CAR-5030 Series
Communication Appliance

User's Manual
Revision: 1.0

TÜV
CERT
ISO 9001

Table of Contents

Chapter 1   Introduction

1.1 About This Manual

This manual contains all required information for setting up and using the CAR-5030 series.

CAR-5030 provides the essential platform for delivering optimal performance and functionality in the value communications appliance market segment. This manual should familiarize you with CAR-5030 operations and functions. CAR-5030 series provide Up to five PCI-E x8 slot support proprietary NIC to serve communication applications like Firewall, requiring ten Ethernet ports to connect external network (internet), demilitarized zone and internal network.

CAR-5030 series overview:
◆   Supports Dual Sandy Bridge-EP socket R 130W
◆   16 DDR3 1600 RDIMM slots for each CPU
◆   Two USB ports and one RJ45 port on COM1.
◆   Dual 3.5" SATA/ SAS HDD
◆   User-friendly LCD control panel
◆   Three PCI-Ex8 and one PCI-Ex4 add-on card slots.
◆   Provides absolute high flexibility of customized I/O configuration for front accessible PCI-E modules

1.2 Manual Organization

This manual describes how to configure your CAR-5030 system to meet various operating requirements. It is divided into three chapters, with each chapter addressing the basic concept and operation of this system.

Chapter 1:   Introduction. This section describes how this document is organized. It includes brief guidelines and overview to help find necessary information.

Chapter 2:   Hardware Configuration Setting and Installation. This chapter demonstrated the hardware assembly procedure, including detailed information. It shows the definitions and locations of Jumpers and Connectors that can be used to configure the system.

Chapter 3:   Operation Information. This section provides illustrations and information on the system architecture and how to optimize its performance.

Chapter 4:   This section describes how to programming software. It includes EZIO.

1.3 Technical Support Information

Users may find helpful tips or related information on Portwell's web site: *http:// www.portwell.com* A direct contact to Portwell's technical person is also available. For further support, users may also contact Portwell's headquarter in Taipei or local distributors.

Taipei Office Phone Number: +886-2-7705-8888

Figure 1-1   Board Layout of CAR-5030 M/B

1.5 System Block Diagram
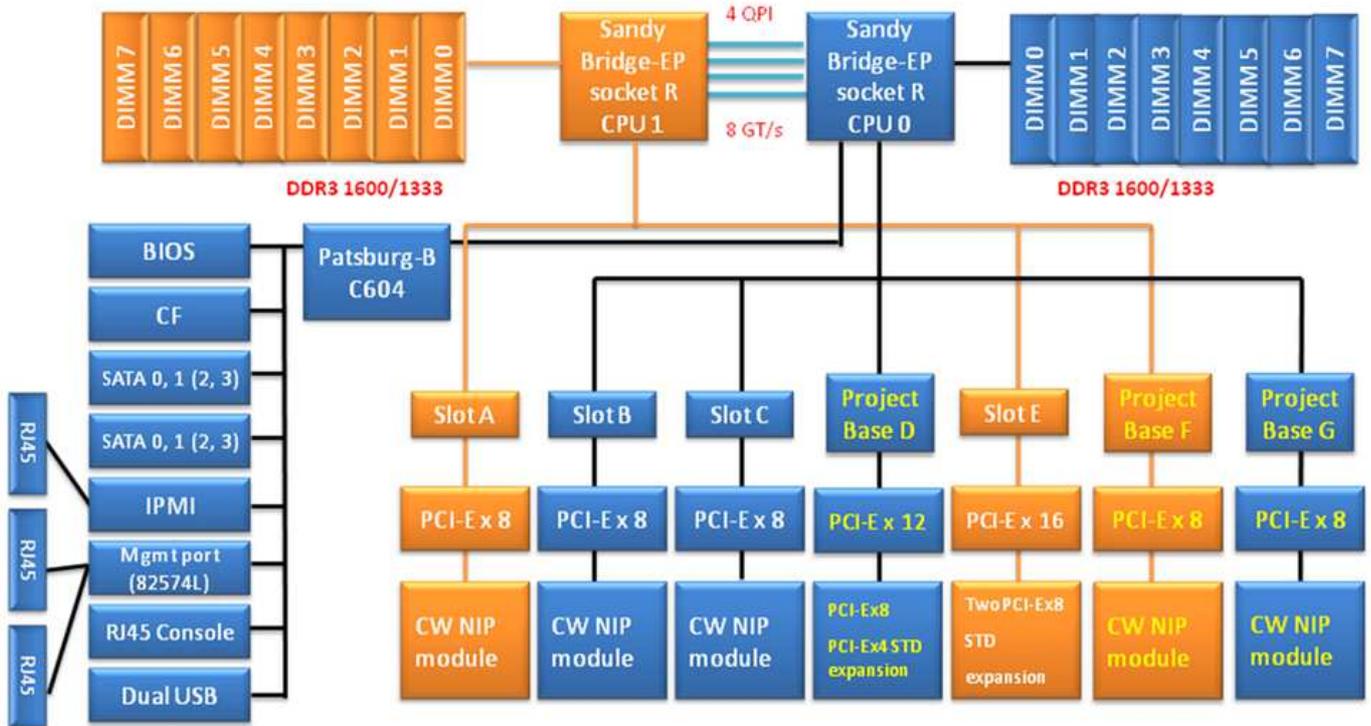
Figure 1-2   CAR-5030 Basic Block Diagram

1.6 Product Specifications

	Feature	Detailed Description
1	CPU	Dual Sandy Bridge-EP socket R 130W
2	CPU Board	◆ CAPB-5030VR
3	System Memory	◆ 16 DDR3 1600 RDIMM slots for each CPU ◆ Support ECC, R and U DIMM
4	Power Supply	◆ 500W/ 600W 1+1 Redundant PSU w/ smart fan ◆ Dimension: TBD
5	Ethernet	◆ Up to five PCI-E x8 slot support proprietary NIC
6	SATA & IDE Interfaces	◆ Dual 3.5" SATA/ SAS HDD
7	Front Panel	◆ EZIO ◆ 2 Drawable 3.5" HDD Kit ◆ USB interface: dual-USB connectors ◆ RS232 interface: RS232 port with RJ45 connector for system console, tab-down, no LED. ◆ Dual Mgnt. Ports ◆ One IPMI port ◆ Hardware power on/off Button ◆ F/D button ◆ Drawable Ethernet module ◆ LED: ◆ System LED: Power, Data access ◆ Ethernet LED: For every Ethernet interface there should be LEDs for link status and speed of LAN-ports, which should be built in the connector.
8	Rear Panel	◆ AC power inlet ◆ Power switch ◆ Two expansion module for PCI-Ex8
9	Dimension	◆ 2U Dimension: 438(W) x 626 (D) x 88 (H) (TBD)
11	Environmental requirement	<table><tr><td></td><td>Operating</td><td>Storage</td></tr><tr><td>Acoustics</td><td></td><td></td></tr><tr><td>Temperature</td><td>0°C to 40°C</td><td>-10°C to 70°C</td></tr><tr><td>Relative Humidity</td><td>20 to 90% RH</td><td>5 to 95% RH @55℃ (EZIO)</td></tr></table>

	Feature	Detailed Description		
			w/o EZIO @70℃	

	Operating	Storage
Shock	0.5 Sine s ock, 10G peak, 10 +/- 3 ms on (X,Y,Z) axis	
Vibration	0.5G (Peak) / 5~5 0 Hz, 2hours at ach of Z axis	(Packaged) Sine Wave,2.0G/ 5~500 Hz, 2hours at ach axis(X,Y,Z)
Transpor ation		(Packaged) 0.5 sine shock 50 peak on each surface.
Dr p		(Packaged) Portwell standard from level 1 to 4
Random Vibration		(Packaged) Sine Wave,2.8G/ 5~500 Hz, 1hours at each axis(X,Y,Z)

♦

Chapter 2Getting Started

This section describes how the hardware installation and system settings should be done.

2.1Included Hardware

The following hardware is included in package:

- CAR-5030 Communication Appliance System Board
- One null serial port cable

2.2Before You Begin

To prevent damage to any system board, it is important to handle it with care. The following measures are generally sufficient to protect your equipment from static electricity discharge:

When handling the board, to use a grounded wrist strap designed for static discharge elimination and touch a grounded metal object before removing the board from the antistatic bag. Handle the board by its edges only; do not touch its components, peripheral chips, memory modules or gold contacts.

When handling processor chips or memory modules, avoid touching their pins or gold edge fingers. Restore the communications appliance system board and peripherals back into the antistatic bag when they are not in use or not installed in the chassis.

Some circuitry on the system board can continue operating even though the power is switched off. Under no circumstances should the Lithium battery cell used to power the real-time clock be allowed to be shorted. The battery cell may heat up under these conditions and present a burn hazard.

WARNING!

1. **"CAUTION: DANGER OF EXPLOSION IF BATTERY IS INCORRECTLY REPLACED. REPLACE ONLY WITH SAME OR EQUIVALENT TYPE RECOMMENDED BY THE MANUFACTURER. DISCARD USED BATTERIES ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS"**

2. **This guide is for technically qualified personnel who have experience installing and configuring system boards. Disconnect the system board power supply from its power source before you connect/disconnect cables or install/remove any system board components. Failure to do this can result in personnel injury or equipment damage.**

3. **Avoid short-circuiting the lithium battery; this can cause it to superheat and cause burns if touched.**

4. **Do not operate the processor without a thermal solution. Damage to the processor can occur in seconds.**

5. **Do not block air vents. Minimum 1/2-inch clearance required.**

2.3.1 CAR-5030 System Board Jumper

In general, jumpers on CAR-5030 system board are used to select options for certain features. Some of the jumpers are configurable for system enhancement. The others are for testing purpose only and should not be altered. To select any option, cover the jumper cap over (Short) or remove (NC) it from the jumper pins according to the following instructions. Here NC stands for "Not Connected".
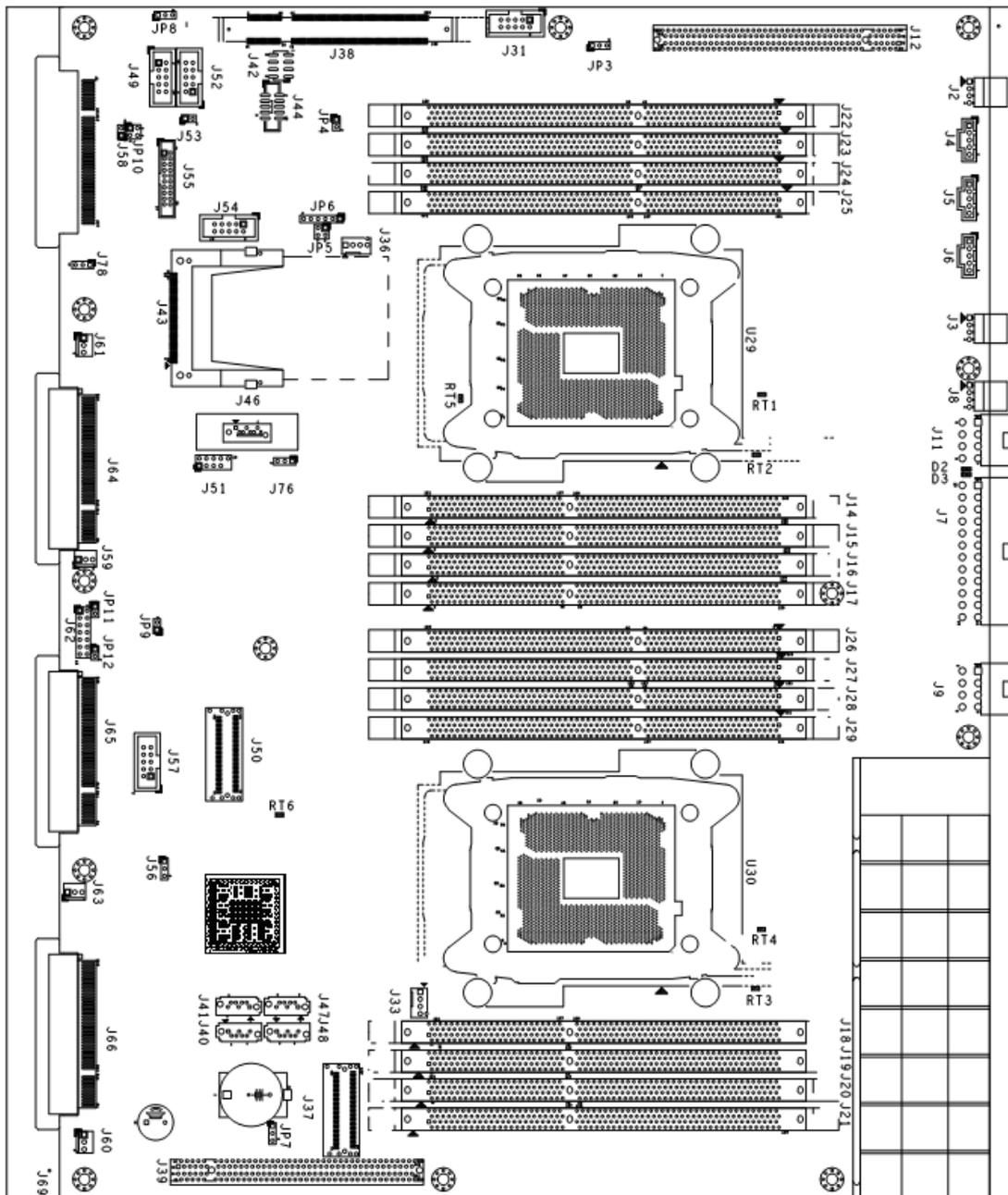
Jumper List

JP3: Slot E(J12) PCI express width *1-2: two x8(default), 2-3: by Riser card Open: x16	**JP4**: NMI button *open (default)
JP5: Factory test use only *1-2 3-4(default)	**JP6**: Factory test use only *Open (default)
JP7: CMOS clean *1-2: Normal (default), 2-3: clear	**JP8**: GPIO port(J52) power selector *1-2: 5Voltage (default), 2-3: 3.3Voltage
JP9: Factory test use only *open (default)	**JP10:** Factory test use only *1-2 3-4(default)
JP11: Auto power ON *1-2 enable (default), Open: Disable	**JP12**: Watchdog timer reset *1-2 enable (default), Open: Disable
J76: SATA DOM Power Select *2-3 GND (default), 1-2: VCC	**J78**: Mgmt. Board RES/PB Switch *1-2 PB (default), 2-3: RB

LED List

D2 : (Green) 5VSB indicator, Power standby
D3 : (Orange) VCC3 indicator, Power ON

Thermal sensor List

RT1 : CPU1 PWM temperature sensor
RT2 : CPU1 VSA temperature sensor
RT3 : CPU0 VSA temperature sensor
RT4 : CPU0 PWM temperature sensor
RT5 : CPU1 temperature sensor
RT6 : System temperature sensor
RT7 : CPU0 temperature sensor

Connector List

J1/ J10/J13/J30/J32/J34/J35/J45: N/A	**J2**: Chassis Fan 1
J3: Chassis Fan 2	**J4**: Host SM bus
J5: Power supply SM bus for IPMI	**J6**: PM bus connector
J7: ATX PSU main connector	**J8**: Chassis Fan 3
J9: AUX +12V input for CPU0	
J11: AUX +12V input for CPU1	**J12**: PCIe expansion x16 slot **E**
J14: CPU 1, CH H DIMM1	**J15**: CPU 1, CH H DIMM0
J16: CPU 1, CH G DIMM1	**J17**: CPU 1, CH G DIMM0
J18: CPU 0, CH D DIMM1	**J19**: CPU 0, CH D DIMM0
J20: CPU 0, CH C DIMM1	**J21**: CPU 0, CH C DIMM0
J22: CPU 1, CH E DIMM0	**J23**: CPU 1, CH E DIMM1
J24: CPU 1, CH F DIMM0	**J25**: CPU 1, CH F DIMM1
J26: CPU 0, CH A DIMM0	**J27**: CPU 0, CH A DIMM1
J28: CPU 0, CH B DIMM0	**J29**: CPU 0, CH B DIMM1
J31: PS2 Keyboard / Mouse	**J33**: CPU 0 (right) FAN
J36: CPU 1(left) FAN	**J37**: Cable PCI express x8*
J38: IPMI	**J39**: PCI express slot **D** x8 + x4*
J40: SATA port 0 (6 Gb/s)	**J41**: SATA port 1 (6 Gb/s)
J42: IPMB	**J43**: CF socket
J44: COM 2 (for Ezio)*	**J46**: SATA port 4 (SATA DOM only)
J47: SAS port 1	**J48**: SAS port 0
J49: COM 2	**J50**: Cable PCI express x8
J51: LPC debug port*	**J52**: GPIO*
J53: Over Temperature LED connector	**J54**: VGA*
J55: TPM	**J56**: System Management Link
J57: USB 2/3 (aux USB)*	**J58**: CASEOPEN
J59: Front Fan	**J60**: Front Fan
J61: Front Fan	**J62**: Front Panel Control
J63: Front Fan	**J64**: PCI express x8 slot **A** (CPU 1)*
J65: PCI express x8 slot **B** (CPU 0)*	**J66**: PCI express x8 slot **C** (CPU 0)*
J67 ~ J73/**J75**: N/A	**J74**: Expansion slot **M** ABM-5020 manager board connector
U30: CPU 0 socket	**U29**: CPU 1 socket

*With detail pin list

J49: COM 2

9 7 5 3 1
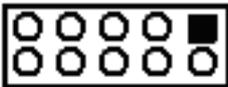
10 8 6 4 2

9 GND	7 DTR	5 TXD	3 RXD	1 CD
10 NC	8 RI	6 CTS	4 RTS	2 DSR

J52: GPIO

9 7 5 3 1
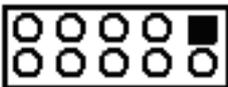
10 8 6 4 2

9 GND	7 GP34	5 GP35	3 GP36	1 GP37
10 POWER	8 GP23	6 GP22	4 GP31	2 GP30

J31: PS/2 KEYBOARD MOUSE

9 7 5 3 1
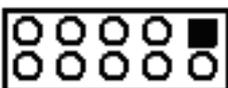
10 8 6 4 2

9 MOUSE CLK	7 VCC(+5V)	5 GND	3 NP	1 MOUSE DATA
10 KEY CLK	8 VCC(+5V)	6 GND	4 NP	2 KEY DATA

J57: USB 2(3)

9 7 5 3 1
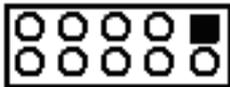
9 SBV3 (+5V)	**7** SBD-3	**5** SBD+3	**3** GND	**1** NC
10 NC	**8** GND	**6** SBD+2	**4** SBD-2	**2** SBV2 (+5V)

10 8 6 4 2

J62: Front Panel Control

2 PWR LED+	**4** PWR LED	**6** PWRON-	**8** PWR ON+	**10** LDF-	**12** FAULT LED+	**14** FAULT LED-
1 IDE LED+	**3** IDE LED-	**5** RESET-	**7** RESET+	**9** LDF+	**11** CHASSIS LED+	**13** CHASSIS LED-

J51: LPC debug port

2 4 6 8 10
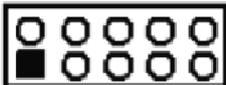
1 3 5 7 9

2 VCC3	**4** RESET#	**6** LFRAME#	**8** 33MHZ CLOCK	**10** GND
1 LAD0	**3** LAD1	**5** LAD2	**7** LAD3	

J54: VGA

9 7 5 3 1
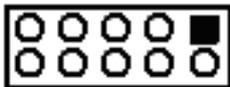
10 8 6 4 2

9 H-SYNC	**7** V-SYNC	**5** BLUE	**3** GREEN	**1** RED
10 NC	**8** GND	**6** DDC_DATA	**4** GND	**2** DDC_CLOCK

J44: EZ-IO (COM 2)

2 4 6 8 10
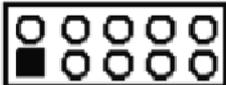
1 3 5 7 9

2 N/A	**4** N/A	**6** N/A	**8** N/A	**10** N/A
1 GND	**3** RXD	**5** TXD	**7** 5V	**9** N/A

J64/J65/J66: PCI express x8(or x4 2pcs) expansion slot pin define

B1	+12V	**A1**	VCC
B2	+12V	**A2**	+12V
B3	+12V	**A3**	+12V
B4	GND	**A4**	SLOT ID BIT0
B5	SMB_CLOCK	**A5**	VCC
B6	SMB_DATA	**A6**	VCC
B7	GND	**A7**	VCC3
B8	3.3V	**A8**	VCC3
B9	SLOT ID BIT1	**A9**	VCC3
B10	3.3V DUAL	**A10**	VCC3
B11	WAKE-	**A11**	PERST-
B12	PWRGD-	**A12**	GND
B13	GND	**A13**	REFCLK+1
B14	PET+0	**A14**	REFCLK-1
B15	PET-0	**A15**	GND
B16	GND	**A16**	PER+0
B17	RSVD	**A17**	PER-0
B18	GND	**A18**	GND
B19	PET+1	**A19**	RSVD

B20	PET-1	**A20**	GND
B21	GND	**A21**	PER+1
B22	GND	**A22**	PER-1
B23	PET+2	**A23**	GND
B24	PET-2	**A24**	GND
B25	GND	**A25**	PER+2
B26	GND	**A26**	PER-2
B27	PET+3	**A27**	GND
B28	PET-3	**A28**	GND
B29	GND	**A29**	PER+3
B30	REFCLK+0	**A30**	PER-3
B31	REFCLK-0	**A31**	GND
B32	GND	**A32**	RSVD
B33	PET+4	**A33**	RSVD
B34	PET-4	**A34**	GND
B35	GND	**A35**	PER+4
B36	GND	**A36**	PER-4
B37	PET+5	**A37**	GND
B38	PET-5	**A38**	GND
B39	GND	**A39**	PER+5
B40	GND	**A40**	PER-5
B41	PET+6	**A41**	GND
B42	PET-6	**A42**	GND
B43	GND	**A43**	PER+6
B44	GND	**A44**	PER-6
B45	PET+7	**A45**	GND
B46	PET-7	**A46**	GND
B47	GND	**A47**	PER+7
B48	PE_WIDTH0- (L: x8, H: x4)	**A48**	PER-7
B49	GND	**A49**	GND

*J64: SLOT A ID BIT 0/1 equal 00** J65: SLOT B ID BIT 0/1 equal 01
** *J66: SLOT C ID BIT 0/1 equal 10

J37/J50 PCI express cable x8 pin define

A1	GND	**B1**	GND
A2	PET+0	**B2**	PER+0
A3	PET-0	**B3**	PER-0
A4	GND	**B4**	GND
A5	PET+1	**B5**	PER+1
A6	PET-1	**B6**	PER-1
A7	GND	**B7**	GND
A8	PET+2	**B8**	PER+2
A9	PET-2	**B9**	PER-2
A10	GND	**B10**	GND
A11	PET+3	**B11**	PER+3
A12	PET-3	**B12**	PER-3
A13	GND	**B13**	GND
A14	REFCLK+	**B14**	3.3V
A15	REFCLK-	**B15**	3.3V
A16	GND	**B16**	3.3V
A17	SMB_CLOCK	**B17**	GND
A18	SMB_DATA	**B18**	GND
A19	GND	**B19**	GND
A20	CPRSNT#	**B20**	PWRGD#
A21	PE_WIDTH0- (L: x8, H: x4)	**B21**	RESET#
A22	GND	**B22**	GND
A23	PET+4	**B23**	PER+4
A24	PET-4	**B24**	PER-4
A25	GND	**B25**	GND
A26	PET+5	**B26**	PER+5
A27	PET-5	**B27**	PER-5
A28	GND	**B28**	GND
A29	PET+6	**B29**	PER+6
A30	PET-6	**B30**	PER-6
A31	GND	**B31**	GND
A32	PET+7	**B32**	PER+7
A33	PET-7	**B33**	PER-7
A34	GND	**B34**	GND

2.4 The Chassis

The system is integrated in a customized 2U chassis (*Fig. 2-1, Fig. 2-2*). On the front panel user will find a 4-push-button LCD module (EZIO), two USB ports and a COM port and Ethernet ports.

CAR-5030

Fig. 2-1 *Front view of the chassis*

Fig. 2-2 *Rear view of the chassis*

2.5 Open the Chassis

1. Please loosen the screw of top cover: two at the left and right side, last one at the rear side, to remove the top lead (*Fig. 2-3*).

Fig. 2-3 *Take off screws*

2. The top lead (*Fig. 2-4*) can be removed from the base stand (*Fig. 2-5*).

Fig. 2-4 *The top lead*

Fig. 2-5 *The base stand*

To install a CPU

1. Local the CPU socket on the motherboard

CAR-5030 CPU socket B ILM

> Before installing the CPU, make sure that the socket box is facing towards you and the load lever is on your left.

2. Press the load lever with your thumb (A), then move it to left (B) until it is released from the retention tab

Retention tab

Load lever

PnP Cap

This side of the socket box should face you

> To prevent damage to the socket pins, do not remove the PnP cap unless you are installing a CPU.

3. Lift the load lever in the direction of the arrow to a 135° angle

4. Lift the load plate with your thumb and forefinger to a 100° angle (A), then push the PnP cap from the load plate window to remove (B)

5. Position the CPU over the socket, making sure that the gold triangle is on the bottom-left corner of the socket. The socket alignment key should fit into the CPU notch

Alignment key

Gold triangle mark

6. Close the load plate (A), then push the load lever (B) until it snaps into the retention tab
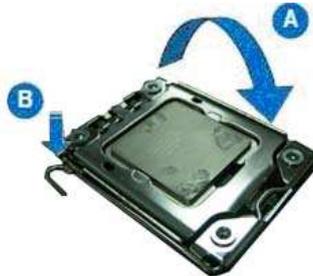
⚠ The CPU fits in only one correct orientation. DO NOT force the CPU into the socket to prevent bending the connectors on the socket and damaging the CPU!

Configure Processor Speed

The system was designed to self-detect its CPU speed. So it does not require any system adjustment.

Once the system CPU does not run frequency correctly, try to clean CMOS or enter BIOS setup to load failsafe default then load optimal default one time.

Follow these steps to upgrade RAM module:

Make sure to unplug the power supply before adding or removing DIMMs or other system components. Failure to do so may cause severe damage to both the motherboard and the components.

1. Unlock a DIMM socket by pressing the retaining clips outward
2. Align a DIMM on the socket such that the notch on the DIMM matches the break on the socket

DDR DIMM notch

Unlocked retaining clip
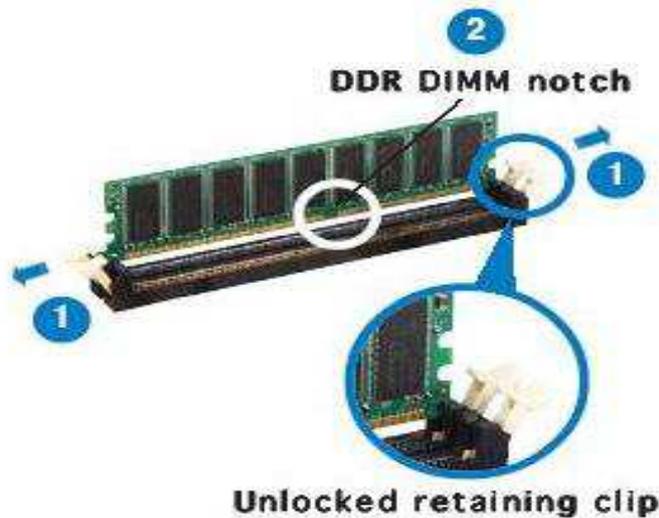
A DDR DIMM is keyed with a notch so that it fits in only one direction. DO NOT force a DIMM into a socket to avoid damaging the DIMM.

3. Firmly insert the DIMM into the socket until the retaining clips snap back in place and the DIMM is properly seated

Locked Retaining Clip
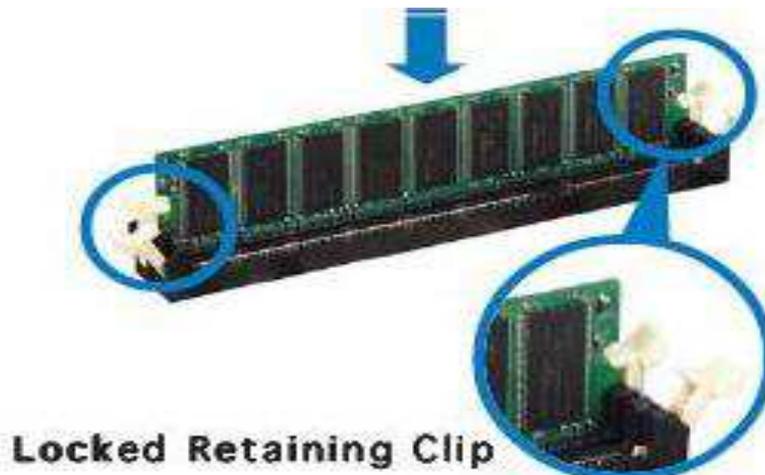
Follow these steps to remove a DIMM:

1. Simultaneously press the retaining clips outward to unlock the DIMM

DDR DIMM notch
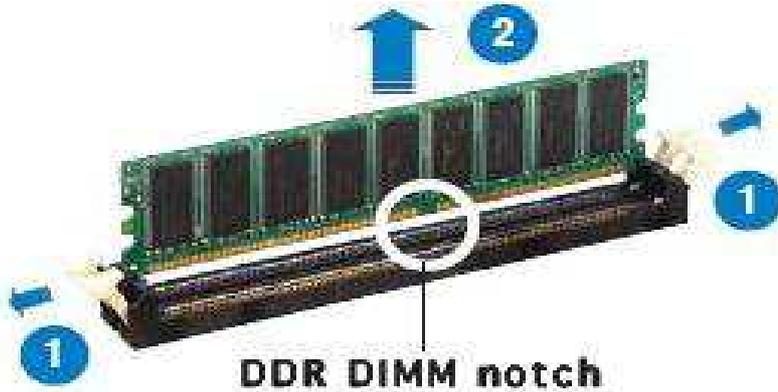
2. Remove the DIMM from the socket

Follow these steps for DIMM configuration:

1. Memory socket A0 ~D1 are controlled by CPU0
2. Memory socket E0 ~H1 are controlled by CPU1
3. If users use only CPU0, memory can't be used when installed on socket A0~D1
4. When user installs memory, please install them from A0, B0, C0, D0, E0, F0, G0 or H0 first. (Black socket)
5. Memory speed support depends on the types of CPU.
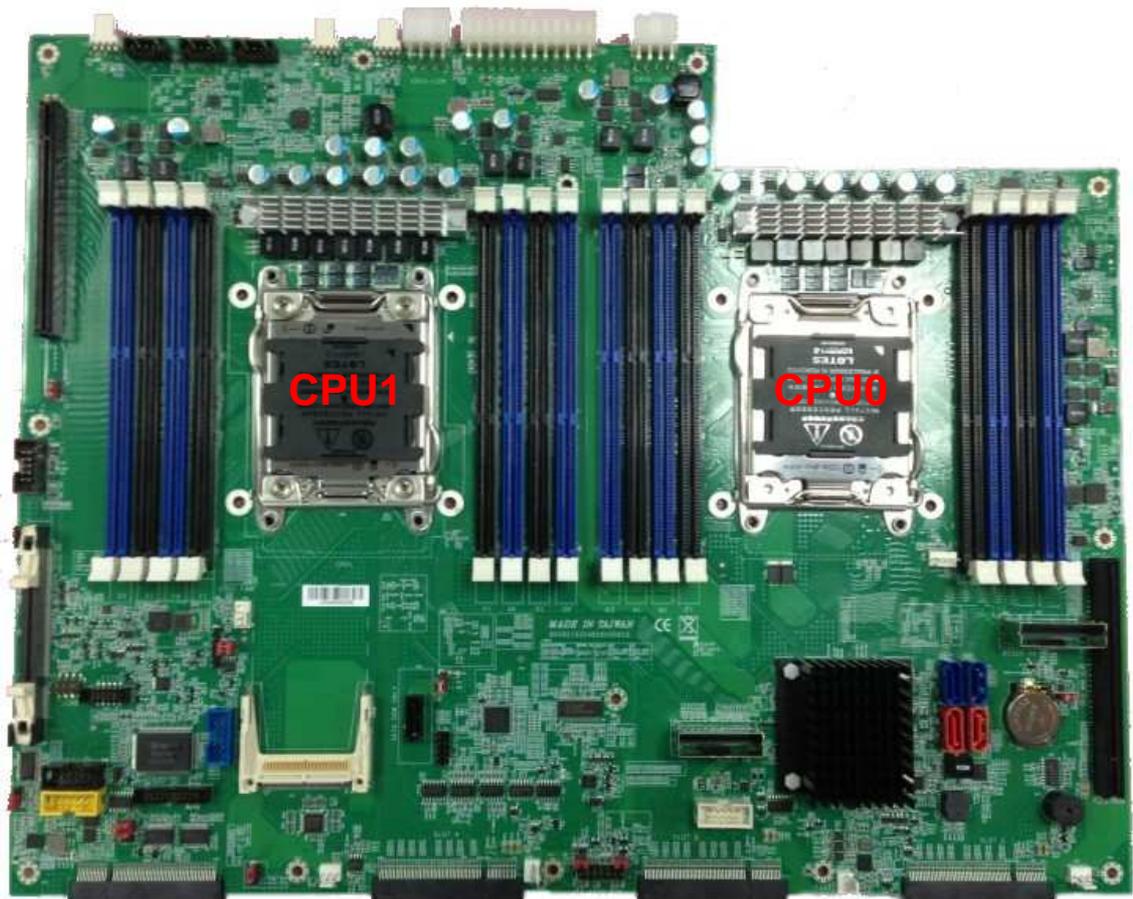
6. Follow the table below for memory installation: For Nehalem/Westmere CPU.

Memory optimal performance for main board with CPU 0 installed.								
	Branch 0		Branch 1		Branch 2		Branch 3	
2 DIMM	A0		B0					
4 DIMM	A0		B0			D0		C0
8 DIMM	A0	A1	B0	B1	D1	D0	C1	C0

Memory optimal performance for main board with CPU 1 installed.								
	Branch 0		Branch 1		Branch 2		Branch 3	
2 DIMM	E0		F0					
4 DIMM	E0		F0			H0		G0
8 DIMM	E0	E1	F0	F1	H1	H0	G1	G0

Memory optimal performance for main board with two CPUs installed															
	CPU0								CPU1						
	Branch 0		Branch 1		Branch 2		Branch 3		Branch 0		Branch 1		Branch 2		Branch 3
8DIMM	A0		B0			D0		C0	E0		F0			H0		G0
16 DIMM	A0	A1	B0	B1	D1	D0	C1	C0	E0	E1	F0	F1	H1	H0	G1	G0

Memory speed support table															
Speed (MHz)	CPU0								CPU1						
	Branch 0		Branch 1		Branch 2		Branch 3		Branch 0		Branch 1		Branch 2		Branch 3
800,1066 1333	A0		B0			D0		C0	E0		F0			H0		G0
800,1066	A0	A1	B0	B1	D1	D0	C1	C0	E0	E1	F0	F1	H1	H0	G1	G0

2.8Remove and Install Compact Flash Card

1. Insert the Compact Flash Card (*Fig. 2-7*) into the CF interface (*Fig. 2-8*).

Fig. 2-6 Compact Flash Card
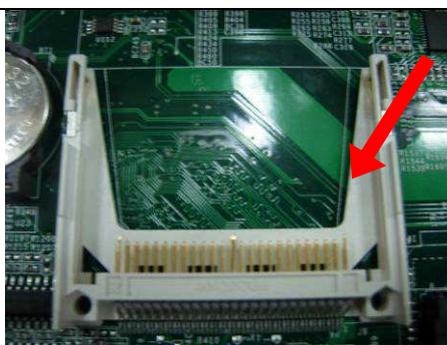
Fig. 2-7 Insert Compact Flash Card into the CF interface

2.The completed installation of Compact Flash Card is shown as Fig. 2-8

Fig. 2-8 Completion of Compact Flash Card

2.9Remove and Install Battery

1. Press the metal clip back to eject the button battery (*Fig. 2-9*).

2. Replace it with a new one by pressing the battery with fingertip to restore the battery (*Fig. 2-10*).
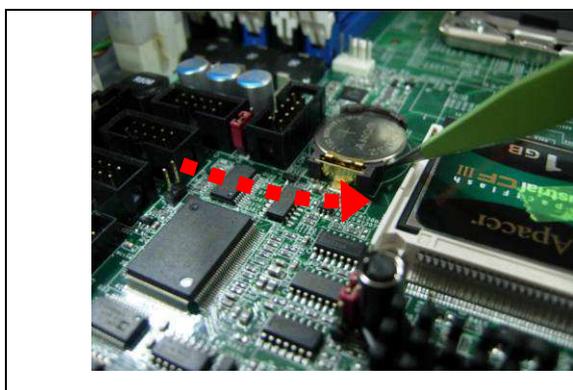
Fig. 2-9 Eject the battery

Fig. 2-10 Restore the battery

2.10 Install HDD

The system has an internal drive bay for one 3.5" SATA hard disk drive. If the HDD is not pre-installed, user can install it by himself. Follow the steps below to install the HDD:

1. Fasten the four screws to lock HDD and bracket together (***Fig. 2-11a, 2-11b***).

Fig. 2-11a *A 3.5"SATA HDD and the HDD bracket*	***Fig. 2-11b*** *Fix HDD to the bracket*
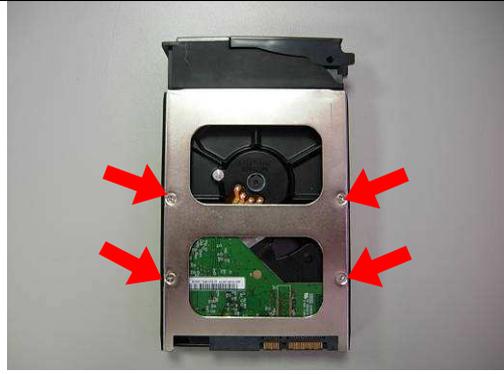
2. Install HDD tray to CAR-5030 system (***Fig. 2-12***).

Fig. 2-12a *Connect HDD bracket to CAR-5030 system then push the switch in.*	***Fig. 2-12b*** *Fix HDD into CAR-5030 system*

2.11 Ear Mount Kit Installation

The CAR-5030 series shipped with 2 ear mount kits. The following is the installation instruction of these ear mounts:

1. Take out the L shape ear mount kits. One ear mount fits on one side of the chassis,
2. Placing the side with four holes agonists the chassis and the side with two holes face outward. (***Fig. 2-13.1***)
3. If users need to mount system from front. Fasten five screws on each side (***Fig. 2-13.1).*** And push the system from front into rack mount.
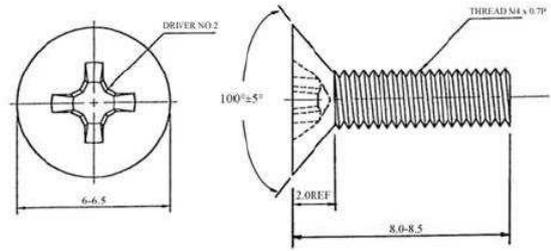
Fig.2-13.1 *Fasten the screws to the side*

4. If users need to mount system from rear. Fasten nine screws on each side (*Fig. 2-13.2 and Fig. 2-13.3).* And push the system from rear into rack mount.
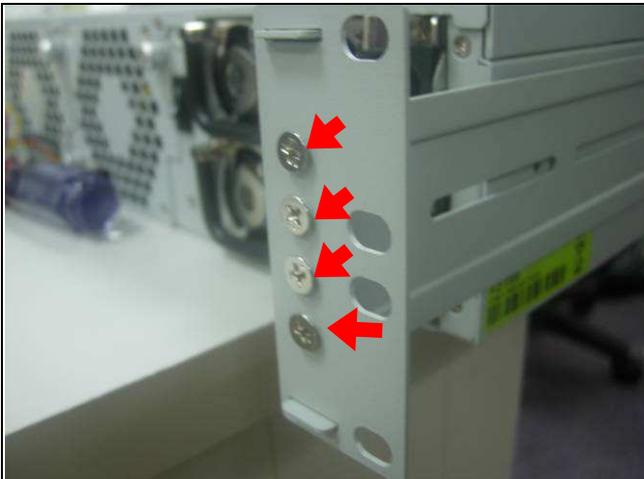
Fig.2-13.2 *Fasten the screws to the side*   **Fig.2-13.3** *Fasten the screws to the side*
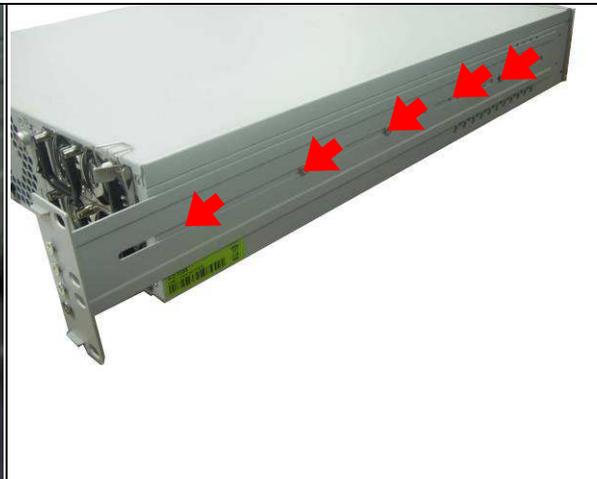
2.12 Remove EZIO / LCD

The CAR-5030 series support EZIO modules. The following is the remove instruction of these EZIO/LCD modules:

1. Remove all cables from EZIO (*Fig. 2-14, 2-15, 2-16*).

Fig.2-14 *Remove the EZIO cable from EZIO*

Fig.2-15 *Cut the cable collector.*

Fig.2-16 *Remove the front panel cable from main board*

2. Remove the front panel from chassis. (*Fig. 2-17a, 2-17b*).

Fig.2-17a   Please loosen the screw of top cover: two at the left and right side, last one at the rear side, to remove the top lead
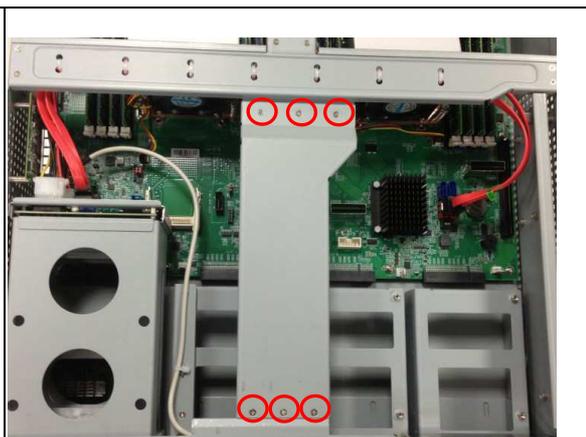
Fig.2-17b   *Remove screws and rack.*

3. Remove the EZIO kit from chassis.

Fig.2-18   *Remove the screws from EZIO kit*

4. Final remove the EZIO/LCD module.
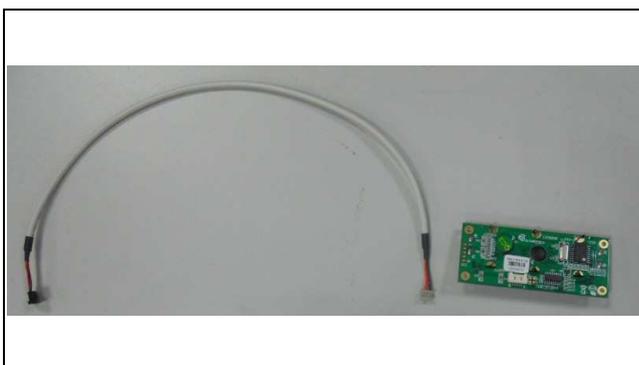
Fig.2-20   *Remove EZIO/LCD from EZIO kit*

2.13 Remove Power Supply

The following is the remove step instruction of power supply.

1. Remove the power modules

Fig.2-21.1 Remove *the screw to unlock the power module.*
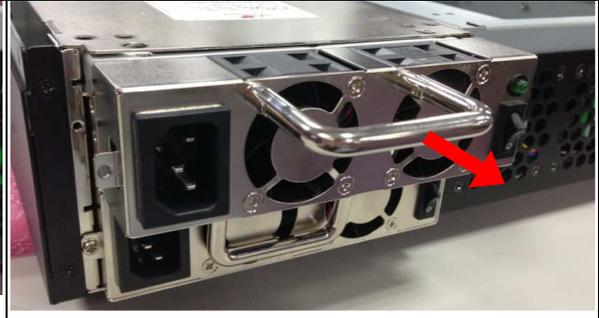
Fig.2-21.2 *Pull out the power modules.*

2. Remove all power cables from main board and HDD bay. Remove I2C cable from board.
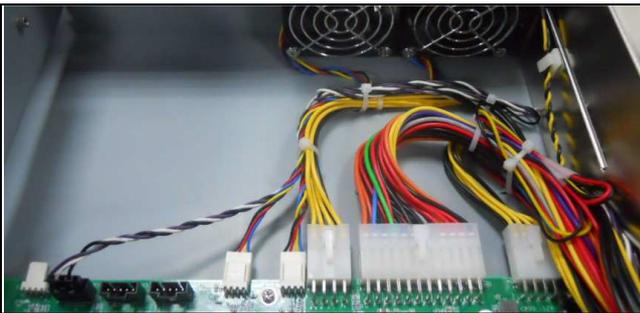
Fig.2-23 *Remove all power cables from board and HDD bay.*
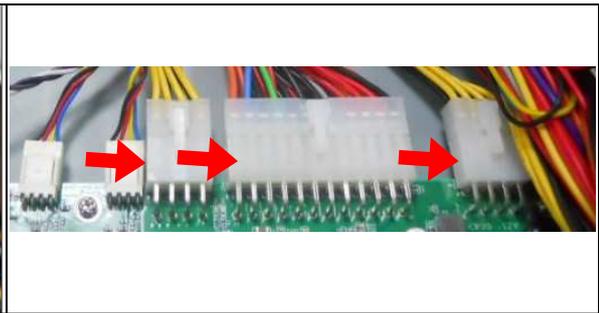
Fig.2-24 *Remove all cables from the board.*
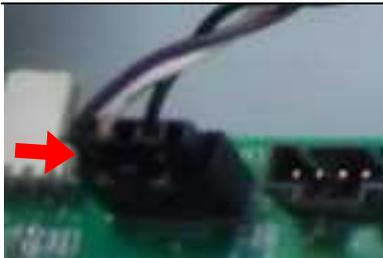
Fig.2-23 *Remove I2C cable.*

3. Remove all screws from power supply.

Fig.2-25.1 *Remove the screws.*   **Fig.2-25.2   Remove the screws.*

4. Push the power supply inside system then lift up power supply to pull out the power supply.
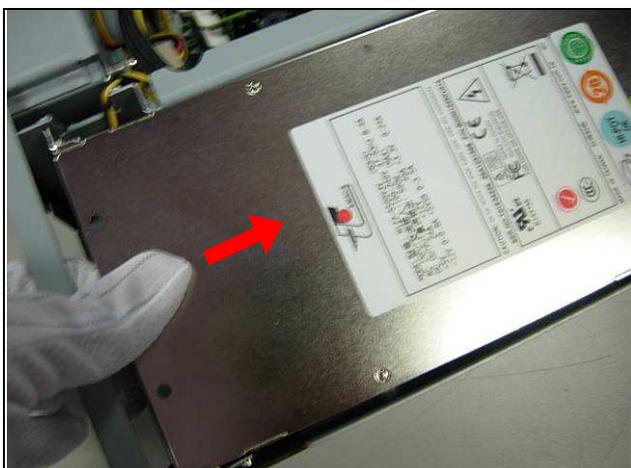
Fig.2-26.1 *Push the power supply into system first.*   **Fig.2-26.2** *Lift up and Pull out the power supply.*

2.14 Remove main board

The section shows how to remove the main board.

1. Remove all add-on modules or LOM devices from system first.
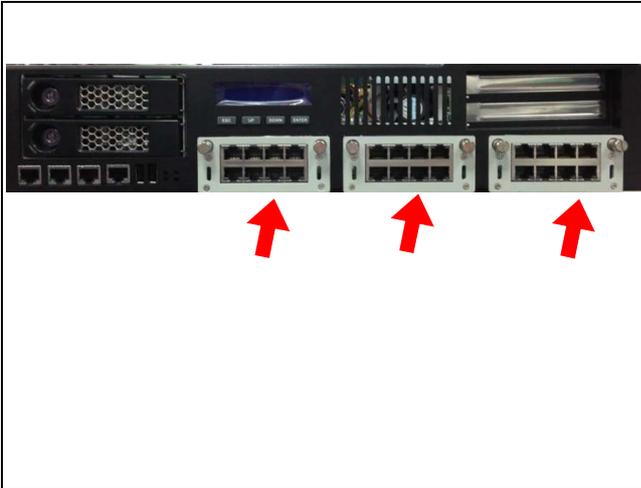
Fig.2-27 *Remove all add-on modules.*
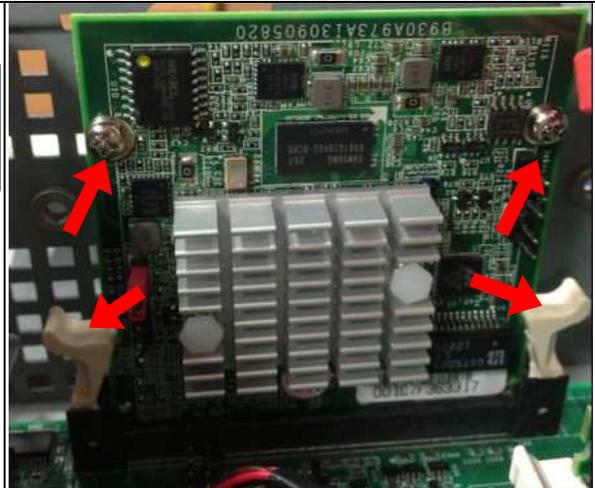
1. Fig.2-28   1.Remove the screws.
   2. .Remove the LOM from the socket.

2. Remove following items from main board: cables, CPU cooler, CPU, memory.
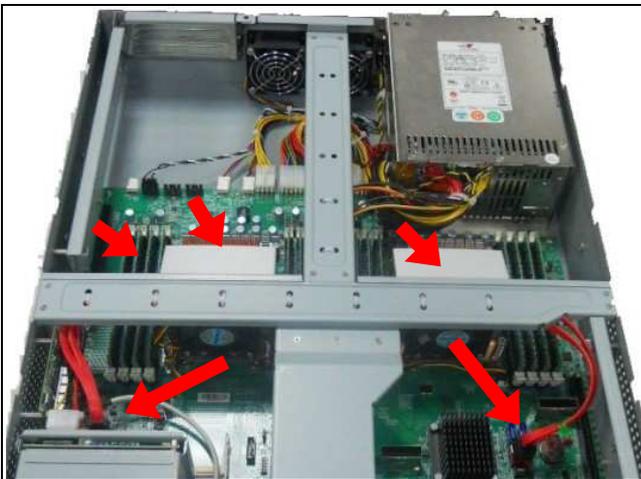
Fig.2-29 *Remove CPU cooler, CPU and memory. All SATA and power cble.*

Fig.2-30   *Remove all fan cable from board.*

3. After remove above items, and push the PnP cap back to CPU socket. Users can start remove all screws from board.
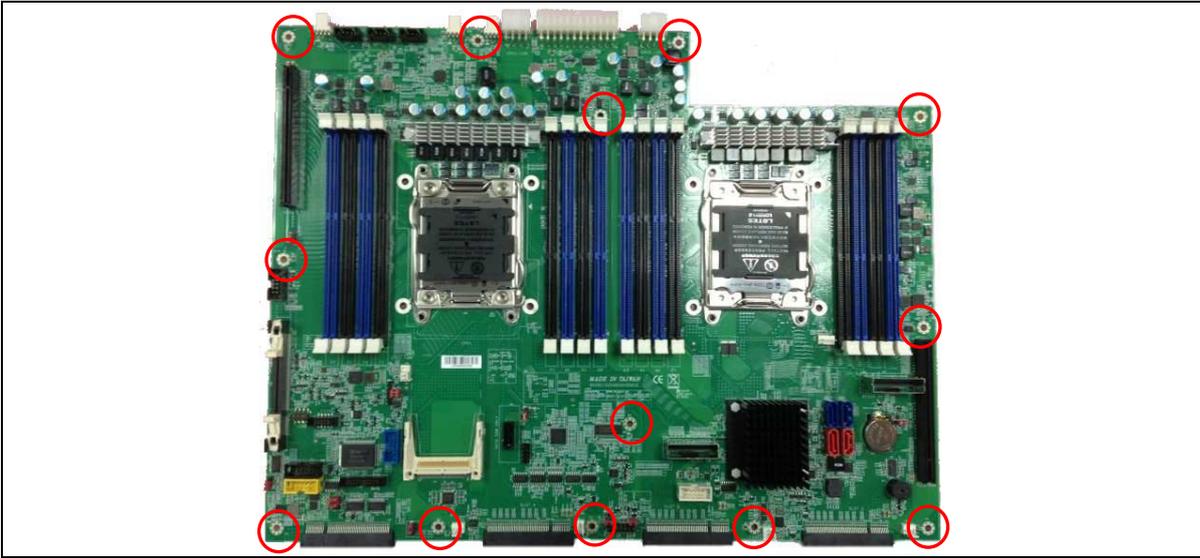
Fig.2-31 *Remove all screws from main board.*

P.S After remove all screws from board. User can remove main board. Please be genteelly and carefully. Avoid colliding board with chassis bottom sticks. It may damage the main components.

 Connection Using Hyper Terminal

To access CAR-5030 via the console, Hyper Terminal is one of many choices. Follow the steps below for the setup:

Fig.2-36 Connect null serial port cable to CAR-5030 console management port.

Note: Terminal software may need to update for correct console output.

1. Execute HyperTerminal under C:\Program Files\Accessories\HyperTerminal
2. Enter a name to create new dial
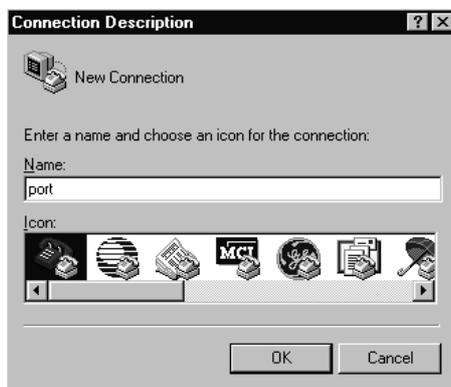
3. For the connection settings, make it Direct to Com1.

4. Please make the port settings to Baud rate 19200, Parity None, Data bits 8, Stop bits 1
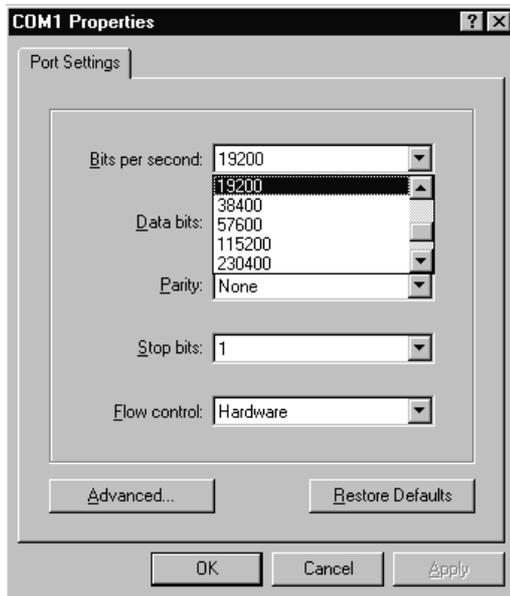
5. Turn on the power of CAR-5030 system, after following screen was shown:
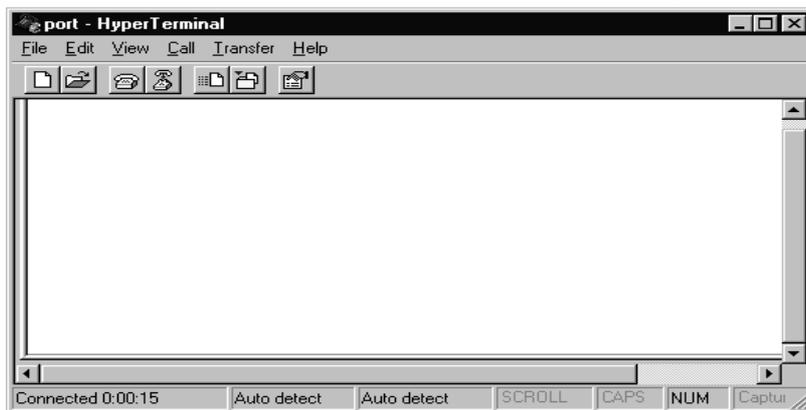
6. User can see the boot up information of CAR-5030.

```
p - HyperTerminal
File  Edit  View  Call  Transfer  Help

AMIBIOS(C)2006 American Megatrends, Inc.
BIOS Date: 04/28/09 15:06:29 Ver: 08.00.15
CPU : Intel(R) Xeon(R) CPU          E5540  @ 2.53GHz
 Speed : 2.53 GHz    Count : 2

Press DEL to run Setup ('TAB' key on Re  603C yboard)
Press 'L' key if you want to boot from the network
Press F11 for BBS POPUP  ('B' key on Remote Keyboard)
Initializing USB Controllers .. Done.
6136MB OK




(C) American Megatrends, Inc.
66-3257-009999-00101111-042809-TYLSBURG-1AAAA000-Y2KC              603C

Connected 0:00:19    Auto detect    19200 8-N-1    SCROLL   CAPS   NUM   Capture
```

7. When message "Hit <DEL> if user want to run Setup" appear during POST, after turning on or rebooting the computer, press **<Tab>** key *immediately* to enter BIOS setup program.

This is the end of this section. If the terminal did not port correctly, please check the previous   steps.

Chapter 3   BIOS Setting

3.1 BIOS Setup Information

Power on the system, press the <Del> to run BIOS setup (remote mode is <Tab>). After you press the <Delete> key, the main BIOS setup menu displays. You can access the other setup screens from the main BIOS setup menu, such as the Chipset and Power menus.

The BIOS setup/utility uses a key-based navigation system called hot keys. Most of the BIOS setup utility hot keys can be used at any time during the setup navigation process. These keys include <F1>, <F4> <Enter>, <ESC>, <Arrow> keys, and so on.
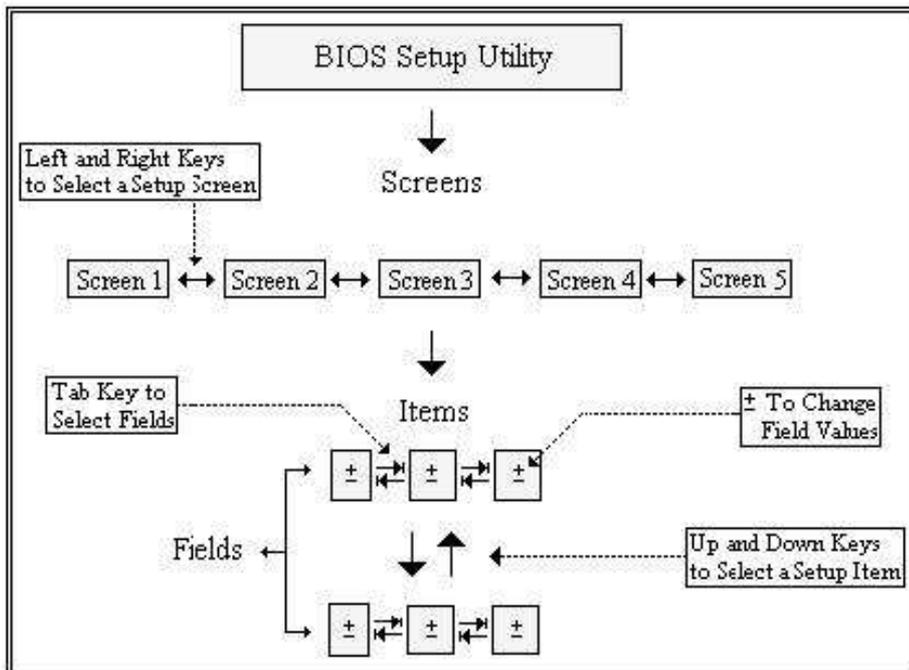
Control Keys

Key	Function
↑↓**Up /Down**	The *Up and Down* <Arrow> keys allow user to select a setup item or sub-screen.
→ ← **Left/Right**	The *Left and Right* <Arrow> keys allow user to select a setup screen. For example: Main screen, Advanced screen, Chipset screen, and so on.
+ - **Plus/ Minus**	The *Plus and Minus* <Arrow> keys allow user to change the field value of a particular setup item. For example: Date and Time.

Hot Key	Description
F1	The <F1> key allows you to display the *General Help screen*.
	Press the <F1> key to open the *General Help screen*.
F4	The <F4> key allows you to save any changes you have made and exit Setup. Press the <F4> key to save your changes. The following screen will appear:
	Press the <Enter> key to save the configuration and exit. You can also use the <Arrow> key to select *Cancel* and then press the <Enter> key to abort this function and return to the previous screen.
ESC	The <Esc> key allows you to discard any changes you have made and exit the Setup. Press the <Esc> key to exit the setup without saving your changes. The following screen will appear:
	Press the <Enter> key to discard changes and exit. You can also use the <Arrow> key to select *Cancel* and then press the <Enter> key to abort this function and return to the previous screen.
Enter	The <Enter> key allows you to display or change the setup option listed for a particular setup item. The <Enter> key can also allow you to display the setup sub-screens.
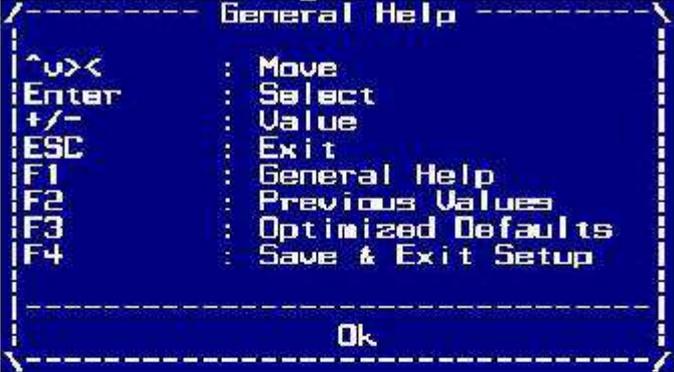
Main Menu

When user enters the Setup Utility, user see the Main setup screen. User can always return to the Main setup screen by selecting the *Main* tab. There are two Main Setup options. They are described in this section.

```
        Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
         Main  Advanced  Chipset  Server Mgmt  Boot  Security  Save & Exit
/-------------------------------------------------+---------------------------\
|  BIOS Information                                |Choose the system          |
|  BIOS Vendor             American Megatrends     |default language           |
|  Core Version            4.6.5.3                 |                           |
|  Compliancy              UEFI 2.3; PI 1.2        |                           |
|  Project Version         0ABYV 0.20 x64          |                           |
|  Build Date and Time     03/13/2013 15:00:05     |                           |
|                                                  |                           |
|  Memory Information                              |                           |
|  Total Memory            65536 MB (DDR3)         |                           |
|                                                  |---------------------------|
|  System Language         [English]               |><: Select Screen          |
|                                                  |^v: Select Item            |
|  System Date             [Tue 03/26/2013]        |Enter: Select              |
|  System Time             [21:44:42]              |+/-: Change Opt.           |
|                                                  |F1: General Help           |
|  Access Level            Administrator           |F2: Previous Values        |
|                                                  |F3: Optimized Defaults     |
|                                                  |F4: Save & Exit            |
|                                                  |ESC: Exit                  |
\-------------------------------------------------+---------------------------/
        Version 2.15.1229. Copyright (C) 2012 American Megatrends, Inc.
```

System Date / Time
Use this option to change the system time and date. Highlight System Time or System Date using the <Arrow> keys. Enter new values through the keyboard. Press the <Tab> key or the <Arrow> keys to move between fields. The date must be entered in MM/DD/YY format. The time is entered in HH:MM:SS format.

➢ Advanced BIOS 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 SuperIO
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) 2012 American Megatrends, Inc.
      Main  Advanced  Chipset  Server Mgmt  Boot  Security  Save & Exit
/--------------------------------------------------+---------------------------\
|> PCI Subsystem Settings                          |PCI, PCI-X and PCI         |
|> CSM parameters                                  |Express Settings.          |
|> ACPI Settings                                   |                           |
|> Trusted Computing                               |                           |
|> WHEA Configuration                              |                           |
|> CPU Configuration                               |                           |
|> Runtime Error Logging                           |                           |
|> SATA Configuration                              |                           |
|> SAS Configuration                               |                           |
|> Thermal Configuration                           |---------------------------|
|> USB Configuration                               |><: Select Screen          |
|> Info Report Configuration                       |^v: Select Item            |
|> W83627DHG Super IO Configuration                |Enter: Select              |
|> W83627DHG HW Monitor                            |+/-: Change Opt.           |
|> Serial Port Console Redirection                 |F1: General Help           |
|> Network Stack                                   |F2: Previous Values        |
|                                                  |F3: Optimized Defaults     |
|                                                  |F4: Save & Exit            |
|                                                  |ESC: Exit                  |
\--------------------------------------------------+---------------------------/
        Version 2.15.1229. Copyright (C) 2012 American Megatrends, Inc.
```

➢ IDE Configuration Setup

From the IDE Configuration screen, press <Enter> to access the sub menu. Use the up and down <Arrow> keys
to select an item. The settings are described on the following pages.

```
        Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
          Advanced
/--------------------------------------------------+---------------------------\
| SATA Configuration                              ^|(1) IDE Mode. (2) AHCI     |
|                                                 *|Mode. (3) RAID Mode.       |
| SATA Port0            Not Present               *|                           |
| SATA Port1            WDC WD1003FBYX (1000.0GB  *|                           |
| SATA Port2            Not Present               *|                           |
| SATA Port3            Not Present               *|                           |
| SATA Port4            Not Present               *|                           |
| SATA Port5            Not Present               *|                           |
|                                                 *|                           |
| SATA Mode            [AHCI Mode]                *|---------------------------|
| Aggressive Link Power [Enabled]                 *|><: Select Screen          |
|                                                 +|^v: Select Item            |
| Port 0 Hot Plug      [Disabled]                 +|Enter: Select              |
| Port 1 Hot Plug      [Disabled]                 +|+/-: Change Opt.           |
| Port 2 Hot Plug      [Disabled]                 +|F1: General Help           |
| Port 3 Hot Plug      [Disabled]                 +|F2: Previous Values        |
| Port 4 Hot Plug      [Disabled]                 +|F3: Optimized Defaults     |
| Port 5 Hot Plug      [Disabled]                 +|F4: Save & Exit            |
|                                                 v|ESC: Exit                  |
\--------------------------------------------------+---------------------------/
        Version 2.15.1229. Copyright (C) 2012 American Megatrends, Inc.
```

➢ SUPER IO CONFIGURATION

You can use this screen to select options for the Super I/O settings. Use the up and down <Arrow> keys to select an item. Use the <Plus> and <Minus> keys to change the value of the selected option. The settings are described on the following pages. The screen is shown below.

```
        Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
            Advanced
/---------------------------------------------------+--------------------------\
|  W83627DHG Super IO Configuration                 |Set Parameters of          |
|                                                   |Serial Port 0 (COMA)       |
|  W83627DHG Super IO Ch    W83627DHG               |                           |
| > Serial Port 0 Configuration                     |                           |
| > Serial Port 1 Configuration                     |                           |
|                                                   |                           |
|                                                   |                           |
|                                                   |                           |
|                                                   |                           |
|                                                   |---------------------------|
|                                                   |><: Select Screen          |
|                                                   |^v: Select Item            |
|                                                   |Enter: Select              |
|                                                   |+/-: Change Opt.           |
|                                                   |F1: General Help           |
|                                                   |F2: Previous Values        |
|                                                   |F3: Optimized Defaults     |
|                                                   |F4: Save & Exit            |
|                                                   |ESC: Exit                  |
\---------------------------------------------------+--------------------------/
        Version 2.15.1229. Copyright (C) 2012 American Megatrends, Inc.
```
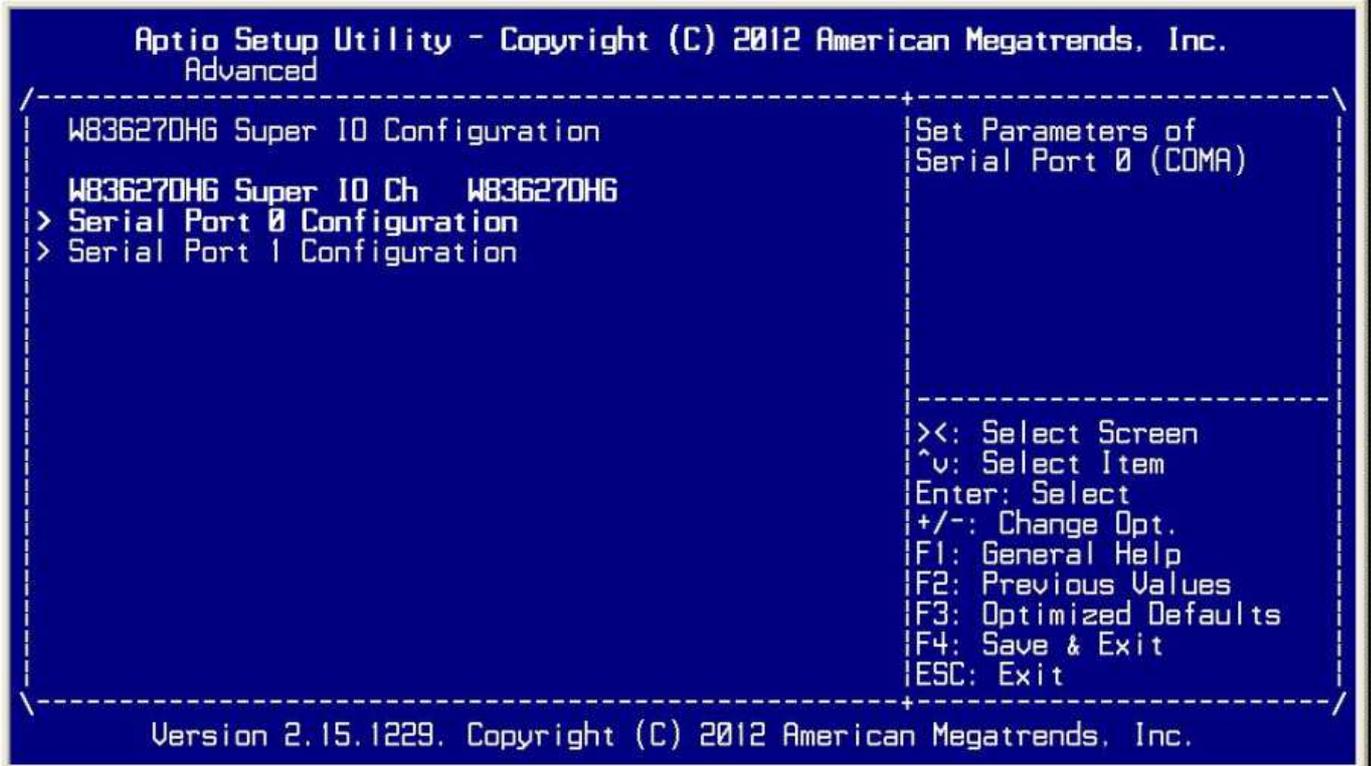
➢ REMOTE ACCESS CONFIGURATION

Remote Access Configuration
You can use this screen to select options for the Remote Access Configuration. Use the up and down <Arrow> keys to select an item. Use the <Plus> and <Minus> keys to change the value of the selected option. The settings are described on the following pages. The screen is shown below

```
        Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
            Advanced
/---------------------------------------------------+--------------------------\
|                                                   |Console Redirection        |
|  COM0                                             |Enable or Disable.         |
|  Console Redirection      [Enabled]               |                           |
| > Console Redirection Settings                    |                           |
|                                                   |                           |
|  COM1                                             |                           |
|  Console Redirection      [Disabled]              |                           |
| > Console Redirection Settings                    |                           |
|                                                   |                           |
|  Serial Port for Out-of-Band Management/          |---------------------------|
|  Windows Emergency Management Services (EMS)      |><: Select Screen          |
|  Console Redirection      [Disabled]              |^v: Select Item            |
| > Console Redirection Settings                    |Enter: Select              |
|                                                   |+/-: Change Opt.           |
|                                                   |F1: General Help           |
|                  █                                |F2: Previous Values        |
|                                                   |F3: Optimized Defaults     |
|                                                   |F4: Save & Exit            |
|                                                   |ESC: Exit                  |
\---------------------------------------------------+--------------------------/
        Version 2.15.1229. Copyright (C) 2012 American Megatrends, Inc.
```

Remote Access
You can disable or enable the BIOS remote access feature here.

Serial Port Number
Select the serial port you want to use for console redirection. You can set the value for this option to either COM1.

➢ USB Configuration
You can use this screen to select options for the USB Configuration. Use the up and down<Arrow> keys to select an item. Use the <Plus> and <Minus> keys to change the value of the selected option. The settings are described on the following pages. The screen is shown below.

```
       Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
          Advanced
/----------------------------------------------+----------------------------\
| USB Configuration                            |Enables Legacy USB          |
|                                              |support. AUTO option        |
| USB Devices:                                 |disables legacy support     |
|      1 Drive, 1 Keyboard, 2 Hubs             |if no USB devices are       |
|                                              |connected. DISABLE          |
| Legacy USB Support       [Enabled]           |option will keep USB        |
| EHCI Hand-off            [Disabled]          |devices available only      |
|                                              |for EFI applications.       |
| USB hardware delays a                        |                            |
| USB transfer time-out    [20 sec]            |----------------------------|
| Device reset time-out    [20 sec]            |><: Select Screen           |
| Device power-up delay    [Auto]              |^v: Select Item             |
|                                              |Enter: Select               |
| Mass Storage Devices:                        |+/-: Change Opt.            |
| BENQ DVD DC EW200G 6B    [Auto]              |F1: General Help            |
|                                              |F2: Previous Values         |
|                                              |F3: Optimized Defaults      |
|                                              |F4: Save & Exit             |
|                                              |ESC: Exit                   |
\----------------------------------------------+----------------------------/
       Version 2.15.1229. Copyright (C) 2012 American Megatrends, Inc.
```

Legacy USB Support
Legacy USB Support refers to the USB mouse and USB keyboard support. Normally if this option is not enabled, any attached USB mouse or USB keyboard will not become available until a USB compatible operating system is fully booted with all USB drivers loaded. When this option is enabled, any attached USB mouse or USB keyboard can control the system even when there is no USB drivers loaded on the system. Set this value to enable or disable the Legacy USB Support. The Optimal and Fail-Safe default setting is *Disabled*.

➢ CPU Configuration

You can use this screen to select options for the CPU Configuration. Use the up and down<Arrow> keys to select an item. Use the <Plus> and <Minus> keys to change the value of the selected option.

```
          Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
              Advanced
/------------------------------------------------+------------------------\
|  CPU Configuration                             |Socket specific CPU     |
|                                                |Information             |
|> Socket 0 CPU Information                      |                        |
|> Socket 1 CPU Information                      |                        |
|                                                |                        |
|  CPU Speed                 1800 MHz            |                        |
|  64-bit                    Supported           |                        |
|                                                |                        |
|  Hyper-threading           [Enabled]           |                        |
|  Active Processor Core     [All]               |------------------------|
|  Limit CPUID Maximum       [Disabled]          |><: Select Screen       |
|  Execute Disable Bit       [Disabled]          |^v: Select Item         |
|  Hardware Prefetcher       [Enabled]           |Enter: Select           |
|  Adjacent Cache Line P     [Enabled]           |+/-: Change Opt.        |
|  DCU Streamer Prefetch     [Enabled]           |F1: General Help        |
|  DCU IP Prefetcher         [Enabled]           |F2: Previous Values     |
|  Intel Virtualization      [Disabled]          |F3: Optimized Defaults  |
|> CPU Power Management Configuration            |F4: Save & Exit         |
|                                                |ESC: Exit               |
\------------------------------------------------+------------------------/
          Version 2.15.1229. Copyright (C) 2012 American Megatrends, Inc.
```

Note: The CPU Configuration setup screen varies depending on the installed processor.

➢ Boot Settings

Select the *Boot* tab from the setup screen to enter the Boot BIOS Setup screen.

```
          Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
      Main  Advanced  Chipset  Server Mgmt  Boot  Security  Save & Exit
/------------------------------------------------+------------------------\
|  Boot Configuration                          ^ |Number of seconds to    |
|  Setup Prompt Timeout      1                 * |wait for setup          |
|  Bootup NumLock State      [On]              * |activation key.         |
|                                              * |65535(0xFFFF) means     |
|  Quiet Boot                [Disabled]        * |indefinite waiting.     |
|                                              * |                        |
|                                              * |                        |
|  Set Boot Priority                           * |                        |
|  1st Boot                  [USB Floppy]      * |                        |
|  2nd Boot                  [USB CD/DVD:BENQ DVD...] * |------------------|
|  3rd Boot                  [USB KEY]         * |><: Select Screen       |
|  4th Boot                  [USB Hard Disk]   * |^v: Select Item         |
|  5th Boot                  [CD/DVD]          * |Enter: Select           |
|  6th Boot                  [CF HDD]          * |+/-: Change Opt.        |
|  7th Boot                  [Hard Disk: WDC WD10...] * |F1: General Help   |
|  8th Boot                  [Network:IBA GE Slot...] * |F2: Previous Values |
|> CSM16 Parameters                            * |F3: Optimized Defaults  |
|                                              + |F4: Save & Exit         |
|> Hard Disk Drive BBS Priorities              v |ESC: Exit               |
\------------------------------------------------+------------------------/
          Version 2.15.1229. Copyright (C) 2012 American Megatrends, Inc.
```

➢ BOOT DEVICE PRIORITY

Use this screen to specify the order in which the system checks for the device to boot from. To access this screen, select Boot Device Priority on the Boot Setup screen and press<Enter>. The following screen displays:

```
    Aptio Setup Utility - Copyright (C) 2011 American Megatrends. Inc.
                              Boot
/-----------------------------------------------+-----------------------\
|  Boot Option #1          [A-DATA USB Flash D...]  |Sets the system boot  |
|  Boot Option #2          [P0: FUJITSU MHV204...]  |order                 |
|                                                   |                      |
|                                                   |                      |
|                                                   |                      |
|                                                   |                      |
|                                                   |                      |
|                                                   |                      |
|                                                   |                      |
|                                                   |----------------------|
|                                                   |><: Select Screen     |
|                                                   |^v: Select Item       |
|                                                   |Enter: Select         |
|                                                   |+/-: Change Opt.      |
|                                                   |F1: General Help      |
|                                                   |F2: Previous Values   |
|                                                   |F3: Optimized Defaults|
|                                                   |F4: Save & Exit       |
|                                                   |ESC: Exit             |
\-----------------------------------------------+-----------------------/
         Version 2.14.1219. Copyright (C) 2011 American Megatrends. Inc.
```
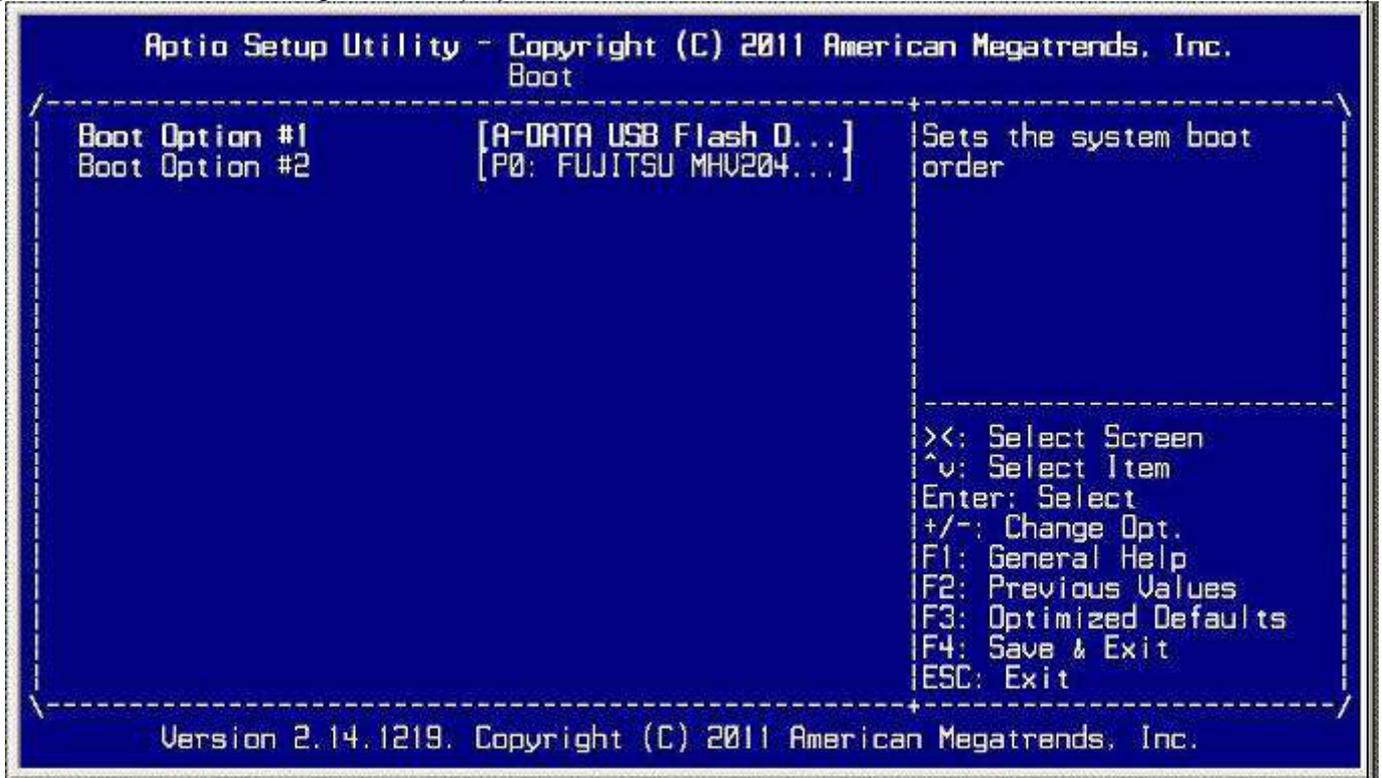
➢ Exit Menu

Select the Exit tab from the setup screen to enter the Exit BIOS Setup screen. You can display an Exit BIOS Setup option by highlighting it using the <Arrow> keys. All Exit BIOS Setup options are described in this section. The Exit BIOS Setup screen is shown below.

```
    Aptio Setup Utility - Copyright (C) 2012 American Megatrends. Inc.
   Main  Advanced  Chipset  Server Mgmt  Boot  Security  Save & Exit
/-----------------------------------------------+-----------------------\
|  Save Changes and Exit                            |Exit system setup after|
|  Discard Changes and Exit                         |saving the changes.    |
|  Save Changes and Reset                           |                       |
|  Discard Changes and Reset                        |                       |
|                                                   |                       |
|  Save Options                                     |                       |
|  Save Changes                                     |                       |
|  Discard Changes                                  |                       |
|                                                   |                       |
|  Restore Defaults                                 |-----------------------|
|  Save as User Defaults                            |><: Select Screen      |
|  Restore User Defaults                            |^v: Select Item        |
|                                                   |Enter: Select          |
|  Boot Override                                    |+/-: Change Opt.       |
|  BENQ DVD DC EW200G 6B43                          |F1: General Help       |
|  P1: WDC WD1003FBYX-01Y7B0                        |F2: Previous Values    |
|  IBA GE Slot 0C00 v1322                           |F3: Optimized Defaults |
|                                                   |F4: Save & Exit        |
|  Launch EFI Shell from filesystem device          |ESC: Exit              |
\-----------------------------------------------+-----------------------/
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```

➢ Saving Changes and Exit

When you have completed the system configuration changes, select this option to leave

Setup and reboot the computer so the new system configuration parameters can take effect. Select Exit Saving Changes from the Exit menu and press <Enter>.

➢ Discard Changes and Exit
Select this option to quit Setup without making any permanent changes to the system configuration. Select Exit Discarding Changes from the Exit menu and press <Enter>.

➢ Saving Changes and Exit
Reset the system after saving the changes.

➢ Discard Changes and Reset
Reset system setup without saving any changes.

➢ Save Changes
Save changes done so far to any of the setup options.

➢ Discard Changes
Discard Changes done so far to any of the setup options.

➢ Restore Defaults
Restore/Load Default values for all the setup options.

➢ Save as User Defaults
Save the changes done so far as User Defaults.

➢ Restore User Defaults
Restore the User Defaults to all the setup options.