EC7-1817LNAR

基于 Chief rive 平台（IVY bridge CPU+QM67 PCH）的 MINI-ITX 主板

MINI-ITX motherboard based on Chief River platform (IVY Bridge CPU+QM67 PCH)

Version: C02

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Safety Instructions

1. Please read this manual carefully before using the product;

2. Leave the board or card in the antistatic bag until you are ready to use it;

3. Touch a grounded metal object (e.g. for 10 seconds) before removing the board or card from the anti-static bag;

4. Before installing or removing a board, wear the ESD gloves or ESD wrist strap; handle the board by its edges only;

5. Before inserting, removing or re-configuring motherboards or expansion cards, first disconnect the computer and peripherals from their power sources to prevent electric shock to human bodies or damage to the product;

6. Remember to disconnect the AC power cord from the socket before removing the board or moving the PC;

7. For PC products, remember to disconnect the computer and peripherals from the power sources before inserting or removing a board;

8. Before connecting or disconnecting any terminal, peripheral or any device, be sure the system is powered off and all the power sources are disconnected;

9. After turning off the computer, wait at least 30 seconds before turning it back on

Contents

Chapter 1 Product Introduction

Overview

This product is a high performance MINI-ITX motherboard based on Intel® Chief River platform (IVY Bridge CPU+QM67 PCH). It supports the latest IVY Bridge CPU, 22nm process, and is downward compatible with Sandy Bridge CPU. It also supports VGA/DVI/HDMI/Display port/dual-channel LVDS.It provides four SATA connectors; SATA1 and SATA2 support third generation SATA standard (6 Gbps data transmission). It also supports RAID 0/1/5/10; twelve USB2.0 ports; one Gigabit LAN port; one HDA AUDIO connector; one PCIe x4 slot; two RS-232 COMs; one 8-bit digital IO connector; one TPM pin header; one 80-digital display port on-board; one Mini PCIe socket and two vertical DDR3 SO-DIMM slots, supporting DDR3 1066/1333/1600 Un-buffered NON-ECC memory.

Mechanical Dimensions, Weight and Environment

➢ Dimensions: 170mm (L) x 177.8mm (W) x 44.2mm (H);

➢ Net Weight:0.336Kg;

➢ Operating Environment:

Temperature: 0°C ~ 60°C;

Humidity: 5% ~ 95% (non-condensing);

➢ Storage Environment:

Temperature: -40°C ~ 80°C;

Humidity: 5% ~ 95% (non-condensing);

Typical Consumption

The typical consumption is based on the following idle status values.

CPU: Intel® i5 Q15K 2.20GHz

Memory: DDR3 1333 1GB Kingston*2

HDD: Seagate ST3500418AS 500GB 7200.12 SATA

     Samsung TS-H653 DVD RW SATA

➢   +12V@1.15A; +5%/-3%;

Microprocessor

It supports Intel® rPGA988 package IVY Bridge, Sandy Bridge Mobile SV

NON-ECC processors, such as Intel® Core^{TM} i7, Intel® Core^{TM} i5, Intel® Core^{TM}i3

and Intel® Celeron® processor, etc.

Chipset

Mobile Intel® QM67 Express Chipset

System Memory

Provides two 204Pin DDRIII SO-DIMM memory slots, supporting Un-buffered

NON-ECC and dual-channel function. The maximum memory capacity supported by

a single memory slot is up to 8GB while the total memory capacity is up to 16GB.

Display Function

➢   Adopts Intel® IVY bridge CPU built-in integrated graphics controller display
chip, supporting Direct X11.0; also supports Sandy bridge CPU built-in
graphics processing, supporting DirectX 10.1;

➢   Supports VGA+LVDS, VGA+Display Port, VGA+HDMI and VGA+DVI
display and hot-swap function, all of which are synchronous output;

➢ VGA supports 2048x1536@75HZ, 32bit color depth in maximum; Display port supports 2560x1200@60HZ in maximum; DVI and HDMI support 1920x1200@60HZ in maximum.

Network Function

Provides one 10/100/1000Mbps LAN port, supporting Wake-on-LAN, LAN PXE booting and AMT7.0 functions. To enable the LAN wake-up function, please enter the AMT setting interface to configure the relevant AMT parameters first. Please set as follows:

A. Modify the parameters in [Intel ME General Settings]\[Power Control]\[Intel ME On in Host sleep states] to: Mobile: ON in S0, ME Wake in S3, S4-5 (AC only);

B. Choose "Activate LAN Wake-up Function" in [Intel AMT Configuration].

Audio Function

Supporting HDA CODEC and MIC-in/Line-in/Line-out function.

Power Feature

Adopts single 12V Adapter power input, brought out various status power on-board; supports ACPI function and S0, S1, S3, S4, S5, Deep Sleep S4, Deep Sleep S5 and AMT7.0 functions.

Two ways to test the DSW function (Deep sleep S4/S5):

a) Enter via pressing "CTRL+P" --> Input the ME password--> Intel ME General settings --> Power control --> Intel ME ON in host sleep states--> Choose Mobile: ON in S0. Save and exit ME finally. Enter the M_off status after powering off the computer.

b) Short JP2 via jumper cap and disable ME.

c) Press the POWER BUTTON to power off the computer after save the setting. Measure VCC5SB via ammeter, at that time the power on VCC3SB has been disabled while the power on VCC3_3DSW remains. That is to say the system has entered DSW status.

Expansion Bus

➢ One PCIe x4 slot;

➢ One Mini PCIe slot, complying with PCIE 2.0 specification.

Watchdog Function

➢ 255 levels, programmable by minute or second;

➢ Watchdog timeout interrupt or reset system.

Operating System

➢ Supported OSs: Windows XP, Windows 7 and Linux;

On-board I/O

➢ Two serial ports, supporting RS-232 mode;

➢ Four SATA connectors, supporting hot-swap function under RAID or AHCI mode;

Note: When a large capacity HDD (e.g. 3TB) is used, users need to set time (e.g. 5 seconds) in HDD Latency Time under the Advanced menu in BIOS Setting, so that HDD detection will not take too long.

➢ Twelve USB2.0 ports;

➢ One 8-channel digital I/O connector.

Notice for RAID Installation:

The default operating mode saved in BIOS for SATA is AHCI. Under AHCI mode, if an operating system without AHCI driver is getting installed (such as WINDOWS XP), USB floppy driver is required to load and install the AHCI driver before installing the operating system.

Tips: how to identify the alarms

1. One short beep indicates that a system memory error occurs.;

2. Short beep indicates to power on the computer.

Chapter 2 Installation

Product Outline
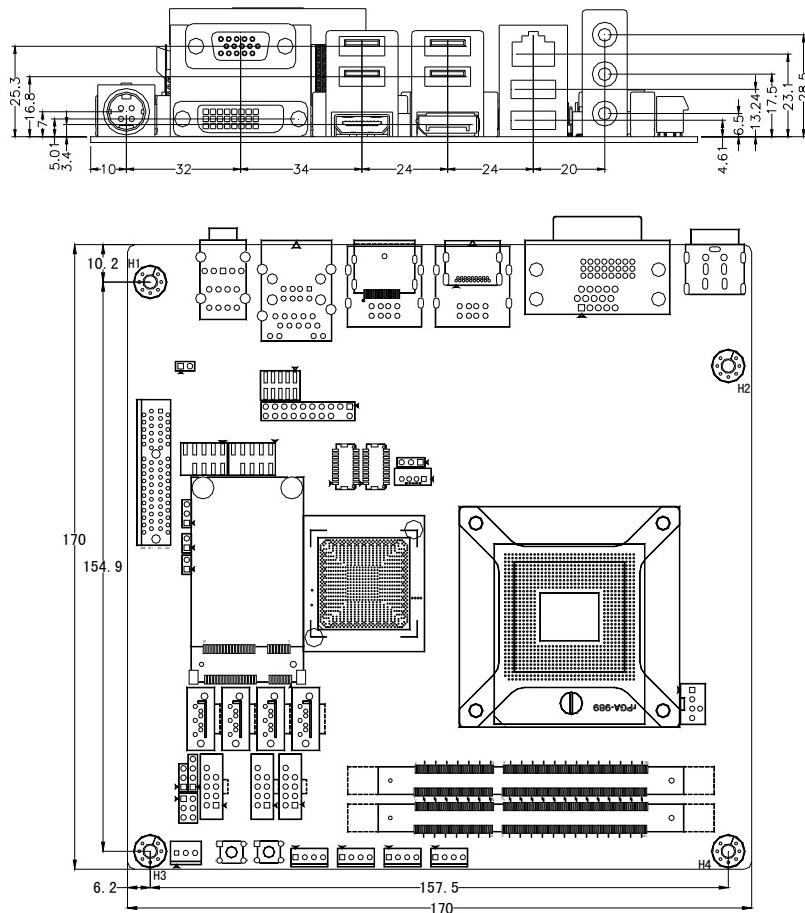
Unit: mm

Warning!

Please adopt appropriate screws and proper installation methods (including board allocation, CPU and heat sink installation, etc); otherwise, the board may be damaged. It is recommended to use M3x6 GB9074.4-88 screws at H1 ~ H4.

Locations of Connectors

Structure

```
                                    ┌──────────────────────┐
                                    │  IVY Bridge          │ ◄── Channel A DDR3 ──► ┌─────────────────────┐
                                    │  Sandy Bridge        │                        │ SODIMM#A NO-ECC     │
                                    │                      │                        │ 1066/1333           │
                                    │  rPGA989(Socket G2)  │ ◄── Channel B DDR3 ──► ┌─────────────────────┐
                                    │  37.5*37.5mm         │                        │ SODIMM#B NO-ECC     │
                                    └──────────────────────┘                        │ 1066/1333           │
                                         FD1        DMIX4                            └─────────────────────┘
```

SATA1-2 6Gbps SATA3-4 3Gbps	SATA		PCIE P7 — 82579LM — RJ45 CONNECTOR
RJ45+USB2.0*2 DP+USB2.0*2 HDMI+USB2.0*2	USB 2.0*6		PCIE P8 — MINI PCIE CONN
USB2.0 Header	USB 2.0*3		USB2.0
		CougarPoint	VGA — CRT
		QM67 BGA989 25*25mm	DDPD — DVI-D
LIN-IN (Blue)		PCIE X4 SLOT2 — PCIE P1-4	DDPC — HDMI
LIN-OUT (Green)	3.5" JACK	HDA AUDIO — HDA	DDPB — DISPLAY PORT
MIC-IN (PINK)		SPI Flash *2 — SPI 8MB	2CH LVDS — LVDS 24bit/18bit

```
                                    LPC ──► TPM Header
                                        ──► 80 Debug port
   COM1(RS232) ──┐
                 ├── NCT6776F ──► Hardware Monitor
   COM2(RS232) ──┘            ──► 8bit GPIO
                              ──► WDT_OUT
```

Tip: How to identify the first pin of the jumpers and connectors

1. Observe the letter beside the socket; it would be marked with "1" or bold lines or triangular symbols;

2. Observe the solder pad on the back; the square pad usually denotes the first pin.

Jumper Setting

### 1.　JCC1: Clear/Keep CMOS Setting (Pitch: 2.54mm)

CMOS is powered by the button battery on board. Clearing CMOS will restore original settings (factory default). The steps are listed as follows: (1) Turn off the computer and unplug the power cable; (2) Instantly short circuit JCC1; (3) Turn on the computer; (4) Follow the prompt on screen to enter BIOS setup when booting the computer, load optimized defaults; (5) Save and exit. Please set as follows:

| Setup	Function
1-2 Open	Normal (Default)
1-2 Short	Clear the contents of CMOS and all BIOS settings will restore to factory default values.

JCC1

2.　JM1: Clear/Keep ME Register Setting (Pitch: 2.54mm)

Setup	Function
1-2 Open	Normal (Default)
1-2 Short	Clear the contents of ME RTC register and all the settings will restore to factory default values.

JM1

3.　JP1: Enable the Operating Voltage of LVDS and Embedded Panel (Pitch: 2.54mm)

Setup	Function
1-2 Short	Enabled LVDS Voltage (Default)
2-3 Short	Enabled EDP Voltage

JP1

4.　JP2: SPI Flash Safety Performance Setting (Pitch: 2.54mm)

Setup	Function
1-2 Open	Enable ME function and disable on-line refresh BIOS. (Default)
1-2 Short	Disable ME function while enable on-line refresh BIOS.

JP2

Note: when short circuit JP2 (1-2), ME is disabled; an error prompt of "The system doesn't comply with the minimum requirement to install the software" will appear when installing the AMT driver; therefore, before installing the ME driver, please set the jumper cap of JP2 to "OFF" so as to enable ME.

5.　JLCD1: Select LCD Operating Voltage (Pitch: 2.54mm)

Different LCD screens have different voltages; the board provides two voltage options, +3.3V and +5V. Only when the selected LCD voltage is in accord with the LCD screen operating voltage in use, can the LCD screen operate normally. Please set as follows:

JLCD1

Setup	Function
1-2 Short	+3.3V(Default)
2-3 Short	+5V

Install the System Memory

The board provides two 204Pin DDRIII SO-DIMM slots (DIMM1/DIMM2). Please pay attention to the following issues when installing the memory banks:

➢ Open the buckles on both sides of the memory slot. When installing, align the notch of the memory bank with that of the memory slot and gently insert the module into the slot;

➢ The memory of 1.5V DDRIII 1600MHz supported by Intel® Chipset can be used; the maximum memory capacity supported by the board is up to 16GB;

➢ It is recommended to use the memory bank with SPD to ensure stable operation.

Serial Port

The board provides two 2x5Pin serial ports (Pitch: 2.54mm), supporting RS-232 mode; the pin definitions are as follows:
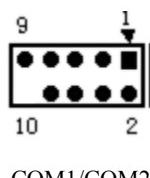
COM1/COM2

Pin	Signal Name
1	DCD#
2	RXD
3	TXD
4	DTR#
5	GND
6	DSR#
7	RTS#
8	CTS#
9	RI#
10	NA

LCD Backlight Control Connector

The board provides one 1x4Pin LCD backlight control connector (Pitch: 2.0mm); the pin definitions are as follows:

LCDB1
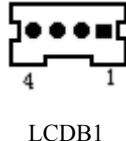
Pin	Signal Name
1	+12V
2	LCD_BKLTCTL
3	LCD_BKLTEN
4	GND

VCC12 -------Backlight Power (The current is limited below 1A);

LCD_BKLTCTL---Backlight Control (The signal is output as PWM signal via North Bridge directly; the voltage amplitude is between 0V-3.3V while the duty cycle is between 0% ~ 100%);

LCD_BKLTEN ---Backlight Enable, Active High.

USB Port

The board provides twelve USB ports, six of which are standard ports while the other six ports are brought out on three 2x5Pin headers (Pitch: 2.54mm).

J5(USB1/USB2)
J2(USB3/USB4)
J3(USB9/USB10)
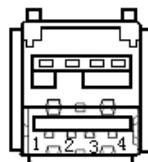
Pin	Signal Name
1	+5V
2	USB_Data-
3	USB_Data+
4	GND

J6(USB5/USB6)
J7(USB7/USB8)
J8(USB11/USB12)
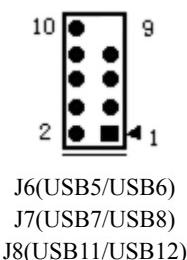
Pin	Signal Name	Pin	Signal Name
1	+5V	2	+5V
3	USB1_Data-	4	USB2_Data-
5	USB1_Data+	6	USB2_Data+
7	GND	8	GND
9	NA	10	GND

Display Connector

1、 The board provides one standard DB15 VGA connector; the pin definitions are as follows:
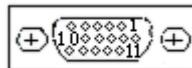
J1(VGA1)

Pin	Signal Name	Pin	Signal Name
1	Red	2	Green
3	Blue	4	NC
5	GND	6	GND
7	GND	8	GND
9	NC	10	GND
11	NC	12	DDCDATA
13	HSYNC	14	VSYNC
15	DDCCLK		

2、 The board provides one dual-channel 24bitLVDS connector (LVDS1 and LVDS2; Pitch: 1.0mm). When single channel 18-bit/24-bit LVDS screens are adopted, the LVDS data cable shall be connected with LVDS1. The pin definitions for dual-channel 24-bit LVDS are as follows:

LVDS1
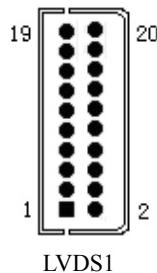
Pin	Signal Name	Pin	Signal Name
1	LVDSO_D0+	2	LVDSO_D0-
3	GND	4	GND
5	LVDSO_D1+	6	LVDSO_D1-
7	GND	8	GND
9	LVDSO_D2+	10	LVDSO_D2-
11	GND	12	GND
13	LVDSO_CLK+	14	LVDSO_CLK-
15	GND	16	GND
17	LVDSO_D3+	18	LVDSO_D3-
19	VDD	20	VDD
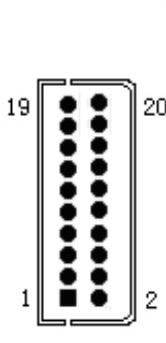
Pin	Signal Name	Pin	Signal Name
1	LVDSE_D0+	2	LVDSE_D0-
3	GND	4	GND
5	LVDSE_D1+	6	LVDSE_D1-
7	GND	8	GND
9	LVDSE_D2+	10	LVDSE_D2-
11	GND	12	GND
13	LVDSE_CLK+	14	LVDSE_CLK-
15	GND	16	GND
17	LVDSE_D3+	18	LVDSE_D3-
19	VDD	20	VDD

LVDS2

Note: LVDSOx indicates to dual scan the odd line of PANEL while LVDSEx indicates to dual scan the even line of PANEL.

The LVDS socket adopted by the board is DF20G-20DP-1V while the corresponding terminal type is DF20A-20DF-1C.

3、 The board provides one Type A HDMI connector; the pin definitions are as follows:

HDMI1
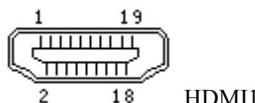
Pin	Signal Name	Pin	Signal Name
1	TMDS Data2+	2	TMDS Data2 Shield
3	TMDS Data2-	4	TMDS Data1+
5	TMDS Data1 Shield	6	TMDS Data1-
7	TMDS Data0+	8	TMDS Data0 Shield
9	TMDS Data0-	10	TMDS Clock+
11	TMDS Clock Shield	12	TMDS Clock-
13	CEC	14	Reserved (NC on device)
15	SCL	16	SDA
17	DDC/CEC Ground	18	+5V
19	Hot Plug Detect		

4、 Display Port
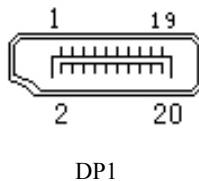
Pin	Signal Name	Pin	Signal Name
1	LANE0P	2	GND
3	LANE0N	4	LANE1P
5	GND	6	LANE1N
7	LANE2P	8	GND
9	LANE2N	10	LANE3P
11	GND	12	LANE3N
13	GND	14	GND
15	AUXCHP	16	GND
17	AUXCHN	18	HPD
19	RETURN	20	DP_PWR

DP1

5、 DVI-D Connector
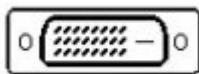
Pin	Signal Name	Pin	Signal Name
1	DATA2-	13	NC
2	DATA2+	14	+5V
3	GND_DVI	15	GND
4	NC	16	HOTPLUG
5	NC	17	DATA0-
6	DDCCLK	18	DATA0+
7	DDCDATA	19	GND_DVI
8	NC	20	NC
9	DATA1-	21	NC
10	DATA1+	22	GND_DVI
11	GND_DVI	23	CLK+
12	NC	24	CLK-

J1(DVI1)

Audio Connector

AUDIO connector provides LINE-IN, LINE-OUT and MIC-IN connector. LINE-In can be used to connect with audio signal input; LINE-OUT can be used to connect with earphone or loudspeaker with more appropriate power; MIC-IN can be used to connect with microphone to input sound.

AUDIO1

Pin	Signal Name
Blue	LINE-IN
Green	LINE-OUT
Pink	MIC-IN

Status Indicating and Control Connector

ATX Power Switch and HDD Indicating Connector (Pitch: 2.54mm)

FP1
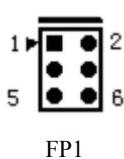
Pin	Signal Name	Pin	Signal Name
1	PWRBTN#	2	GND
3	GND	4	RESET#
5	HDD_LED-	6	HDD_LED+

Power Indicator Connector (Pitch: 2.54mm)

FP2

Pin	Signal Name
1	PWR_LED+
2	NC
3	GND

Loudspeaker Output Connector (Pitch: 2.54mm)

FP3

Pin	Signal Name
1	SPEAKER
2	NC
3	GND
4	+5V

Power Connector
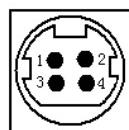
Pin	Signal Name
1	+12V
2	+12V
3	GND
4	GND

PWR1
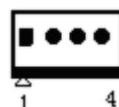
PWR2～PWR5

Pitch: 2.54mm

Pin	Signal Name
1	+12V
2	GND
3	GND
4	+5V

SATA Connector

The board provides four SATA sockets and the pin definitions are as follows:
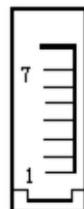
SATA1/SATA2
SATA3/SATA4

Pin	Signal Name
1	GND
2	TX+
3	TX-
4	GND
5	RX-
6	RX+
7	GND

Hot-swap of SATA Hard Disk

Notices for hot-swap of SATA hard disk:

1. The hard disk shall support SATA 2.0 and use 15-pin SATA hard disk power connector.

2. The driver of chipset shall support the hot-swap of SATA hard disk.

3. Hot-swap of SATA hard disk with the operating system is forbidden when system is powered-on.
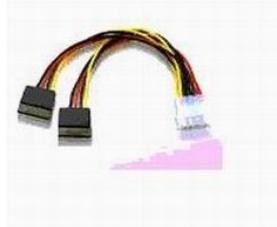
SATA Data Cable   SATA Power Cable

Please carry out hot plugging as follows. Improper operation may destroy the hard disk or result in data loss.

Hot Plug
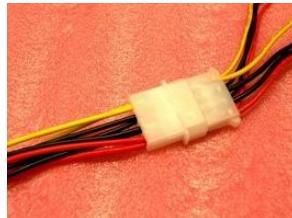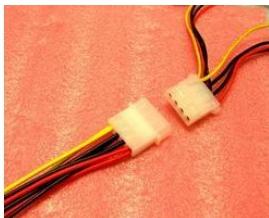
Step 1: Please plug the 1 x 4 pin SATA power connector (white) into the power adapter.

Step 2: Please connect the SATA data cable to the SATA connector on board.

Step 3: Please connect the 15-pin SATA power connector (black) to the SATA hard disk.

Step 4: Please connect the SATA data cable to the SATA hard disk.

Hot Unplug

Step 1: Uninstall the hard disk from the device manager.

Step 2: Unplug the data cable from the SATA hard disk.

Step 3: Unplug the SATA 15-pin power connector (black) from the SATA hard disk.

LAN Port

The board provides one 10/100/1000Mbps LAN port, LAN1, which supports Wake-on-LAN, LAN PXE booting and AMT7.0 functions. ACTLED and LILED are the green and dual-color LEDs beside the Ethernet port, which respectively indicates the activity status and the speed of LAN. Please refer to the status description for each LED:

ACTLED LILED

MX0+(Pin#1)
MX0-(Pin#2)
MX1+(Pin#3)
MX2+(Pin#4)
MX2-(Pin#5)
MX1-(Pin#6)
MX3+(Pin#7)
MX3-(Pin#8)

8   1

J5(LAN1)
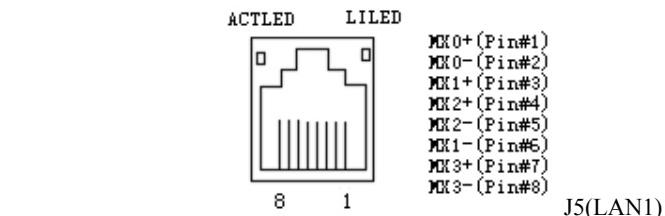
ACTLED (Green)	LAN Activity Status Indicator		LILED (Dual-Color: O/G)	LAN Speed Indicator
			Green	1000Mbps
Blink	Data Transmitting		Orange	100Mbps
Off	No Data to Transmit		Off	10Mbps

Switch

The board provides one PWR Button switch (SW1) and one reset switch (SW2).

GPIO Connector

9   1

10   2

GPIO1

(Pitch: 2.0mm)
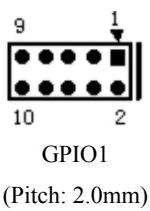
Pin	Signal Name	Pin	Signal Name
1	GPIO1	2	GPIO5
3	GPIO2	4	GPIO6
5	GPIO3	6	GPIO7
7	GPIO4	8	GPIO8
9	GND	10	NC

Note: the pins for GPIO are bi-directional signals. To facilitate test and application, the factory default value is that Pin1, 3, 5 and 7 are for TTL input while Pin2, 4, 6 and 8 are for CMOS output. The factory default status is high level while the voltage range for IO signals is 0-5V.

Fan Connector

The board provides one 1x4Pin CPU fan (CPUFAN1, Pitch: 2.54mm) and one 1x3Pin system fan (SYSFAN1, Pitch: 2.54mm). Pay attention to the following three issues when using the fan socket:

➢   The current for fan shall not exceed 700mA (12V);

➢ Please confirm that the fan cable complies with the socket cable. Power cable (usually red) is in the middle position. In addition, please confirm the earth cable (usually black) and fan speed output impulse signal cable (other colors). Some fans have no speed detection while the output of the cable is up to 12V. These substandard connections will destroy the CPU card. It is recommended to use a fan with speed detection.

➢ Adjust the fan's airflow to the direction of heat venting.
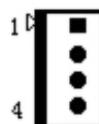
CPUFAN1

Pin	Signal Name
1	GND
2	+12V
3	FAN_IO
4	FAN_PWM

Note: FAN_IO: fan speed impulse output; FAN_PWM: fan speed PWM control.
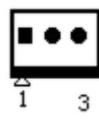
SYSFAN1

Pin	Signal Name
1	GND
2	+12V
3	FAN_IO

Note: FAN_IO: fan speed impulse output.

TPM Pin Header

The board provides one 2x10TPM pin header; PIN4 is NA, Pitch: 2.54mm.
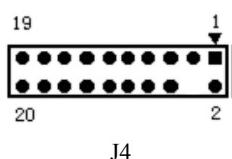
J4

Pin	Signal Name	Pin	Signal Name
1	CLOCK	2	GND
3	LPC_FRAM	4	NA
5	PLT_RST-	6	VCC5
7	AD3	8	AD2
9	VCC3.3	10	AD1
11	AD0	12	GND
13	SMB_CLK	14	SMB_DATA
15	VCC3SB	16	SERIRQ
17	GND	18	CLKRUN
19	SUS_SATA-	20	DRQ-

Mini PCIe Connector

The board provides one Mini PCIe slot on the rear of the board, supporting Intel® WiFi

Link5150 and Intel® WiFi Link 5350 wireless network card.

MPCIE1
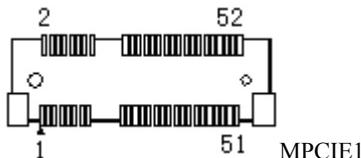
Pin	Signal Name	Pin	Signal Name
1	WAKE#	2	+3.3V
3	NC	4	GND
5	NC	6	+1.5V
7	CLKREQ#	8	NC
9	GND	10	NC
11	REFCLK-	12	NC
13	REFCLK+	14	NC
15	GND	16	NC
17	Reserved	18	GND
19	Reserved	20	W_DISABLE#
21	GND	22	PERST#
23	PERn0	24	+3.3V
25	PERp0	26	GND
27	GND	28	+1.5V
29	GND	30	SMB_CLK
31	PETn0	32	SMB_DATA
33	PETp0	34	GND
35	GND	36	USB_D-
37	GND	38	USB_D+
39	+3.3V	40	GND
41	+3.3V	42	NC
43	GND	44	NC
45	Reserved	46	NC
47	Reserved	48	+1.5V
49	Reserved	50	GND
51	Reserved	52	+3.3V

PCIe x4 Slot

The board provides one PCIe x4 slot, marked as PCIE1 on board.

Pin	Signal Name	Pin	Signal Name	Pin	Signal Name	Pin	Signal Name
A1	PRSNT1#	A2	+12V	B1	+12V	B2	+12V
A3	+12V	A4	GND	B3	RSVD	B4	GND
A5	TCK	A6	TDI	B5	SMCLK	B6	SMDATA
A7	TDO	A8	TMS	B7	GND	B8	+3.3V
A9	+3.3V	A10	+3.3V	B9	TRST#	B10	3.3Vaux
A11	PWRGD/ PERST#	A12	GND	B11	WAKE#	B12	RSVD
A13	REFCLK+	A14	REFCLK-	B13	GND	B14	PETp0
A15	GND	A16	PERp0	B15	PETn0	B16	GND
A17	PERn0	A18	GND	B17	PRSNT2#	B18	GND
A19	RSVD	A20	GND	B19	PETp1	B20	PETn1
A21	PERp1	A22	PERn1	B21	GND	B22	GND
A23	GND	A24	GND	B23	PETp2	B24	PETn2
A25	PERp2	A26	PERn2	B25	GND	B26	GND
A27	GND	A28	GND	B27	PETp3	B28	PETn3
A29	PERp3	A30	PERn3	B29	GND	B30	RSVD
A31	GND	A32	RSVD	B31	PRSNT2#A	B32	GND

Install the CPU

Please install the CPU as follows (refer to the figure below):

➢ Align the first pin (with triangle mark) of the CPU with the notches on the socket (refer to Figure ①) and insert the CPU into the socket.

➢ When the CPU is fully seated in the socket, fix the screws on CPU socket in clockwise direction via screwdrivers (refer to Figure ②). Do it with moderate force so as not to damage the CPU socket.

Lay the board according to the figure

Take care the notch of the CPU shall be on the top right. 1

Tighten the CPU via slotted screwdriver. 2
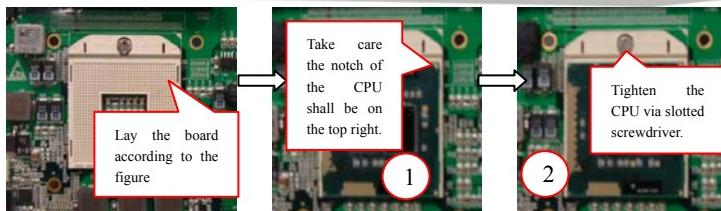
Install the CPU Fan

Please install the CPU fan as follows: (refer to the figure below):

➢ Assemble the bracket of the cooling fin (refer to ①) with the fixing holes on the rear of the motherboard;

➢ Connect the front side of cooling fin with the bracket and fix them; take care that the surface between the cooling fin and the CPU crystal wafer shall be well contacted;

➢ Fix the cooling fin with two screws on the cross (do not tighten it) and then the other two screws; then tighten the four screws (refer to ②);

➢ Lastly, connect the fan power cable to the fan socket on the CPU card (refer to ③).

Tighten the screws on CPU radiator

Connect the fan power cable with the fan socket on board.

1   2   3
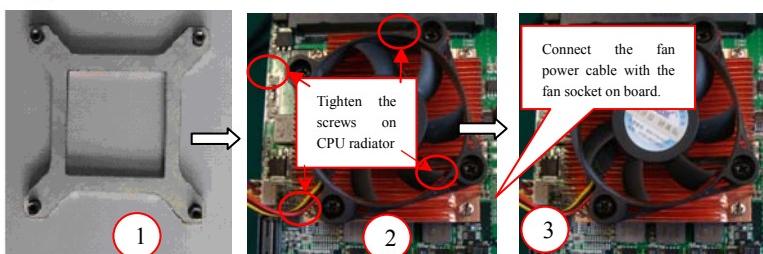
Note! It is recommended to use cooling fan authenticated by Intel; before installing the fan, smear the heat sink compound on the surface between CPU and the fan cooling fin to improve the heat dissipation performance; always check whether the fan is operating normally to ensure the heat dissipation within the chassis. When holding a board, please hold the edge instead of the cooling fin.

Chapter 3 BIOS Setup

UEFI Overview

UEFI (Unified Extensible Firmware Interface) is the latest computer firmware to replace traditional BIOS. UEFI is solidified in the flash memory on the CPU board. Its main functions include: initialize system hardware, set the operating status of the system components, adjust the operating parameters of the system components, diagnose the functions of the system components and report failures, provide hardware operating and controlling interface for the upper level software system, guide operating system and so on. UEFI provides users with a human-computer interface in menu style to facilitate the configuration of system parameters for users, control power management mode and adjust the resource distribution of system device, etc.

Setting the parameters of the UEFI correctly can enable the system to operate stably and reliably; it can also improve the overall performance of the system at the same time. Inadequate even incorrect UEFI parameter setting will decrease the system operating capability and make the system unstable, or even unable to operate normally.

UEFI Parameter Setup

Prompt message for UEFI setting may appear once powering on the system. At that time (invalid at other time), press the key specified in the prompt message (usually <Del> or <F2>) to enter UEFI setting.

All the setup values modified by UEFI (excluding data and time) are saved in the flash storage in system; the contents will not be lost even if powered down or remove the battery of the board. The data and time are saved in CMOS storage, which is powered by battery; unless clearing CMOS is executed, its contents would not be lost even if powered off.

> **Note!** UEFI setting will influence the computer performance directly. Setting parameter improperly will cause damage to the computer; it may even be unable to power on. Please use the internal default value of UEFI to restore the system.
> Our company is constantly researching and updating UEFI, its setup interface may be a bit different. The figure below is for reference only; it may be different from your UEFI setting in use.

Basic Function Setting for UEFI

The main interface for Copyright (C) 2008 American Megatrends, Inc. is as follows:

Aptio Setup Utility – Copyright (C) 2010 American Megatrends, Inc.	
Main Advanced Chipset Boot Security Save & Exit	
BIOS Information	Set the Date. Use'Tab' to
Project Name EC7-1817LNAR	switch between Date
BIOS Version Q5652010 C01	elements.→←: Select Screen
Build Date and Time 11/18/2010 10:10:10	
	↑↓: Select Item
	Enter: Select
Total Memory 1024 MB (DDR3)	+/-: Change Opt
Memory Frequency 1333Mhz	F1: General Help
	F2: Previous Values
System Date [Wed 11/18/2010]	F3: Optimized Defaults
System Time [00:47:55]	F4: Save
	ESC: Exit
Access Level Administrator	
Version 1.28.1119. Copyright (C) 2010,American Megatrends, Inc.	

◆　　**Main**

➢　　**System Date**

Choose this option and set the current date by < + > / < - >, which is displayed in

the format of month/date/year. Reasonable range for each option is: Month

(Jan.-Dec.), Date (01-31), Year (Maximum to 2099), Week (Mon. ~ Sun.).

➢　　**System Time**

Choose this option and set the current time by < + > / < - >, which is displayed in

the format of hour/minute/second. Reasonable range for each option is: Hour

(00-23), Minute (00-59), Second (00-59).

◆ **Advanced**

Aptio Setup Utility – Copyright (C) 2010 American Megatrends, Inc.	
Main **Advanced** Chipset Boot Security Save & Exit	
▶ Trusted Computing ▶ CPU Configuration ▶ SATA Configuration ▶ Intel TXT(LT) Configuration ▶ PCH-FW Configuration ▶ AMT Configuration ▶ USB Configuration ▶ Super IO Configuration ▶ H/W Monitor ▶ CPU PPM Configuration ▶ HDD Latency Time	→←: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save ESC: Exit
Version 1.28.1119. Copyright (C) 2010,American Megatrends, Inc.	

➢ **Trusted Computing**

Aptio Setup Utility – Copyright (C) 2011 American Megatrends, Inc.	
Advanced	
Configuration TPM SUPPORT [Disabled] Current Status Information NO Security Device Found	→←：Select Screen ↑↓：Select Item Enter：Select +/-：Change Opt F1：General Help F2：Previous Values F3：Optimized Defaults F4：Save ESC：Exit
Version 2.14.1219. Copyright (C) 2011,American Megatrends, Inc.	

● **TPM SUPPORT**

Enable TPM function.

➢ **CPU Configuration**

Aptio Setup Utility – Copyright (C) 2010 American Megatrends, Inc.	
Advanced	
Processor Type Genuine Intel(R) CPU Processor Speed 2400MHz Processor Stepping 2067a Microcode Revision 6 Processor Cores 4 Intel HT Technology Supported Intel VT-x Technology Supported Intel SMX Technology Supported 64-bit Supported L1 Data Cache 32 kB x 4 L1 Code Cache 32 kB x 4 L2 Cache 256 kB x 4 L3 Cache 8192 kB Hyper-threading [Enabled] Active Processor Cores [All] Intel Virtualization Technology [Disabled]	→←: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save ESC: Exit
Version 1.28.1119. Copyright (C) 2010,American Megatrends, Inc.	

● **Hyper-threading**

Control switch for Hyper Threading Technology function.

● **Active Processor Cores**

Active the CPU core number, which is available for the CPU with multi-core.

● **Intel Virtualization Technology**

Switch for Intel Virtualization Technology.

> ➢ **SATA Configuration**

Aptio Setup Utility – Copyright (C) 2010 American Megatrends, Inc.	
Advanced	
SATA Controller(s) [Enabled] SATA Mode Selection [IDE] IDE Legacy/Native Mode Selection [Native] SATA ATA Port 0-5 Empty Software Preserve Unknown Port 0-5 [Enabled] Hot Plug [Disabled] External SATA [Disabled] SATA Device Type [Hard Disk Driver]	→←: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save ESC: Exit
Version 1.28.1119. Copyright (C) 2010,American Megatrends, Inc.	

● **SATA Controller(s)**

Enabling switch for SATA controller.

● **SATA Mode Selection**

SATA controller type selection; there are three options for this item: IDE, RAID and AHCI.

When choosing AHCI or RAID mode to implement system installation, the driver programs of the Floppy device and the chipset are required.

Note: the following options will be displayed only when the SATA Mode is set to AHCI.

● **Port 0-5**

Switch for SATA Port 0-5.

● **Hot Plug**

Switch for hot plugging the SATA Port.

● **External SATA**

Support switch for external SATA.

● **SATA Device Type**

Choose the SATA device type.

● IDE Legacy/Native Mode Selection

   IDE Legacy/Native mode selection.

➢ **Intel TXT(LT) Configuration**

Aptio Setup Utility – Copyright (C) 2010 American Megatrends, Inc.	
Advanced	
Intel Trusted Execution Technology Configuration Intel TXT support only can be enabled/disabled if SMX enabled. And must enables the VT support prior to TXT. Secure Mode Extensions (SMX)　　　　[Enabled] Intel TXT(LT) Support　　　　　　　[Disabled]	→←: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save ESC: Exit
Version 1.28.1119. Copyright (C) 2010,American Megatrends, Inc.	

● **Secure Mode Extensions (SMX)**

   Support switch for Intel CPU SMX.

● **Intel TXT(LT) Support**

   Support switch for Intel(R) TXT.

   Note: the Intel TXT (LT) Support option can be enabled when Intel Virtualization Technology option is enabled.

➢ **PCH-FW Configuration**

Aptio Setup Utility – Copyright (C) 2010 American Megatrends, Inc.		
Advanced		
ME FW Version	8.0.13.1502	→←: Select Screen
ME Firmware Mode	Normal Mode	↑↓: Select Item
ME Firmware Type	Full SKU Firmware	Enter: Select
ME Firmware SKU	5MB	+/-: Change Opt
		F1: General Help
		F2: Previous Values
		F3: Optimized Defaults
		F4: Save
		ESC: Exit
Version 1.28.1119. Copyright (C) 2010,American Megatrends, Inc.		

This option is the ME version and other relevant information.

➢ **AMT Configuration**

Aptio Setup Utility – Copyright (C) 2010 American Megatrends, Inc.		
Advanced		
Intel AMT	[Enabled]	→←：Select Screen
Disable Me	[Disabled]	↑↓：Select Item
Un-Configure ME	[Disabled]	Enter：Select
		+/-：Change Opt
		F1：General Help
		F2：Previous Values
		F3：Optimized Defaults
		F4：Save
		ESC：Exit
Version 1.28.1119. Copyright (C) 2010,American Megatrends, Inc.		

● **Intel AMT**

Control switch for AMT function.

● **Disable ME**

Enable ME function control switch.

● **Un-configure ME**

Switch for reconfiguring ME without password. When this option is Enabled, it will load ME default value without requiring the password during POST period.

➢ **USB Configuration**

Aptio Setup Utility – Copyright (C) 2010 American Megatrends, Inc.	
Advanced	
USB Configuration USB Devices: 1 Keyboard, 1 Mouse, 2 Hubs Legacy USB Support [Auto]	→←: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save ESC: Exit
Version 1.28.1119. Copyright (C) 2010,American Megatrends, Inc.	

● **Legacy USB Support**

This option is used to support legacy USB devices (keyboard, mouse and storage device, etc.); when this option is set to Enabled, the USB device could be used even if under OS that doesn't support USB, such as DOS.

➢ **Super IO Configuration**

Aptio Setup Utility – Copyright (C) 2010 American Megatrends, Inc.	
Advanced	
Super IO Configuration ▶ Serial Port 0 Configuration ▶ Serial Port 1 Configuration	→←: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save ESC: Exit
Version 1.28.1119. Copyright (C) 2010,American Megatrends, Inc.	

● **Serial Port 0 Configuration**

Aptio Setup Utility – Copyright (C) 2010 American Megatrends, Inc.		
Advanced		
Serial Port 0 Configuration		→←: Select Screen ↑↓: Select Item
Serial Port	[Enabled]	Enter: Select
Device Settings	IO=3F8h; IRQ=4;	+/-: Change Opt
		F1: General Help
Change Settings	[Auto]	F2: Previous Values F3: Optimized Defaults F4: Save ESC: Exit
Version 1.28.1119. Copyright (C) 2010,American Megatrends, Inc.		

1.   Serial Port

This option is used to enable or disable the serial port.

2.   Device Settings

This option is used to display the current resource setting for the serial port.

3.   Change Settings

This option is used to configure the resource adopted by the serial port (IO and IRQ).

● **Serial Port 1 Configuration**

Aptio Setup Utility – Copyright (C) 2010 American Megatrends, Inc.	
Advanced	
Serial Port 1 Configuration	→←: Select Screen
	↑↓: Select Item
Serial Port [Enabled]	Enter: Select
Device Settings IO=2F8h; IRQ=3;	+/-: Change Opt
	F1: General Help
Change Settings [Auto]	F2: Previous Values
	F3: Optimized Defaults
	F4: Save
	ESC: Exit
Version 1.28.1119. Copyright (C) 2010,American Megatrends, Inc.	

1. **Serial Port**

   This option is used to enable or disable the serial port.

2. **Device Settings**

   This option is used to display the current resource setting for the serial port.

3. **Change Settings**

   This option is used to configure the resource adopted by the serial port (IO and IRQ).

➢ **H/W Monitor**

Aptio Setup Utility – Copyright (C) 2010 American Megatrends, Inc.	
Advanced	
PC Health Status System Temperature ： +36 C CPU Temperature ： +38 C SYSFAN1 ： N/A CPUFAN1 ： 1280 RPM Vcore ： +0.824 V V3.3 ： +3.296 V V12.0 ： +12.091 V VBAT ： +3.152 V	→←: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save ESC: Exit
Version 1.28.1119. Copyright (C) 2010,American Megatrends, Inc.	

Display the currently detected hardware monitoring information, such as voltage, temperature, fan speed, etc.

● **System Temperature**

Current system temperature, monitored by the thermal resistor on motherboard.

● **CPU Temperature**

Current CPU temperature, monitored by the temperature sensor on motherboard.

● **SYSFAN1/CPUFAN1**

Current CPU fan speed.

● **Vcore**

CPU core voltage.

● **V3.3/V12.0**

Turn on/off the power to output voltage.

● **VBAT**

CMOS battery voltage.

➢ **CPU PPM Configuration**

Aptio Setup Utility – Copyright (C) 2011 American Megatrends, Inc.		
Advanced		
CPU PPM Configuration		→←：Select Screen
		↑↓：Select Item
EIST	[Enabled]	Enter：Select
Turbo Mode	[Enabled]	+/-：Change Opt
		F1：General Help
		F2：Previous Values
		F3：Optimized Defaults
		F4：Save
		ESC：Exit
Version 2.14.1219. Copyright (C) 2011,American Megatrends, Inc.		

Display the information relevant to CPU. Note: the displayed CPU information is relevant to the CPU installed within the platform; different series CPU may have different display information.

● **EIST**

Enable the SpeedStep function of CPU.

● **Turbo Mode**

Enable the Turbo Mode function.

➢ **HDD Latency Time**

Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.	
Advanced	
HDD Latency Time [Disabled]	→←: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save ESC: Exit
Version 2.14.1219. Copyright (C) 2011,American Megatrends, Inc.	

● HDD Latency Time

Delay function selection for HDD detection. When a large capacity HDD is used, the delay time needs to be modified according to the actual requirement, so as to ensure normal detection.

◆ **Chipset**

Aptio Setup Utility – Copyright (C) 2010 American Megatrends, Inc.	
Main Advanced **Chipset** Boot Security Save & Exit	
WARNING: Setting wrong values in below sections may cause system to malfunction! ▶System Agent (SA) Configuration ▶PCH-IO Configuration	→←: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save ESC: Exit
Version 1.28.1119. Copyright (C) 2010,American Megatrends, Inc.	

➢ **System Agent (SA) Configuration**

Aptio Setup Utility – Copyright (C) 2010 American Megatrends, Inc.	
Chipset	
VT-D [Enabled] ▶ Graphics Configuration	→←: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save ESC: Exit
Version 1.28.1119. Copyright (C) 2010,American Megatrends, Inc.	

● **VT-d**

Switch for the Intel virtualization technology.

➢ **Graphics Configuration**

Aptio Setup Utility – Copyright (C) 2011 American Megatrends, Inc.	
Advanced	
Graphics Configuration Primary Display [Auto] Internal Graphics [Auto] DVMT Pre-Allocated [64M] DVMT Total Gfx Mem [256M] ▶ LCD Control	→←：Select Screen ↑↓：Select Item Enter：Select +/-：Change Opt F1：General Help F2：Previous Values F3：Optimized Defaults F4：Save ESC：Exit
Version 2.14.1219. Copyright (C) 2011,American Megatrends, Inc.	

1. Primary Display

Choose the primary display type.

2. Internal Graphics

Switch for the internally integrated graphics card.

3. DVMT Pre-Allocated

Select the memory size pre-allocated by DVMT.

4. DVMT Total Gfx Mem

Select the DVMT total Gfx memory size.

5. LCD Control

Menu of the LCD control.

➢ **LCD Control**

Aptio Setup Utility – Copyright (C) 2010 American Megatrends, Inc.
Chipset
Primary IGFX Boot Display [CRT] Secondary IGFX Boot Display [LVDS] LCD Panel Type [800x600 xLVDS] Panel Color Depth [18 Bit]	→←: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save ESC: Exit
Version 1.28.1119. Copyright (C) 2010,American Megatrends, Inc.

1. Primary IGFX Boot Display

Choose the primary display device during POST period.

2. Secondary IGFX Boot Display

Choose the secondary display device during POST period.

3. LCD Panel Type

This option is used to choose the resolution for Flat Panel.

4. Panel Color Depth

Choose the bit number for Flat Panel.

➢ **PCH-IO Configuration**

Aptio Setup Utility – Copyright (C) 2010 American Megatrends, Inc.		
Chipset		
▶ USB Configuration		
▶ PCH Azalia Configuration		→←: Select Screen
		↑↓: Select Item
PCH LAN Controller	[Enabled]	Enter: Select
		+/-: Change Opt
Restore AC Power Loss	[last state]	F1: General Help
		F2: Previous Values
		F3: Optimized Defaults
		F4: Save
		ESC: Exit
Version 1.28.1119. Copyright (C) 2010,American Megatrends, Inc.		

● **USB Configuration**

Aptio Setup Utility – Copyright (C) 2011 American Megatrends, Inc.		
Chipset		
USB Configuration		
		→←：Select Screen
		↑↓：Select Item
EHCI1	[Enabled]	Enter：Select
EHCI2	[Enabled]	+/-：Change Opt
		F1：General Help
USB Ports Per-Port Disable Control [Disabled]		F2：Previous Values
		F3：Optimized Defaults
		F4：Save
		ESC：Exit
Version 2.14.1219. Copyright (C) 2011,American Megatrends, Inc.		

* **EHCI 1**

Switch for EHCI controller 1.

* **EHCI 2**

Switch for EHCI controller 2.

* USB Ports Per-Port Disable Control

General control switch for the USB Port.

● **PCH Azalia Configuration**

Aptio Setup Utility – Copyright (C) 2011 American Megatrends, Inc.	
Chipset	
PCH Azalia Configuration	→←：Select Screen
Azalia [Auto]	↑↓：Select Item
Azalia Internal HDMI Codec [Enabled]	Enter：Select
Azalia HDMI Codec Part B [Enabled]	+/-：Change Opt
Azalia HDMI Codec Part C [Enabled]	F1：General Help
Azalia HDMI Codec Part D [Enabled]	F2：Previous Values
	F3：Optimized Defaults
	F4：Save
	ESC：Exit
Version 2.14.1219. Copyright (C) 2011,American Megatrends, Inc.	

● **Azalia**

Control switch for audio card.

● **Azalia Internal HDMI Codec**

Control switch to enbale built-in audio decoding.

● **Azalia HDMI Codec Part B/C/D**

Control switch to enable built-in audio decoding of Codec Part B/C/D.

● **PCH LAN Controller**

Switch for PCH LAN controller.

● **Restore AC Power Loss**

This option could set the system status when the computer is re-electrified after

powered off under AC. "Power Off" is to make the system at power off status;

"Power On" is to power on the system automatically; "Last State" is to recover

the status before powering off.

◆ **Boot**

Aptio Setup Utility – Copyright (C) 2010 American Megatrends, Inc.	
Main Advanced Chipset **Boot** Security Save & Exit	
Boot Configuration Setup Prompt Timeout 1 Bootup Numlock State [on] Quiet Boot [Disabled] Fast Boot [Disabled] **Boot Option Priorities** Boot Option #1 [Built-in EFI Shell] **Hard Drive BBS Priorities**	→←: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save ESC: Exit
Version 1.28.1119. Copyright (C) 2010,American Megatrends, Inc.	

➢ Setup Prompt Timeout

Set number of seconds to wait for setup activation key.

➢ Bootup Numlock State

Set Numlock state of the keyboard.

➢ **Quiet Boot**

Configure whether to display the content of OEM LOGO.

➢ **FAST Boot**

Switch for fast boot.

➢ **Hard Drive BBS Priorities**

This option is used to configure the priority of the boot device during system booting.

◆ **Security**

Aptio Setup Utility – Copyright (C) 2010 American Megatrends, Inc.	
Main Advanced Chipset Boot **Security** Save & Exit	
Password Description 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. Administrator Password	→←: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save ESC: Exit
Version 1.28.1119. Copyright (C) 2010,American Megatrends, Inc.	

➢ **Administrator Password**

This option is used to set administrator password.

◆ **Save & Exit**

Aptio Setup Utility – Copyright (C) 2010 American Megatrends, Inc.	
Main Advanced Chipset Boot Security **Save & Exit**	
Save Changes and Exit Discard Changes and Exit Save Changes and Reset Discard Changes and Reset Save Options Save Changes Discard Changes Restore Defaults Save as User Defaults Restore User Defaults Boot Override	→←: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save ESC: Exit
Version 1.28.1119. Copyright (C) 2010,American Megatrends, Inc.	

➢ **Save Changes and Exit**

This option is used to save changes and exit Setup program. If the changes are

effective after rebooting, then it will reboot automatically.

➢ **Discard Changes and Exit**

This option is used to discard changes and exit Setup program.

➢ **Save Changes and Reset**

The option is used to save changes and reset.

➢ **Discard Changes and Reset**

The option is used to discard changes and reset.

➢ **Save Changes**

Save changes.

➢ **Discard Changes**

Discard changes.

➢ **Restore Defaults**

Restore default values.

➢ **Save as User Defaults**

Save user defaults.

➢ **Restore User Defaults**

Restore user defaults.

➢ **Boot Override**

This option lists all the booting options; users may choose one of the options

and press <Enter>, then you may boot according to the option.

System Resource Managed by UEFI under X86 Platform

We define three kinds of system resources here: I/O port address, IRQ interrupt number and DMA number.

◆ **DMA**

Level	Function
DMA0	Unassigned
DMA1	Unassigned
DMA2	Unassigned
DMA3	Unassigned
DMA4	Used for DMAC cascade
DMA5	Unassigned
DMA6	Unassigned
DMA7	Unassigned

◆ **APIC**

Advanced programmable interrupt controller. Most motherboards above P4 level support APIC and provide more than 16 interrupt sources, like IRQ16 - IRQ23; while some others can have up to 28 interrupt sources, such as motherboard supporting PCI-X. However, relevant OS are required to enable that function, and currently, only the OS above Windows 2000 could support that function.

◆ **IO Port Address**

Only 16 IO address lines are designed for X86, from 0 ~ 0FFFFh; there is 64K for the system I/O address space. In traditional ISA connector, only the foregoing 1024 (0000 ~ 03FFh) are adopted while the ports above 0400h are adopted by PCI and EISA connectors. Each peripheral will occupy portion of the space. The table below shows parts of the I/O connectors used in X86 platform.

Address	Device Description
000h - 001Fh	DMA Controller #1
000h – 0CF7h	PCI BUS
010h – 01Fh	Motherboard Resource
020h - 021h	Programmable Interrupt Controller
022h – 03Fh	Motherboard Resource
040h - 043h	System Timer#1
044h – 05Fh	Motherboard Resource
050h – 053h	System Clock
060h – 060h	Standard 101/102 Key
061h – 061h	Motherboard Resource
063h – 063h	Motherboard Resource
064h – 064h	Standard 101/102 Key
070h - 077h	System CMOS/Real Time Clock
072h – 0EFh	Motherboard Resource
0F0h – 0FFh	Numeric data processor
274h – 277h	ISAPNP Read Data Port
279h – 279h	ISAPNP Read Data Port
2F8h – 2FFh	COM2
3B0h – 3BBh	Intel(R) HD Graphic Family
3C0h – 3DFh	Intel(R) HD Graphic Family
3F8h – 3FFh	COM1
400h – 453h	Motherboard Resource
454h – 457h	Motherboard Resource
458h – 47Fh	Motherboard Resource
4D0h – 4D1h	Programmable Interrupt Controller
500h – 57Fh	Motherboard Resource
680h – 69Fh	Motherboard Resource
A3h – A3Fh	Motherboard Resource
A79h	ISAPNP Read Data Port
0D00h – 0FFFFh	PCI BUS

◆ **IRQ Assignment Table**

There are 15 interrupt sources of the system. Some are occupied by the system devices. Only the ones that are not occupied can be distributed. The ISA devices claim to engross the interrupt. Only the plug and play ISA devices can be distributed by the UEFI or the OS. And several PCI devices share one interrupt through the distribution of UEFI or OS. The diagram below shows parts of the interrupt distribution under X86 platform, but it does not show the interrupt source occupied by the PCI devices.

Level	Function
IRQ0	System Timer
IRQ1	Standard 101/102 Key or Microsoft Natural Keyboard
IRQ2	Reserved
IRQ3	COM2
IRQ4	COM1
IRQ5	Reserved
IRQ6	Reserved
IRQ7	Reserved
IRQ8	System CMOS/Real Time Clock
IRQ9	ACPI-Compliant System
IRQ10	Reserved
IRQ11	Reserved
IRQ12	Microsoft PS/2 Mouse
IRQ13	Numeric data processor
IRQ14	Reserved
IRQ15	Reserved

Chapter 4 Install the Drivers

Regarding the driver program of this product, please refer to the accompanying CD.

Appendix

Watchdog Programming Guide

The board provides a programmable watchdog timer (WDT) up to 255 levels and timed by minute or second. Watchdog timeout event can be programmed to reset system or generate maskable interrupts.

The available IRQ numbers for this board are: 3, 4, 5, 7, 9, 10 and 11. Note: the instructions for the interrupt mode are only appropriate for the OSs with both ACPI and APIC enabled.

The following describes WDT program in C language. The steps to program WDT are listed as follows:

➢ Enter WDT programming mode;

➢ Set WDT operating mode, enable WDT/disable WDT.

(1) Enter WDT Programming Mode

/*

Description: the function, PreInitWDT, is used to initialize the registers relevant to WDT; please invoke the function before configuring and using WDT.

Input: none
Output: none
Note: none

*/

```
#define    INDEX_PORT   0x2E
#define    DATA_PORT        0x2F

VOID PreInitWDT()
{
        outportb(INDEX_PORT, 0x87);
        outportb(INDEX_PORT, 0x87);
        outportb(INDEX_PORT, 0x07);
        outportb(DATA_PORT, 0x08);
        outportb(INDEX_PORT, 0x30);
```

```
        outportb(DATA_PORT, 0x01);
        outportb(INDEX_PORT, 0x07);
        outportb(DATA_PORT, 0x09);
        outportb(INDEX_PORT, 0x30);
        outportb(DATA_PORT, 0x04);

}
```

(2) Configure the WDT operating mode to enable or disable WDT

/*

Description: the function, SetWDT, is used to configure the parameter required when configuring WDT to enable or disable WDT.

    Input: Wmode: 0 - Configure WDT to reset mode

                      IRQ_NO - Configure WDT to interrupt mode. Please replace the constant IRQ_NO with the interrupt number need to be used. The available range of the interrupt number has been listed in the beginning of this chapter

    Wtime: 0 - Configure WDT to time by minute

               1 - Configure WDT to time by second

    Timeout: 0 - disable WDT

               TIME_OUT_VALUE - Enable WDT. Please replace the constant TIME_OUT_VALUE with the unit number of timeout value (0x01 ~ 0xFF)

    Note:

*/

```
SetWDT(int Wmode,   int Wtime,   int Timeout)
{
        unsigned char oldval, tempval, tempval2;

        outportb(INDEX_PORT,0xe0);
          tempval2 = inportb(DATA_PORT);
        tempval2 &= 0xef;
        outportb(DATA_PORT, tempval2);          ;Set GPIO24 to output pin.

        outportb(INDEX_PORT,0xe9);
```

```
            oldval = inportb(DATA_PORT);

    If (Wmode == 0)
        {
          oldval |= 0x10;                      //cr e9h,bit 4: 0--- GPIO,1---WDT
          outportb(DATA_PORT, oldval);
        }
    else
        {
          oldval &= 0xef;
          outportb(DATA_PORT, oldval);

          outportb(INDEX_PORT, 0x07);
          outportb(DATA_PORT, 0x08);

          outportb(INDEX_PORT,0xf7);
          outportb(DATA_PORT, Wmode);
        }

          outportb(INDEX_PORT, 0x07);
          outportb(DATA_PORT, 0x08);

        outportb(INDEX_PORT,0xf5);
    If (Wtime == 0)
          outportb(DATA_PORT,0x08);
    Else
          outportb(DATA_PORT,0x00);

    outportb(INDEX_PORT,0xf6);
    If (Timeout == 0)
          outportb(DATA_PORT,0x00);
    Else
          outportb(DATA_PORT, Timeout);

}
```

GPIO Programming Guide

The board provides 8-channel programmable digital IO pins, four for input while the other four for output.

The following provides digital I/O program in C language; please follow the steps below to implement digital I/O programming:

(The GPIO Input PINs on motherboard include: GP05, GP06, GP46 and GP31; while the Output PINs include: GP47, GP76, GP36 and GP35)

➢   Initialize digital I/O

➢   Input/output program

1.   Initialize digital I/O

```
          #define     INDEX_PORT   0x2E
          #define     DATA_PORT         0x2F
VOID PreInitGPIO()
    {

          outportb(INDEX_PORT,0x87);
          outportb(INDEX_PORT,0x87);
          outportb(INDEX_PORT,0x07);
          outportb(DATA_PORT,0x09);
          outportb(INDEX_PORT,0x30);
          outportb(DATA_PORT,0x98);     // enable GPIO3,4,7.

          outportb(INDEX_PORT,0x07);
          outportb(DATA_PORT,0x08);
          outportb(INDEX_PORT,0x30);
          outportb(DATA_PORT,0x02);     //enable GPIO0
    }
          outportb(INDEX_PORT,0x24);
          Temp_val=inportb(DATA_PORT)&0xBF;
```

```
        outportb(DATA_PORT, Temp_val);      //GP05,GP06 select as gpio

        outportb(INDEX_PORT,0x27);
        Temp_val=(inportb(DATA_PORT)|0x40)&0xDF;
        outportb(DATA_PORT, Temp_val);      //GP46,GP76 select as gpio

        outportb(INDEX_PORT,0x2B);
        Temp_val=inportb(DATA_PORT)|0x62;
        outportb(DATA_PORT, Temp_val);      //GP31,GP35,GP36 select as gpio

        outportb(INDEX_PORT,0x1B);
        Temp_val=inportb(DATA_PORT)|0x80;
        outportb(DATA_PORT, Temp_val);      // GP47 select as gpio

        outportb(INDEX_PORT, 0Xe4);
        Temp_val=inportb(DATA_PORT) &0x9F;
        outportb(DATA_PORT, Temp_val);      // //config gp05, 06 to gpio.

        outportb(INDEX_PORT,0x07);
        outportb(DATA_PORT,0x09);
        outportb(INDEX_PORT, 0Xea);
        Temp_val=inportb(DATA_PORT) &0x9d;
        outportb(DATA_PORT, Temp_val);      // //config gp31,35,36 to gpio.

        outportb(INDEX_PORT, 0Xee);
        Temp_val=inportb(DATA_PORT) &0x3F;
        outportb(DATA_PORT, Temp_val);      // //config gp46，47 to gpio.

        outportb(INDEX_PORT,0x07);
        outportb(DATA_PORT,0x07);
        outportb(INDEX_PORT, 0Xec);
        Temp_val=inportb(DATA_PORT) &0xbf;
        outportb(DATA_PORT, Temp_val);      // //config gp76 to gpio.
```

Note: when adopting GPIO with multi-functional PINs, please initialize it to GPIO function.

2． Input/output program

```
outportb(INDEX_PORT,0x07);
outportb(DATA_PORT,0x09);

outportb(INDEX_PORT, 0Xe4);
Temp_val=(inportb(DATA_PORT)|0x02)&0x9F;
outportb(DATA_PORT,    Temp_val);              //   //config   gp31
input,gp35,36output.

outportb(INDEX_PORT, 0Xf0);
Temp_val=(inportb(DATA_PORT)|0x40)&0x7F;
outportb(DATA_PORT, Temp_val);        // //config  gp46  input, gp47
output.

outportb(INDEX_PORT,0x07);
outportb(DATA_PORT,0x07);
outportb(INDEX_PORT, 0Xe0);
Temp_val=inportb(DATA_PORT)&0xBF;
outportb(DATA_PORT, Temp_val);        //gp76 output.

outportb(INDEX_PORT,0x07);
outportb(DATA_PORT,0x08);
outportb(INDEX_PORT, 0Xe0);
Temp_val=inportb(DATA_PORT) |0x60;   .
outportb(DATA_PORT, Temp_val);        //config gp05,06 to input
```

3． Complete programming

```
Outportb(0x2e, 0xaa);
```

Troubleshooting and Solutions

NO.	Phenomenon	Troubleshooting and Solution
1	BIOS setting cannot be saved	Analysis: it could be the problem of the CMOS battery.
		Solution: measure the CMOS battery with a multi-meter; if the voltage is insufficient, replace the battery; re-set the BIOS and save again.
2	The computer can only be powered-on occasionally	Analysis: it may be caused by poor connection. Remove the power plug from power socket on motherboard, you may find that certain pin of the motherboard power has been collapsed to one side after some forceful insertion.
		Solution: power off the computer and remove the power plug; erect the bended power pin with tweezers and re-insert in the power socket. Reboot the computer and test for several times until the problem no longer exits.
3	When connecting with a USB flash drive, the system prompts that a high-speed device has been connected with a low-speed connector.	Analysis: A USB flash drive is a high-speed USB2.0; when connecting with the computer, it prompts that a high-speed device has been connected with a low-speed connector, which indicates that the connector on motherboard is regarded as a USB1.1 port.
		Solution: enable the USB high-speed transmission mode on the motherboard. Different motherboards may have different settings. Change the FULLSPEED option to HISPEED in USB device option.
4	The screen has no display after replacing with a new memory and cannot enter system; even when the former memory is re-installed, the system cannot be booted as well.	Analysis: it could result from improper operation when inserting or removing the memory and cause abnormal operation of the components on the motherboard. Focus on the circuit related to the memory on the motherboard.
		Solution: check the hardware such as memory, video card first; if it shows that the hardware are all OK, then check the circuit around the memory slot on motherboard carefully; you may find that the two pins connected with the gold finger in the first memory slot are shorted while the second memory slot is normal, then you may know that there is short circuit in the first memory slot. Remove the two pins to their original location with tweezers carefully, insert the memory, reboot the system and the

		system will be booted smoothly.
5	The system cannot be booted after replacing a CD-ROM.	Analysis: the data cable of the hard disk may get knocked when installing the CD-ROM, which leads to poor connection of the hard disk data cable, or the master and slave jumpers on hard disk and CD-ROM are wrongly set.
		Solution: check the data cable of the hard disk and the IDE connectors on hard disk and motherboard first; if there are no problems, then check the master and slave jumper setting. You may find that the hard disk and CD-ROM are connected with different data cables while their jumpers are all set to master; thus, the hard disk cannot be booted. Set the CD-ROM jumper to slave and then re-install it.
6	No PCI card can be detected after entering the system.	Analysis: make sure the PCI card functions normally; re-insert the PCI card or insert it into another PCI slot to see whether it is normal; find out the power type in use (AT or ATX); find out users' requirement for the PCI card voltage.
		Solution: if the PCI card functions abnormally, replace it with a new one; if it functions normally when re-inserted or inserted in another PCI slot, then there is something wrong between the PCI card and the slot. If AT power is adopted and the PCI card requires 3.3V voltage, then the AT power shall be replaced with ATX power because AT power cannot provide 3.3V voltage. (Suggestion: when purchasing power supplies, please check whether the PCI card in use requires 3.3V voltage or not).
7	No peripheral devices can be detected.	Analysis: devices are not connected; no drivers are loaded; devices are broken.
		Solution: check whether the cable between the device and the motherboard is normal; if it is normal, replace it with a new cable to make sure the connection is OK. Re-install the device driver and check whether it can be recognized; check whether the device is normal; if the device is normal, then check whether the device is compatible with the motherboard.