CAR-5010 Series
Communication Appliance

User's Manual

Revision: 1.0

CASwell Inc.
8th Floor, No. 242, Bo-Ai St., Shu-Lin City, Taipei County 238, Taiwan
TEL: +886-2-7705-8888 FAX: +886-2-7731-9988 http://www.cas-well.com

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-5010 series.

CAR-5010 provides the essential platform for delivering optimal performance and functionality in the value communications appliance market segment. This manual should familiarize you with CAR-5010 operations and functions. CAR-5010 series provide up to 24 Ethernet ports to serve communication applications like Firewall, requiring ten Ethernet ports to connect external network (internet), demilitarized zone and internal network.

CAR-5010 series overview:

- Supports LGA 1366 Intel 55XX / 56XX series CPU
- Up to 96GB ECC/Register DDR3 1066/1333MHz
- Two USB ports and one RJ45 port on COM1.
- Four SATA connectors for SATA Hard disk
- User-friendly LCD control panel
- PCI-E architecture with totally three PCI-Ex8 interfaces.
- 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-5010 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 Caswell's web site: ***http://www.cas-well.com*** A direct contact to Caswell's technical person is also available. For further support, users may also contact Caswell's headquarter in Taipei or local distributors.

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

1.4 Board Layout

Figure 1-1 Board Layout of CAR-5010 M/B

1.5 System Block Diagram

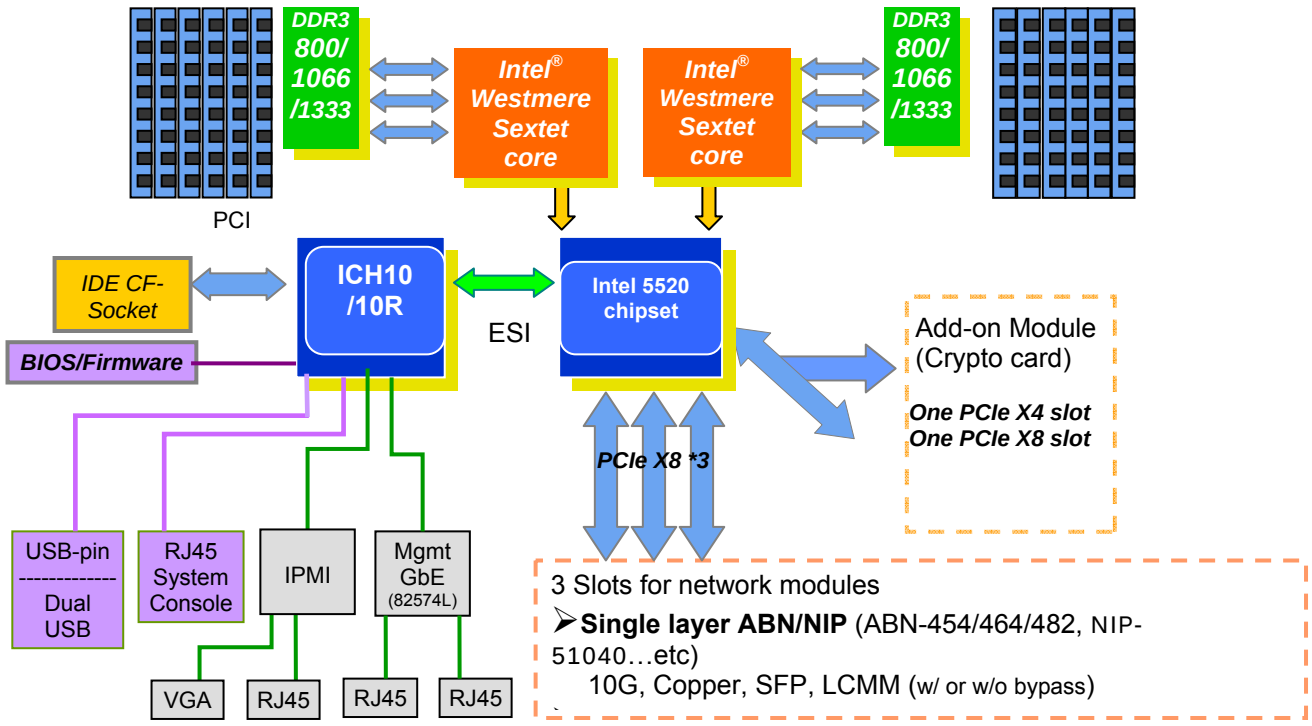


Figure 1-2 CAR-5010 Basic Block Diagram

CAR-5010 Series (Standard model)		
Sub-Model	CAR-5010-4R00-000	CAR-5010-4F00-000
Item P/N	AI2-3415	
MB	CAPB-5010VR (AB2-3284Z)	
Mgmt	ABM-5000 (AI3-3191Z)	
Slot-A/B/C	NIP-51080	NIP-51040
Bypass Segment	Depends on module	Depends on module
Low profile PCI-Ex4	On board slot	On board slot
Expansion slot	CB-5010-0/1 (1*PCI-E x8 drawable expansion slot)	CB-5010-2 (2*PCI-E x8 expansion slots)
HDD	Standard 2* 3.5” HDD tray	
LCM	EZIO-300/G400	
USB	2	
Console	RJ45 on COM1	
ATO-Options	CPU, DDR3, HDD(SATA), Network interface module	

For the detail Ethernet modules’ configuration, please refer to chapter 5.1: CAR-5010 Ethernet modules configuration.

1.6 Product Specifications

Item	Description
CPU Board Chipset	Support for 1) Westmere CPUs 2) Intel 5520 chipset/ ICH10
System Memory	- 12 DDR3 800/1066/1333MHz RDIMM. - 6 channels (3 channels per CPU). - Up to 3 dual rank or 2 quad rank RDIMMs/channel - 96 GB max at launch w/ quad rank RDIMMs
Ethernet Port	Via ABN/NIP module connected
PCI-E Expansion	Create one drawable PCI-E x8 slots riser Create two PCI-E x8 slots riser from PCI-E x8 vertical slot
Storage Device	2 * 3.5” SATA HDD (Inner or removable)
Serial Port	Two 2X5 pin header
LCD Panel	2x16 characters LCD module with 4 buttons 128x32 graphic LCD module with 4 buttons 128x64 graphic LCD module with 7 buttons
LCD LEDs	LED indicator for power status, storage access.
IDE	PCI transfer to IDE (CF socket)
SATA	4 SATA connectors
USB	Two USB 2.0 compliant devices.
VGA	On board pin header
IPMI	On board IPMI module w/ one management port
Power	Full range 500W redundant power supply with active PFC control.
Chassis	438(W) x 446 (D) x 88 (H) (TBD)
Weight	TBD
Operation Environment	Temperature: 5~40℃ (67~130℉) Humidity 20%~90% RH
Storage Environment	Temperature: 0~70℃ (58~184℉) Humidity 5%~95% RH
Certifications	CE/FCC/UL/cUL.

Chapter 2 Getting Started

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

2.1 Included Hardware

The following hardware is included in package:

- CAR-5010 Communication Appliance System Board
- One null serial port cable

2.2 Before 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.

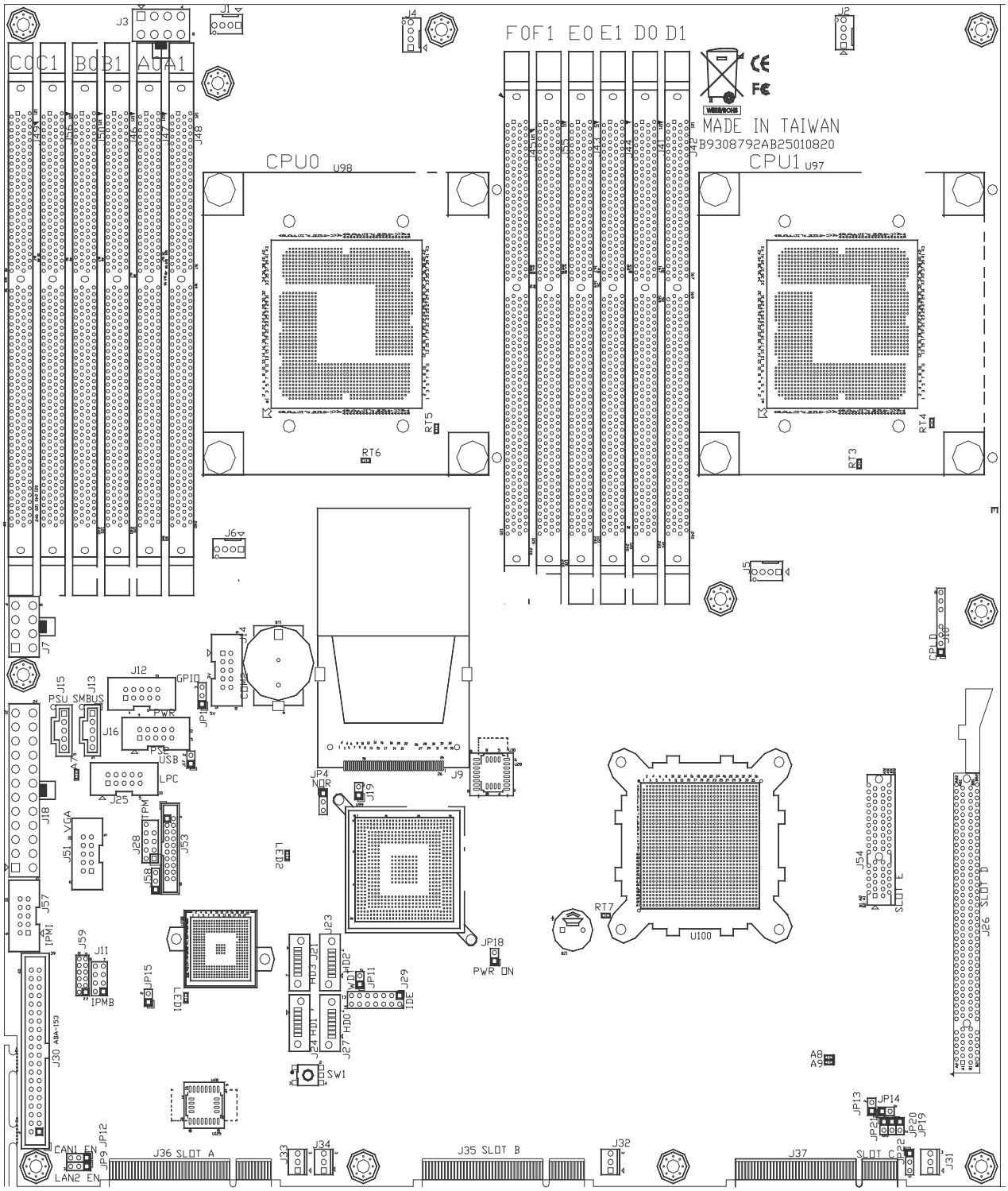
Some circuitry on the system board can continue operating even though the power is switched off. Under no circumstances should the Lithium battery cell used to power the real-time clock be allowed to be shorted. The battery cell may heat up under these conditions and present a burn hazard.

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-5010 System Board Jumper

In general, jumpers on CAR-5010 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”.



CAPB-5010VR R0 Jumper List (*:Default)

JP1: GPIO power, *1-2:5V, 2-3:3.3V	JP4: RTC clear *1-2:Normal, 2-3: Clear
JP9: LAN 2 *1-2:Enable, 2-3: Disable	JP11: Watchdog Reset *IN :Enable, OUT :Disable
JP12: LAN 1 *1-2:Enable, 2-3: Disable	JP13: Slot “C” Hot Plug reset button
JP14: Slot “C” Hot Plug ATTN button	JP18: Auto Power-On *in: Enable, out: None Auto Power-On
JP19: *IN, disable Hot Plug +12V **JP20: *IN, disable** Hot Plug +3.3V **JP21: *IN, disable** Hot Plug +5V standby	
JP22: Slot “C” Hot Plug *2-3:Disable	JP15: IN: IPMI Disable, OUT: Enable

CAPB-5010VR R0 LED List

LED1 : IPMI present
LED2 : Thermtrip
A7: 5VSB
A8: Slot C ATTN
A9: Slot C Power

CAPB-5010VR R0 Thermal sensor List

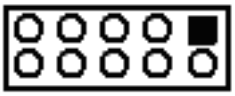
RT3 : CPU1 temperature sensor
RT4 : CPU1 PWM temperature sensor
RT5 : CPU0 PWM temperature sensor
RT6 : CPU0 temperature sensor
RT7 : System temperature sensor

CAPB-5010VR R0 Connector List

U97: CPU 1 socket	U98: CPU 0 socket
J1: Chassis Fan 1	J2: Chassis Fan 3
J3: ATX PSU AUX +12V input 1	J4: Chassis Fan 2
J5: CPU 0 (right) FAN	J6: CPU 1(left) FAN
J7: ATX PSU AUX +12V input 1	J8: n/a
J9: CF socket	J10: CPLD download header
J11: IPMB	J12: GPIO
J13: Host SM bus	J14: COM 2
J15: Power supply SM bus	J16: PS2 Keyboard / Mouse
J17: Over Temperature LED connector	J18: ATX PSU main connector
J19: CASEOPEN 1	J20: n/a
J21: SATA 3	J22: n/a
J23: SATA 2	J24: SATA 1
J25: USB 2/3	J26: PCI express x16 expansion slot **D**
J27: SATA 0	J28: LPC debug port
J29: Front Panel Control	J30: ABA-153 manager board connector
J31: Front Fan	J32: Front Fan
J33: Front Fan	J34: Front Fan
J35: PCI express x8 expansion slot **B**	J36: PCI express x8 expansion slot **A**
J37: PCI express x8 expansion slot **C**	J38: n/a
J39: n/a	J40: Reserved
J41: CPU 1, CH D SLOT1	J47: CPU 0, CH A SLOT1
J42: CPU 1, CH D SLOT0	J48: CPU 0, CH A SLOT0
J43: CPU 1, CH E SLOT1	J50: CPU 0, CH B SLOT1
J44: CPU 1, CH E SLOT0	J46: CPU 0, CH B SLOT0
J55: CPU 1, CH F SLOT1	J56: CPU 0, CH C SLOT1
J45: CPU 1, CH F SLOT0	J49: CPU 0, CH C SLOT0
J51: VGA	J52: OPMA firmware debug port
J53: TPM	J54: PCI express x4 expansion slot **E**
J57: IPMI LAN PORT	

J14: COM 2

5 4 3 2 1

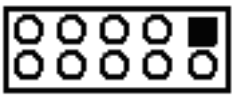


10 9 8 7 6

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

J12: GPIO

5 4 3 2 1

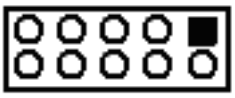


10 9 8 7 6

5 GND	4 IO14	3 IO15	2 IO16	1 IO17
10 POWER	9 IO23	8 IO22	7 IO11	6 IO10

J16: PS/2 KEYBOARD MOUSE

5 4 3 2 1

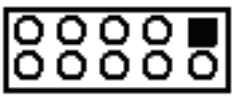


10 9 8 7 6

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

J25: USB 2(3)

5 4 3 2 1

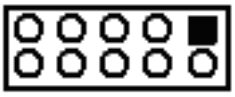


10 9 8 7 6

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

J51: VGA

5 4 3 2 1

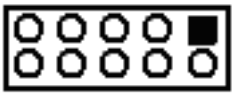


10 9 8 7 6

5 H-SYNC	4 V-SYNC	3 BLUE	2 GREEN	1 RED
10 NC	9 GND	8 DDC DATA	7 GND	6 DDC CLK

J57: IPMI LAN PORT

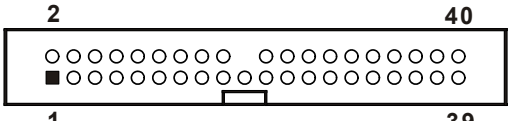
5 4 3 2 1



10 9 8 7 6

5 GND_EARTH	4 LINK_LED-	3 LINK_LED+	2 MDI+0	1 MDI+1
10 GND	9 BUSY_LED-	8 BUSY_LED+	7 MDI-0	6 MDI-1

J30: ABA-153 / ABM-5000 Connector



PIN No.	Signal Description	PIN No.	Signal Description
1	LAN1_LINK1000_R#	2	LAN_Ground_EARTH
3	LAN1_MDI+0	4	LAN1_MDI-0

5	LAN1_MDI+1	6	LAN1_MDI-1
7	LAN1_MDI+2	8	LAN1_MDI-2
9	LAN1_MDI+3	10	LAN1_MDI-3
11	LAN2_MDI+0	12	LAN2_MDI-0
13	LAN2_MDI+1	14	LAN2_MDI-1
15	LAN2_MDI+2	16	LAN2_MDI-2
17	LAN2_MDI+3	18	LAN2_MDI-3
19	Ground	20	LAN2_LINK1000_R#
21	LAN1_ACT_R#	22	LAN2_ACT_R#
23	LAN1_LINK100#	24	LAN2_LINK100#
25	COM1_RxD	26	COM1_TxD
27	COM1_CTS	28	COM1_RTS
29	COM1_DSR	30	COM1_DTR
31	COM1_CD	32	COM1_RI
33	Ground	34	USB1_VCC
35	USB0_DATA+	36	USB1_DATA-
37	USB0_DATA-	38	USB1_DATA+
39	USB0_VCC	40	Ground

J11: IPMB

7 5 3 1

8 6 4 2

7 BMC_CTR1	5 BMC_CTR0	3 IPMB_SMBCLK	1 IPMB_SMBDAT
9 GND	6 GND	4 GND	2 GND

J29: Front Panel Control

13PWR LED+	11PWR LED-	9 LDF+	7PWR ON+	5 GND-	3 IDE LED-	1 IDE LED+
14IDE LED+	12IDE LED-	10 LDF-	8 PWR ON+	6 PWR ON-	4 PWR LED	2 PWR LED+

J58: IPMI debug COM port

3 GND	2 RXD	1 TXD

J36/J35/J37: 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 BIT1
B5	SMB_CLOCK	**A5**	VCC
B6	SMB_DATA	**A6**	VCC
B7	GND	**A7**	VCC3
B8	3.3V	**A8**	VCC3
B9	SLOT ID BIT0	**A9**	VCC3
B10	3.3V AUX	**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	33MHz CLOCK	**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

*J36: SLOT ID BIT 0/1 equal 00 ** J35: SLOT ID BIT 0/1 equal 01
** *J37: SLOT ID BIT 0/1 equal 10

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-5010

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

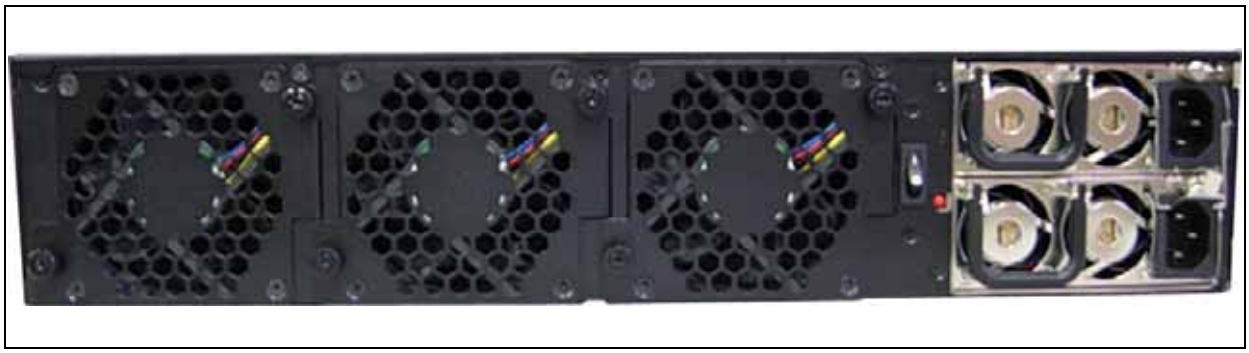


Fig. 2-2 *Rear view of the chassis*

2.5 Open the Chassis

Loosen the 4 screws of the chassis, two on each side and the rest two on the back, to remove the top lead (***Fig. 2-3***).

Fig. 2-3 *Take off screws*

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*

2.6 Install a Different Processor

To install a CPU

1. Local the CPU socket on the motherboard

CAR-5010 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.

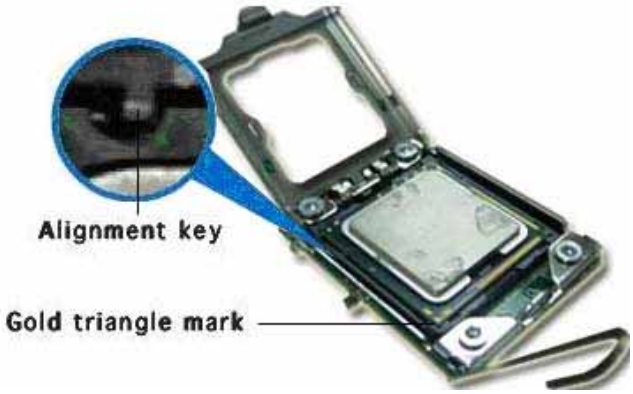
2. Press the load lever with your thumb (A), then move it to left (B) until it is released from the retention tab

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



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.

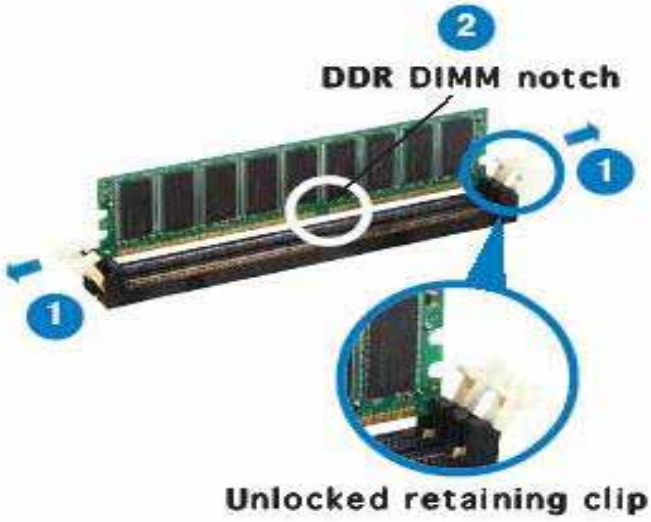
Once the system CPU does not run frequency correctly, try to clean CMOS or enter BIOS setup to load failsafe default then load optimal default one time.

2.7 Remove and Install DIMM

Follow these steps to upgrade RAM module:

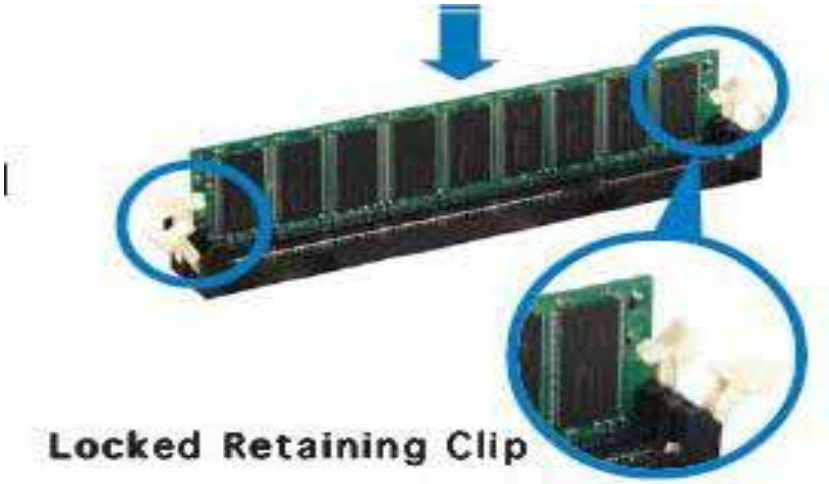
Make sure to unplug the power supply before adding or removing DIMMs or other system components. Failure to do so may cause severe damage to both the motherboard and the components.

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



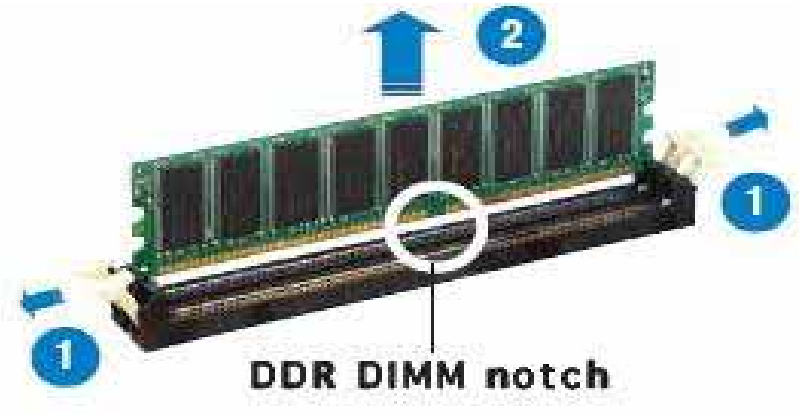
A DDR DIMM is keyed with a notch so that it fits in only one direction. DO NOT force a DIMM into a socket to avoid damaging the DIMM.

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



Follow these steps to remove a DIMM:

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



2. Remove the DIMM from the socket

Follow these steps for DIMM configuration:

1. Memory socket A0~C0 are controlled by CPU0
2. Memory socket D0~F0 are controlled by CPU1
3. If users use only CPU0, memory can't be used when installed on socket D0~F0.
4. When user installs memory, please install them from A0, B0, or C0 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	
2 DIMM	A0		B0			
3 DIMM	A0		B0		C0	
6 DIMM	A0	A1	B0	B1	C0	C1

Memory optimal performance for main board with CPU 1 installed.						
	Branch 0		Branch 1		Branch 2	
2 DIMM	D0		E0			
3 DIMM	D0		E0		F0	
6 DIMM	D0	D1	E0	E1	F0	F1

Memory optimal performance for main board with two CPUs installed.												
	CPU0						CPU1					
	Branch 0		Branch 1		Branch 2		Branch 0		Branch 1		Branch 2	
6DIMM	A0		B0		C0		D0		E0		F0	
12 DIMM	A0	A1	B0	B1	C0	C1	D0	D1	E0	E1	F0	F1

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

2.8 Remove 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*

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

Fig. 2-8 *Completion of Compact Flash Card*

2.9 Remove 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-5010 system (***Fig. 2-12***).

Fig. 2-12a *Connect HDD bracket to CAR-5010 system then push the switch in.*

Fig. 2-12b *Fix HDD into CAR-5010 system*

2.11 Install or remove Riser Card / Add-on card

The system has a removable riser card to support up to one PCI-e x8 slots.

1. Fasten the screws to lock riser and bracket together and fix in CAR-5010 (***Fig. 2-11a, 2-11b***).

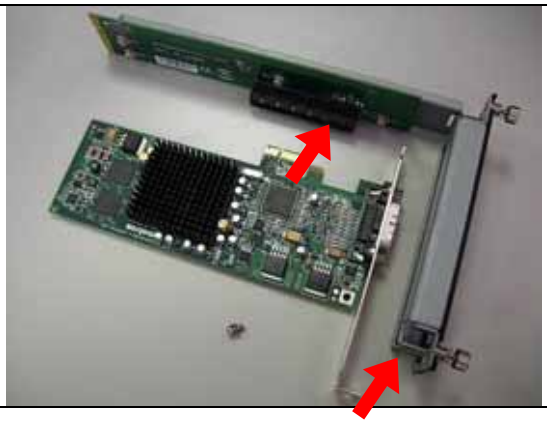


Fig. 2-11a *CB-5010-1 riser card and the bracket*

Fig. 2-11b *Fix riser card/ add-on card to CAR-5010*

2. For CB-5010-1 riser card and add-on card, user can change any device as they want. (***Fig. 2-11c to 2-11e***).

Fig. 2-11c *Loosen the screws.*

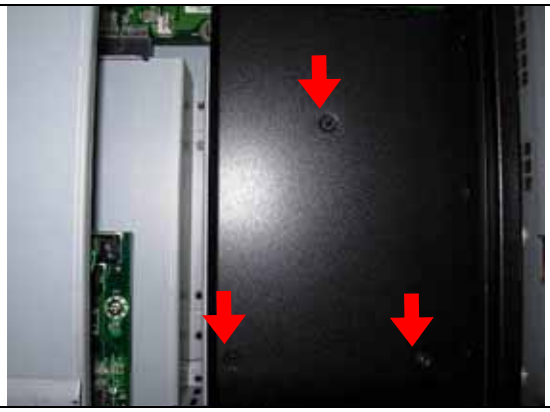


Fig. 2-11d *Open the top lead and loosen the screws.*

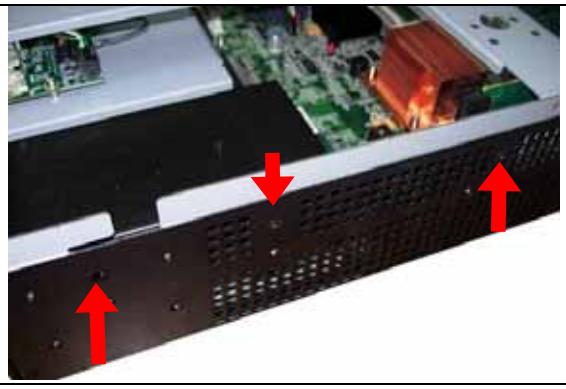


Fig. 2-11e *Loosen the three screws.*

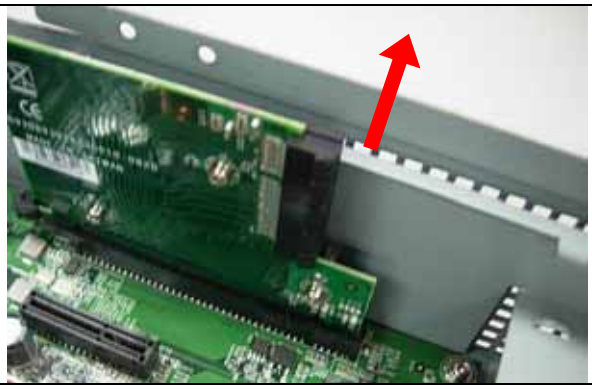


Fig. 2-11f ***Remove the riser card and bracket***

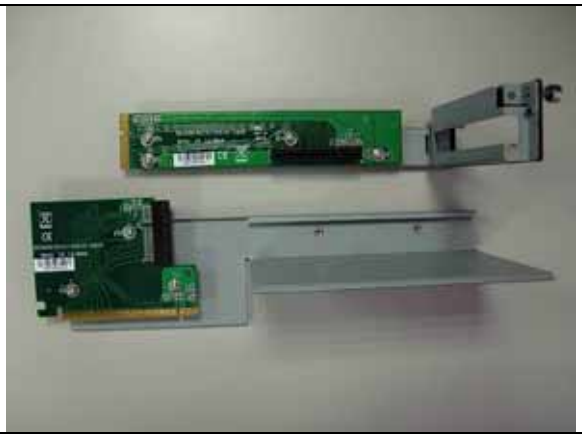


Fig. 2-11e ***Loosen the screws and remove riser.***

2.12 Ear Mount Kit Installation

The CAR-5010 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.

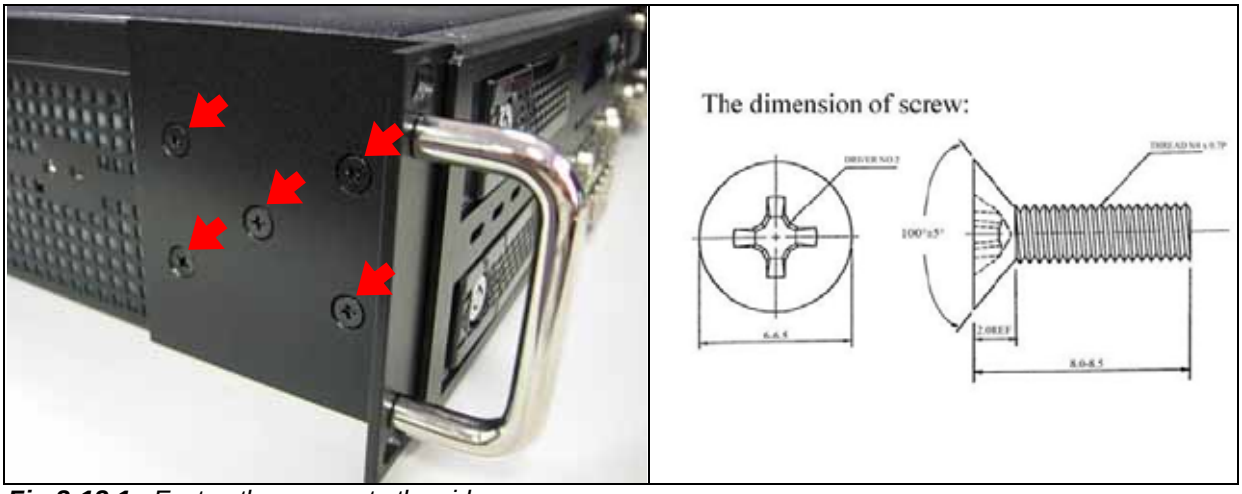


Fig.2-13.1 *Fasten the screws to the side*

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.

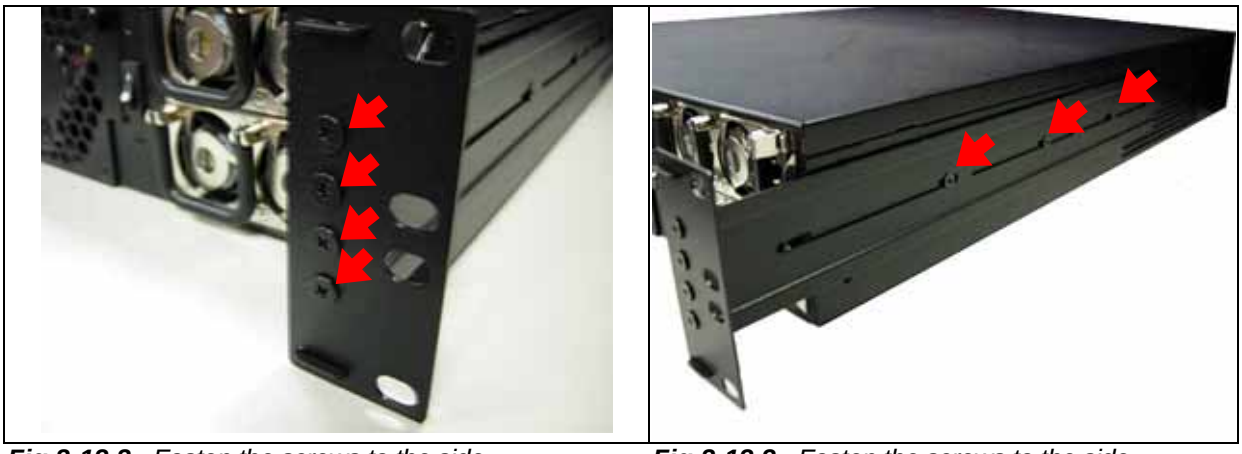


Fig.2-13.2 *Fasten the screws to the side*

Fig.2-13.3 *Fasten the screws to the side*

2.13 Remove EZIO / LCD

The CAR-5010 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***).

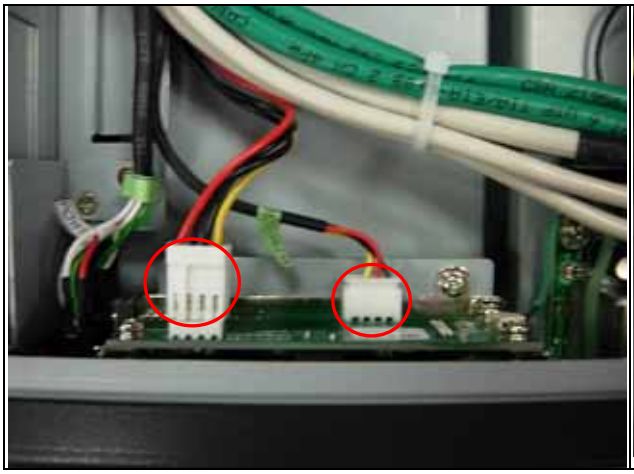


Fig.2-14 *Remove the EZIO cable from EZIO*

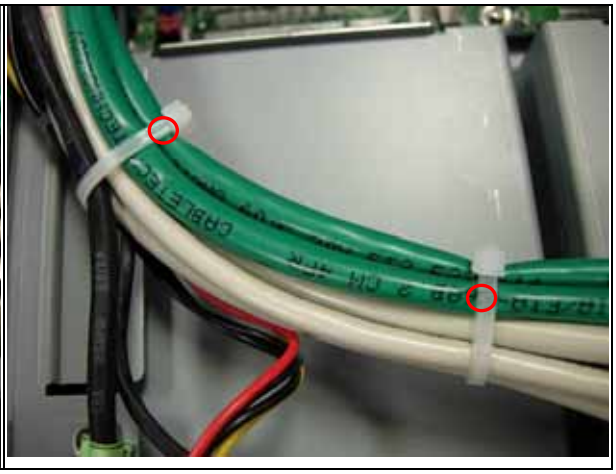


Fig.2-15 *Cut the cable collector.*

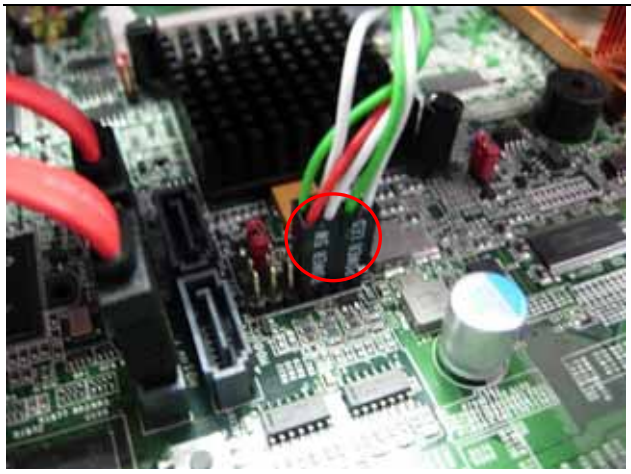


Fig.2-16 *Remove the front panel cable from main board*

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

Fig.2-17a *Remove front panel first. Remove 5 screws.*

Fig.2-17b *Remove screws and front panel.*

3. Remove the EZIO kit from chassis.

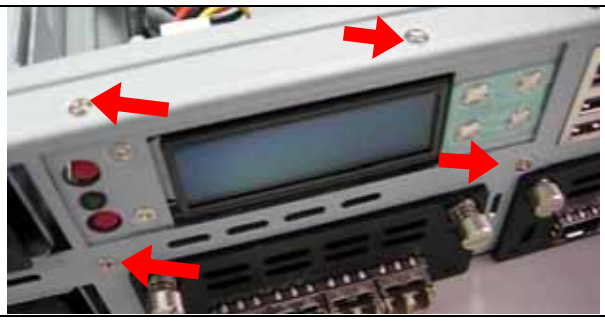


Fig.2-18 *Remove the screws from EZIO kit*

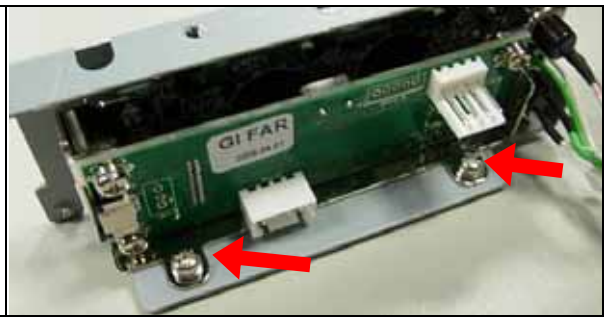


Fig.2-19 *Remove the screws from EZIO kit*

4. Final remove the EZIO/LCD module.

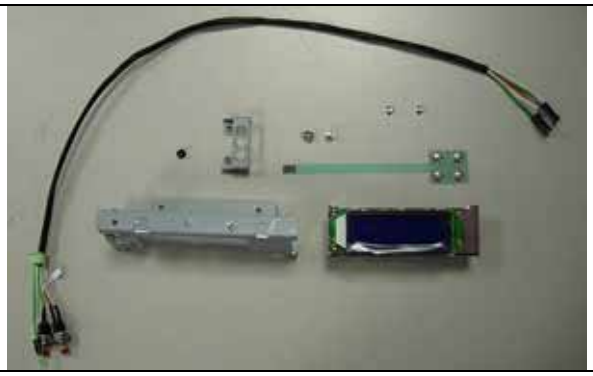


Fig.2-20 *Remove EZIO/LCD from EZIO kit*

2.14 Remove Power Supply

The following is the remove step instruction of power supply.

1. Remove the power modules

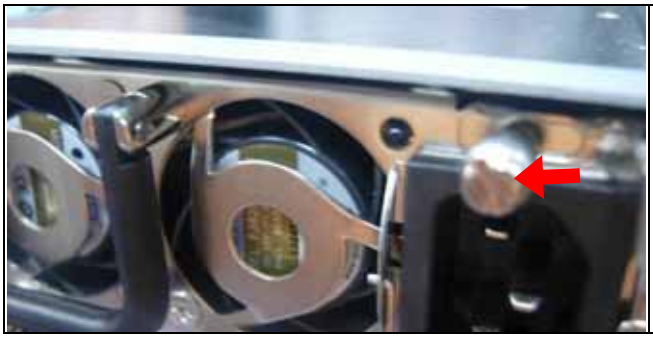


Fig.2-21.1 *Loosen the screw to unlock the power module.*

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.*

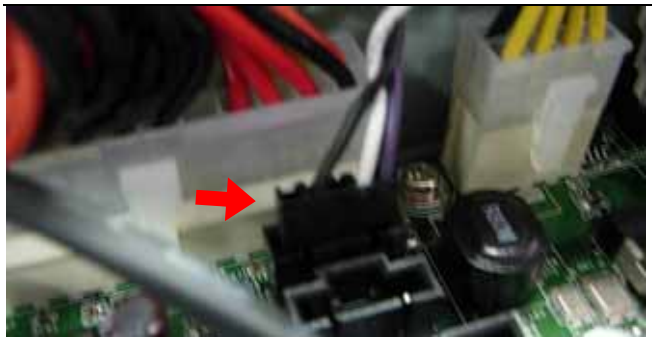


Fig.2-23 *Remove I2C cable.*

3. Remove all screws from power supply.

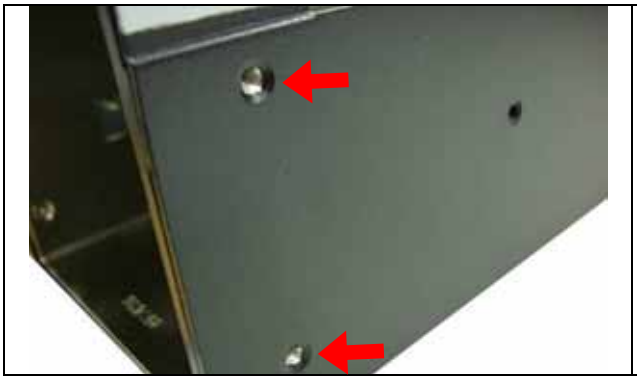


Fig.2-25.1 *Remove the screws.*

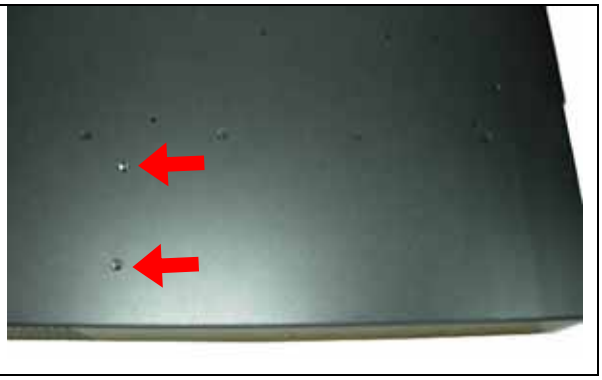


Fig.2-25.2 *Remove the screws.*

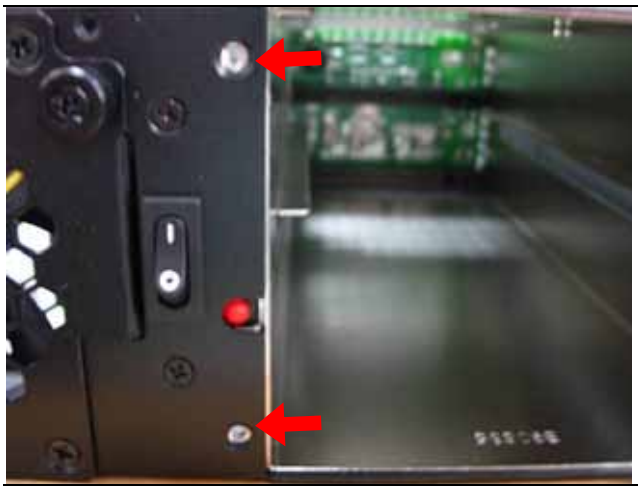


Fig.2-25.3 *Remove the screws.*

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.*

2.15 Remove main board

The section shows how to remove the main board.

1. Remove all add-on modules or riser card devices from system first.

Fig.2-27 *Remove all add-on modules.*

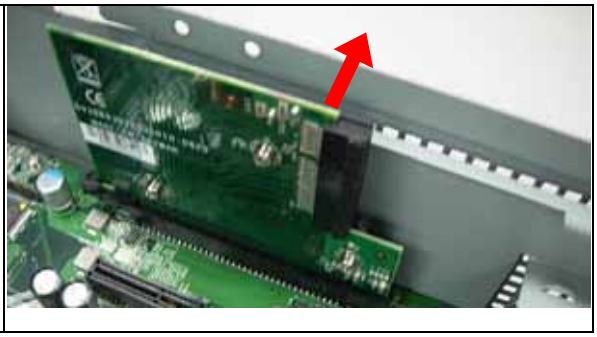


Fig.2-28 *Remove riser card. Please follow 2.11 steps*

2. Remove following items from main board: cables, CPU cooler, CPU, memory.

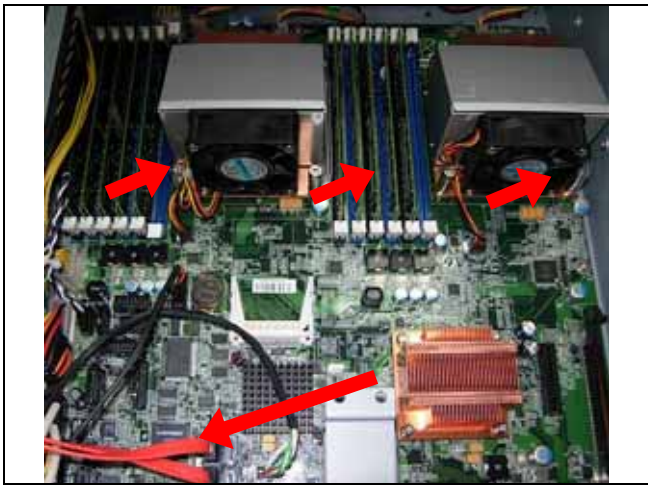


Fig.2-29 *Remove CPU cooler, CPU and memory. All SATA and power cable.*

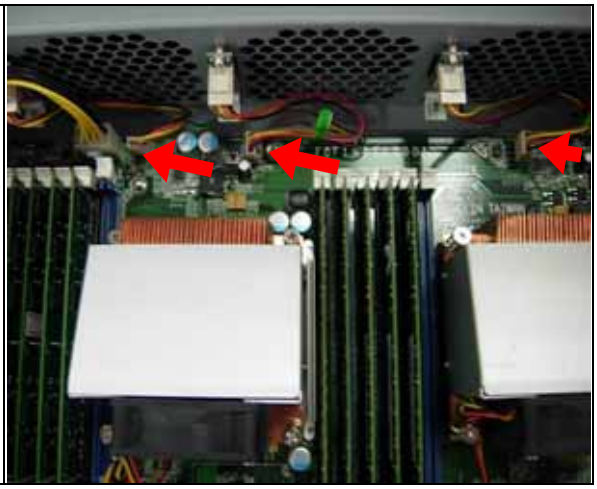


Fig.2-30 *Remove all fan cable from board.*

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.*

Fig.2-32 *lift up main board from system from rear-left side.*

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.

2.16 Use a Client Computer

Connection Using Hyper Terminal

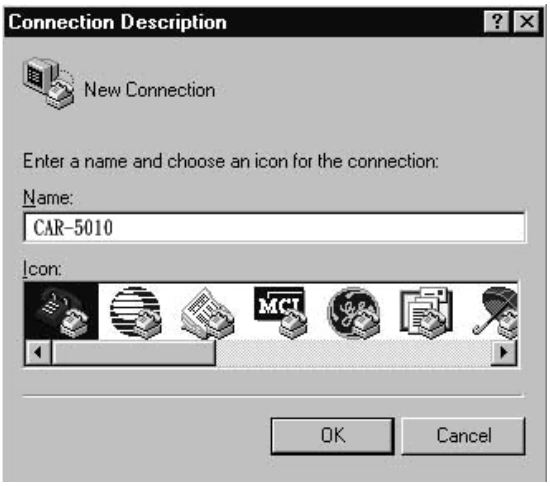
If users use a headless CAR-5010 system, which has no mouse/keyboard and VGA output connected to it, the console may be used to communicate with CAR-5010.

To access CAR-5010 via the console, Hyper Terminal is one of many choices. Follow the steps below for the setup:

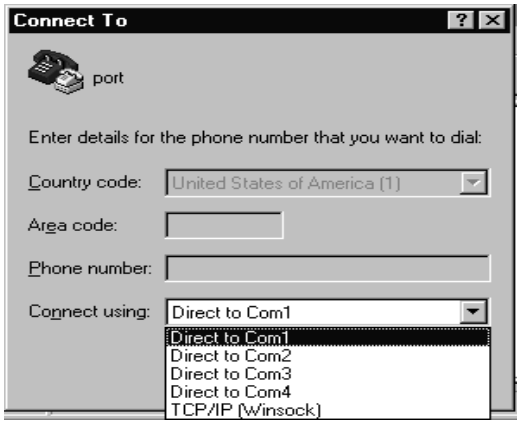
Fig.2-36 *Connect null serial port cable to CAR-5010 console management port.*

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

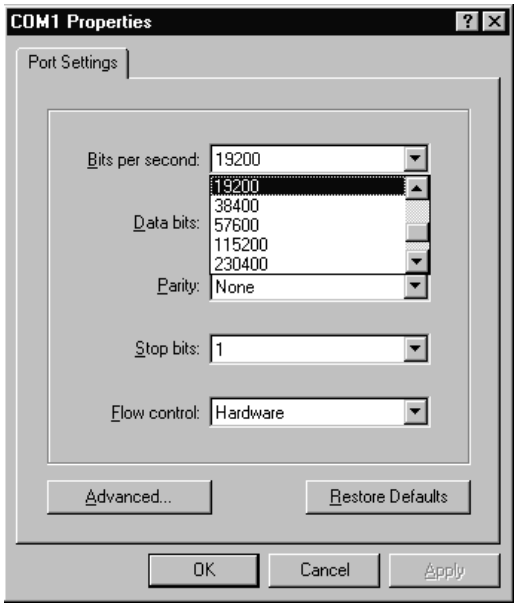
1. Execute HyperTerminal under C:\Program Files\Accessories\HyperTerminal
2. Enter a name to create new dial



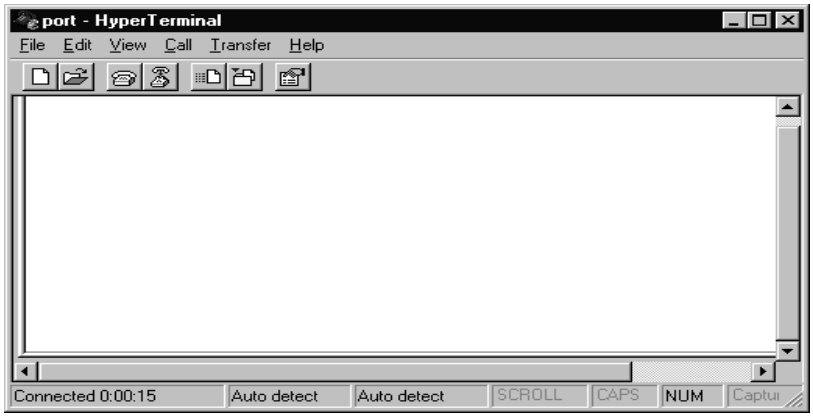
3. For the connection settings, make it Direct to Com1.



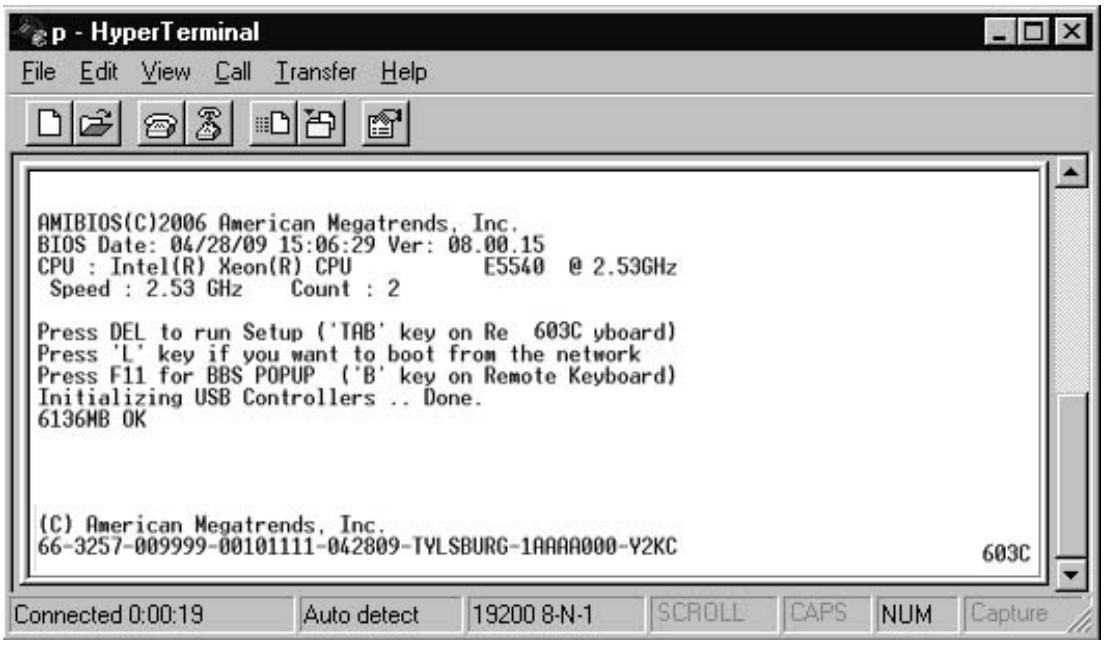
4. Please make the port settings to Baud rate 19200, Parity None, Data bits 8, Stop bits 1



5. Turn on the power of CAR-5010 system, after following screen was shown:



6. User can see the boot up information of CAR-5010.



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.

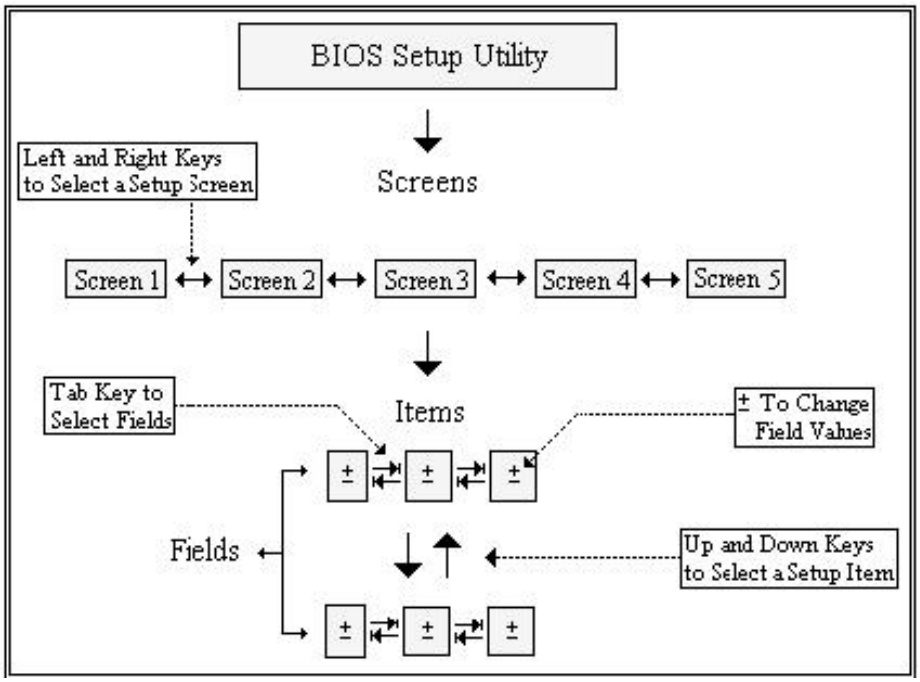
This is the end of this section. If the terminal did not port correctly, please check the previous steps.

Chapter 3 BIOS Setting

BIOS Setup Information

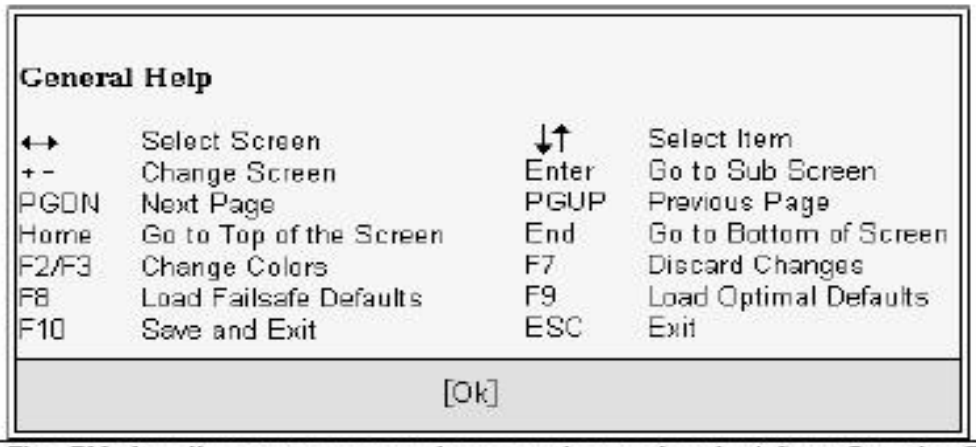
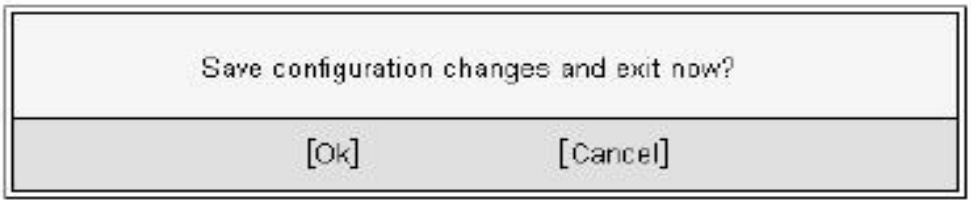
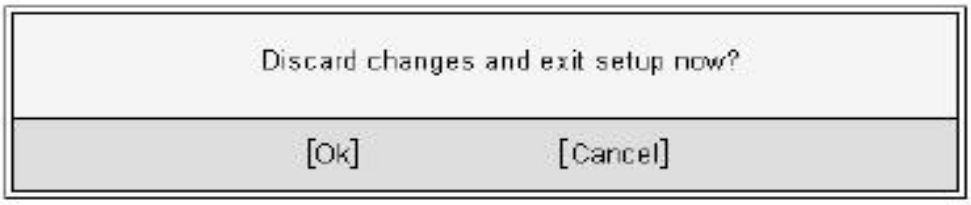
Power on the system, press the <Del> to run BIOS setup. After press the <Delete> key, the main BIOS setup menu displays. User can access the other setup screens from the main BIOS setup menu, such as the Chipset and Power menus.

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>, <F10>, <Enter>, <ESC>, <Arrow> keys, and so on.



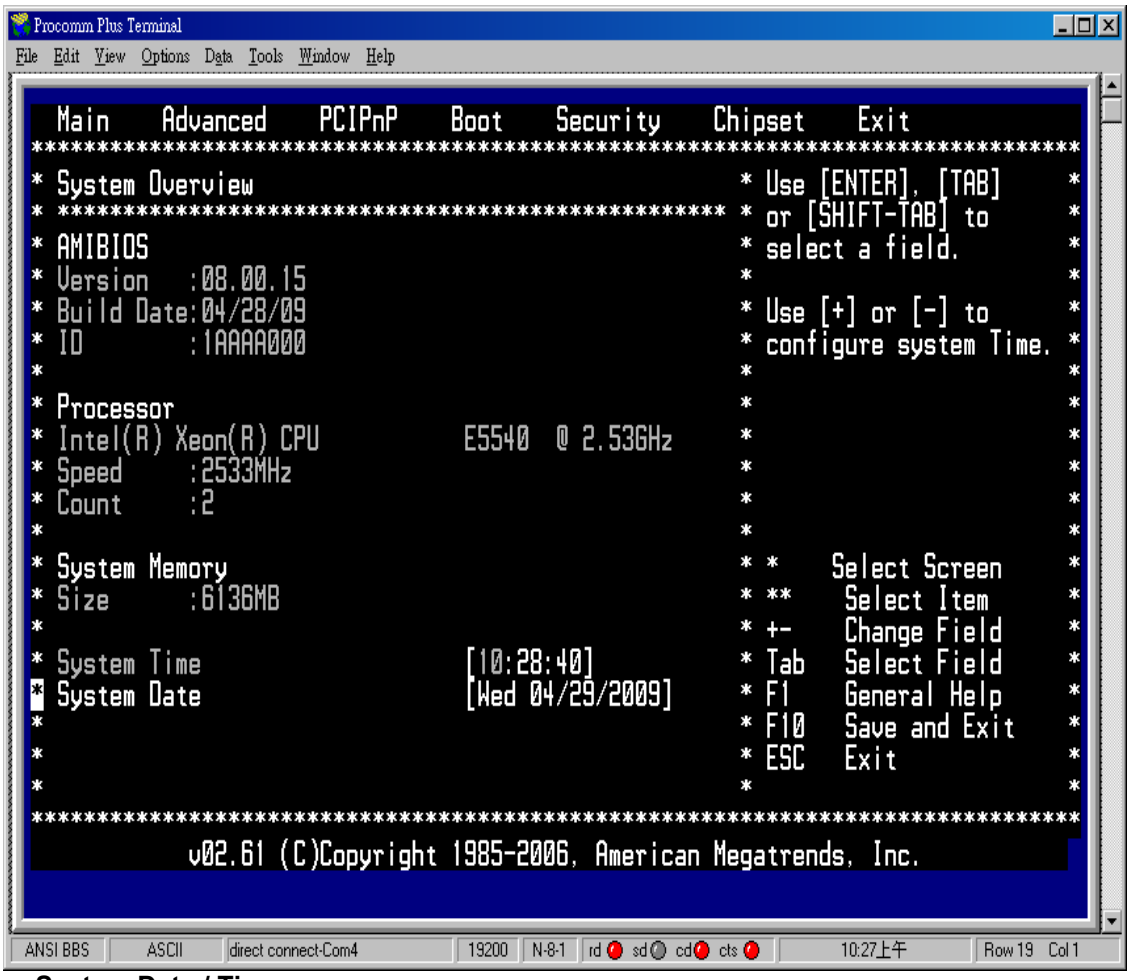
Control Keys

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.
Tab	The <Tab> key allows user to select setup fields.

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*. 
F10	The <F10> key allows you to save any changes you have made and exit Setup. Press the <F10> 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.

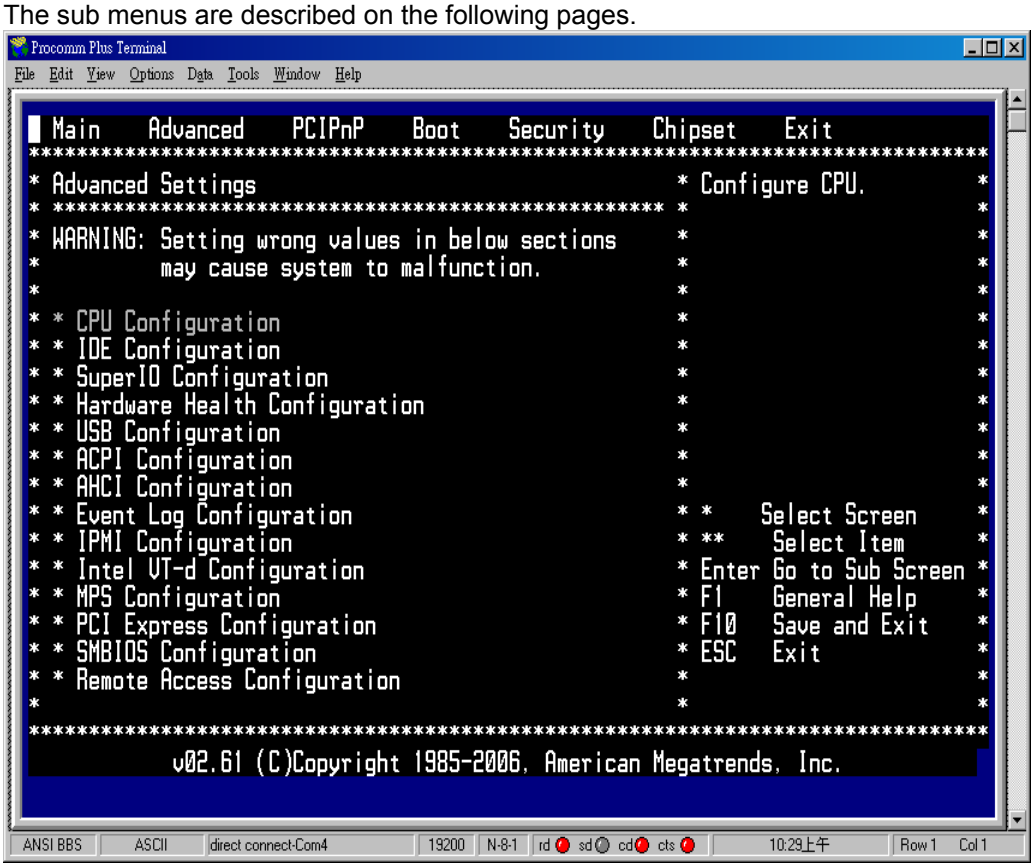


System Date / Time

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.

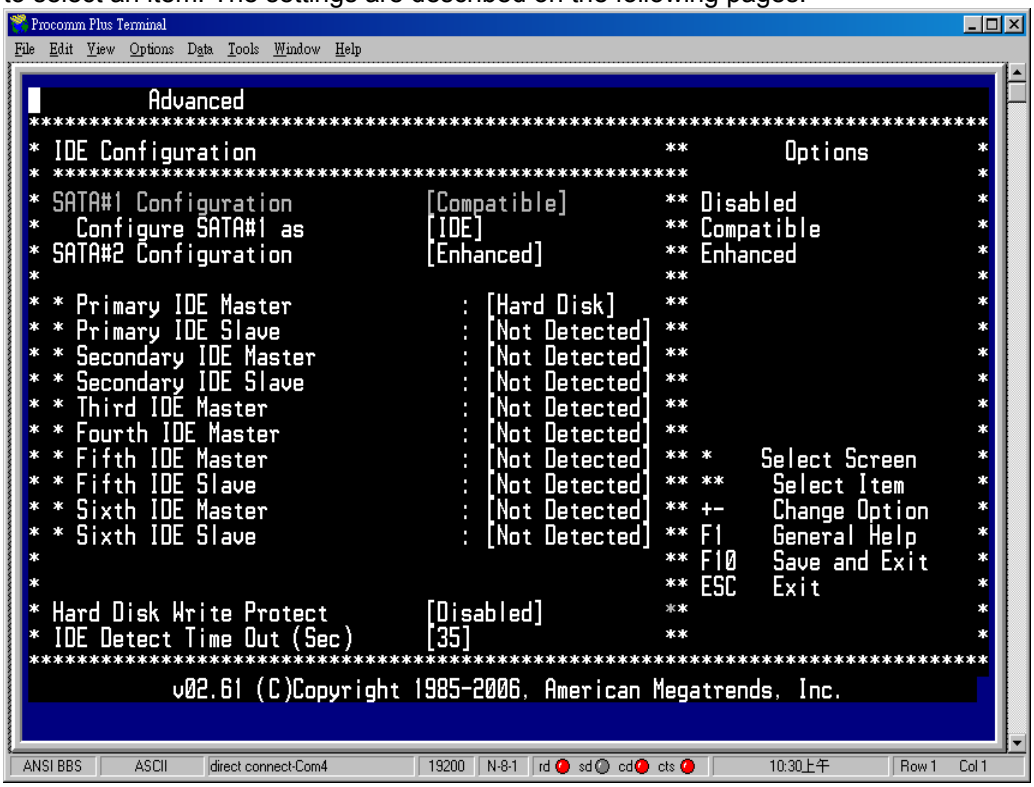
➢ Advanced BIOS Setup

Select the *Advanced* tab from the setup screen to enter the Advanced BIOS Setup screen. 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. It will 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.



➢ IDE Configuration Setup

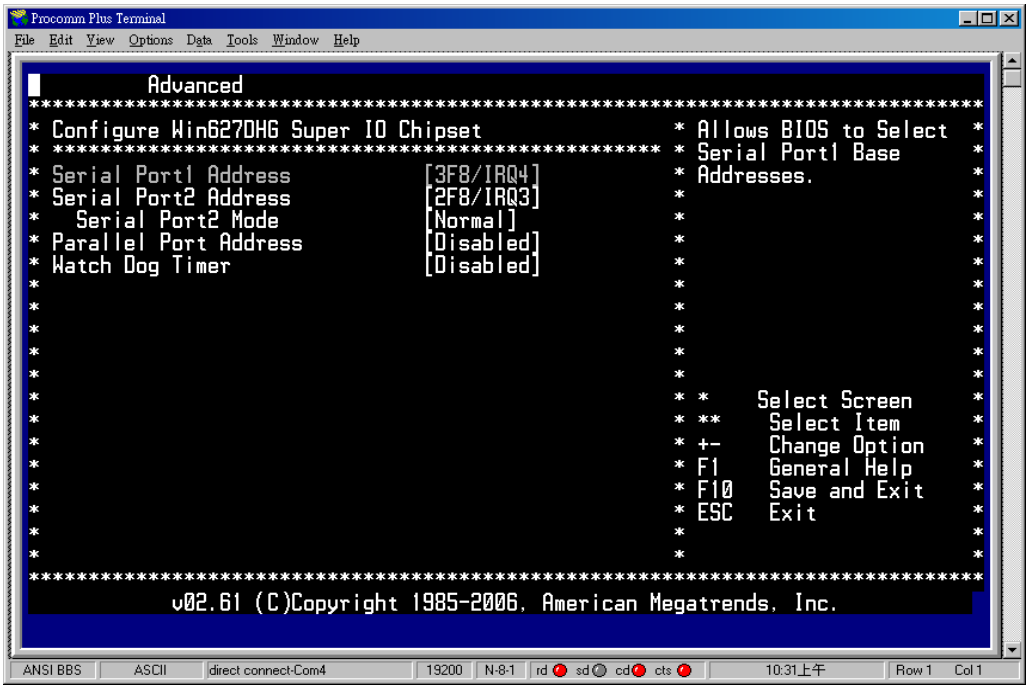
From the IDE Configuration screen, press <Enter> to access the sub menu. Use the up and down <Arrow> keys to select an item. The settings are described on the following pages.



➢ SUPER IO CONFIGURATION

Super IO Configuration

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.



➢ REMOTE ACCESS CONFIGURATION

Remote Access Configuration

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.

Remote Access

Disable or enable the BIOS remote access feature here.

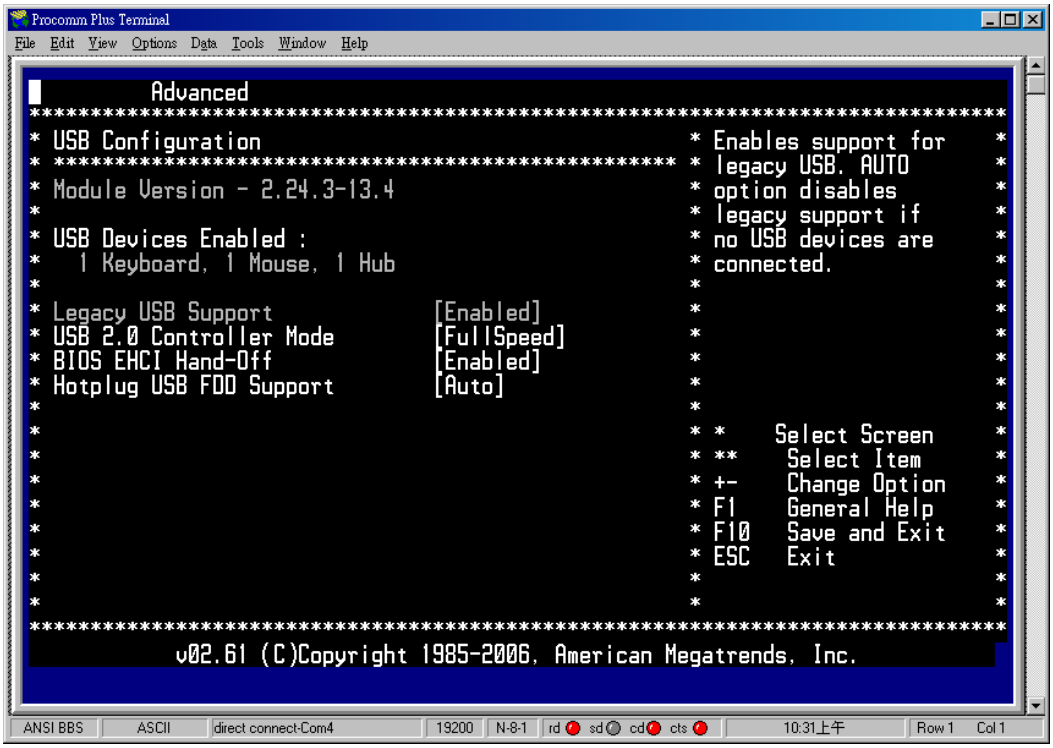
Serial Port Number

Select the serial port to use for console redirection. Set the value for this option to either *COM1* or *COM2*.

Serial Port Mode
Select the baud rate want the serial port to use for console redirection.

➢ USB Configuration

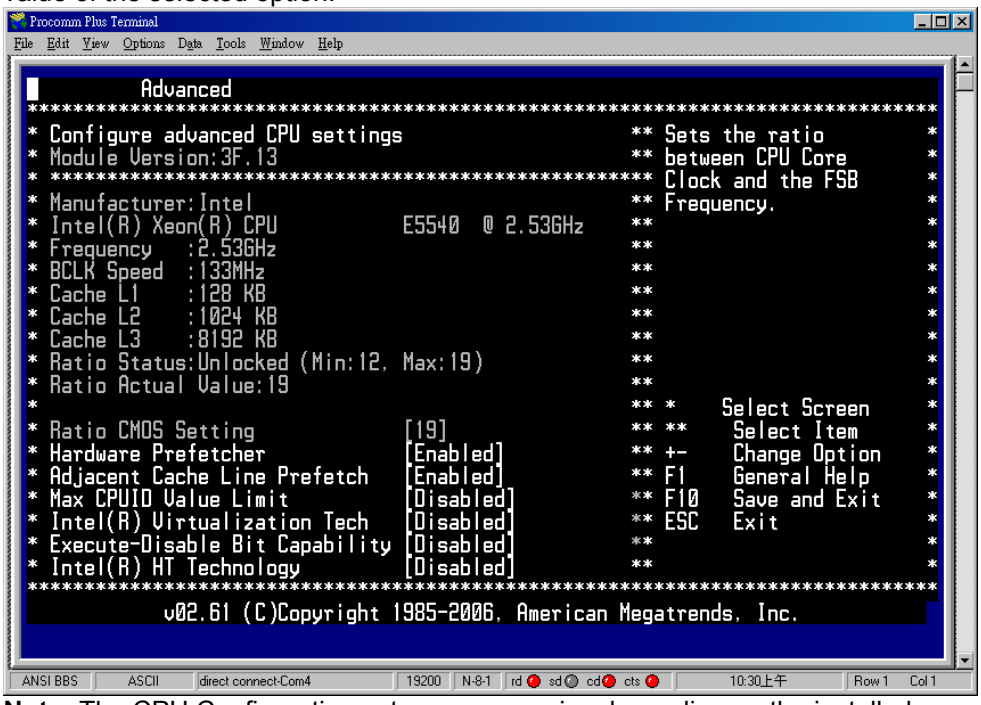
Use this screen to select options for the USB Configuration. Use the up and down <Arrow> keys to select an item. Use the <Plus> and <Minus> keys to change the value of the selected option. The settings are described on the following pages. The screen is shown below.



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

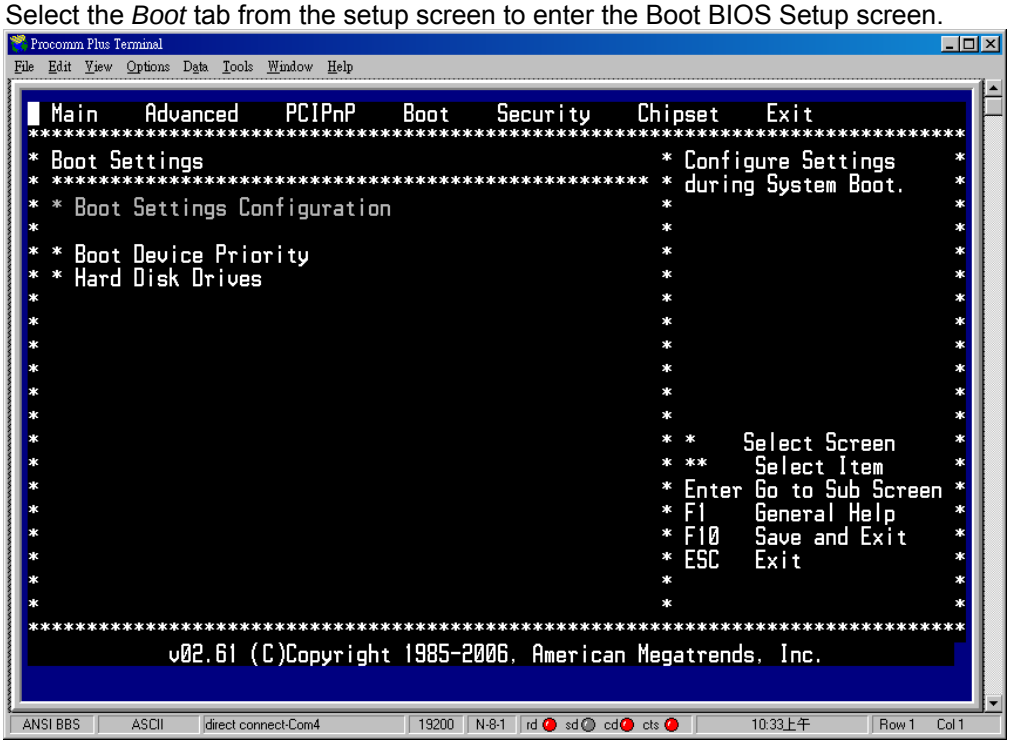
Use this screen to select options for the CPU Configuration. Use the up and down <Arrow> keys to select an item. Use the <Plus> and <Minus> keys to change the value of the selected option.



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

➢ Boot Settings

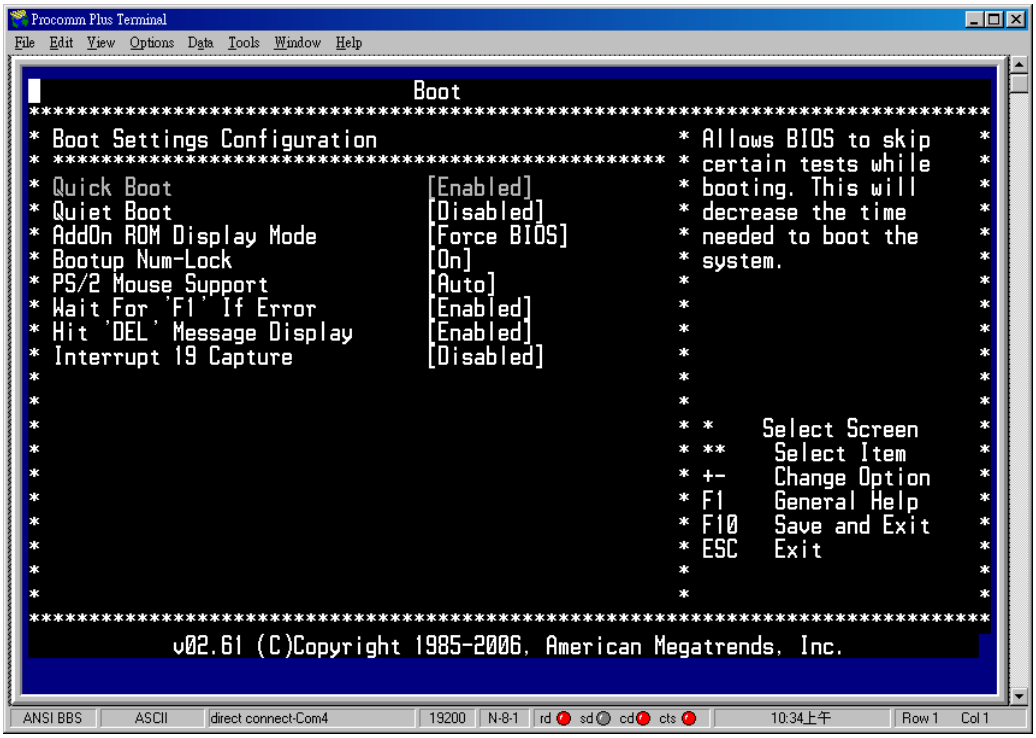
Select the *Boot* tab from the setup screen to enter the Boot BIOS Setup screen.



➢ BOOT SETTINGS CONFIGURATION SCREEN

Boot Settings Configuration

Use this screen to select options for the Boot Settings 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.



Quick Boot

The Optimal and Fail-Safe default setting is *Disabled*.

Quiet Boot

Set this value to allow the boot up screen options to be modified between POST messages or OEM logo. The Optimal and Fail-Safe default setting is *Enabled.*

Add-On ROM Display Mode

Set this option to display add-on ROM (read-only memory) messages. The Optimal and Fail-Safe default setting is *Force BIOS*. An example of this is a SCSI BIOS or VGA BIOS.

Boot up Num-Lock

Set this value to allow the Number Lock setting to be modified during boot up. The Optimal and Fail-Safe default setting is *On.*

PS/2 Mouse Support

Set this value to allow the PS/2 mouse support to be adjusted. The Optimal and Fail-Safe default setting is *Enabled*

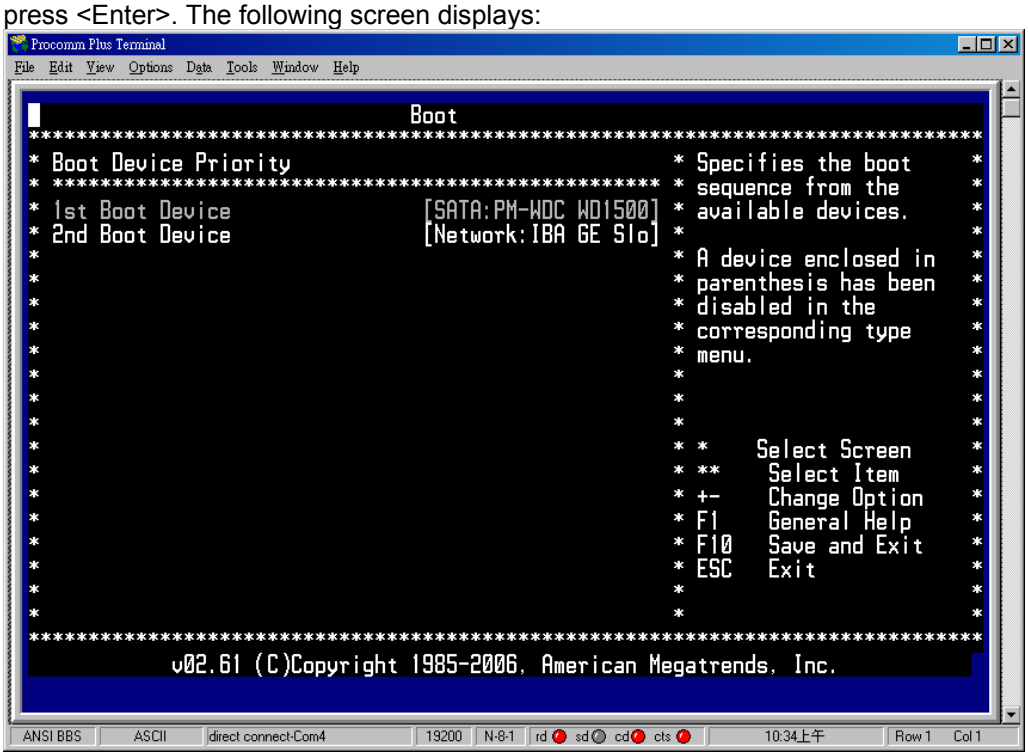
Interrupt 19 Capture

Set this value to allow option ROMs such as network controllers to trap BIOS interrupt 19.

➢ BOOT DEVICE PRIORITY

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:



➢ Exit Menu

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

Saving Changes and Exit

When 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>.

Discarding 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>.

Discard Changes
Select Discard Changes from the Exit menu and press <Enter>.

Load Optimal Defaults
Automatically sets all Setup options to a complete set of default settings when select this option. Select Load Optimal Defaults from the Exit menu and press <Enter>.

Load Fail-Safe Defaults
Automatically sets all Setup options to a complete set of default settings when select this option. The Fail-Safe settings are designed for maximum system stability, but not maximum performance. Select the Fail-Safe Setup options if computer is experiencing system configuration problems.
Select Load Fail-Safe Defaults from the Exit menu and press <Enter>.

Note: Strongly suggest user to load fail-Safe default then load optimal default one time after user update BIOS.

Chapter 4 Programming Guide

4.1 About EZIO-G400

The major purpose of this module is to provide an easier man-machine interface for those computing systems in whose applications friendly operation is a “must.” In traditional computing system design, proprietary keypad and LCD display interfaces are implemented and these interfaces are usually different from system to system. The design goals of this interface are:

A. A single interface for both LCD display and keypad is required.
B. This interface should be available in every computing system.
C. The communication implementation should be OS independent.

Our solution is to use “Serial port” as the interface for both LCD display and keypad. A simple protocol is further defined so that applications can directly communicate with this module no matter what the operating system is.

Figure 1: Display area

WARNING!

THE LCD DRIVER ICS ARE MADE OF CMOS PROCESS, DAMAGED BY STATIC CHARGE VERY EASILY. MAKE SURE THE USER IS GROUNDED WHEN HANDLING THE LCD.

4.1.1 Features

- Ideal user interface for communication appliance
- No driver required; OS independent
- Alphanumeric characters display support
- Four key pads can be customized for different applications
- Easy system installation and operation
- Clearly display system status
- Single interface to SBC or M/B

-

4.1.2 Technical Support Information

For further support, users may also contact Caswell's headquarter in Taipei or your local distributors.

Taipei Office Phone Number: +886-2-5591-1999

4.1.3 Mechanical Specification

Item	Value	Unit
Number of dots	128 X 32	Dot
Dot size	0.341 X 0.334	mm
Dot pitch	0.366 X 0.359	mm
Module dimension	87(W) X 30(H) X 31.85(T)	mm
Viewing Area	55 (W) X 18 (H)	mm
Active Area	46.823 (W) X 11.463 (H)	mm
Duty	1/32	-
Bias	1/6	-
Viewing direction	6 O'clock	-
LCD type	STN (BLUE), TRANSMISSIVE/NEGATIVE	-
INTERFACE	RS-232	-

4.1.4 Product Outlook

There are two connectors on the module, as shown in Figure 3 power connector and serial port connector. The power source into this module is 5 volt only. Three pins being used in the serial port interface.

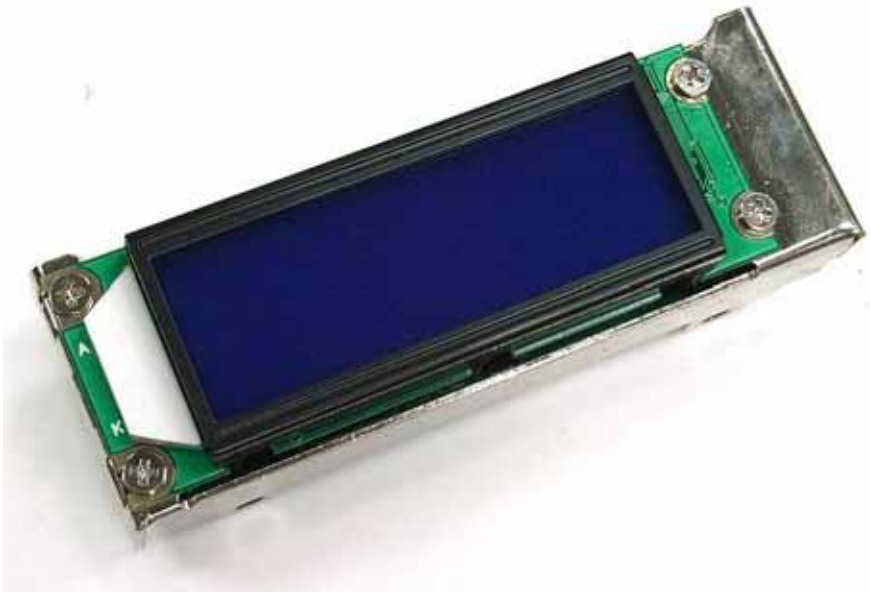
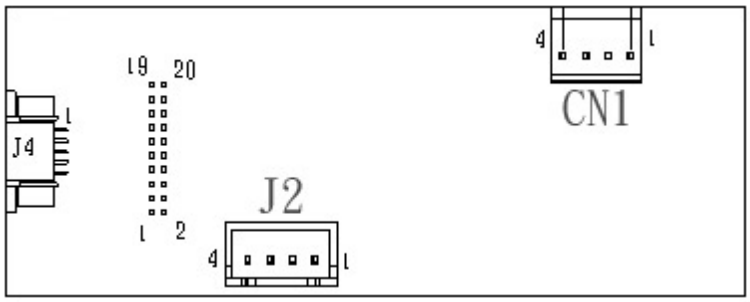


Figure 2: Front view of EZIO G400

Figure 3: Back view of EZIO G400



Connector J2: RS-232

NO	Signal	Direction	Function Description
1	NC		NC
2	RXD	LCM to PC	Transmit data
3	TXD	PC to LCM	Receiver data
4	GND		Signal ground

Connector CN1: POWER

NO	Signal
1	5V
2	GND
3	GND
4	NC

In other words, the Serial Port is defined as DCE. Therefore, we can use a straight-through cable to connect it to the Serial Port of most of the computers, defined as DTE.

4.1.5 Hardware installation

The installation steps are:

A. Connect the power connector to the power connector of this module.
B. Connect the straight-through cable between Serial port of this module and computer.

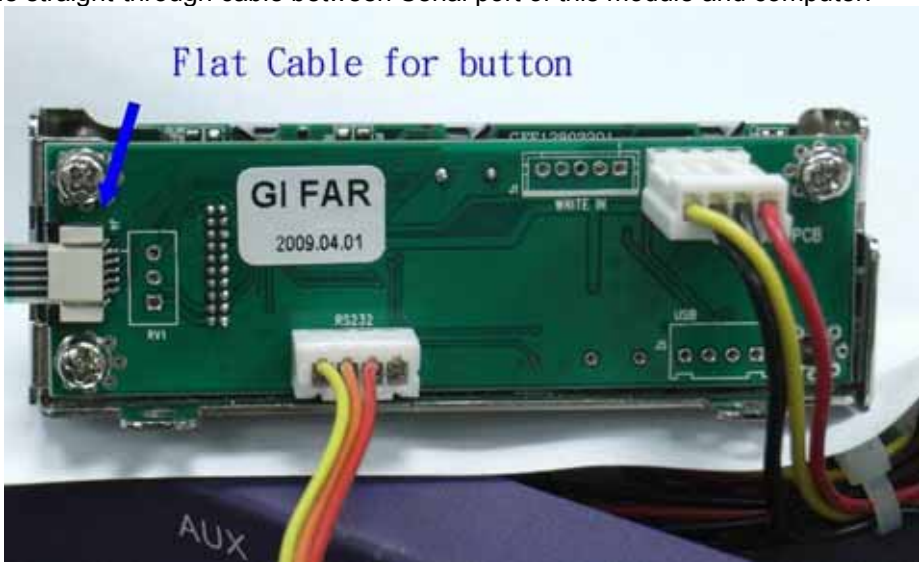


Figure 4: Connect EZIO-G400

4.1.6 EZIO Function Command

3. EZIO is an intelligent device, which will display those data received from RS232 port and reply key pressing status to RS232 port.
4. The valid data range is as following table shows.

Valid data range	Displayed characters
48-57 (30-39 Hex)	0-9
65-90 (41-5A Hex)	A-Z
97-122 (61-7A Hex)	a-z

4.1.7 Command Code

COMMAND	CODE DESCRIPTION (HEX)	FUNCTION DESCRIPTION
ESC DC2	1B 12	Vertical scroll mode
ESC DC3	1B 13	Horizontal scroll mode
ESC [D	1B 5B 44	Move cursor left
BS	08	Move cursor left
ESC [C	1B 5B 43	Move cursor right
HT	09	Move cursor right
ESC [A	1B 5B 41	Move cursor up
ESC [B	1B 5B 42	Move cursor down
LF	0A	Move cursor down
ESC [H	1B 5B 48	Move cursor to home position
HOM	0B	Move cursor to home position
ESC [L	1B 5B 4C	Move cursor to left-most position
CR	0D	Move cursor to left-most position
ESC [R	1B 5B 52	Move cursor to right-most position
ESC [K	1B 5B 4B	Move cursor to bottom position
ESC l x y	1B 6C x y 00≦x≦0F 00≦y≦03	Move cursor to specified position
ESC @	1B 40	Initial display
CLR	0C	Clear display screen
CAN	18	Clear cursor line
ESC_n	1B 5F n n = 00,01	Set cursor ON/OFF
ECS r n	1B 72 n n = 00,01	Select / cancel reverse character.
ESC G [data x 512 bytes]		Download graphic to the LCD display
ESC S n	1B 53 n 01≦n≦16	Save the graphic in layer n.
ESC P n	1B 50 n 01≦n≦16	Show the graphic saved in layer n.
ESC B n	1B 5B n n = 00~07	Set Back Light
ESC TEST	1B 54 45 53 54	Scan the baud rate. Send out " OK "= 4F 4B (hex) when detected
ESC R n	1B 52 n n = 0024,0048,0096,0192 0384,0576, 1152 Example: Set the Baud Rate 1B 52 31 31 35 32	Set Baud Rate 0024 = 2400 Baud Rate 0048 = 4800 Baud Rate 0096 = 9600 Baud Rate 0192 = 19200 Baud Rate 0384 = 38400 Baud Rate 0576 = 57600 Baud Rate 1152 = 115200 Baud Rate * (Default)

Read Key function:
Read one byte from RS-232 rx pin if user want to detect which keys are currently pressed.

Function key	Status byte
Escape	41 (H)
Up arrow	44 (H)
Enter	46 (H)
Down arrow	45 (H)

4.1.8 SLCM Function control by Flex LCD API

Purpose:
The purpose of SLCM is to provide a simple CLI command to control EZIO-G400. SLCM can work with Linux kernel 2.4.x and 2.6.x.

4.1 Command Description:
Use Example:
$ slcmapi –d [device] –b [baud rate] –Parameter options

Device:
Serial port device path.
Ex: /dev/ttyS0/

Baud rate:
Support 2400, 4800, 9600, 19200, 38400, 57600, 115200 baud rate.

Parameter list:

Parameter	Description
S	Display string message
G	Display 128*64 bmp
C	Clear screen
c	Clear current line
H	Home cursor
s	Set cursor ON/OFF
P	Move cursor to (x, y) position
L	Move cursor 1 character left
R	Move cursor 1 character right
I	Move cursor to left-most
r	Move cursor to right-most
U	Move cursor up
D	Move cursor down
B	Set back light
K	Change device baud rate
h	Help

Options list:

Parameter	Options	Description
S	[String]	String will display in LCD
G	[Mode] [Path]	Mode=0: 192*64 1: 128*64 2: 128*32 Path: Bmp file path
s	[1/0]	1: Show cursor 0: Hide cursor
P	[x] [y]	x = 00 ~ 0F y = 00 ~ 03
B	[Baud rate]	Only support 2400, 4800, 9600, 19200, 38400, 57600, 115200 baud rate
K	[Light]	Light = 00 ~ 07

4.1.9 Use Example:

Display string:
If command runs success then string will be displayed on LCD from present cursor's position.
Use Example:
$ slcmapi –d /dev/ttyS0 –b 115200 –S "Graphic LCD"

4.2.9.1Display bmp:
If command runs success then picture will displayed on LCD.
Use Example:
$ slcmapi –d /dev/ttyS0 –b 115200 –G 1 test.bmp

4.2.9.2 Clean screen:
If command runs success then all screen will cleaned.
Use Example:
$ slcmapi –d /dev/ttyS0 –b 115200 –C

4.2.9.3 Clean cursor line
If command runs success then the line of cursor's position will be cleaned.
Use Example:
$ slcmapi –d /dev/ttyS0 –b 115200 –c

4.2.9.4 Home cursor:
If command runs successes then cursor will be returned to home position.
Use Example:
$ slcmapi –d /dev/ttyS0 –b 115200 –H

4.2.9.5 Set cursor ON/OFF:
If command runs successes then cursor will be shown / hidden.
Use Example:
$ slcmapi –d /dev/ttyS0 –b 115200 –s 1

4.2.9.6 Move cursor to (x, y) position
If command runs successes then cursor will be moved to (x, y) position.
Use Example:
$ slcmapi –d /dev/ttyS0 –b 115200 –P 0E 01

4.2.9.7 Move cursor 1 character left:
If command runs successes then cursor will be moved 1 character left.
Use Example:
$ slcmapi –d /dev/ttyS0 –b 115200 –L

4.2.9.8 Move cursor 1 character right:
If command runs successes then cursor will be moved 1 character left.
Use Example:
$ slcmapi –d /dev/ttyS0 –b 115200 –R

4.2.9.9 Move cursor up
If command runs successes then cursor will be moved up.
Use Example:
$ slcmapi –d /dev/ttyS0 –b 115200 –U

4.2.9.10 Move cursor down
If command runs successes then cursor will be moved down.
Use Example:
$ slcmapi –d /dev/ttyS0 –b 115200 –D

4.2.9.11 Change device baud rate
If command runs successes then device baud rate will be changed after rebooting.
Use Example:
$ slcmapi –d /dev/ttyS0 –b 115200 –B 9600

4.2.9.12 Set back light

If command runs successes then back light will be changed.
Use Example:
$ slcmapi –d /dev/ttyS0 –b 115200 –K 01

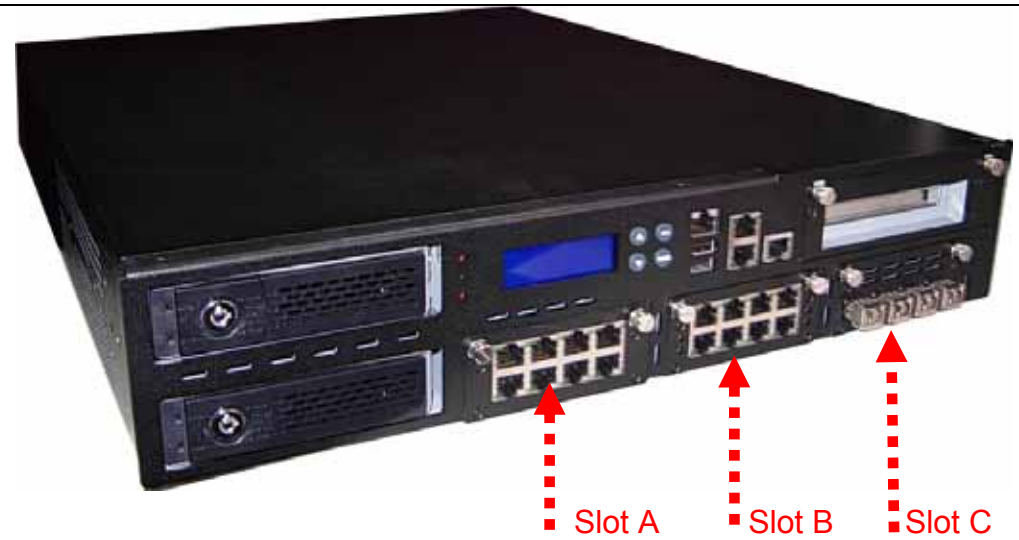
Node:

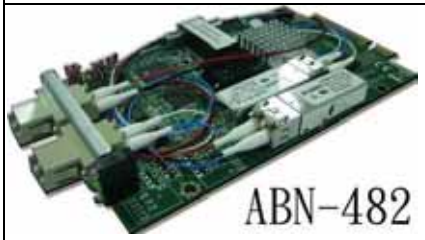
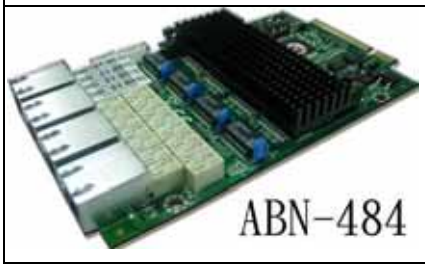
1. Above operate to all show again SLCM screen.
2. Because this is the sample command, so some functions need modify program just can complete.

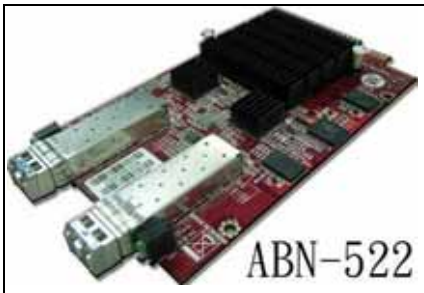
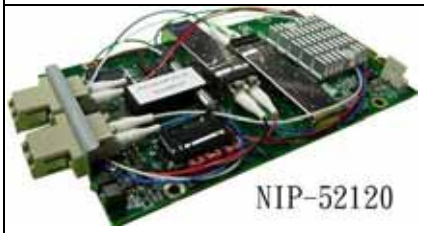
Chapter 5 Appendixes

5.1 CAR-5010 Ethernet modules configuration

This chapter will show what Ethernet modules that CAR-5010 supports. CAR-5010 has three slots to support PCI-E x8 module. The front panel may different when use these modules. Below is the list for all Ethernet modules.



Modules Name	Support Slots	PCI-E Gen2 support	Bypass Gen2 support	RJ-45(C) Fiber (F) Support	Ethernet Chip
	A, B, C	X	X	RJ-45 x4	Intel 82571 x2
	A, B, C	X	X	Fiber x4	Intel 82571 x2
	A, B, C	X	O	Fiber x2	Intel 82571 x1
	A, B, C	X	O	RJ-45 x4	Intel 82571 x2

	A, B, C	X	X	10G Fiber x2	Intel 82598 x1
	A, B, C	O	X	10G Fiber x2	Intel 82599 x1
	A, B, C	O	X	10G Copper x2	Intel 82599 x1
	A, B, C	O	X	RJ-45 x8	Intel 82580 x2
	A, B, C	O	X	Fiber x8	Intel 82580 x2
	A, B, C	O	O	Fiber x2	Intel 82580 x1
	A, B, C	X	O	RJ-45 x4	Intel 82574 x4

	A, B, C	O	X	RJ-45 x4	Intel 82580 x1
	A, B, C	O	X	Fiber x4	Intel 82580 x1
	A, B, C	O	O	RJ-45 x4	Intel 82580 x1
	A, B, C	X	X	RJ-45 x8	Cavium CN5640