erican Megatrends, Inc.

Security Device Support

This item allows you to enable or disable BIOS support for security device.

4.3.2 ACPI Settings

Aptio Setup Ut Advanced	ility – Copyright (C) 2016 Americ	an Megatrends, Inc.
ACPI Settings		Enables or Disables System ability to Hibernate (OS/S4 Sleep State). This option may
Enable Hibernation	[Enabled] [S3 (Suspend to PAM)]	be not effective with some OS.
S3 Video Repost	[Disabled]	
PCIE# Wake from S5	[Disabled]	
		++: Select Screen
		Enter: Select
		+/−: Change Opt.
		F1: General Help F2: Previous Values
		F3: Optimized Defaults
		F4: Save & Exit
		ESC. EXIC
Version 9.17	1955 Conunight (C) 2016 Amonicon	Norothando Tao
VERSION 2.17.	1255, Copyright (C) 2016 Hillerican	Megatrenus, Inc.
Enable Hibernation		
Enable or Disable system	ability to Hibernation.	
, Configuration options: [Er	nable] [Disable]	
CPI Sleep State		

Select the highest ACPI sleep state the system will enter the SUSPEND button is press. Configuration options: [Suspend Disable] [S3 only(suspend to RAM)]

S3 Video Repost

Enable or disable S3 video repost Configuration options: [Disabled] [Enabled]

PCIE# Wake from S5

Enable or disable PCIE wake the system from S5. Configuration options: [Disabled] [Enabled]

4.3.3 AMT Configuration

Aptic Advanced) Setup Utility – Copyright (C) 20	016 American Megatrends, Inc.
Intel AMT Un-Configure ME	[Enabled] [Disabled]	Enable/Disable Intel (R) Active Management Technology BIOS Extension. Note : iAMT H/W is always enabled. This option just controls the BIOS extension execution. If enabled, this requires additional firmware in the SPI device ++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Vens	ion 2.17.1255. Copyright (C) 201	6 American Megatrends, Inc.

Intel AMT

Enable or Disable Intel AMT BIOS extension Configuration options: [Disabled] [Enabled]

Un-configure ME

Un-configure ME with Password Configuration options: [Disabled] [Enabled]

4.3.4 PCH FW Configuration

Aptio Setup Utility Advanced	– Copyright (C) 2016 American	Megatrends, Inc.
ME FW Version ME Firmware Mode ME Firmware Type ME Firmware SKU PTT Capability / State NFC Support ME State	11.0.0.1202 Normal Mode Full Sku Firmware Corporate SKU 1 / 0 Disabled [Enabled]	++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version 2.17.1255.	Copyright (C) 2016 American M	egatrends, Inc.

4.3.5 Super IO Configuration

This setting allows you to select options for the NCT6106D Super IO Configuration, and change the value of the selected option.

Aptio Setup Utility - Advanced	– Copyright (C) 2016 Americar	n Megatrends, Inc.
NCT6106D Super IO Configuration		Set Parameters of Serial Port
Super IO Chip > Serial Port 1 Configuration > Serial Port 2 Configuration > Serial Port 3 Configuration > Serial Port 4 Configuration > Serial Port 5 Configuration > Digital I/O Configuration	NCT6106D	
WatchDog Count Mode WatchDog TimeOut Value Deep S5 Support	[Second] O [Disabled]	<pre>++: Select Screen 1↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
Version 2.17.1255. (Copyright (C) 2016American M	legatrends, Inc.

Serial Port 1 Configuration

Aptio Setup Utility - Advanced	· Copyright (C) 2013 American	n Megatrends, Inc.
Serial Port 1 Configuration		Enable or Disable Serial Port
Serial Port Device Settings	[Enabled] IO=3F8h; IRQ=4;	(601)
Change Settings	[Auto]	
Device Type Select	[RS232]	
		++: Select Screen
		Enter: Select
		F1: General Help
		F2: Previous Values F3: Optimized Defaults
		F4: Save & Exit ESC: Exit
Version 2.16.1242. C	Copyright (C) 2013 American M	legatrends, Inc.

Serial Port

This item allows you to enable or disable serial port.

Change Settings

This item allows you to change the address & IRQ settings of the specified serial port.

Device Type Select

Change the Serial interface. Select <RS232> ,<RS422 Full Duplex> or <RS485 Half Duplex> interface.

Serial Port 2 Configuration



Serial Port

This item allows you to enable or disable serial port.

Change Settings

This item allows you to change the address & IRQ settings of the specified serial port.

Device Type Select

Change the Serial interface. Select <RS232> ,<RS422 Full Duplex> or <RS485 Half Duplex> interface.

Serial Port 3 Configuration



Serial Port

This item allows you to enable or disable serial port.

Change Settings

This item allows you to change the address & IRQ settings of the specified serial port.

Device Type Select

Change the Serial interface. Select <RS232> ,<RS422 Full Duplex> or <RS485 Half Duplex> interface.

Serial Port 4 Configuration

Aptio Setup Utility – (Advanced	Copyright (C) 2013 American	Megatrends, Inc.
Serial Port 4 Configuration		Enable or Disable Serial Port
Serial Port Device Settings	[Enabled] IO=2E8h; IRQ=7;	(001)
Change Settings	[Auto]	
Device Type Select	[RS232]	
		++: Select Screen 14: Select Item Enter: Select
		+/-: Change Opt.
		F2: Previous Values
		F3: Optimized Defaults F4: Save & Exit
		ESC: Exit

Serial Port

This item allows you to enable or disable serial port.

Change Settings

This item allows you to change the address & IRQ settings of the specified serial port.

Device Type Select

Change the Serial interface. Select <RS232> ,<RS422 Full Duplex> or <RS485 Half Duplex> interface.

Serial Port 5 Configuration

Aptio Setup Utility - Advanced	Copyright (C) 2013 American	Megatrends, Inc.
Serial Port 5 Configuration		Enable or Disable Serial Port
Serial Port Device Settings	[Enabled] IO=2F0h; IRQ=7;	(661)
Change Settings	[Auto]	
Device Type Select	[RS232]	
		<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 2.16.1242. Co	pyright (C) 2013 American M	egatrends, Inc.

Serial Port

This item allows you to enable or disable serial port.

Change Settings

This item allows you to change the address & IRQ settings of the specified serial port.

Device Type Select

Change the Serial interface. Select <RS232> ,<RS422 Full Duplex> or <RS485 Half Duplex> interface.

Watch Dog Function

This setting allows you to setup the system watch-dog timer, a hardware timer that generates a reset when the software that it monitors does not respond as expected each time the watch dog polls it.

□ Watch Dog Timer Count Mode

Change the Watch dog mode. Select <Second Mode> or <Minute Mode> mode.

□ Watch Dog Timer Time Out Value

User can set a value in the range of 0 to 255.

4.3.6 Hardware Monitor

These items display the current status of all monitored hardware devices/ components such as voltages and temperatures.

Aptio Setup Utility Advanced	y – Copyright (C) 2016 Am	erican Megatrends, Inc.
Advanced Pc Health Status > Smart Fan System Temperature CPU Temperature (PECI) SYS_FAN1 Speed CPU_FAN1 Speed VCORE +12V +5V SV_Dual AVCC 3VSB 3VCC VBAT	: +35 C : +61 C : N/A : N/A : +0.944 V : +12.672 V : +5.135 V : +4.978 V : +3.312 V : +3.264 V : +3.264 V : +3.072 V	Smart Fan Function Page ++: Select Screen 11: Select Item
		Hoter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit

Smart Fan

This setting allows you to setup the system watch-dog timer, a hardware timer that generates a reset when the software that it monitors does not respond as expected each time the watch dog polls it.

□ Watch Dog Timer Count Mode

Change the Watch dog mode. Select <Second Mode> or <Minute Mode> mode.

□ Watch Dog Timer Time Out Value

User can set a value in the range of 0 to 255.

4.3.7 Serial Port Console Redirection

Aptio Setup Utilit Advanced	y – Copyright (C) 2016 America	n Megatrends, Inc.
COM1 Console Redirection ▶ Console Redirection Settings	[Disabled]	Console Redirection Enable or Disable.
		<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 2.17.1255	. Copyright (C) 2016 American	Megatrends, Inc.

Console Redirection

These items allows you to enable or disable COM1~COM5 console redirection.

4.3.8 CPU Configuration

Aptio Setup Utility - Advanced	Copyright (C) 2016 American	Megatrends, Inc.
CPU Configuration	4	Number of cores to enable in
Intel(R) Core(IM) i5-6500IE CPU @ 2	30GHz	cuch processor puckage.
CPU Signature	506E3	
Microcode Patch	70	
Max CPU Speed	2300 MHz	
Min CPU Speed	800 MHz	
CPU Speed	2300 MHz	
Processor Cores	4	
Hyper Threading Technology	Not 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.
CPU C8 state	Supported	F1: General Help
CPU C9 state	Not Supported	F2: Previous Values
CPU C10 state	Not Supported	F3: Optimized Defaults
LA Data Oralia		F4: Save & Exit
L1 Data Cache	32 KB X 4	ESU: EXIT
Li code Cache		

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Chapter 4: BIOS Setup

Hyper-Threading [Enabled]

Enabled or Disabled the hyper threading of Intel CPU Configuration options: [Disabled][Enabled] This depends on CPU sku.

Active Processor Core [All]

Number of Cores to enable in each processor package Configuration options: [all] [1][2][3][4] This depends on CPU sku.

Intel Virtualization Technology [Enabled]

When enabled, a VWM can utilize the additional hardware capabilities provided by vanderpool Technology Configuration options: [Disabled][Enabled]

Intel[®] SpeedStep™ [Enabled]

Allow more than two frequency ranges to be supported. Configuration options: [Disabled][Enabled]

Turbo mode [Enabled]

Enable or disable Turbo mode Configuration options: [Enabled] [Disabled]

CPU C states [Enabled]

Enable or disable CPU C states Configuration options: [Enabled] [Disabled]

Enhanced C-states [Enabled]

Enable or disable C1E. When enabled, CPU will switch to minimum speed when all cores enter C-state. Configuration options: [Enabled] [Disabled]

Package C state limit [Auto]

Package C state limit Configuration options: [C0/C1][C2][C3][C6][C7][C7s][C8][Auto]

Intel TXT(LT) Support [Disabled]

Enable or disable Intel TXT support Configuration options: [Enabled] [Disabled]

SW Guard Extensions(SGX) [software controlled]

Enable or disables Guard Extensions Configuration options:[Disabled][Enabled][Software Controlled]

Select owner EPOCH input type [No change in owner EPOCHs]

After user enters EPOCH values manually, the values will not be visible for security reasons Configuration options: [No change in owner EPOCHs][change to new random owner EPOCHs][Manual user defined owner EPOCHs]

4.3.9 Intel TXT Information

Display Intel TXT information

Aptio Setup Utility – Advanced	Copyright (C) 2016 American	Megatrends, Inc.
Intel TXT Information		
Chipset BiosAcm Chipset Txt Cpu Txt Error Code Class Code Major Code Minor Code	Production Fused Production Fused Supported None None None None None	<pre> ++: Select Screen f↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
Version 2.17.1255. Co	pyright (C) 2016 American Mo	egatrends, Inc.

4.3.10 SATA Configuration

Aptio Setup Utilit	y – Copyright (C) 2016 f	American Megatrends, Inc.
SATA Controller(s) SATA Mode Selection	[Enabled] [AHCI]	Enable or disable SATA Device.
Serial ATA Port 1 Software Preserve Port 1 Serial ATA Port 2 Software Preserve Port 2 Serial ATA Port 3 Software Preserve Port 3 Serial ATA Port 4 Software Preserve Port 4 MiniCard SATA Port Software Preserve MiniCard Port M.2 SATA Port Software Preserve M.2 Port	Empty Unknown [Enabled] Empty Unknown [Enabled] Empty Unknown [Enabled] Empty Unknown [Enabled] Empty Unknown [Enabled] Empty Unknown [Enabled]	<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>
 SATA Controller [Enabled Enable or Disable SATA de Configuration options: [E SATA Mode Selection [A Determines how SATA co Configuration options: [A 	1] evice nabled][Disabled] HCI] ntroller operate HCI][BAID]	
comparation options. [/		
Serial – ATA Port 1 This item allows you to e	nable or disable Ser	ial-ATA Port 1.
Serial – ATA Port 2 This item allows you to e	nable or disable Ser	ial-ATA Port 2.
Serial – ATA Port 3 This item allows you to e	nable or disable Ser	ial-ATA Port 3.
Serial – ATA Port 4 This item allows you to e	nable or disable Ser	ial-ATA Port 4.
MiniCard SATA Port		ATA

This item allows you to enable or disable mSATA.

M.2 SATA Port

This item allows you to enable or disable M.2 SATA Port.

4.3.11 Network Stack Configuration

Aptio S Advanced	Setup Utility – Copyright (C) 2016 Americar	Megatrends, Inc.
Network Stack	[Disabled]	Enable/Disable UEFI Network Stack
		<pre>++: Select Screen 1↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
Versio	on 2.17.1255.Copyright (C) 2016 American M	legatrends, Inc.

Network Stack [Disabled] Enabled or disabled UEFI Network Stack Configuration options: [Disabled] [Enabled]

4.3.12 Compatibility Support Module Configuration

Aptio Setup Utility – (Advanced	Copyright (C) 2016 American	Megatrends, Inc.
Compatibility Support Module Configur	ration	Enable/Disable CSM Support.
CSM Support	[Enabled]	
CSM16 Module Version	07.79	
Boot option filter Option ROM execution	[UEFI and Legacy]	
Network Storage Video Other PCI devices	[UEF1] [UEF1] [UEF1] [UEF1]	<pre>++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
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CSM Support

Enabled or disabled CSM Support Configuration options: [Disabled] [Enabled]

Boot option filter

This option controls Legacy/UEFI ROMs Priority Configuration options: [UEFI and Legacy] [Legacy Only][UEFI Only]

Network [UEFI]

Control the execution of UEFI and Legacy PXE OpROM Configuration options: [Do not launch] [UEFI][Legacy]

Storage [UEFI]

Control the execution of UEFI and Legacy Storage OpROM Configuration options: [Do not launch] [UEFI][Legacy]

Video [UEFI]

Control the execution of UEFI and Legacy Video OpROM Configuration options: [Do not launch] [UEFI][Legacy]

Other PCI devices [UEFI]

Determines OpROM execution policy for devices other than Network, Storage, or Video. Configuration options: [Do not launch] [UEFI][Legacy]

4.3.13 NVMe Configuration



4.3.14 USB Configuration

Aptio Setup Utility - Advanced	Copyright (C) 2016 American	Megatrends, Inc.
USB Configuration		Enables Legacy USB support. AUTO ontion disables legacy
USB Module Version	13	support if no USB devices are connected. DISABLE option will
USB Controllers: 1 XHCI		keep USB devices available only for EFI applications.
USB Devices: 1 Drive, 1 Keyboard		
Legacy USB Support XHCI Hand–off USB Mass Storage Driver Support	(Enabled) [Enabled] [Enabled]	
Mass Storage Devices:		++: Select Screen
JetFlashTranscend 16GB 8.07	[Auto]	†∔: Select Item Enter: Select
		+/−: Change Opt. F1: General Help
		F2: Previous Values F3: Optimized Defaults
		F4: Save & Exit ESC: Exit
Version 2.17.1255. Co	pyright (C) 2016 American M	egatrends, Inc.

Legacy USB Support [Enabled]

Enabled Legacy USB Support. Auto Option disables legacy support if no USB devices are connected. Disabled option will keep USB devices available only for EFI application. Configuration options: [Disabled] [Enabled][Auto]

XHCI Hand-off [Enabled]

This is a workaround for OSes without XHCI hand-off support. This XHCI ownership change should be claimed by XHCI drivers Configuration options: [Disabled] [Enabled]

USB Mass storage Driver Support[Enabled]

Enabled or Disabled USB Mass storage driver support. Configuration options: [Disabled] [Enabled]

JetFlashTranscend 16GB 8.07 [Auto]

Mass storage device emulation type. 'Auto' enumerates devices according to their media format. Optical drives are emulated as 'CDROM', drives with no media will be emulated according to a drive type.

Configuration options: [Auto] [Floopy][Forced FDD][hard Disk][CD-ROM]

4.4 Chipset

Main Advance	Aptio Setup Utility – Co d Chipset Security Bo	opyright (C) oot Save &) 2016 Americar Exit	Megatrends, Inc.
▶ System Agent (▶ PCH-IO Configu	SA) Configuration ration			System Agent (SA) Parameters ++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
	Version 2.17.1255. Copy	yright (C) 3	2016 American M	legatrends, Inc.

4.4.1 System Agent Configuration

This section provides configure options for on-graphic, PEG port, and installed memory.

Aptio Setup Chipset	Utility – Copyright (C) 2016 A	merican Megatrends, Inc.
System Agent Bridge Name SA PCIe Code Version VT-d	Skylake 1.8.0.0 Supported	VT-d capability
VT-d	[Enabled]	
 Graphics Configuration PEG Port Configuration Memory Configuration 		++: Select Screen f1: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version 2.1	17.1255. Copyright (C) 2016 Ame	rican Megatrends, Inc.

Graphic Configuration

This section provides onboard graphics-related configuration options.

Aptio Setup Utility - Chipset	- Copyright (C) 2016 An	merican Megatrends, Inc.
Graphics Configuration		Select which of IGFX/PEG Graphics device should be Primary Display.
Primary Display Internal Graphics DVMT Pre-Allocated DVMT Total Gfx Mem ▶ LCD Control	[Auto] [Auto] [32M] [256M]	
		<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>
Version 2.17.1255. (Copyright (C) 2016 Amer	rican Megatrends, Inc.

Primary Display

Select which of IGFX/PEG/PCI graphic device should be primary display or select SG for switchable GFx.

Configuration options: [Auto] [IGFX][PEG][PCIE]

□ Internal Graphics

Keep IGFX enabled based on the setup options Configuration options: [Auto] [disabled][enabled]

DVMT Pre-Allocated

This item selects DVMT 5.0 Pre-Allocated (Fixed) Graphics Memory size used by the Internal Graphics Device. . Select <64M>, <96M>, <128M>, <160M>, <192M>, <224M>, <256M>, <288M>, <320M>, <352M>, <384M>, <416M>, <448M>, <480M>, <512M>, <1024M>, <1536M>, or <2048>.

DVMT Total Gfx Mem

This item selects DVMT5.0 Total Graphic Memory size used by the Internal Graphics Device. Select <128MB>, <256MB> or <Max>.

PEG Port Configuration

This section provides PEG Port configuration options.

Aptio Setup Utility - Chipset	Copyright (C) 2016 America	n Megatrends, Inc.
PEG Port Configuration		Enable or Disable the Root Port
PEG 0:1:0 Enable Root Port Max Link Speed	Not Present [Auto] [Auto]	
Detect Non-Compliance Device	[Disabled]	
		<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 17 1255 Po	pupidht (C) 2016 American	Meratranda Inc

Enable root Port [Auto]

Enable or Disable the root port Configuration options: [Disabled][Enabled][Auto]

□ Max Link Speed [Auto]

Configure PEG 0:1:0 Max Speed Configuration options: [Auto][Gen1][Gen2][Gen3]

□ Detect Non-Compliance Device [Disabled]

Detect non-compliance PCI express Device in PEG Configuration options: [Disabled][Enabled]

Memory Configuration

This section provides installed memory information.

Aptio Setup Utility - Chipset	Copyright (C)	2016 American	Megatrends, Inc.
Memory Configuration			
Memory RC Version Memory Frequency Total Memory VDD SODIMM_A1 SODIMM_B1 Memory Timings (tCL-tRCD-tRP-tRAS)	1.8.0.1 2133 MHz 8192 MB 1200 8192 MB Not Present 15-36		<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>
	opyright (C) 2	2016 American M	egatrends. Inc.

4.4.2 PCH-IO Configuration

Aptio Setup Utility - Chipset	Copyright (C) 2016 American	Megatrends, Inc.
Intel PCH RC Version Intel PCH SKU Name Intel PCH Rev ID	1.8.0.0 PCH–H Desktop Q170 SKU 31/D1	PCI Express Configuration settings
 PCI Express Configuration USB Configuration HD Audio Configuration 		
LAN1 Controller Wake on LAN1 LAN2 Controller Restore AC Power Loss	[Enabled] [Enabled] [Enabled] [Power Off]	
		<pre>++: Select Screen f↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values</pre>
		F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version 2.17.1255. C	opyright (C) 2016 American M	egatrends, Inc.

Lan1 Controller [Enabled]

Enable or Disable onboard Lan1 Configuration options: [Disabled][Enabled]

Wake on lan [Auto]

Enable or Disable integrated LAN to wake the system Configuration options: [Disabled][Enabled]

Lan2 Controller [Enabled]

Enable or Disable onboard Lan2 Configuration options: [Disabled][Enabled]

Restore AC power Loss [Power off]

Specify what state to go to when power is re-applied after a power failure. Configuration options: [Power on][Power off][Last State]

PCI Express Configuration

Aptio Setup Utility - Chipset	Copyright (C)) 2016 Ame	erican Megatrends,	Inc.
 PCI Express Configuration PCIE Port 5 is assigned to LAN PCIE Port 8 is assigned to LAN2 PCI Express Root Port 9(M2 Slot) PCI Express Root Port 17(Mini Card) 			PCI Express Settings.	Root Port 9
			++: Select S fl: Select I Enter: Selec +/-: Change F1: General F2: Previous F3: Optimize F4: Save & E ESC: Exit	Screen Stem Opt. Help Values d Defaults Xit
Version 2.17.1255. Co	opyright (C) 2	2016 Ameri	.can Megatrends, In	iC.

PCI Express Root Port 9 [Enabled]

Control the PCI Express Port Configuration options: [Disabled][Enabled]

□ ASPM Support [Disabled]

Set the ASPM level: Force LOs- Force all links to LOs State; Auto- BIOS auto configure; Disabled-Disables ASPM

Configuration options: [Disabled][L0s][L1][L0sL2][Auto]

PCIe Speed [Auto]

Select PCI Express Port speed Configuration options: [Auto][Gen1][Gen2][Gen3]

Detect Non-compliance device [Disabled]

Detect non-compliance PCI express Device, If enabled, it will take more time at Post time. Configuration options: [Disabled][Enabled]

PCI Express Root Port 17 [Enabled]

Control the PCI Express Port Configuration options: [Disabled][Enabled]

□ ASPM Support [Disabled]

Set the ASPM level: Force LOs- Force all links to LOs State; Auto- BIOS auto configure; Disabled-Disables ASPM Configuration options: [Disabled][LOs][L1][LOsL2][Auto]

PCIe Speed [Auto]

Select PCI Express Port speed Configuration options: [Auto][Gen1][Gen2][Gen3]

Detect Non-compliance device [Disabled] Detect non-compliance PCI express Device, If enabled, it will take more time at Post time. Configuration options: [Disabled][Enabled]

USB Configuration

□ USB Precondition[Disabled]

Precondition work on USB host controller and root ports for faster enumeration Configuration options: [Disabled] [Enabled]

□ XHCI Disabled Compliance Mode [False]

Options to disable compliance mode. Configuration options: [False][true]

USB Port Disable override [Disabled]

Selectively Enabled/Disabled the corresponding USB port from reporting a device connection to the controller.

Configuration options: [Disabled] [Select Per-Pin]

Aptio Setup Utility - Chipset	Copyright (C) 2016 American	Megatrends, Inc.
USB Configuration		Precondition work on USB host
USB Precondition	[Disabled]	faster enumeration.
XHCI Disable Compliance Mode	[FALSE]	
USB Port Disable Override	[Disabled]	
		<pre> ++: Select Screen f↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
Version 2 17 1255 Cr	nuright (C) 2016 American M	legatrends Inc

HD Audio Configuration

Control Detection of the HD-Audio device. Configuration options: [Disabled] [Enabled][Auto]

	Aptio Setup Utility – Copyright (C) 2010 Chipset	6 American Megatrends, Inc.
HD Audio Cont	figuration [Auto]	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.
		++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
	Version 2.17.1255. Copyright (C) 2016 (American Megatrends, Inc.

4.5 Security

Security menu allow you to change administrator password and user password settings.

Main Advanced Chipset Security Boot Save & Exit	egati chus, inc.
Password Description Se	et Administrator Password
If ONLY the Administrator's password is set, then this only limits access to Setup and is only asked for when entering Setup. If ONLY the User's password is set, then this is a power on password and must be entered to boot or enter Setup. In Setup the User will have Administrator rights. The password length must be in the following range: Minimum length 3 Maximum length 20 Administrator Password User Password Figure 20 Figure 20 Fig	<pre>+: Select Screen 4: Select Item inter: Select ./-: Change Opt. 1: General Help 2: Previous Values 3: Optimized Defaults 4: Save & Exit SC: Exit</pre>
Version 2 17 1255 Conveight (C) 2016 American Meg	atrends Inc

4.5.1 Administrator Password

This item allows you to set Administrator Password.

4.5.2 User Password

This item allows you to set User Password.

4.6 Boot

This menu allows you to setup the system boot options.

Boot Configuration Setup Prompt Timeout 1	Number of seconds to wait for setup activation key. 65535(OxFFFF) means indefinite
Quiet Boot [Disabled]	waiting.
Boot mode select [UEFI]	
FIXED BOOT ORDER Priorities Boot Option #1 [USB Key:UEFI: JetFlashTranscend 16GB 8.07, Partition 1] Boot Option #2 [CD/DVD] Boot Option #3 [USB Hard Disk] Boot Option #4 [USB CD/DVD] Boot Option #5 [Hard Disk] Boot Option #6 [USB Floppy] Dest Option #6	++: Select Screen ↑↓: Select Item Enter: Select
Boot Option #7 [USB Lan] Boot Option #8 [Network]	F1: General Help
▶ UEFI USB Key Drive BBS Priorities	F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit

4.6.1 Setup Prompt Timeout

Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.

4.6.2 Bootup NumLock State

This item selects the keyboard NumLock state. Select <On> or <Off>.

4.6.3 Quiet Boot

Enable or disable Quiet Boot option Configuration options: [Disabled] [Enabled]

4.6.4 Boot mode select [UEFI]

Select boot mode LEGACY/UEFI Configuration options: [LEGACY] [UEFI]

4.6.5 Boot Option Priorities

The items specify the boot device priority sequence from the available devices. The number of device items that appears on the screen depends on the number of devices installed in the system.

4.6.6 UEFI USB Key Drive BBS Priorities

Specifies the boot device priority sequence from available UEFI USB key Drives.

4.7 Save & Exit

This setting allows you to configure the boot settings.

Aptio Setup Utility – Copyright (C) 2016 American Main Advanced Chipset Security Boot Save & Exit	Megatrends, Inc.
Save Options Save Changes and Exit Discard Changes and Exit	Exit system setup after saving the changes.
Save Changes and Reset Default Options Restore Defaults	
Boot Override UEFI: JetFlashTranscend 16GB 8.07, Partition 1 Launch EFI Shell from filesystem device	
	<pre>++: Select Screen f↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values</pre>
	F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version 2.17.1255. Copyright (C) 2016 American Ma	egatrends, Inc.

4.7.1 Save Changes and Exit

This item allows you exit BIOS Setup after saving the changes.

4.7.2 Discard Changes and Exit

Select this option to quit Setup without making any permanent changes to the system configuration.

4.7.3 Save Changes and Reset

This item allows you reset the system after saving the changes.

4.7.4 Restore Defaults

This selection allows you to reload the BIOS when problem occurs during system booting sequence. These configurations are factory settings optimized for this system.

4.7.5 Launch EFI Shell from Filesystem Device

Attempts to launch EFI shell application from one of the available filesystem devices.

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