Ruggcore™ REC3423

User Manual

Ruggdized Embedded Controller

Intel® Atom™ N270 Processor

(1st Edition 09/30/2009)

All information is subject to change without notice.

Approved by	Checked by	Prepared by
Ming	Hank	Jack

RECORD OF REVISION

Version and Date	Page	Old Description	New Description	Remark
Sep.30 2009	all		Preliminary Release	

Acknowledgments

Packing List

Before installation, please ensure the following items have been shipped:

- ☐ 1 x REC3423 Embedded Controller
- ☐ 1 x CD-ROM for manual (in PDF format) and drivers

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

Ordering Information

Model Number Description

REC3423-A01
Intel Atom™ N270 CPU, Fanless, DC 8.5~19V input, SODIMM DDRII 1GB RAM, 2 x GbE, 4 x COM, 1 x DVI-I, 2 x USB2.0, CompactFlash™, Mini-PCI, HDD Bay

Optional Accessories

810218001020 DVI-I to DVI-D & DVI-I to VGA Port Y Cable
810618301015 Power Cable USA Type
810618301070 Power Cable Europe Type

Safety & Warranty

1. Read these safety instructions carefully.
2. Keep this user's manual for later reference.
3. Disconnect this equipment from any AC outlet before cleaning. Do not use liquid or spray detergents for cleaning. Use a damp cloth.
4. For pluggable equipment, the power outlet must be installed near the equipment and must be easily accessible.
5. Keep this equipment away from humidity.
6. Put this equipment on a firm surface during installation. Dropping it or letting it fall could cause damage.
7. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
8. Position the power cord so that people cannot step on it. Do not place anything over the power cord.
9. All cautions and warnings on the equipment should be noted.
10. If the equipment is not used for a long time, disconnect it from the power source to avoid damage by transient over-voltage.
11. Never pour any liquid into an opening. This could cause fire or electrical shock.
12. Never open the equipment. For safety reasons, only qualified service personnel should open the equipment.
13. If any of the following situations arises, get the equipment checked by service personnel:
    a. The power cord or plug is damaged.
    b. Liquid has penetrated into the equipment.
    c. The equipment has been exposed to moisture.
    d. The equipment does not work well, or you cannot get it to work according to the user's manual.
    e. The equipment has been dropped and damaged.
    f. The equipment has obvious signs of breakage.
14. DO NOT LEAVE THIS EQUIPMENT IN AN ENVIRONMENT WHERE THE STORAGE TEMPERATURE IS BELOW -20°C (-4°F) OR ABOVE 70°C (158°F). IT MAY DAMAGE THE EQUIPMENT.

FCC Safety

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

TABLE OF CONTENT

1.0 INTRODUCTION

1.1 About Ruggcore™ Embedded Controller

The REC3423 Embedded Controller system's design concept not only focuses on the fast expanding Machine Automation market but also the Industrial Automation industry. The REC3423 provide one mini PCI slot (internal) for expansion.

A solid sealed aluminum case provides vibration and dust resistance while also providing a passive cooling solution. The REC3423 provides system integrators with a turn-key solution and versatile application development path to fulfill the diversified market demand.

The REC3423 can be used as a standalone system, and wall-mounted. The system accepts a wide range of power supplies (DC power in). The rugged aluminum case not only provides great protection from EMI, shock/vibration, cold and heat, but also passive cooling for quiet fanless operation.

The REC3423 Embedded Computer supports Compact Flash card for storage options and it can provide the diversified application field. Therefore REC3423's expandable function, compact size combined with fanless design and highly efficient heat conduction mechanism can fulfill any rugged technical application in industrial automation, factory control, and test instrumentation.

1.2 FEATURES

- Intel® Atom Based Fanless Design
- Rugged Design
- Rich IO (4 USB, 2 COM, 2 GbE)
- Wide Range DC Input (+8.5V ~ 19V)

1.3 SPECIFICATIONS:

System

Processor	*Intel Atom N270 Processor*
Chip Set	*Intel945GSE + ICH-7M*
System Memory	*DDRII SODIMM x 1, Max. 2GB (DDRII 400/533)*
Ethernet	*Intel 82574L GbE (Gigabit Ethernet)*
Storage	*CF Card* *SATAII HDD Bay*
Audio	*Line-Out, MIC in*
I/O Interface-Front	*PWR/HDD LED, DC-In, Power on SW,* *RJ45 x2, USB x2, COMx1, DVI-I x1, CFD*
I/O Interface-Rear	*Audio Phone Jack (Line-out, MIC-in), USBx2, COMx3* *(RS232 x2, RS232/422/485 x1), DC Input Phoenix Connector*
BIOS	*Award*
Watchdog Timer	*Generates a time-out system reset*

Expansion Interface	*Mini PCI (internal)*
Power Requirement	*+8.5V DC ~ +19V DC wide range DC input*

Mechanical

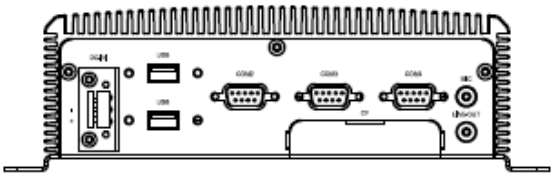
Construction	*Rugged Aluminum Alloy chassis*
Mounting	*Wallmount, Desktop*
Dimension	*196mm (W) x 69mm(H) x 150mm(D)*
Net Weight	*2.3Kg*

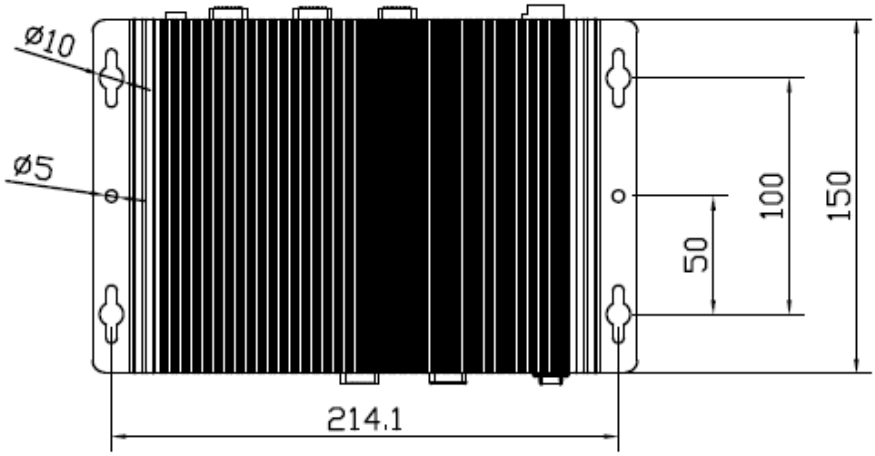
Environment

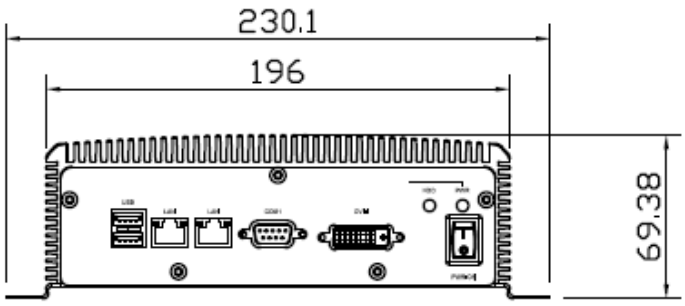
Operating Temperature	*-15°C ~ 50°C (5°F ~ 131°F) – HDD*
Storage Temperature	*-20°C ~ 70°C (-4°F ~-158°F)*
Operating Humidity	*5~90% @ 40°C, non-condensing*
Vibration:	*5g rms / 5~500Hz / random operation (CFD);* *1g rms / 5~500Hz / random operation (HDD);*
Shock:	*50g peak acceleration (11msec. duration)(CFD)* *20g peak acceleration (11msec. duration) (HDD)*
Certification	*CE/FCC*

2.0 HARDWARE INSTALLATION

2.1 REC3423 Dimension

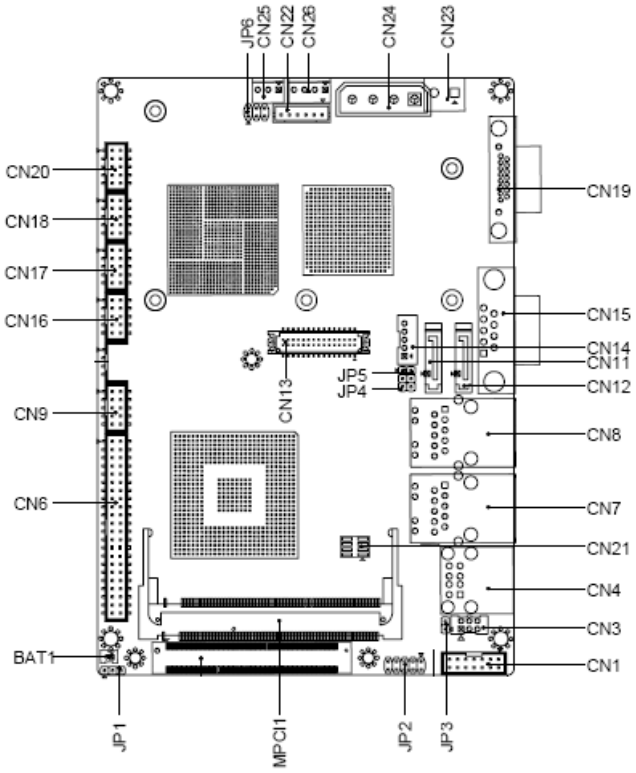




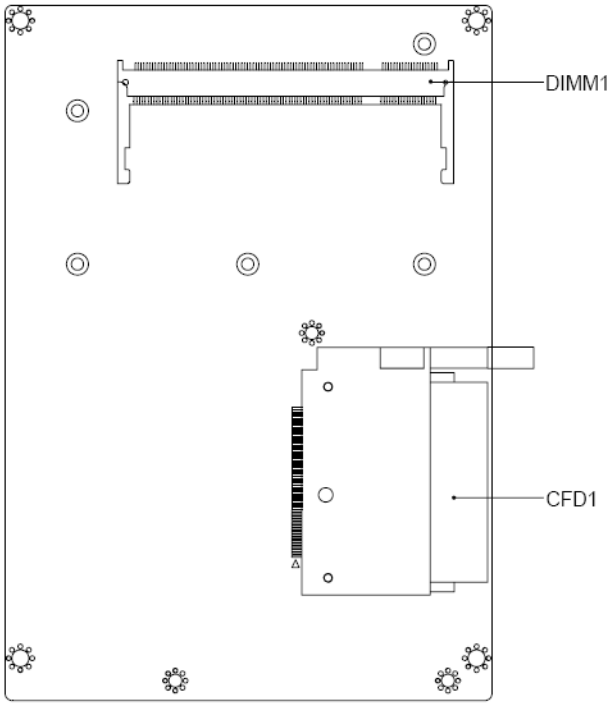


2.2 Location of Connectors and Jumpers

Component Side



Solder Side



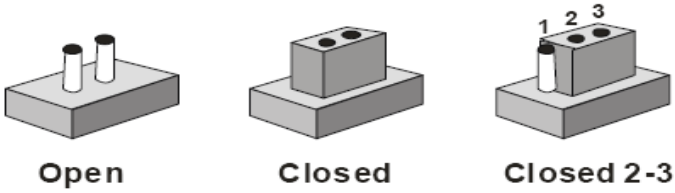
2.2.1 List of Connectors

The board has a number of connectors that allow you to configure your system to suit your application.
The table below shows the function of the board's connectors:

Location	Function
CN1	Audio Connector
CN3	Keyboard / Mouse Connector
CN4	USB Port 1,2 Connector
CN9	USB Port 3,4 Connector
CN11	SATA 1 Connector
CN12	SATA 2 Connector
CN12	I2C Connector
CN13	LVDS Connector
CN14	LVDS Inverter Connector
CN15	COM Port 1 Connector
CN16	COM Port 2 Connector
CN17	COM Port 3 Connector
CN18	COM Port 4 Connector
CN19	DVI Display Connector
CN20	Digital I/O Connector
CN21	Onboard BIOS Programming I/F
CN22	ATX Connector
CN23	Wide Range Voltage Input Connector
CN24	+5V Power Input Connector
CN25	CPU Fan Connector
CN26	+5V / +12V Output Connector
CFD1	Compact Flash Disk
MPCI1	Mini-PCI Slot
DIMM1	DDRII SODIMM Slot

2.2.2 Setting Jumpers

You configure your card to match the needs of your application by setting jumpers. A jumper is the simplest kind of electric switch. It consists of two metal pins and a small metal clip (often protected by a plastic cover) that slides over the pins to connect them. To “close” a jumper you connect the pins with the clip.
To “open” a jumper you remove the clip. Sometimes a jumper will have three pins, labeled 1, 2 and 3. In this case you would connect either pins 1 and 2 or 2 and 3.



A pair of needle-nose pliers may be helpful when working with jumpers.
If you have any doubts about the best hardware configuration for your application, contact your local distributor or sales representative before you make any change. Generally, you simply need a standard cable to make most connections.

2.2.3 List of Jumpers

Jumpers

Label	Function
JP1	Clear CMOS
JP2	Front Panel
JP3	Touch Screen 4/5/8-wires Mode Selection (Optional)
JP4	LVDS Operating Voltage Selection
JP5	LVDS Inverter Voltage Selection
JP6	COM2 RI/+5/+12V Selection

Clear CMOS (JP1)

JP1	Function
1-2	Normal (Default)
2-3	Clear CMOS

Front Panel (JP2)

Pin	Signal
(-)1-2(+)	ATX Power-on Button
(-)3-4(+)	HDD Active LED
(-)5-6(+)	External Speaker
(-)7-8(+)	Power LED
(-)9-10(+)	System Reset Button

LVDS Operating Voltage Selection (JP4)

JP4	Function
1-2	+5V
2-3	+3.3V (Default)

LVDS Inverter Voltage Selection (JP5)

JP5	Function
1-2	+12V
2-3	+5V (Default)

COM2 RI/+5V/+12V Selection (JP6)

JP6	Function
5-6	RI (Default)
3-4	+5V
1-2	+12V

Audio Connector (CN1)

Pin	Signal	Pin	Signal
1	MIC	2	MIC_Vcc
3	Ground	4	CD_GND
5	LINE_IN L	6	CD_L
7	LINE_IN R	8	CD_GND
9	Ground	10	CD_R
11	LINE_OUT L	12	LINE_OUT R
13	Ground	14	Ground

Keyboard/Mouse Connector (CN3)

Pin	Signal	Pin	Signal
1	Keyboard Data	2	Keyboard Clock
3	Ground	4	+5 Volt.
5	Mouse Data	6	Mouse Clock

USB Port 1, 2 Connector (CN4)

Pin	Signal	Pin	Signal
1	+5 Volt. Standby	5	+5 Volt. Standby
2	Data0-	6	Data1-
3	Data0+	7	Data1+
4	Ground	8	Ground

IDE Connector (CN6)

Pin	Signal	Pin	Signal
1	IDERST#	2	Ground
3	D7	4	D8
5	D6	6	D9
7	D5	8	D10
9	D4	10	D11
11	D3	12	D12
13	D2	14	D13
15	D1	16	D14
17	D0	18	D15
19	Ground	20	N/C /+5 Volt. For DOM optional
21	DREQ	22	Ground
23	IOW#	24	Ground
25	IOR#	26	Ground
27	IORDY	28	Ground
29	DACK#	30	Ground
31	IRQ14	32	N/C
33	A1	34	Cable Detect
35	A0	36	A2
37	CS#1	38	CS#3
39	ACT#	40	Ground

RJ-45 Ethernet #1 Connector (CN8)

Pin	Signal	Pin	Signal
1	MDI1_0+ / TXD+	2	MDI1_0- / TXD-
3	MDI1_1+ / RXD+	4	MDI1_1- / RXD-
5	TCD1_0	6	TCD1_1
7	MDI1_2+	8	MDI1_2-
9	MDI1_3+	10	MDI1_3-
11	ACT_1_LED	12	+3.3 Volt.
13	SPD100_1_LED	14	SPD1G_1_LED

USB Port 3, 4 Connector (CN9)

Pin	Signal	Pin	Signal
1	+5 Volt. Standby	2	Ground
3	Data2-	4	Ground
5	Data2+	6	Data3+
7	Ground	8	Data3-
9	Ground	10	+5 Volt. Standby

SATA 0 Connector (CN11)

Pin	Signal
1	Ground
2	TX0+
3	TX0-
4	Ground
5	RX0-
6	RX0+
7	Ground

SATA 2 Connector (CN12)

Pin	Signal
1	Ground
2	TX1+
3	TX1-
4	Ground
5	RX1-
6	RX1+
7	Ground

LVDS Connector (CN13)

Pin	Signal	Pin	Signal
1	Back-Light Enable	2	Back-Light Control / N/C
3	LCD Volt.	4	Ground
5	LA_CLK#	6	LA_CLK
7	LCD Volt.	8	Ground

9	LA_DATA#_0	10	LA_DATA_0
11	LA_DATA#_1	12	LA_DATA_1
13	LA_DATA#_2	14	LA_DATA_2
15	N/C	16	N/C
17	LVDS_DATA / N/C	18	LVDS_CLK / N/C
19	LB_DATA#_0	20	LB_DATA_0
21	LB_DATA#_1	22	LB_DATA_1
23	LB_DATA#_2	24	LB_DATA_2
25	N/C	26	N/C
27	LCD Volt.	28	Ground
29	LB_CLK#	30	LB_CLK

LVDS Inverter Connector (CN14)

Pin	Signal
1	+5 Volt. / +12 Volt.
2	Brightness Control
3	Ground
4	Ground
5	Backlight Enable

COM Port 1 Connector (CN15)

Pin	Signal	Pin	Signal
1	DCDA	2	RXA
3	TXA	4	DTRA
5	Ground	6	DSRA
7	RTSA	8	CTSA
9	RIA	10	N/C

COM Port 2 Connector (CN16)

RS-232 Mode

Pin	Signal	Pin	Signal
1	DCDB	2	RXB
3	TXB	4	DTRB
5	Ground	6	DSRB
7	RTSB	8	CTSB
9	RIB / +5 Volt. / +12 Volt.	10	N/C

RS-422 Mode

Pin	Signal	Pin	Signal
1	TXD-	2	RXD+
3	TXD+	4	RXD-
5	Ground	6	N/C
7	N/C	8	N/C
9	N/C / +5 Volt. / +12 Volt.	10	N/C

RS-485 Mode

Pin	Signal	Pin	Signal
1	TXD-	2	N/C
3	TXD+	4	N/C
5	Ground	6	N/C
7	N/C	8	N/C
9	N/C / +5 Volt. / +12 Volt.	10	N/C

COM Port 3 Connector (CN17)

Pin	Signal	Pin	Signal
1	DCDC	2	RXC
3	TXC	4	DTRC
5	Ground	6	DSRC
7	RTSC	8	CTSC
9	RIC	10	N/C

COM Port 4 Connector (CN18)

Pin	Signal	Pin	Signal
1	DCDD	2	RXD
3	TXD	4	DTRD
5	Ground	6	DSRD
7	RTSD	8	CTSD
9	RID	10	N/C

Onboard BIOS Programming I/F (CN21)

Pin	Signal	Pin	Signal
1	+3.3 Volt.	2	Ground
3	SPI_CE#	4	SPI_CLK
5	SPI_SO	6	SPI_SI
7	N/C	8	N/C

ATX Connector (CN22)

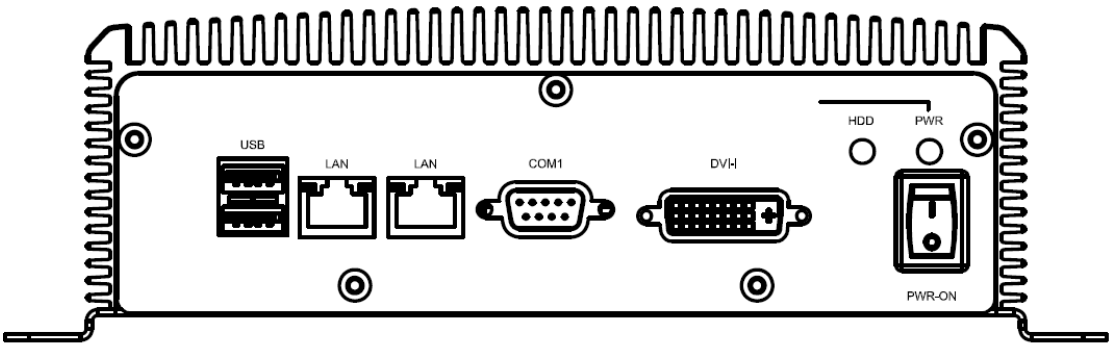
Pin	Signal
1	N/C
2	Ground
3	N/C
4	Ground
5	PS_ON#
6	+5 Volt. Standby

CompactFlash Disk (CFD1)

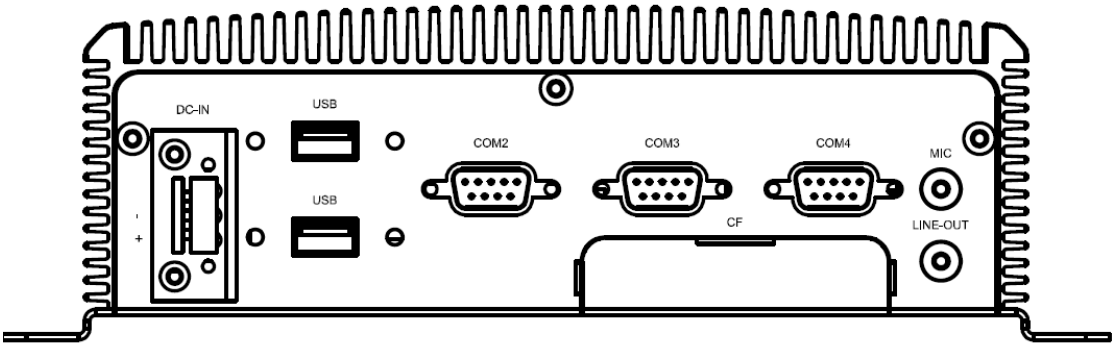
Pin	Signal	Pin	Signal
1	Ground	26	Ground
2	PDD3	27	PDD11
3	PDD4	28	PDD12
4	PDD5	29	PDD13
5	PDD6	30	PDD14
6	PDD7	31	PDD15
7	PDCS#1	32	PDCS#3
8	Ground	33	Ground
9	Ground	34	PDIOR#
10	Ground	35	PDIOW#
11	Ground	36	+3.3 Volt.
12	Ground	37	INT_IRQ14
13	+3.3 Volt.	38	+3.3 Volt.
14	Ground	39	CSEL#
15	Ground	40	N/C
16	Ground	41	IDERST#
17	Ground	42	PIORDY
18	PDA2	43	N/C
19	PDA1	44	+3.3 Volt.
20	PDA0	45	DASP#
21	PDD0	46	PDIAG#
22	PDD1	47	PDD8
23	PDD2	48	PDD9
24	N/C	49	PDD10
25	Ground	50	Ground

2.3 External I/O Connectors

Front View



Rear View



3.0 AWARD BIOS SETUP

3.1 Award BIOS Setup

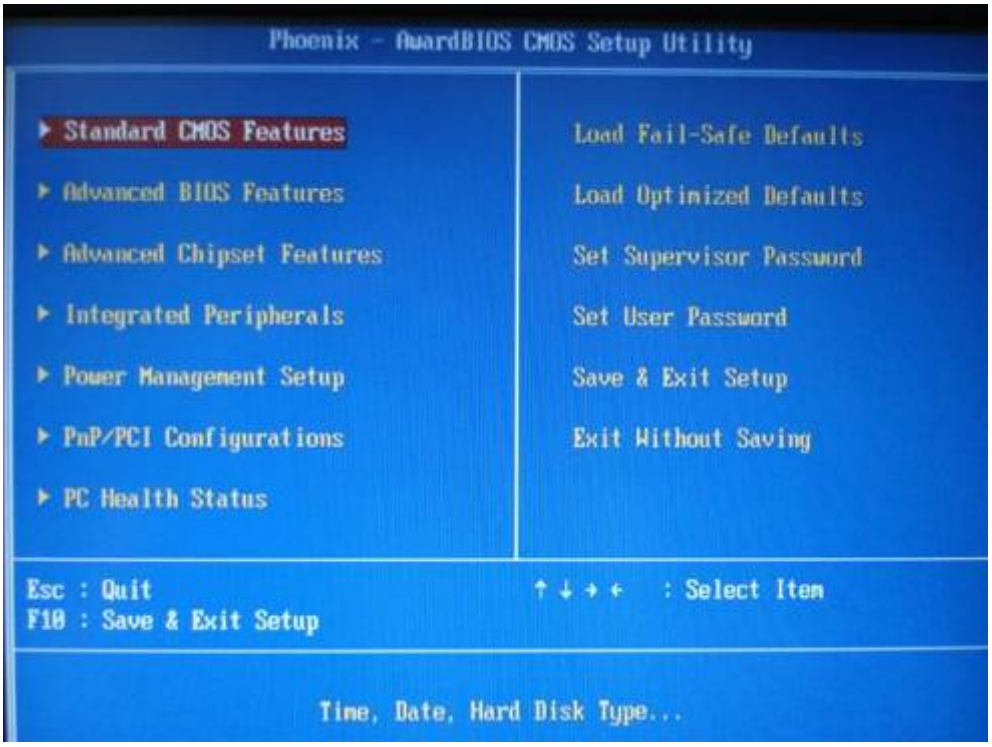
The BIOS setup, also called CMOS setup, is a crucial part of the proper setting up of Ruggcore. The BIOS (Basic Input Output System) tells the operating system the characteristics of the main basic components of Ruggcore. Because of this, an incorrectly set up BIOS can result in some devices not being recognized by the operating system.

Getting into the Award BIOS

Cold boot Ruggcore and when you see the first screen showing in monitor, press the Delete key repeatedly till you get a blue screen titled.
When you successfully get into the BIOS setup, you will be presented with the following menu.

Setup 1: The Main BIOS Menu.

The sections that follow provide guidelines on how to set up the various settings in each section of the BIOS. We have concentrated only on those settings that may need changing, if a setting does not appear in this document, leave it as you found it.
Press Enter on a main menu option to go into that section.
To return to the Main Menu from within a section, press Escape.



Screen 1

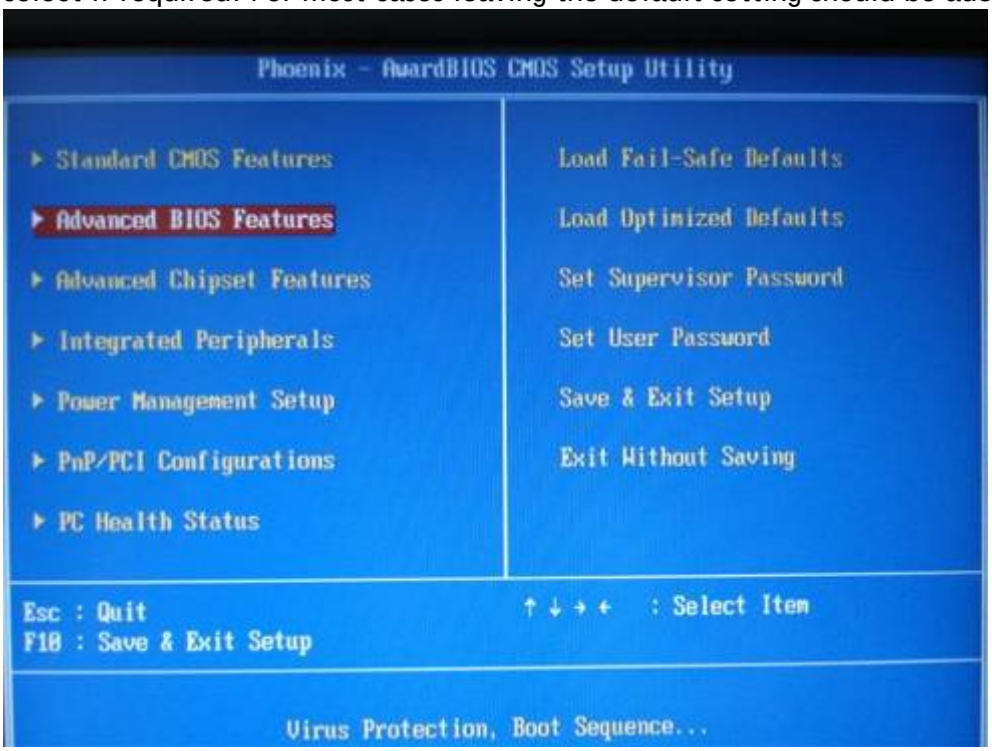
Setup 2: Standard CMOS Features

Here you can setup the basic BIOS features such as date and time. Use the arrow keys to move around and press enter to select the required option. You can specify what IDE or SATA devices you have such as Hard drive, CF device etc. The easiest way to setup the devices is by leaving it set to auto. This allows the BIOS to detect the devices automatically so you don't have to do it manually. At the bottom, it also displays the total memory in your system. Verify that your hard disk or CF device have been correctly detected in the shaded fields.

Screen 2

Setup 3: Advanced BIOS Features

As you can see from screen 3, there are numerous advance settings which you can select if required. For most cases leaving the default setting should be adequate.



Screen 3

As you can see from the screen 4, the first and second boot device is set to Hard Disk. This ensures that the hard disk is read first when the system boots, and therefore can boot from boot disk. The third is set to CD ROM.

Screen 4

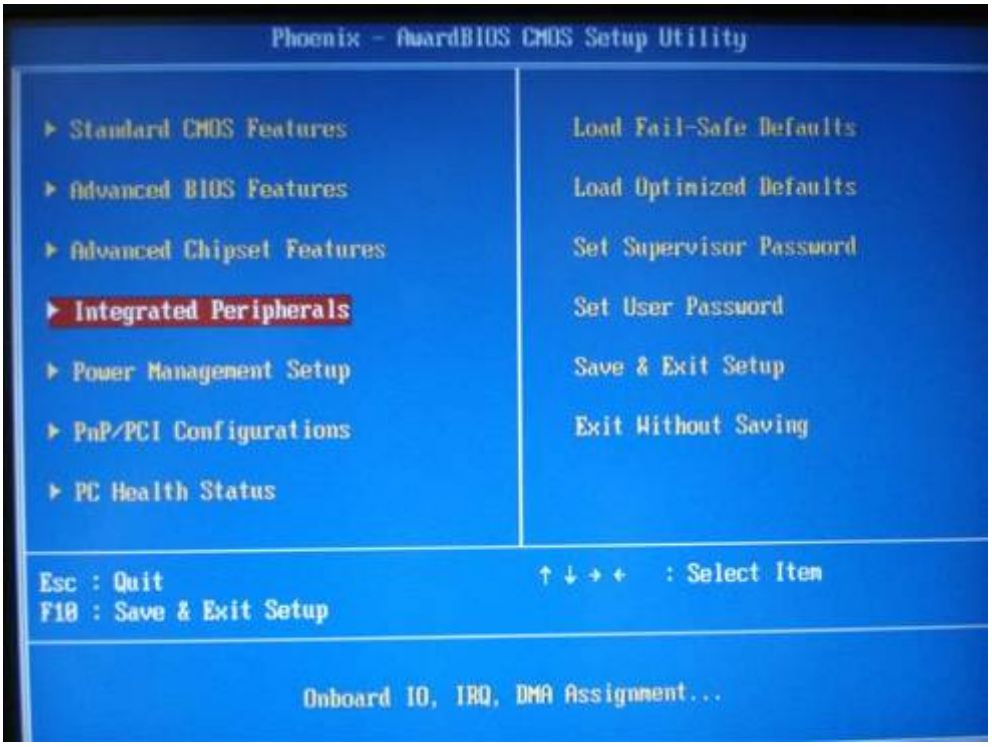
Setup 4: Advanced Chipset Features

Here you can setup the contents of the chipset buffers. It is closely related to the hardware and is therefore recommended that you leave the default setting unless you know what you are doing. Having an incorrect setting can make your system unstable.

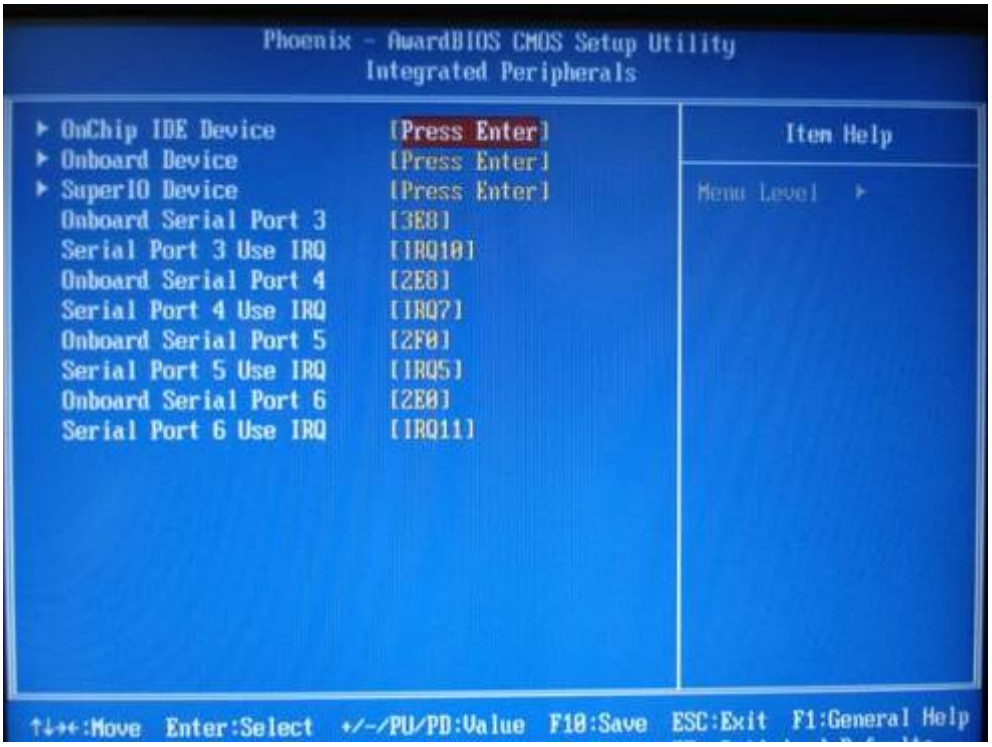
Screen 5

Setup 5: Integrated Peripherals

This menu allows you to change the various I/O devices such as IDE controllers, serial ports, keyboard, USB, and LAN. You can make changes as necessary.



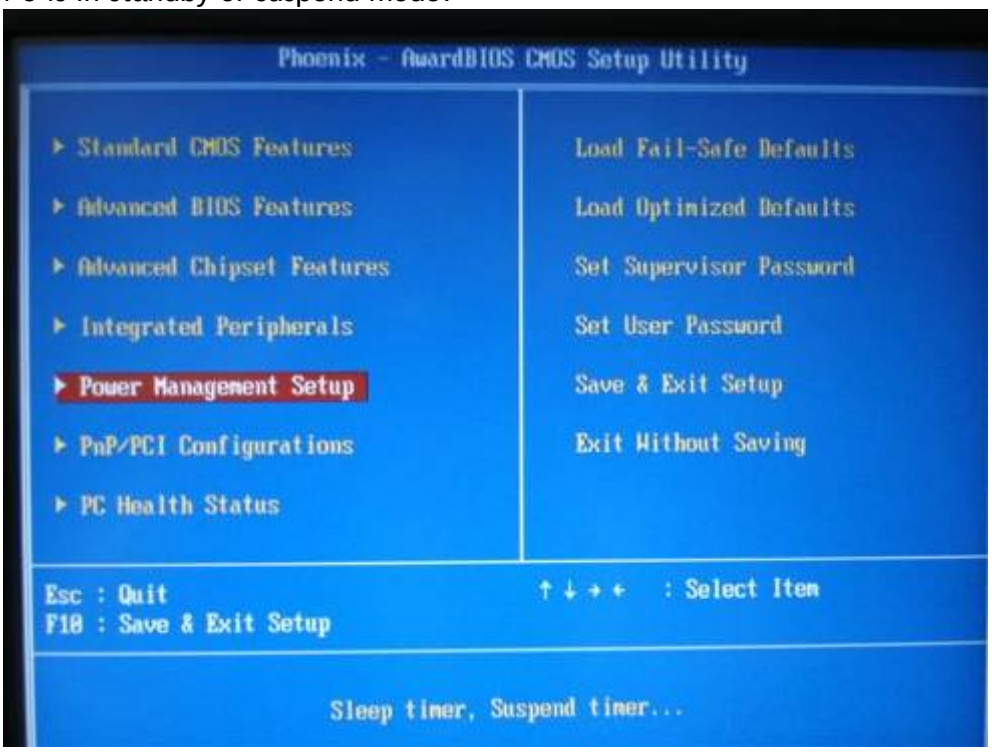
Screen 6



Screen 7

Setup 6: Power Management Setup

The power management allows you to setup various power saving features, when the PC is in standby or suspend mode.

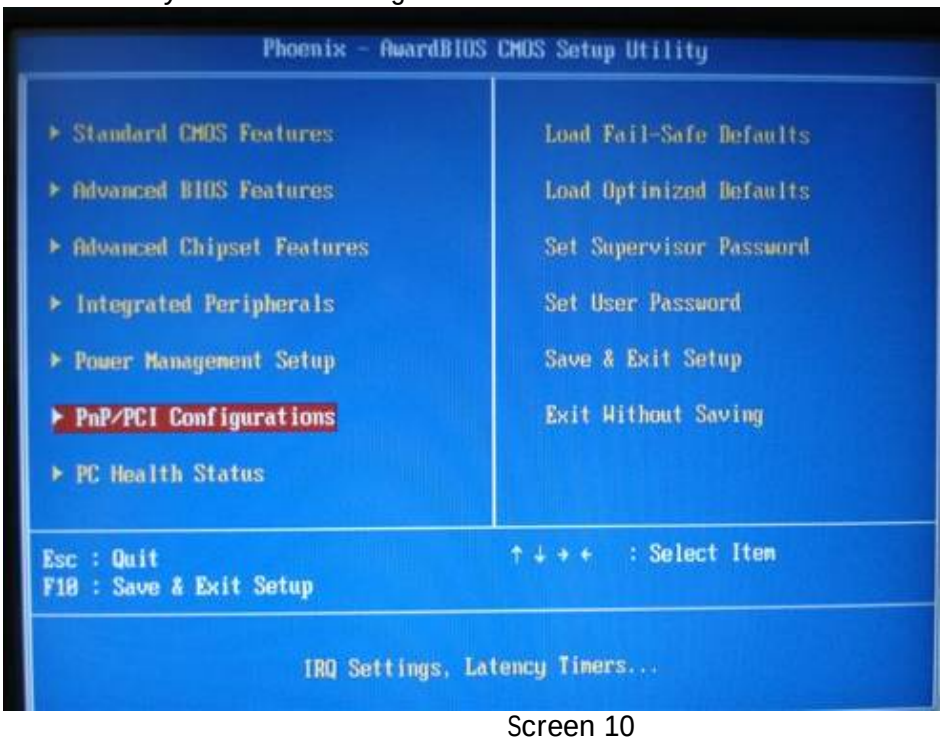


Screen 8

Screen 9

Setup 7: PnP/PCI Configurations

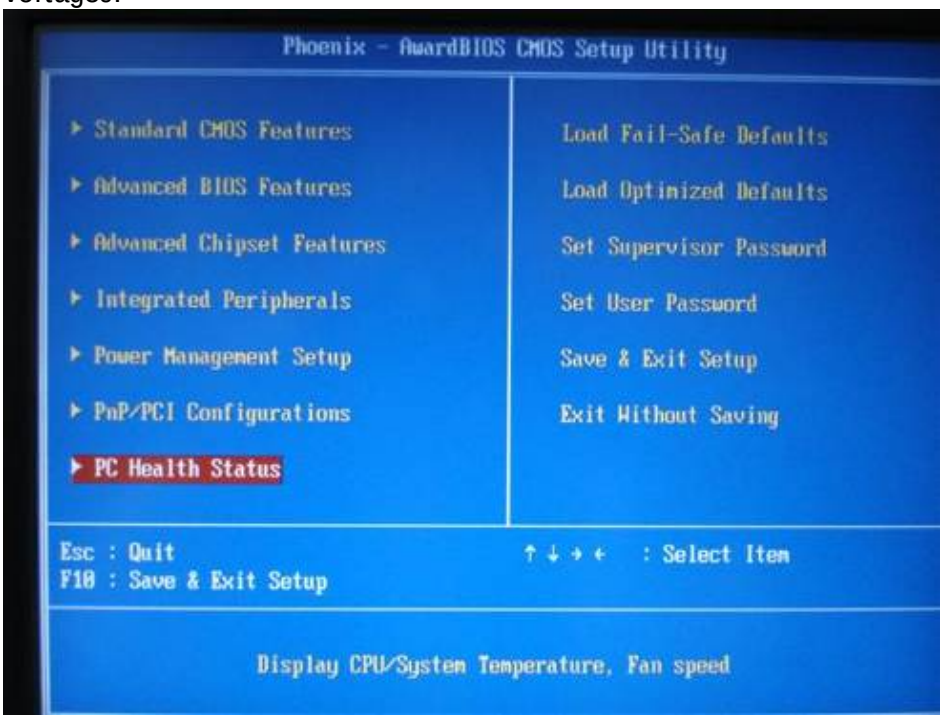
This menu allows you to configure your PCI slots. You can assign IRQ's for various PCI slots. It is recommended that you leave the default settings, BIOS can automatically configure all the boot and plug & play compatible devices. You may choose manual mode when you want to change PCI device resources.



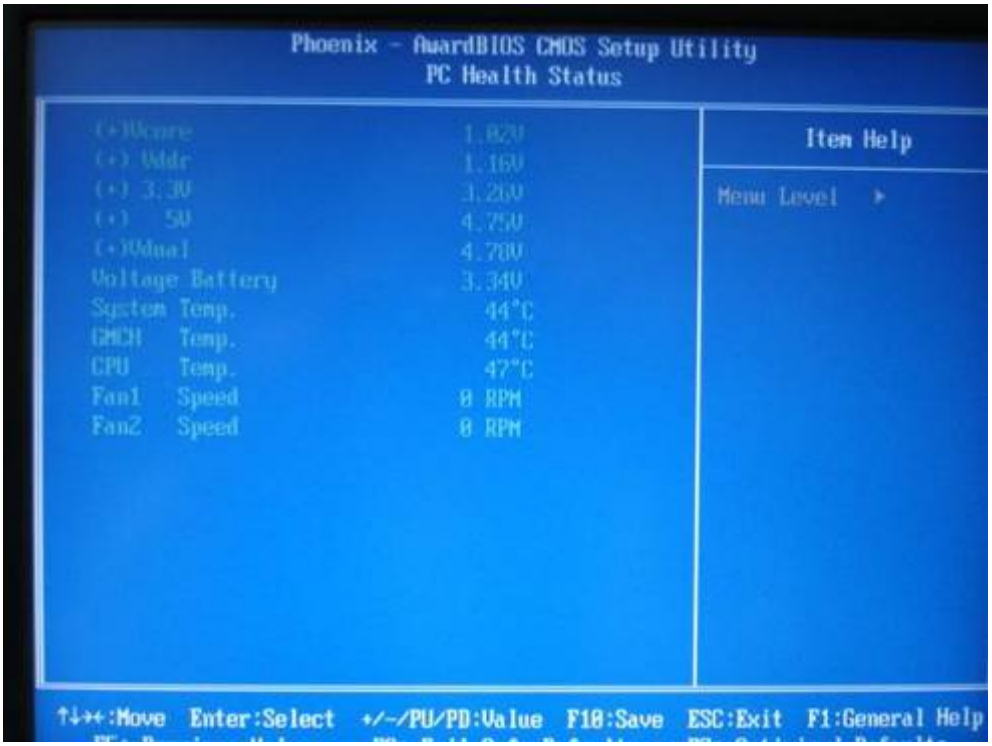
Screen 10

Setup 8: PC Health Status

This menu displays the current CPU, chipset, system temperature, fan speeds, and voltages.



Screen 11



Screen 12

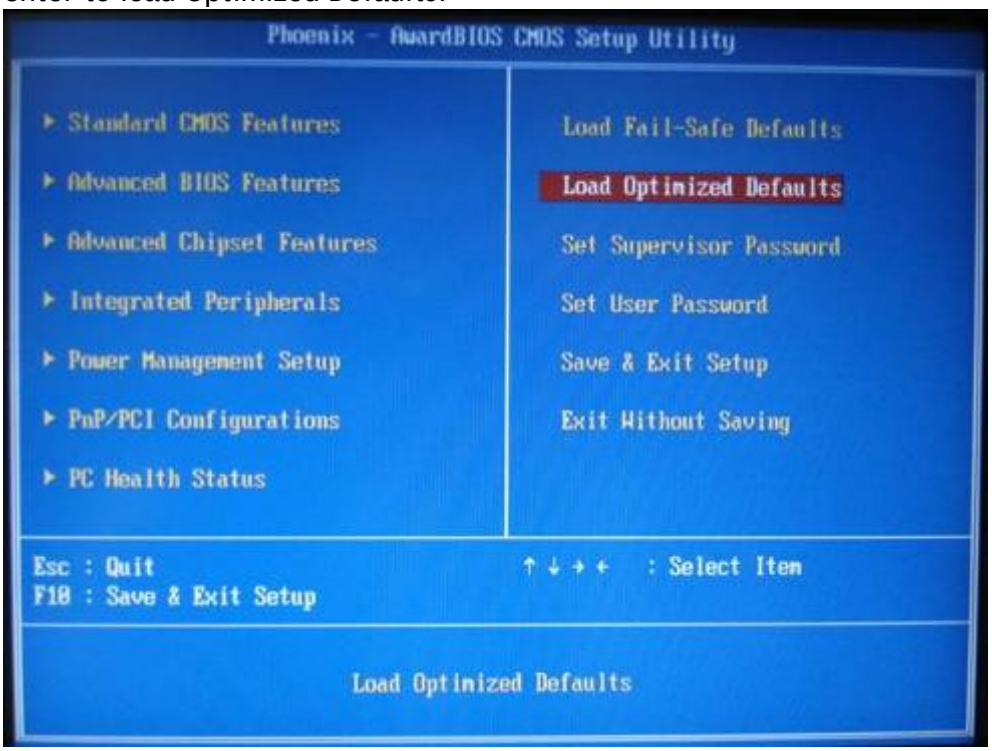
Setup 9: Load Fail-Safe Defaults

If you made changes to the BIOS and your system becomes unstable as a result, you can change it back to default. However if you made many changes and don't know which one is causing the problem, your best bet is to choose the option "Load Fail Safe Defaults" from the BIOS menu. This uses a minimal performance setting, but the system would run in a stable way. From the dialog box Choose "Y" followed by enter to load Fail-Safe Defaults.

Screen 13

Setup 10: Load Optimized Defaults

Like the Fail-Safe mode above, this option loads the BIOS default settings, but runs the system at optimal performance. From the dialog box Choose "Y" followed by enter to load Optimized Defaults.



Screen 14

Steup11: Set Password

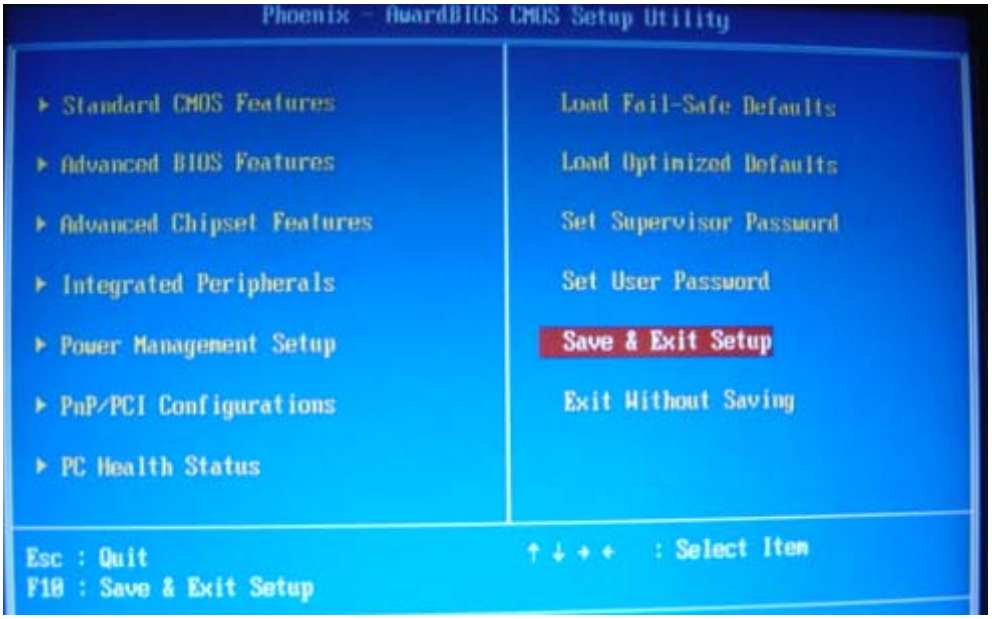
There are two kinds of password protect your BIOS, Supervisor and User password, you can specify a password and make sure you don't forget the password. You will be asked for password when you into BIOS setup manual.

Screen 15

Screen 16

Setup 12: Save and Exit Setup

To save any changes you made to the BIOS you must choose this option. From the dialog box choose "Y".



Screen 17

Setup 13: Exit without Saving

If you don't want to save changes made to the BIOS, choose "N" from the dialog box.

Screen 18

4.0 DRIVER INSTALLATION

The REC3423 comes with a CD-ROM that contains all drivers and utilities that meet your needs.

Follow the sequence below to install the drivers:
Step 1 – Install INF Driver
Step 2 – Install VGA Driver
Step 3 – Install LAN Driver
Step 4 – Install Audio Driver

USB 2.0 Drivers are available for download using Windows Update for both Windows XP and Windows 2000. For additional information regarding USB 2.0 support in Windows XP and Windows 2000, please visit www.microsoft.com/hwdev/usb/.

Please read instructions below for further detailed installations.

4.1 Installation:

Insert the REC3423 CD-ROM into the CD-ROM Drive. And install the drivers from Step 1 to Step 5 in order.

Step 1 – Install Chip Driver

1. Click on the *Step 1 - INF Update Utility v8.2.0.1014* folder and double click on the *Setup.exe*
2. Follow the instructions that the window shows
3. The system will help you install the driver automatically

Step 2 – Install VGA Driver

1. Click on the *Step 2 - Intel Graphics Media Accelerator Driver* folder and select the OS folder your system is
2. Double click on the *Setup.exe* file located in each OS folder
3. Follow the instructions that the window shows
4. The system will help you install the driver automatically

Step 3 –Install LAN Driver

1. Click on the *Step 3 - Intel Ethernet Driver* folder and select the OS folder your system is
2. Double click on the *.exe* file located in each OS folder
3. Follow the instructions that the window shows
4. The system will help you install the driver automatically

Step 4 –Install Audio Driver

1. Click on the *Step 4 - Realtek ALC655 Audio Driver v3.71* folder and select the OS folder your system is
2. Double click on *setup.exe* file located in each OS folder
3. Follow the instructions that the window shows
4. The system will help you install the driver automatically