ROCKY-512

Version 2.1

December 25, 2003

Copyright Notice

The information in this document is subject to change without prior notice in order to improve reliability, design and function and does not represent a commitment on the part of the manu-facturer.

In no event will the manufacturer be liable for direct, indirect, special, incidental, or consequen-tial damages arising out of the use or inability to use the product or documentation, even if ad-vised of the possibility of such damages.

This document contains proprietary information protected by copyright. All rights are reserved. No part of this manual may be reproduced by any mechanical, electronic, or other means in any form without prior written permission of the manufacturer.

Trademarks

ROCKY-512 is a registered trademark of ICP Electronics Inc. IBM PC is a registered trademark of International Business Machines Corporation. Intel is a registered trademark of Intel Corporation. Other product names mentioned herein are used for identification purposes only and may be trademarks and/or registered trademarks of their respective companies. If you have any question or need other information, please connect to our web site.

http://www.ieiworld.com.tw

Table of Contents

3

Chapter 1. Introduction

ROCKY-512 is designed for limited space applications with only the half size. It supports the full functions of an AT& ATX-compatible industrial computer on a single board. So it provides wake on LAN and Modem. The ROCKY-512 is equipped with a low-power consumption and high performance GXLV/GX1 processor on board. It also contains an SDRAM DIMM socket that can support up to 256 MB memory.

The ROCKY-512 provides an Ethernet interface, Compact Flash Type II, EIDE interface, one parallel port, Two RS-232 serial ports, and a PS/2 keyboard/mouse interface. The built-in SVGA CRT only.   CRT resolutions supports up to 1280 x 1024 @ 256 colors &1024x 768 @ 16 bpp. The Flash ROM contains both the system BIOS and the VGA BIOS.   Reprogramming the Flash ROM could do modification, in case of necessary.

1.1 Specifications

- **NS GXLV/GX1-233/266/300 MMX 32-Bit x86 Processor**
    - ✓ Supports Intel MMX instruction set extension for the acceleration of multi media applications
    - ✓ 16 KB unified L1 cache
    - ✓ Five-stage pipelined integer unit
    - ✓ Integrated Floating Point Unit（FPU）
- **System Memory:** On board 64/128MB SDRAM and one 168-pin DIMM socket that supports up to 256MB SDRAM memory
- **BIOS:** AWARD 256 KB Flash memory
- **Display Controller**
    - ✓ MediaGx processor has applied UMA technology, which provides 1.5~4MB display memory, configured through BIOS setting.
    - ✓ Support CRT only.
    - ✓ Support non-interlaced CRT monitors resolutions up to 1280x1024 @ 256 colors &1024x768 @ 16bpp
- **IDE Interface:** The IDE support to two PCI Enhanced IDE hard drives
- **FDD Interface:** Support up to two floppy disk drives, 5.25″ （360KB and 1.2MB）and/or 3.5″（720KB, 1.44MB, and 2.88MB）
- **Serial Ports:** Two RS232 ports. (Support wake on modem)
- **Parallel Port:** One Parallel port, supports SPP/EPP/ECP mode
- **PS/2 Mouse/Keyboard Connector:** A 6-pin mini-DIN connector for easy connection to a keyboard and PS/2 mouse
- **USB Interface:** Two USB ports, USB 1.0 compliant
- **Power Management**: Supports power saving modes including Normal/Doze/Sleep modes. APM1.1 compliant

- **Watchdog Timer:** Can be set to 1-255 seconds per period. Reset or NMI was generated when CPU did not periodically trigger the timer.

- **10/100Mbps Ethernet Controller:**
  - ✓ Realtek 8100 IEEE802.u 100 BASE-TX standard Dual Auto-sensing interface to 10MBps or 100MBps networks.
  - ✓ On board RJ45 connectors provide for easy connection. (Support wake on LAN)

- **CompactFlash Disk:**
  - ✓ The CompactFlash Storage Card also runs in True IDE Mode that is compatible with an IDE disk drive.
  - ✓ It can be used with a passive adapter in a Type II socket.

- **DiskOnChip**^{TM} **Flash Disk**: Supports one 32-pin socket for DiskOnChip Flash Disk

- **Power Supply:** +5V @1.8A（typical）(+5V only)

- **Operating Temperature:** 0-60℃

- **Dimension:** 7.27″（L）x4.85″（W）(185mmx122mm）For detail dimension, please refer to page 8.

1.2 Package Contents

Before you begin installing the product, please check that all of the following materials are included in the package:

- One ROCKY-512 All-in-one single board computer
- One CD disk for utility and drivers
- One 3.5" IDE flat cable (40-pin to 40-pin 2.54mm pitch)
- One serial + parallel port cable with bracket
- One floppy cable (for 3.5" FDD only)
- One 1 to 2, 6pin mini Din Connector for keyboard and mouse

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

Chapter 2. Installation

This chapter is guidance to assist you setup ROCKY-512 hardware, including directions of setting jumpers and connecting peripherals, switches and indicators. Before installation, please pay attention to the unpacking precautions on the following page to ensure safety.

2.1 ROCKY-512 Board Layout

(Please turn to the following pages for layout diagram.)
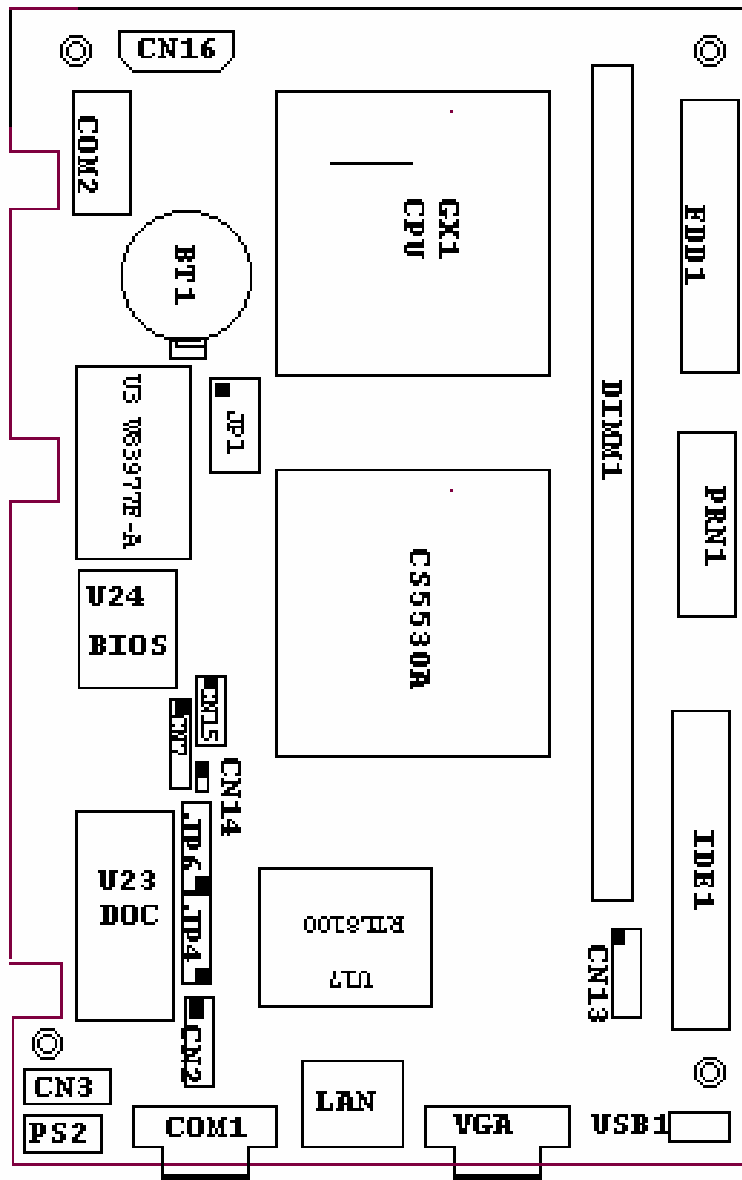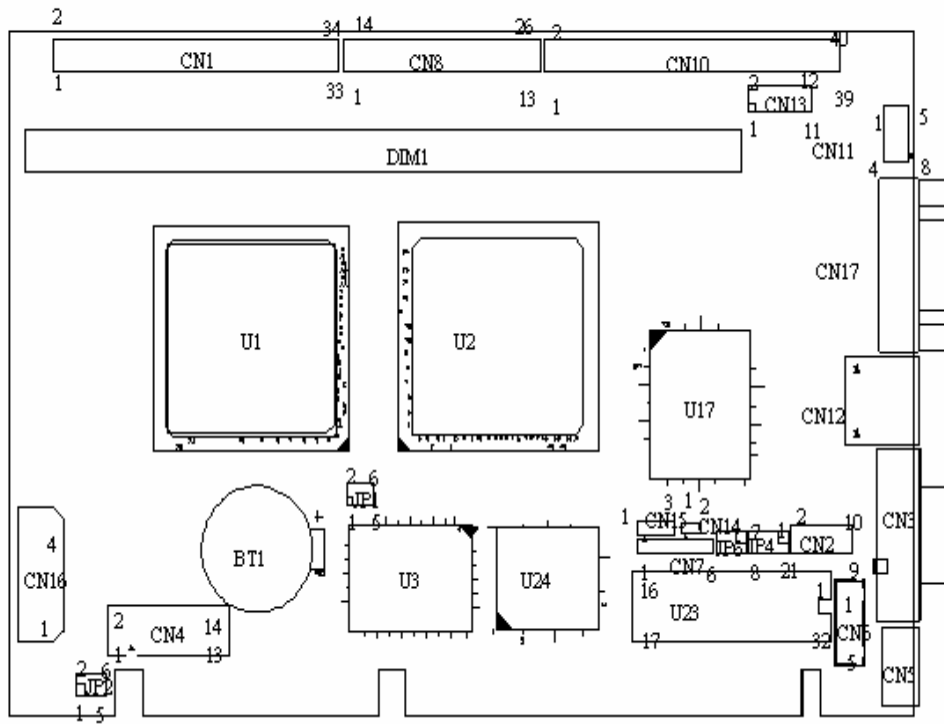
2.2 Unpacking Precautions

Some components of ROCKY-512 SBC are very sensitive to static electric charges and can be damaged by a sudden rush of power. To protect it from unintended damage, be sure to note these following precautions:

● Ground yourself to remove any static charge before touching the ROCKY-512 SBC. You can do it by using a grounded wrist strap at all times or by frequently touching any conducting materials that is connected to the ground.

● Handle your ROCKY-512 SBC by its edges. Don't touch IC chips, leads or circuitry if not necessary.

● Do not plug any connector or jumper while the power is on.

● On board 64/128MB SDRAM and there is one 168-pin DIMM socket to accept 3.3V non-buffered SDRAM. The max. Memory size is 256MB.

2.3 Watchdog Timer Setting (JP5)

Reading port 443H enables the Watchdog Timer. It should be triggered before the time-out period ends, otherwise it will assume the program operation is abnormal and will issue a reset signal to start again. On the other hand, reading port 043/843H disables the Watchdog Timer. For detail information about Watch-Dog Timer please refer to Appendix A.

● **JP5: Watchdog Active Type Setting**

JP5	DESCRIPTION
2-3	Reset when WDT time-out
OPEN	Disable WDT

2.4 Compact Flash Setting (JP3)

Set the operating mode of CompactFlash disk

● **JP3: Compact Flash Setting**

ADDRESS	JP3
MASTER	SHORT
SLAVE	OPEN

2.5 COM2 Setting

The COM2 (CN4) can supply +5V or +12V power to the serial devices via RI pin (Pin 8) of the COM port connector. The max. support current is 1A with fuse protection between these two connector's 5V/12V output. If the output is set to 12V, make sure that you have 12V to power up the board.

CN4 Pin 8	JP2 (2,4,6)	JP2 (1,3,5)
RI Signal	4-6	Disregard
+5V	2-4	1-3
+12V	2-4	3-5

● **COM2 RS-232, RS-422 or RS-485 Setting JP1 (2,4,6) (Optional)**

The COM2 (CN4) can be set to RS-232 or RS-422/485 for industrial field site application. Moreover when this port set to the RS-485 mode, the board equipped self-tuner IC will automatic sense data direction as to eliminate data collision. This is especially important in WINDOWS programming environment where you are not allowed to let the program catch the control pin at your will. As for RS422 and RS485 function, it's optional and up to user's decision.

JP1 (2,4,6)	DESCRIPTION
2-4	**RS232**
4-6	RS422/RS485

2.6 Clear CMOS Setup (JP1/1,3,5)

If you need to clear the CMOS Setup (for example, you forgot the password then you should clear setup and then reset the password), you should short the JP1 (3,5) for about 3 seconds, and then open it again and this will set system back to normal operation mode.

- **JP1/1,3,5: Clear CMOS Setup (Reserve Function)**

JP1 (1,3,5)	DESCRIPTION
1-3	**Normal Operation**
3-5	Clear CMOS Setup

2.7 DiskOnChip™ Flash Disk Memory Address Setting (u23)

The DiskOnChip™ Flash Disk Chip (DOC) is produced by M-Systems. Because DOC is 100% compatible with hard disk and DOS so users don't need to install any extra software utility. "Plug and Play" function is not only easy but also reliable. The MD-2200-Xmb series DOC will share only 8KB memory address.

- **JP4 & JP6: DiskOnChip Memory Address Setting**

ADDRESS	JP4				JP6		
	1-2	3-4	5-6	7-8	1-2	3-4	5-6
CC000	OPEN	OPEN	SHORT	OPEN	OPEN	SHORT	SHORT
CE000	OPEN	OPEN	OPEN	SHORT	OPEN	SHORT	SHORT
D0000	SHORT	OPEN	OPEN	OPEN	SHORT	OPEN	SHORT
D2000	OPEN	SHORT	OPEN	OPEN	SHORT	OPEN	SHORT
D4000	OPEN	OPEN	SHORT	OPEN	SHORT	OPEN	SHORT
D6000	OPEN	OPEN	OPEN	SHORT	SHORT	OPEN	SHORT
D8000	SHORT	OPEN	OPEN	OPEN	OPEN	OPEN	SHORT
DA000	OPEN	SHORT	OPEN	OPEN	OPEN	OPEN	SHORT
DC000	OPEN	OPEN	SHORT	OPEN	OPEN	OPEN	SHORT
DE000	OPEN	OPEN	OPEN	SHORT	OPEN	OPEN	SHORT

Chapter 3. Connection

This chapter describes how to connect peripherals, switches and indicators to the ROCKY-512 board.

3.1 VGA Connector (CN17)

The ROCKY-512 built-in 15-pin VGA connector that connects directly CRT monitors.

- **CN17: 15-pin VGA Connector**

1	RED	2	GREEN
3	BLUE	4	NC
5	GROUND	6	GROUND
7	GROUND	8	GROUND
9	VCC	10	GROUND
11	NC	12	DDC DATA
13	HSYNC	14	VSYNC
15	DDC CLOCK		

3.2 External Switches and Indicators (CN13)

There are several external switches and indicators for monitoring and controlling your CPU board. All the functions are in the CN13 connector.

- **CN13: External Switches and Indicators**

	PIN	DESCRIPTION	PIN	DESCRIPTION	
Power LED	1	+5V	2	Speaker	Speaker
	3	GND	4	N/C	
	5	GND	6	N/C	
	7	N/C	8	+5V	
HDD LED	9	+5V	10	Reset Switch	Reset button
	11	IDE LED	12	GND	

3.3 External Power Connector (CN16)

The ROCKY-512 has an on-board external power connector CN16. You can connect power directly to the CPU board.

- **CN16: External Power Connector**

PIN	DESCRIPTION
1	+12V
2	GROUND
3	GROUND
4	VCC5V

3.4 ATX Power Connector (CN15, CN14)

The ROCKY-512 can accept AT or ATX power supply. The CN15, CN14 provide the ATX power controlled signals and +5V standby voltage (+5VSB).

- **CN15: ATX Power connector**

PIN	DESCRIPTION
1	+5VSB
2	PSON
3	GROUND

● **CN14: ATX Power controlled signal connector**

PIN	DESCRIPTION
1	Power Button
2	GROUND

Application: CN15 can connect to the backplane directly when the backplane supports the ATX function.CN14 connects to the power button in the chassis.

3.5 LAN RJ45 Connector (CN12)

The ROCKY-512 built-in RJ45 LAN connector is for 10/100Mbps Ethernet (REALTEK 8100). Support wake-on-LAN when you use the ATX power supply.

● **CN12: LAN RJ45 Connector**

1	TX+	5	GND
2	TX-	6	RX-
3	RX+	7	GND
4	GND	8	GND

3.6 USB Port Connector (CN11)

ROCKY-512 provides two USB interfaces, which fully supports plug and play function for up to 127 external devices.

● **CN11: Internal USB Connector**

1.	+5V	5.	GND
2.	D1F-	6.	D2F+
3.	D1F+	7.	D2F-
4.	GND	8.	+5V

3.7 CompactFlash Connector -- TYPE II (CN9)

You can attach one Compact Flash Disk to CN18 that occupy the Secondary IDE channel. CN9 supports both the TYPE II and TYPE I module.

● **CN9: 50-pin CompactFlash Connector (secondary IDE)**

PIN	DESCRIPTION	PIN	DESCRIPTION
1	GROUND	26	VCC-IN CHECK1
2	DATA 3	27	DATA 11
3	DATA 4	28	DATA 12
4	DATA 5	29	DATA 13
5	DATA 6	30	DATA 14
6	DATA 7	31	DATA 15
7	HDC_CS0#	32	HDC_CS1
8	N/C	33	N/C
9	GROUND	34	IOR#
10	N/C	35	IOW#
11	N/C	36	N/C
12	N/C	37	INTERRUPT
13	VCC_COM	38	VCC_COM
14	N/C	39	CSEL
15	N/C	40	N/C
16	N/C	41	HDD_RESET
17	N/C	42	IORDY
18	SA2	43	N/C
19	SA1	44	VCC_COM
20	SA0	45	HDD_ACTIVE#
21	DATA 0	46	N/C
22	DATA 1	47	DATA 8
23	DATA 2	48	DAYA 9
24	N/C	49	DATA 10
25	VCC-IN CHECK	50	GROUND

3.8 E-IDE Hard Disk Connector (CN10)

For IDE HDD connection, The ROCKY-512 was designed with one2.54mm connector (CN10), which could be converted to two 2.54mm standard IDE connector via proprietary cable.

● **CN10: 40-pin Primary IDE Interface Connector**

PIN	DESCRIPTION	PIN	DESCRIPTION
1	RESET#	2	GROUND
3	DATA 7	4	DATA 8
5	DATA 6	6	DATA 9
7	DATA 5	8	DATA 10
9	DATA 4	10	DATA 11
11	DATA 3	12	DATA 12
13	DATA 2	14	DATA 13
15	DATA 1	16	DATA 14
17	DATA 0	18	DATA 15
19	GROUND	20	N/C
21	IDE DRQ	22	GROUND
23	IOW#	24	GROUND
25	IOR#	26	GROUND
27	IDE CHRDY	28	GROUND
29	IDE DACK	30	GROUND–DEFAULT
31	INTERRUPT	32	N/C
33	SA1	34	N/C
35	SA0	36	SA2
37	HDC CS0#	38	HDC CS1#
39	HDD ACTIVE#	40	GROUND

3.9 Serial Ports (CN3, CN4)

The ROCKY-512 offers two high speeds NS16C550 compatible UARTs with Read/Receive 16 byte FIFO serial ports. These ports let you connect to serial devices or a communication network. One 9-pin D-SUB connector and one 14-pin header are also provided by the

ROCKY-512. The detailed pin assignment of the connectors are specified in the following tables:

- **CN3 (com1) serial Port Connector (9-pin DSUB)**

PIN	DESCRIPTION	
1	DATA CARRIER DETECT	(DCD)
2	RECEIVE DATA	(RXD)
3	TRANSMIT DATA	(TXD)
4	DATA TERMINAL READY	(DTR)
5	GROUND	(GND)
6	DATA SET READY	(DSR)
7	REQUEST TO SEND	(RTS)
8	CLEAR TO SEND	(CTS)
9	RING INDICATOR	(RI)

- **CN4 (com2): Serial Port Connector (14-pin Header/W Housing)**

PIN	DESCRIPTION	PIN	DESCRIPTION
1	DCD	2	DSR
3	RX	4	RTS
5	TX	6	CTS
7	DTR	8	RI
9	GND	10	N/C
11	TX2+	12	TX2-
13	RX2+	14	RX2-

Note: If you want to use the RS485, just connect to TX2-, TX2+. If you want to use the RS422, please connect to TX2-, TX2+, RX2+, and RX2-.

20

3.10 Keyboard & PS/2 Mouse Connector (CN5, CN6)

The ROCKY-512 provides one 6-pin mini–DIN connector for one keyboard and one PS/2 mouse connectors and one 5-pin external keyboard connector.

● **CN5: 6-pin mini-DIN Keyboard & Mouse Connector**

PIN	DESCRIPTION
1	KB DATA
2	MS DATA
3	GND
4	+5V
5	KB CLOCK
6	MS CLOCK

● **CN6: 5-pin External Keyboard Connector**

PIN	DESCRIPTION
1	KEYBOARD CLOCK
2	KEYBOARD DATA
3	N/C
4	GND
5	+5V

3.11 IrDA Infrared Interface Port (CN7)

The ROCKY-512 built-in an IrDA port which support Serial Infrared (SIR) or Amplitude Shift Keyed IR (ASKIR) interface. When IrDA port is in use, you would have to set SIR or ASKIR model through BIOS's Peripheral Setup's COM2. Please note that normal RS-232 COM2 will be disabled.

● **CN7: IrDA connector**

PIN	DESCRIPTION
1	VCC
2	
3	IRRX
4	Ground
5	IR-TX
6	

3.12 Parallel Port (CN8)

This port is usually connected to a printer; The ROCKY-512 includes an on-board parallel port (CN8), accessed through a 26-pin flat-cable connector.

● **CN8: Parallel Port Connector**

PIN	DESCRIPTION	PIN	DESCRIPTION
1	STROBE#	14	AUTO FORM FEED #
2	DATA 0	15	ERROR#
3	DATA 1	16	INITIALIZE
4	DATA 2	17	PRINTER SELECT LN #
5	DATA 3	18	GROUND
6	DATA 4	19	GROUND
7	DATA 5	20	GROUND
8	DATA 6	21	GROUND
9	DATA 7	22	GROUND
10	ACKNOWLEDGE	23	GROUND
11	BUSY	24	GROUND
12	PAPER EMPTY	25	GROUND
13	PRINTER SELECT	26	N/C

3.13 Floppy Disk Drive Connector (CN1)

ROCKY-512 board is equipped with a 34-pin daisy-chain driver connector cable.

● CN1: FDC CONNECTOR

PIN	DESCRIPTION	PIN	DESCRIPTION
1	GROUND	2	REDUCE WRITE
3	GROUND	4	N/C
5	GROUND	6	N/C
7	GROUND	8	INDEX#
9	GROUND	10	MOTOR ENABLE A#
11	GROUND	12	DRIVE SELECT B#
13	GROUND	14	DRIVE SELECT A#
15	GROUND	16	MOTOR ENABLE B#
17	GROUND	18	DIRECTION#
19	GROUND	20	STEP#
21	GROUND	22	WRITE DATA#
23	GROUND	24	WRITE GATE#
25	GROUND	26	TRACK 0#
27	GROUND	28	WRITE PROTECT#
29	GROUND	30	READ DATA#
31	GROUND	32	SIDE 1 SELECT#
33	GROUND	34	DISK CHANGE#

3.14 Digital I/O (CN2)

One characteristic of digital circuit is its fast response to high or low signal. This kind of response is highly needed for harsh and critical industrial operating environment. That's why we design 4-bit digital inputs and 4-bit digital outputs on the ROCKY-512.

Digital Input and Output, generally, are control signals. You can use these signals to control external devices that needs On/Off circuit or TTL devices. The register address is 240H, 260H or 280H that can be selected in BIOS SETUP Menu. You can read or write data to the selected address to enable the function of digital IO.

● **CN2: Digital I/O**

READ		WRITE	
Bit0	DIN0	Bit0	DO0
Bit1	DIN1	Bit1	DO1
Bit2	DIN2	Bit2	DO2
Bit3	DIN3	Bit3	DO3

PIN	SIGNAL NAME	PIN	SIGNAL NAME
1	GND	2	+5V
3	DO3	4	DO2
5	DO1	6	DO0
7	DIN3	8	DIN2
9	DIN1	10	DIN0

24

Chapter 4. AWARD BIOS Setup

ROCKY-512 uses the AWARD PCI/ISA BIOS for system configuration. The AWARD BIOS setup program is designed to provide maximum flexibility in configuring the system by offering various options that may be selected to meet end-user requirements. This chapter is written to assist you in proper usage of these features.

4.1 Getting Start

When you turn on the power button, the BIOS will enter the Power-On-Self-Test routines. These routines will be executed for system test and initialization and system configuration verification. After the POST routines are completed, the following message appears:

" Hit DEL if you want to run SETUP"

To access AWARD BIOS SETUP UTILITY, press <Del> key. The following screen will be displayed at this time:

```
                    ROM PCI/ISA BIOS (2A434I9C)
                       CMOS SETUP UTILITY
                      AWARD SOFTWARE, INC.
──────────────────────────────────────────────────────────────────
   STANDARD CMOS SETUP              INTEGRATED PERIPHERALS

   BIOS FEATURES SETUP              SUPERVISOR PASSWORD

   CHIPSET FEATURES SETUP           USER PASSWORD

   POWER MANAGEMENT SETUP           IDE HDD AUTO DETECTION

   PNP/PCI CONFIGURATION            SAVE & EXIT SETUP

   LOAD BIOS DEFAULTS               EXIT WITHOUT SAVING

   LOAD SETUP DEFAULTS
──────────────────────────────────────────────────────────────────
 Esc : Quit                      ↑ ↓ → ←   : Select Item
 F10 : Save & Exit Setup         (Shift)F2 : Change Color
```

4.2 Standard CMOS Setup

The Standard CMOS Setup is used for basic hardware system
configuration. The main function is for Date/Time setting and
Floppy/Hard Disk Drive setting. Please refer to the following screen
for this setup.

```
                    ROM PCI/ISA BIOS (2A434I9C)
                       STANDARD CMOS SETUP
                      AWARD SOFTWARE, INC.
──────────────────────────────────────────────────────────────────

   Date (mm:dd:yy) : Fri, Mar  9 2001
   Time (hh:mm:ss) :  9 : 23 : 34

   HARD DISKS          TYPE    SIZE   CYLS HEAD PRECOMP LANDZ SECTOR  MODE

   Primary Master   :  AUTO      0      0    0      0      0      0   AUTO
   Primary Slave    :  AUTO      0      0    0      0      0      0   AUTO
   Secondary Master :  AUTO      0      0    0      0      0      0   AUTO
   Secondary Slave  :  AUTO      0      0    0      0      0      0   AUTO

   Drive A : 1.44M, 3.5 in
   Drive B : None

   Video   : EGA/VGA
   Halt On : All Errors

──────────────────────────────────────────────────────────────────
 ESC : Quit              ↑ ↓ → ←   : Select Item     PU/PD/+/- : Modify
 F1  : Help              (Shift)F2 : Change Color
```

26

- **To set the Date,** for example, press either the arrow or <Enter> button on your keyboard to select one of the fields (Month, Date or Year) then press either <PgUp> or <PgDn> to increase or decrease the value of that field. Do the same steps for Time setting.

- **For IDE hard disk drive setup,** please check the following possible setup procedure:
  1. Use the Auto setting for detection during boot-up.
  2. Use the IDE HDD AUTO DETECTION in the main menu; the computer will automatically detect the HDD specifications.
  3. Manually enter the specifications by yourself from the "User" option.

  Note: If you need more information on any particular field, just highlight it then press <F1> button. A pop-up window will come out to give you more information on that field.

4.3 BIOS Features Setup

This BIOS Features Setup is designed for the 'fine tuning' of your system in order to improve its performance. As for normal operation, you don't have to change any default setting. The default setting is pre-set for most reliable operation.

```
                    ROM PCI/ISA BIOS (2A434I9C)
                         BIOS FEATURES SETUP
                         AWARD SOFTWARE, INC.

Virus Warning               : Disabled    Video  BIOS Shadow  : Enabled
CPU Internal Cache          : Enabled     C8000-CBFFF Shadow  : Disabled
                                          CC000-CFFFF Shadow  : Disabled
Quick Power On Self Test    : Enabled     D0000-D3FFF Shadow  : Disabled
Boot Sequence               : A,C,SCSI    D4000-D7FFF Shadow  : Disabled
Swap Floppy Drive           : Disabled    D8000-DBFFF Shadow  : Disabled
Boot Up Floppy Seek         : Enabled     DC000-DFFFF Shadow  : Disabled
Boot Up NumLock Status      : On          Cyrix 6x86/MII CPUID: Enabled
Boot Up System Speed        : High
Gate A20 Option             : Fast
Memory Parity Check         : Enabled
Typematic Rate Setting      : Disabled
Typematic Rate (Chars/Sec)  : 6
Typematic Delay (Msec)      : 250
Security Option             : Setup
PCI/VGA Palette Snoop       : Disabled    ESC : Quit        ↑↓→← : Select Item
OS Select For DRAM > 64MB   : Non-OS2     F1  : Help        PU/PD/+/- : Modify
Report No FDD For WIN 95    : Yes         F5  : Old Values  (Shift)F2 : Color
                                          F6  : Load BIOS  Defaults
                                          F7  : Load Setup Defaults
```

28

4.4 Chipset Features Setup

This setup function works mostly on board's chipset. This option is used to change the chipset's configuration. Please be careful while making any changes in default setting, otherwise the system will become unstable.

```
                  ROM PCI/ISA BIOS (2A434I9H)
                     CHIPSET FEATURES SETUP
                      AWARD SOFTWARE, INC.

 SDRAM CAS latency Time   : AUTO
 SDRAM Clock Ratio Div By : 3

 16-bit I/O Recovery (CLK): 5
 8-bit  I/O Recovery (CLK): 5

 USB Controller           : Enabled
 USB Legacy Support       : Disabled



                                       ESC : Quit        ↑↓←→ : Select Item
                                       F1  : Help        PU/PD/+/- : Modify
                                       F5  : Old Values  (Shift)F2 : Color
                                       F6  : Load BIOS  Defaults
                                       F7  : Load Setup Defaults
```

29
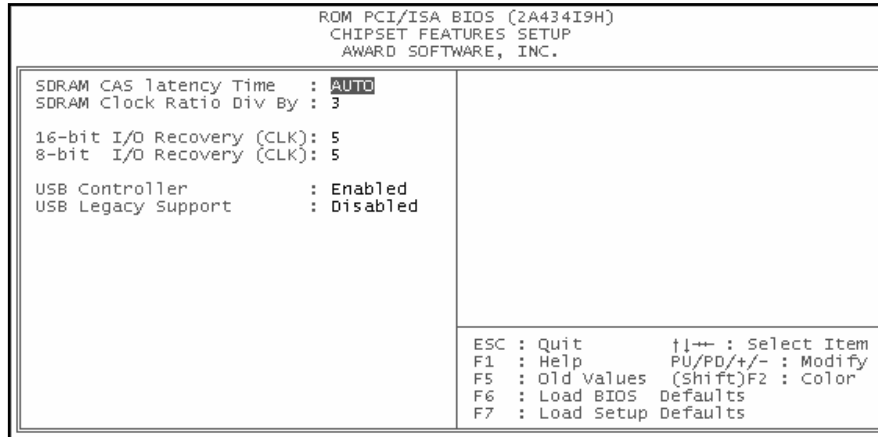
4.5 Power Management Setup

Power Management Setup helps user to handle the ROCKY-512 board's "green" function. This feature can shut down the video display and hard disk to save energy, for example. The power management setup screen is as following

```
                    ROM PCI/ISA BIOS (2A434I9C)
                       POWER MANAGEMENT SETUP
                       AWARD SOFTWARE, INC.

Power Management      : Disabled    IRQ1   (KeyBoard)    : ON
                                    IRQ3   (COM 2)       : OFF
       ** PM Timers **              IRQ4   (COM 1)       : OFF
Doze Mode             : Disabled    IRQ5   (LPT 2)       : OFF
Standby Mode          : Disabled    IRQ6   (Floppy Disk): OFF
HDD Power Down        : Disabled    IRQ7   (LPT 1)       : OFF
MODEM Use IRQ         : NA          IRQ9   (IRQ2 Redir)  : OFF
                                    IRQ10  (Reserved)    : OFF
Throttle Duty Cycle   : 33.3 %      IRQ11  (Reserved)    : OFF
                                    IRQ12  (PS/2 Mouse)  : OFF
                                    IRQ13  (Coprocessor): OFF
                                    IRQ14  (Hard Disk)   : OFF
                                    IRQ15  (Reserved)    : OFF


                                    ESC : Quit         ↑↓→← : Select It
                                    F1  : Help          PU/PD/+/- : Modi
                                    F5  : Old Values   (Shift)F2 : Colo
                                    F6  : Load BIOS  Defaults
                                    F7  : Load Setup Defaults
```

4.6 PNP / PCI CONFIGURATION

This menu is used to assign certain IRQ to your PNP/PCI devices manually.

```
                    ROM PCI/ISA BIOS (2A434I9H)
                       PNP/PCI CONFIGURATION
                        AWARD SOFTWARE, INC.

 PNP OS Installed      : No        PCI IRQ Actived By  : Level
 Resources Controlled By : Manual
 Reset Configuration Data : Disabled   Used MEM base addr  : N/A

 IRQ-3  assigned to : PCI/ISA PnP
 IRQ-4  assigned to : PCI/ISA PnP
 IRQ-5  assigned to : PCI/ISA PnP
 IRQ-7  assigned to : PCI/ISA PnP
 IRQ-9  assigned to : PCI/ISA PnP
 IRQ-10 assigned to : PCI/ISA PnP
 IRQ-11 assigned to : PCI/ISA PnP
 IRQ-12 assigned to : PCI/ISA PnP
 IRQ-14 assigned to : PCI/ISA PnP
 IRQ-15 assigned to : PCI/ISA PnP
 DMA-0  assigned to : PCI/ISA PnP
 DMA-1  assigned to : PCI/ISA PnP    ESC : Quit        ↑↓→← : Select Item
 DMA-3  assigned to : PCI/ISA PnP    F1  : Help        PU/PD/+/- : Modify
 DMA-5  assigned to : PCI/ISA PnP    F5  : Old Values  (Shift)F2 : Color
 DMA-6  assigned to : PCI/ISA PnP    F6  : Load BIOS  Defaults
 DMA-7  assigned to : PCI/ISA PnP    F7  : Load Setup Defaults
```

- **PNP OS Installed**: if you install Plug and Play operating system (OS), the OS will reassign the interrupt if you select *Yes* in this field. If you install a non-Plug and Play OS or if you want to prevent reassigning of interrupt settings, select *No* in this field.
- **Resources Controlled By**: select *Auto* if you want the computer to assign the IRQs automatically and vice versa.
- **Reset Configuration Data**: *Enabling* this field means you allow the configuration data to be reset.
- **IRQ-xx assigned to**: these fields show whether a PCI/ISA uses certain IRQ.

4.7 LOAD BIOS DEFAULTS

```
                    ROM PCI/ISA BIOS (2A434I9C)
                        CMOS SETUP UTILITY
                       AWARD SOFTWARE, INC.
  ┌──────────────────────────────────┬──────────────────────────────┐
    STANDARD CMOS SETUP                    INTEGRATED PERIPHERALS

    BIOS FEATURES SETUP                    SUPERVISOR PASSWORD

    CHIPSET FEATURES SETUP                 USER PASSWORD

    POWER MANAGEMENT SETUP                 IDE HDD AUTO DETECTION

    PNP/PCI CONFIGURA┌────────────────────────────┐ ETUP
                     │  Load BIOS  Defaults (Y/N)? N │
    LOAD BIOS DEFAULT└────────────────────────────┘ SAVING

    LOAD SETUP DEFAULTS
  ├──────────────────────────────────┴──────────────────────────────┤
  Esc : Quit                         ↑ ↓ → ←   : Select Item
  F10 : Save & Exit Setup            (Shift)F2 : Change Color
```

If you select 'Y' to this field, the BIOS Defaults will be loaded except
Standard CMOS SETUP. The default settings are not optimal and
turning all high performance into disabled condition. Select 'N' to
abort.

*Suggestion: For the first time or for our primary user, we suggest
you to use LOAD SETUP DEFAULTS because it is the
safest mode for your system.*
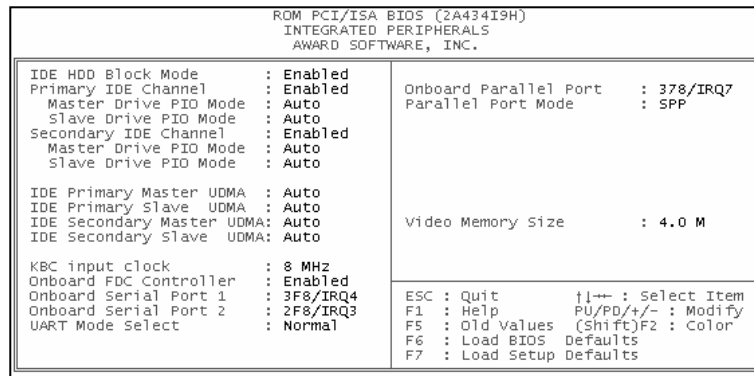
32

4.8 LOAD SETUP DEFAULTS

```
                    ROM PCI/ISA BIOS (2A434I9C)
                        CMOS SETUP UTILITY
                       AWARD SOFTWARE, INC.
   ┌──────────────────────────────────────────────────────────────────┐
   │  STANDARD CMOS SETUP              INTEGRATED PERIPHERALS           │
   │                                                                    │
   │  BIOS FEATURES SETUP             SUPERVISOR PASSWORD               │
   │                                                                    │
   │  CHIPSET FEATURES SETUP          USER PASSWORD                     │
   │                                                                    │
   │  POWER MANAGEMENT SETUP          IDE HDD AUTO DETECTION            │
   │                          ┌───────────────────────────┐            │
   │  PNP/PCI CONFIGURA       │ Load SETUP Defaults (Y/N)? N│  ETUP     │
   │  LOAD BIOS DEFAULT       └───────────────────────────┘  SAVING    │
   │                                                                    │
   │  LOAD SETUP DEFAULTS                                               │
   ├──────────────────────────────────────────────────────────────────┤
   │  Esc : Quit                     ↑ ↓ → ←   : Select Item            │
   │  F10 : Save & Exit Setup        (Shift)F2 : Change Color           │
   │                                                                    │
   │                                                                    │
   └──────────────────────────────────────────────────────────────────┘
```

If you select 'Y' to this field, the Setup Defaults will be loaded
except Standard CMOS SETUP. The default settings are optimal
configuration settings for your system.

33

4.9 INTEGRATED PERIPHERALS

This option is used to assign Onboard I/O, IRQ, and DMA etc. If you don't know how to configure them, just press <F7> to load Setup Defaults.

```
                    ROM PCI/ISA BIOS (2A434I9H)
                      INTEGRATED PERIPHERALS
                       AWARD SOFTWARE, INC.

 IDE HDD Block Mode      : Enabled
 Primary IDE Channel     : Enabled     Onboard Parallel Port    : 378/IRQ7
   Master Drive PIO Mode : Auto        Parallel Port Mode       : SPP
   Slave Drive PIO Mode  : Auto
 Secondary IDE Channel   : Enabled
   Master Drive PIO Mode : Auto
   Slave Drive PIO Mode  : Auto

 IDE Primary Master UDMA  : Auto
 IDE Primary Slave  UDMA  : Auto
 IDE Secondary Master UDMA: Auto       Video Memory Size        : 4.0 M
 IDE Secondary Slave  UDMA: Auto

 KBC input clock          : 8 MHz
 Onboard FDC Controller   : Enabled
 Onboard Serial Port 1    : 3F8/IRQ4   ESC : Quit        ↑↓→← : Select Item
 Onboard Serial Port 2    : 2F8/IRQ3   F1  : Help        PU/PD/+/- : Modify
 UART Mode Select         : Normal     F5  : Old Values  (Shift)F2 : Color
                                       F6  : Load BIOS  Defaults
                                       F7  : Load Setup Defaults
```

The flat panels will then be applied with two modes: 640x480 or 800x600, for which it needs to set up from BIOS for proper flat panel resolution.

- **_Digital I/O Base Address -- 240H, 260H, 280H, Disabled_**
  To select the I/O address for digital I/O function.
- **_Video Memory Size -- 1.5M, 2.5M, 4.0M_**
  Select the size of video memory. It makes use of system memory

4.10 PASSWORD SETTING

Password SETTING sets a password that is used to protect your system and Setup Utility. Once you setup the password, the system will always ask you to key-in password every time you enter the BIOS SETUP. If you enter the BIOS SETUP with Password, you can choose every setup/option on the main menu. To disable the

34

password, enter the BIOS SETUP room with Password and then just press the <Enter> key instead of entering a new password when the 'Enter Password' prompt pop-up.

Note: If you forget the password, do the Clear/Reset CMOS procedure (see Section 2.5 Clear CMOS Setup)

4.11 IDE HDD AUTODETECTION

This option detects the parameters of an IDE hard disk drive (HDD sector, cylinder, head, etc) automatically and will put the parameters into the Standard CMOS Setup screen. Up to 2 IDE drives can be detected and the parameters will be listed in the box. Press <Y> if you accept these parameters. Press <N> to skip the next IDE drives.

Note: If your IDE HDD was formatted in previous older system, incorrect parameters may be detected. In this case, you need to enter the correct parameters manually or low-level format the disk

4.12 SAVE AND EXIT SETUP

```
                    ROM PCI/ISA BIOS (2A434I9C)
                       CMOS SETUP UTILITY
                      AWARD SOFTWARE, INC.
   ─────────────────────────────────────────────────────────────
     STANDARD CMOS SETUP              INTEGRATED PERIPHERALS

     BIOS FEATURES SETUP              SUPERVISOR PASSWORD

     CHIPSET FEATURES SETUP           USER PASSWORD

     POWER MANAGEMENT SETUP           IDE HDD AUTO DETECTION

     PNP/PCI CONFIGURA┌──────────────────────────────┐ ETUP
                      │  SAVE to CMOS and EXIT (Y/N)? N │
     LOAD BIOS DEFAULT└──────────────────────────────┘ SAVING

     LOAD SETUP DEFAULTS
   ─────────────────────────────────────────────────────────────
   Esc : Quit                       ↑ ↓ → ←   : Select Item
   F10 : Save & Exit Setup          (Shift)F2 : Change Color

   ─────────────────────────────────────────────────────────────
```

Select this option when you finish setting all the parameters and
want to save them into the CMOS. Simply press <Enter> key and all
the configuration changes will be saved

36

4.13 Quit Without Saving

```
                    ROM PCI/ISA BIOS (2A434I9C)
                        CMOS SETUP UTILITY
                       AWARD SOFTWARE, INC.

       STANDARD CMOS SETUP                INTEGRATED PERIPHERALS

       BIOS FEATURES SETUP                SUPERVISOR PASSWORD

       CHIPSET FEATURES SETUP             USER PASSWORD

       POWER MANAGEMENT SETUP             IDE HDD AUTO DETECTION

       PNP/PCI CONFIGURA┌──────────────────────────────┐ETUP
                        │   Quit Without Saving (Y/N)? N │
       LOAD BIOS DEFAULT│                              │SAVING
                        └──────────────────────────────┘
       LOAD SETUP DEFAULTS

  Esc : Quit                       ↑ ↓ → ←   : Select Item
  F10 : Save & Exit Setup          (Shift)F2 : Change Color
```

Select this option if you want to exit the Setup without saving the
changes that you made. Simply press <Enter> key and you will exit
the BIOS SETUP without saving the changes.

37

Chapter 5. SVGA Setup

5.1 Introduction

The ROCKY-512 is equipped with on-board VGA interface. The description below is its specifications and features:

5.1.1 Chipset

The ROCKY-512 uses a Cyrix CX5530A chipset as its SVGA controller for traditional analog CRT monitors. The VGA BIOS does not support LCD. Moreover, it also accepts interlaced and non-interlaced analog monitors (color and monochrome VGA) with high-resolution quality while maintaining complete IBM VGA compatibility. However, digital monitors (i.e. MDA, CGA, and EGA) may NOT be supported. Multiple frequency (multisync) monitors will be operated as if they were analog monitors.

5.1.2 Display memory

Having 1.5 ~ 4 MB UMA memory, the VGA controller can make CRT displays or color panel displays perform with resolutions up to 1024 x 768 at 64 K colors. The display memory can be modified up to 4 MB in BIOS for true-color resolution of 1024 x 768.

5.1.3 Display drivers

1. Win95, 98 drivers (VGA) in \VGA\MediaGX\National Geode Win9x Drivers 1.2

2. WinNT4.0, Windows 2000 driver in \VGA\MediaGX\Nt40Vga\

5.2 Further Information

For more detailed information about the PCI/SVGA installation in your ROCKY-512, including driver updates, troubleshooting instructions, please refer to the following webs, which provide some resources you may need. If not find the information you need, please contact with your local contributor or ICP support team:

ICP web site: www.ieiworld.com.tw

Chapter 6. PCI Bus Ethernet Interface

The ROCKY-512 provides a high performance 32-bit Ethernet chipset, which is completely compliant with IEEE 802.3 100 Mbps CSMA/CD standards. As it is both 100Base-T and 10Base-T compatible so it is suitable for most major network operating systems.

The Ethernet port supplies a standard RJ-45 connector on board. To utilize the network boot feature is by incorporating the boot ROM image files for the appropriate network operating system.

40

Appendix A. Watchdog Timer

The Watchdog Timer is a device to ensure that standalone systems can always recover from catastrophic conditions that cause the CPU to crash. This condition may have occurred by external EMI or a software bug. When the CPU stops working normally, hardware on the board will perform hardware reset (cold boot) to bring the system back to a known state.

Three I/O ports control the Watchdog Timer.

443	Write	Set Watchdog Time period
443 (hex)	Read	Enable the refresh the Watch-Dog Timer.
043/843 (hex)	Read	Disable the Watchdog Timer.

Prior to enable the Watchdog Timer, the user has to define Timer first. The output data is a value of time interval and the range of the value is from 01(hex) to FF (hex) and time interval 1 sec to 255 sec.

DATA	TIME INTERVAL
01	1 sec
02	2 sec
03	3 sec
04	4 sec
.	.
.	.
.	.
FF	255 sec

This will enable and activate the countdown timer which will eventually time out and reset the CPU to ensure that this reset condition does not occur, the Watchdog Timer must be periodically refreshed by reading the same I/O port 043/843H and 443H. This must be done within the time out period that is selected by software, please refer to the example program.
A tolerance of at least 5% must be maintained to avoid unknown routines within the operating system (DOS), such as disk I/O that can be very time consuming. Therefore if the time out period has

been set to 10 seconds, the I/O port 443H must be read within 7 seconds.

Note: When exiting a program it is necessary to disable the Watchdog Timer, otherwise the system will reset.

Example Assembly Program:
```
TIMER_PORT    = 443H
TIMER_START   = 443H
TIMER_STOP    = 843H

;;INITIAL TIME PERIOD COUNTER
MOV DX, TIME_PORT
MOV AL, 8:    ;;8 SECONDS
OUT DX,AL
;;ADD YOUR APPLICATION HERE
MOV DX, TIMER_START
IN AL, DX.    ;;START COUNTER


;;ADD YOUR APPLICATION HERE
W_LOOP:
MOV DX, TIMER_STOP
IN AL, DX
MOV DX, TIMER_START
IN AL, DX.         ;;RESTART COUNTER

;;ADD YOUR APPLICATION HERE
CMP EXIT_AP, 0
JNE W_LOOP
MOV DX, TIMER_STOP
IN AL, DX
;;EXIT AP
```

Appendix B. I/O Address Map

B.1 System I/O Address Map

I/O ADDRESS MAP	DESCRIPTION
000-01F	DMA Controller #1
020-021	Interrupt Controller # 1, Master
022-023	Chipset address
040-05F	System Timer
060-06F	Standard 101/102 keyboard Controller
070-07F	Real time Clock, NMI Controller
080-0BF	DMA Page Register
0A0-0BF	Interrupt Controller # 2
0C0-0DF	DMA Controller # 2
0F0-0FF	Math Coprocessor
170-1FF	VIR BUS Master PCI IDE Controller
2E8-2EF	Serial Port 4
2F8-2FF	Serial Port 2
378-37F	Parallel Printer Port 1
3B0-3DF	Cyrix Graphic Adapter
3E8-3EF	Serial Port 3
3F0-3F7	Floppy Disk Controller
3F8-3FF	Serial Port 1
443	Watch dog timer enable
043/843	Watch dog timer disable

B.2 DMA channel assignments

CHANNEL	FUNCTION
0	Available
1	Available
2	Floppy disk (8-bit transfer)
3	Parallel**
4	Cascade for DMA controller 1
5	Available
6	Available
7	Available

** parallel port DMA default setting: DMA 3
    parallel port DMA select: DMA 1.3

B.3 Interrupt assignments

INTERRUPT #	INTERRUPT SOURCE
NMI	Parity error detected
IRQ 0	System timer
IRQ 1	Keyboard
IRQ 2	Interrupt from controller 2 (cascade)
IRQ 8	Real-time clock
IRQ 9	LAN Realtak8100
IRQ 10	Serial communication port 4
IRQ 11	Serial communication port 3
IRQ 12	PS/2 mouse
IRQ 13	Numeric data processor
IRQ 14	CX5530 Primary IDE controller
IRQ 15	CX5530 Second IDE controller
IRQ 3	Serial communication port 2
IRQ 4	Serial communication port 1
IRQ 5	
IRQ 6	Diskette controller (FDC)
IRQ 7	Parallel port 1 (print port)

* Ethernet IRQ is automatic set by the system

B.4 1st MB memory map

ADDRESS	DESCRIPTION
F000h-FFFFh	System ROM
D800h-EFFFh	Unused
C800h-D7FFh	Ethernet ROM*
C000h-C7FFh	Expansion ROM*
B800h-BFFFh	CGA/EGA/VGA text
B000h-B7FFh	Unused
A000h-AFFFh	EGA/VGA graphics
0000h-9FFFh	Base memory
D000-D400H	Available

* Default setting

** If Ethernet boot ROM is enabled.