

ROCKY – P288EV

Dual Pentium® II, III with

LAN & AGP VGA SBC Ver 1.x

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Manual first edition November 15,1999

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Introduction

Welcome to the ROCKY-P288EV Dual Pentium® II, III Single Board Computer. The ROCKY-P288EV board is an ISA/PCI form factor board, which comes equipped with high performance Pentium® II, III Processor and advanced high performance multi-mode I/O, designed for the system manufacturers, integrators, or VARs that want to provide all the performance, reliability, and quality at a reasonable price.

In addition, the ROCKY-P288EV provides S3 AGP VGA on board. The VGA chip is S3 Trio 3D graphics chipset which provides up to 1600x1024 colors resolution. The VGA memory on board is 4MB SDRAM RAM, with an option up to 8MB.

This board has a built-in DiskOnChip™ (DOC) Flash Disk Socket for embedded applications. The DOC Flash Disk is 100% software compatible with hard disks. Users can use any DOS command without any extra software utility. The DOC currently is available from 2MB to 144MB.

An advanced high performance super AT I/O chip – Winbond W83977TF is used in the ROCKY-P288EV board. Both on-chip UARTs are compatible with the NS16C550. The parallel port and IDE interface are compatible with IBM PC/AT architecture.

The ROCKY-P288EV uses Intel 82559 Fast Ethernet Multifunction PCI Controller as a LAN controller. The 82559 is a fully integrated 10BASE-T/100BASE-TX LAN solution with high performance networking functions and low power features.

The ROCKY-P288EV uses the advanced INTEL Chipset,440BX which is 100% ISA/PCI software compatible chipset with PCI 2.1 standard.

1.1 Specifications

CPU	Intel Pentium® II 233 - 450MHz Processor Intel Pentium® III 450 - 600MHz Processor
Bus interface	PCI/ISA bus, PICMG compliant
Bus speed	ISA : 8MHz, PCI: 33MHz
DMA channels	7
Interrupt levels	15
Chipset	Intel 440BX
Real-time clock/calendar	SGS M4T28 or equivalent device
RAM memory	Three 168-pin DIMM sockets support SDRAM and EDO RAM module. The max. memory is up to 768MB.
Ultra DMA/33 IDE interface	Up to four PCI Enhanced IDE hard drives. The Ultra DMA/33 IDE can handle data transfer up to 33MB/s. The compatible with existing ATA-2 IDE specifications is its best advantage, so there is no need to do any changes for users' current accessories.
Floppy disk drive interface	Supports 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 RS-232 ports with 16C550 UART (or compatible) with 16-byte FIFO buffer. Support up to 115.2Kbps. Ports can be individually configured to COM1, COM2 or disabled.
Bi-directional parallel port	Configurable to LPT1, LPT2, LPT3 or disabled. Supports EPP/ECP/SPP
Hardware monitor	Built-in LM78 to monitor power supply voltage and fan speed status

IrDA port	Supports Serial Infrared(SIR) and Amplitude Shift Keyed IR(ASKIR) interface
USB port	Supports two USB ports for future expansion
Watch-dog timer	Can be set by 1,2,10,20,110 or 220 seconds period. Reset or NMI is generated when CPU does not periodically trigger the timer. Your program use hex 043 and 443 to control the watch-dog and generate a system reset.
VGA controller	S3 Trio 3D graphics chipset w/ 4MB or w/ 8MB SDRAM RAM. Screen Resolution : up to 1600x1200x4/8
Ethernet	Intel 82559 Fast Ethernet controller , IEEE 802.3u Auto-Negotiation support for 10BASE-T/100BASE-TX standard. An RJ45 connector is located on the mounting bracket for easy connection.
Flash disk socket	The DiskOnChip™compatible 32-pin dip socket is provided for Flash Disk (DiskOnChip™) application which will let users to use the Flash Disk with DOS command, without any extra software utility.
Keyboard and PS/2 mouse connector	A 6-pin mini DIN connector is located on the mounting bracket for easy connection to a keyboard or PS/2 mouse. For alternative application, a keyboard and a PS/2 mouse pin header connector are also available on board, located on CN9 and CN10 respectively.
Power consumption	+5V @ 10A (Dual Pentium®II 300MHz,128MB SDRAM) +12V @ 350mA , -12V @40mA
Operating temperature	0° ~ 55° C (CPU needs Cooler)

1.2 What You Have

In addition to this *User's Manual*, the ROCKY-P288EV package includes the following items:

- ROCKY-P288EV Dual Pentium®II, III Single Board Computer
- One RS-232 and Printer Cable with bracket
- One FDD cable
- One HDD cable
- One 6-pin Mini-Din convert to two 6-pin mini-Din cable for keyboard and mouse connection.

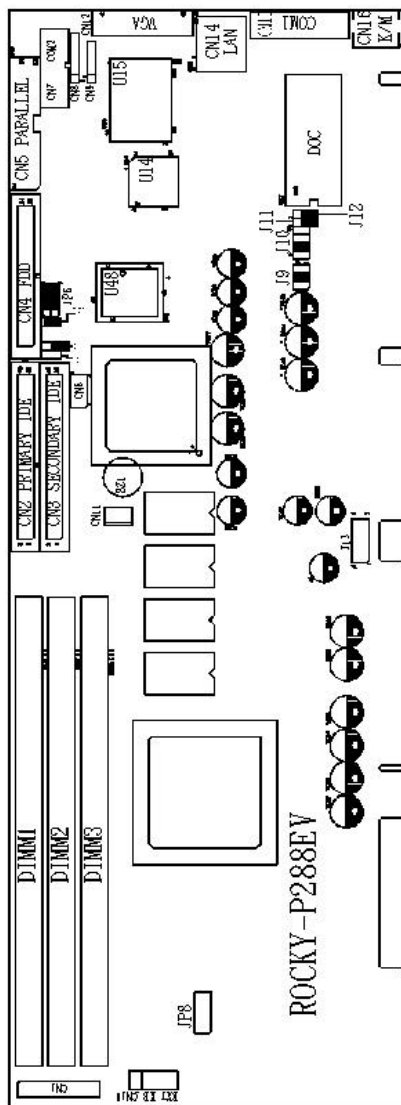
If any of these items are missing or damaged, contact the dealer from whom you purchased this product. Save the shipping materials and carton in case you want to ship or store the product in the future.

2

Installation

This chapter describes how to install the ROCKY-P288EV. At first, the layout of ROCKY-P288EV is shown, and the unpacking information that you should be careful is described. The jumpers and switches setting for the ROCKY-P288EV's configuration, such as CPU type selection, system clock setting, and watch dog timer, are also included.

2.1 ROCKY – P288EV's Layout



2.2 Unpacking Precautions

Some components on ROCKY-P288EV 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 follow these precautions:

- ✓ Ground yourself to remove any static charge before touching your ROCKY-P288EV 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-P288EV 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.

Table of Jumpers

LABEL	FUNCTION
JP1	Clear CMOS Setup (Reserve Function)
JP2	Single or Dual Processor Operation
JP5	IRQ12 Enable/Disable Setting
JP6	CPU Multiplier Setting
JP8	CPU Voltage Setting
JP9	DiskOnChip Memory Address Setting
JP10	WDT Time Out Period
JP11	Watch-Dog Active Type Setting
JP12	Flash Type Setting
JP13	CPU Voltage Setting

Note: All shaded rows in tables of this manual are the default settings for the ROCKY-P288EV.

2.3 Setting the CPU of ROCKY-P288EV (JP2, JP6)

• JP2 : Single or Dual Processor Operation

Function	JP2
Single Processor	1-2
Dual Processor	2-3

• JP6 : CPU Multiplier Setting

Speed	JP6 1-2	JP6 3-4	JP6 5-6	JP6 7-8
3.0 x	CLOSE	OPEN	CLOSE	CLOSE
3.5 x	CLOSE	OPEN	OPEN	CLOSE
4.0 x	OPEN	CLOSE	CLOSE	CLOSE
4.5 x	OPEN	CLOSE	OPEN	CLOSE
5.0 x	OPEN	OPEN	CLOSE	CLOSE
5.5 x	OPEN	OPEN	OPEN	CLOSE
6.0 x	CLOSE	CLOSE	CLOSE	OPEN
6.5 x	CLOSE	CLOSE	OPEN	OPEN
7.0 x	CLOSE	OPEN	OPEN	OPEN
7.5 x	CLOSE	OPEN	OPEN	OPEN
8.0 x	OPEN	CLOSE	CLOSE	OPEN

2.4 BIOS Flash Type Setting (J12)

There are two kind of Flash Chips can be used as BIOS ROM, one is 12V programming and the other is 5V. J12 is designed to handle the setting.

• J12 : Flash Type Setting

J12	DESCRIPTION
2-3	5V Flash
1-2	12V Flash

2.5 Watch-Dog Timer (J11, J10)

The Watch-Dog Timer is enabled by reading I/O port 443H. 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, or activate NMI to CPU. The Watch-Dog Timer is disable by reading I/O port 043H or 843H. Refer to Appendix A for detailed information on Watch-Dog Timer.

• J11 : Watch-Dog Active Type Setting

J11	DESCRIPTION
2-3	RESET WHEN WDT TIME-OUT
1-2	ACTIVATE NMI TO CPU WHEN WDT TIME-OUT
OPEN	DISABLE WDT

• J10 : WDT Time Out Period

PERIOD	1-2	3-4	5-6	7-8
1 sec.	OPEN	OPEN	CLOSE	OPEN
2 sec.	OPEN	OPEN	CLOSE	CLOSE
10 sec.	OPEN	CLOSE	OPEN	OPEN
20 sec.	OPEN	CLOSE	OPEN	CLOSE
110 sec.	CLOSE	OPEN	OPEN	OPEN
220 sec.	CLOSE	OPEN	OPEN	CLOSE

2.6 DiskOnChip™ Flash Disk (J9)

The DiskOnChip™ Flash Disk Chip(DOC) is produced by M-Systems. Because the DOC is 100% software compatible to hard disk and DOS, users don't need any extra software utility. It is just "plug and play" easy and reliable. At present the DOC is available from 2MB to 144MB. The DiskOnChip only shares 8KB memory address.

• J9 : DiskOnChip Memory Address Setting

Address	J9
CE000 – CFFFF	1-2
D6000 – D7FFF	3-4
DE000 – DFFFF	5-6

2.7 Clear CMOS Setup (JP1)

If want to clear the CMOS Setup(for example forgot the password you should clear the setup and then set the password again.), you should close the JP1 about 3 seconds, then open it again. Set back to normal operation mode, open JP1.

- **JP1 : Clear CMOS Setup (Reserve Function)**

JP1	DESCRIPTION
OPEN	Normal Operation
CLOSE	Clear CMOS Setup

2.8 PS/2 Mouse IRQ12 Setting (JP5)

While operating, the on board PS/2 mouse will use IRQ12.

- **JP5 : IRQ12 Enable/Disable Setting**

JP5	DESCRIPTION
CLOSE	IRQ12 Enable for PS/2 Mouse Operating
OPEN	PS/2 Mouse Disable. IRQ12 release to bus

2.9 CPU Voltage Setting (JP8, JP13)

The CPU voltage setting is for the factory test only. The default setting is open.

3

Connection

This chapter describes how to connect peripherals, switches and indicators to the ROCKY- P288EV board.

Table of Connectors

LABEL	FUNCTION
CN1	External Switches and Indicators
CN2	Primary IDE Connector
CN3	Secondary IDE Connector
CN4	FDC Connector
CN5	Parallel Port Connector
CN6	USB Connector
CN7	Serial Port 10-pin Connector
CN8	IrDA connector
CN9	PS/2 Mouse Connector
CN10	5-pin Header Keyboard Connector
CN11	CPU Fan Connector
CN12	15-pin Female Connector
CN14	LAN RJ45 Connector
CN15	Serial Port 9-pin Connector
CN16	6-pin Mini-DIN Keyboard Connector
CN17	CPU Fan Connector
CN18	CPU Fan Connector

3.1 Floppy Disk Drive Connector (CN4)

The ROCKY-P288EV board is equipped with a 34-pin daisy-chain drive connector cable.

• CN4 : FDC Connector

PIN NO.	DESCRIPTION	PIN NO.	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#

3.2 PCI E-IDE Disk Drive Connector (CN2, CN3)

You can attach four IDE(Integrated Device Electronics) hard disk drives to the ROCKY-P288EV IDE controller.

CN2 (IDE 1) : Primary IDE Connector

CN3 (IDE 2) : Secondary IDE Connector

• CN2/CN3 : IDE Interface Connector

PIN NO.	DESCRIPTION	PIN NO.	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	N/C	22	GROUND
23	IOW#	24	GROUND
25	IOR#	26	GROUND
27	N/C	28	BALE - DEFAULT
29	N/C	30	GROUND - DEFAULT
31	INTERRUPT	32	IOCS16#-DEFAULT
33	SA1	34	N/C
35	SA0	36	SA2
37	HDC CS0#	38	HDC CS1#
39	HDD ACTIVE#	40	GROUND

3.3 Parallel Port (CN5)

This port is usually connected to a printer. The ROCKY-P288EV includes an on-board parallel port, accessed through a 26-pin flat-cable connector CN5.

• CN5 : Parallel Port Connector

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	STROBE#	2	DATA 0
3	DATA 1	4	DATA 2
5	DATA 3	6	DATA 4
7	DATA 5	8	DATA 6
9	DATA 7	10	ACKNOWLEDGE
11	BUSY	12	PAPER EMPTY
13	PRINTER SELECT	14	AUTO FORM FEED #
15	ERROR#	16	INITIALIZE
17	PRINTER SELECT LN#	18	GROUND
19	GROUND	20	GROUND
21	GROUND	22	GROUND
23	GROUND	24	GROUND
25	GROUND		

3.4 Serial Ports (CN15, CN7)

The ROCKY-P288EV offers two high speed NS16C550 compatible UART.

CN15 (COM1) : D-9 pin located at bracket

CN7 (COM2) : 10-pin header on board

Serial port connections (CN15, CN17)

Connector	Ports	Address	Interrupt
CN15	COM1	3F8,3E8	IRQ4
CN7	COM2	2F8,2E8	IRQ3

● **CN15 : Serial Port 9-pin Connector**

PIN NO.	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)

● **CN7 : Serial Port 10-pin Connector**

PIN NO.	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)
10	GROUND (GND)

3.5 Keyboard & PS/2 Mouse Connector (CN16)

A 6-pin mini DIN connector(CN16) is located on the mounting bracket for easy connection to a keyboard or a PS/2 mouse. The card comes with an cable to convert from the 6-pin mini-DIN connector to two 6-pin mini-DIN connectors for keyboard and mouse connection.

● **CN16 : 6-pin Mini-DIN Keyboard Connector**

PIN NO.	DESCRIPTION
1	KEYBOARD DATA
2	MOUSE DATA
3	GROUND
4	+5V
5	KEYBOARD CLOCK
6	MOUSE CLOCK

For alternative application, a keyboard and a PS/2 mouse pin header connector are also available on board, located on CN9 and CN10 respectively.

• **CN9 : PS/2 Mouse Connector**

PIN NO.	DESCRIPTION
1	MOUSE DATA
2	NC
3	GROUND
4	+5V
5	MOUSE CLOCK

• **CN10 : 5-pin Header Keyboard Connector**

PIN NO.	DESCRIPTION
1	KEYBOARD CLOCK
2	KEYBOARD DATA
3	N/C
4	GROUND
5	+5V

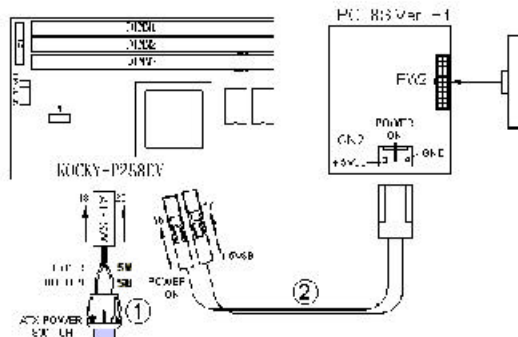
3.6 External Switches and Indicators (CN1)

There are several external switches and indicators for monitoring and controlling your CPU board. All the functions are in the CN1 connector.

CN1 : External Switches and Indicators

	PIN	DESCRIPTION	PIN	DESCRIPTION	
Power LED	2	+5V	1	Speaker	Speaker
	4	N/C	3	N/C	
	6	GND	5	N/C	
KeyLock	8	KeyLock	7	+5V	Reset button
	10	GND	9	Reset Switch	
	12	GND	11	GND	IDE LED
	14	N/C	13	IDE LED	
H ATX Signal	16	ATX Power Control Pin	15	+5V	H ATX Power Button
	18	ATX 5Vsb	17	ATX Power Button	
	20	ATX 5Vsb	19	ATX 5Vsb	

H For backplanes with ATX Connector (through Power Button & +5VSB):



3.7 USB Port Connector (CN6)

The ROCKY- P288EV has two built-in USB ports for the future new I/O bus expansion.

CN6 : 2 ports USB Connector

Pin 1-4 for USB 0

Pin 5-8 for USB 1

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	VCC	5	GROUND
2	DATA-	6	DATA+
3	DATA+	7	DATA-
4	GROUND	8	VCC

3.8 IrDA Infrared Interface Port (CN8)

The ROCKY-P288EV has a built-in IrDA port which supports Serial Infrared (SIR) or Amplitude Shift Keyed IR (ASKIR) interface. If you want to use the IrDA port, you have to configure SIR or ASKIR model in the BIOS under Peripheral Setup COM2. Then the normal RS-232 COM 2 will be disabled.

• **CN8 : IrDA connector**

PIN NO.	DESCRIPTION
1	VCC
2	FIR-RX
3	IR-RX
4	Ground
5	IR-TX
6	CIRRX

3.9 CPU Fan Connector (CN11, CN17, CN18)

The ROCKY-P288EV provides two CPU cooling fan connectors, CN17 and CN18 as well as a chassis fan connector, CN11. These connectors can supply 12V/500mA to the cooling fan. All connectors have the same pin assignments and provide a "rotation" pin to get rotation signals from fans and notice the system. So the system BIOS can recognize the fan speed. Please note that only specified fan can issue the rotation signals.

• **CN11/CN17/CN18 : CPU Fan Connector**

PIN NO.	DESCRIPTION
1	Rotation Signal
2	12V
3	Ground

3.10 LAN RJ45 Connector (CN14)

The ROCKY-P288EV is equipped with a built-in 10/100Mbps Ethernet Controller. You can connect it to your LAN through RJ45 LAN connector. The pin assignments are as following:

• **CN14 : LAN RJ45 Connector**

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	TX+	5.	N/C
2	TX-	6.	RX-
3.	RX+	7.	N/C
4.	N/C	8.	N/C

3.11 VGA Connector (CN12)

The ROCKY-P288EV has a built-in 15-pin VGA connector directly connects to your CRT monitor.

• CN12 : 15-pin Female Connector

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

4

AMI BIOS Setup

The ROCKY-P288EV uses the AMI PCI/ISA BIOS for system configuration. The AMI BIOS setup program is designed to provide maximum flexibility in configuring the system by offering various options which may be selected for end-user requirements. This chapter is written to assist you in the proper usage of these features.

4.1 Getting Started

When powering on the system, the BIOS will enter the Power-On-Self-Test (POST) routines. These routines will be executed for system test ,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 AMI PCI/ISA BIOS Setup program, press key. The following screen will be displayed at this time.

AMIBIOS HIFLEX SETUP UTILITY - VERSION 1.23
(C)1999 American Megatrends, Inc. All Rights Reserved

Standard CMOS Setup
Advanced CMOS Setup
Advanced Chipset Setup
Power Management Setup
Peripheral Setup
Auto-Detect Hard Disks
Change User Password
Change Supervisor Password
Auto Configuration with Optimal Settings
Auto Configuration with Fail Safe Settings
Save Settings and Exit
Exit Without Saving

Standard CMOS setup for changing time, date, hard disk type, etc.
ESC:Exit F1:Sel F2/F3:Color F10:Save & Exit

When choose **Auto Configuration with Fail Safe Settings** will load the minimized settings for Troubleshooting. The performance should be very poor when use this setting.

When choose **Auto Configuration with Optimal Settings** will load optimized defaults for regular use. Choosing this setting will modify all applicable settings.

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.

AMIBIOS SETUP - STANDARD CMOS SETUP									
(C)1998 American Megatrends, Inc. All Rights Reserved									
Date (mm/dd/yyyy): Tue Nov 02, 1999					Base Memory: 0 KB				
Time (hh/mm/ss) : 10:37:48					Ext'd Memory: 0 MB				
Floppy Drive A: 1.44 MB 3½									
Floppy Drive B: Not Installed									
	Type	Size	Cyl'n	Head	WPcom	Sec	LBA Mode	Bik Mode	PIO 32Bit Mode
Pri Master	: Auto								Auto On
Pri Slave	: Auto								Auto On
Sec Master	: Auto								Auto On
Sec Slave	: Auto								Auto On
Boot Sector Virus Protection					Disabled				
Month: Jan - Dec					ESC:Exit ↑:Sel				
Day: 01 - 31					PgUp/PgDn:Modify				
Year: 1901 - 2099					F2/F3:Color				

For IDE hard disk drive setup, please check the following possible setup procedure,

1. Use the Auto setting for detection during bootup.
2. Use the IDE HDD AUTO DETECTION in the main menu to automatically enter the drive specifications.
3. Manually enter the specifications by yourself from the "User" option.

4.3 Advanced CMOS Setup

The Advanced CMOS Setup is designed for the user's tuning best performance of the ROCKY-P288EV board. As for normal operation, users don't have to change any default setting. The default setting is pre-set for most reliable operation.

Users can set "System Keyboard" to "Absent" for the application which don't need keyboard and display.

AMIBIOS SETUP - ADVANCED CMOS SETUP (C)1998 American Megatrends, Inc. All Rights Reserved		
Quick Boot	Enabled	Available Options: Disabled ▶ Enabled
1st Boot Device	Floppy	
2nd Boot Device	IDE-0	
3rd Boot Device	CDROM	
Try Other Boot Devices	Yes	
Floppy Access Control	Read-Write	
Hard Disk Access Control	Read-Write	
S.M.A.R.T. for Hard Disks	Disabled	
BootUp Num-Lock	On	
Floppy Drive Swap	Disabled	
Floppy Drive Seek	Disabled	
PS/2 Mouse Support	Enabled	
System Keyboard	Absent	
Password Check	Setup	
Boot To OS/2 > 64MB	No	
Wait For 'F1' If Error	Enabled	
Hit 'DEL' Message Display	Enabled	
CPU Serial Number	Disabled	ESC:Exit F1:Sel
Cache Bus ECC	Enabled	PgUp/PgDn:Modify
System BIOS Cacheable	Enabled	F2/F3:Color

You can change the value of each options by using <PgUp> and <PgDn> key. The available values are shown on the right screen.

Quick Boot > Enabled: this will enable the BIOS to boot quickly when you turn on your computer. The BIOS will only check the first 1MB of the system memory.

Quick Boot > Disabled: the BIOS will test all system memory when it boots up. It will spend about 40 seconds until it receives a Ready signal from the HDD. It will also wait for you to press the key or not.

1st, 2nd, 3rd Boot Device > to define the sequence of boot drives after the routines check up completes. If the 1st Boot Device fails, the BIOS will attempt to boot from the 2nd or the 3rd device.

Try Other Boot Devices > the BIOS will try to boot from any other available device in the system if the 1st, 2nd and 3rd device fails to boot.

Floppy Access Control > to define the read/write access which is set when booting from a floppy drive.

Hard Disk Access Control > to define the read/write access which is set when booting from a HDD.

S.M.A.R.T. for Hard Disks > to allow BIOS to use the **S**ystem **M**anagement and **R**eporting **T**echnologies protocol for reporting server system information on a network

BootUp Num-Lock > to turn on/off the Num-Lock option on a enhanced keyboard when you boot. If you turn it off, the arrow keys on the numeric keypad can be used just as the other set of arrow keys on the keyboard and vice versa.

Floppy Drive Swap > this function enables you to swap the floppy disk drives via software or without moving the hardware.

Floppy Drive Seek > when this option is turned Enabled, BIOS will perform a Seek command on floppy drive A: before boot-up.

PS/2 Mouse Support > to testify whether or not a PS/2 mouse is supported.

System Keyboard > to configure the keyboard. If you set it Absent, BIOS will not report keyboard errors.

Password Check > to define if a password is necessary or not for access to the BIOS setup.

Boot to OS/2 > if you run the OS/2 operating system, this option must be set to yes. It means you permit BIOS to run properly if OS/2 or any other OS that does not support Plug and Play is found in your computer.

CPU Serial Number > this option is available only if you use Pentium® III processor.

Cache Bus ECC > this option is available only if you use Pentium® III processor.

System BIOS Cacheable > to define whether or not the memory segment F000H can be read from or written to cache memory. Setting it Enabled will give faster execution in your system.

4.4 Advanced Chipset Setup

These setup functions mainly working for Chipset(Intel 440BX). These options are used to change the Chipset's registers.

Please carefully change any default setting, otherwise the system may become unstable.

AMIBIOS SETUP - ADVANCED CHIPSET SETUP (C)1998 American Megatrends, Inc. All Rights Reserved	
***** SDRAM Timing *****	
Configure SDRAM Timing by SPD	Disabled
SDRAM RAS# to CAS# delay	3 SCLks
SDRAM RAS# Precharge	3 SCLks
SDRAM CAS# Latency	3 SCLks
SDRAM Leadoff Cmd Timing	Auto
DRAM Integrity Mode	Non-ECC
DRAM Refresh Rate	15.6 us
Memory Hole	Disabled
UGA Frame Buffer USWC	Disabled
PCI Frame Buffer USWC	Disabled
USWC Write Post	Enabled
Graphics Aperture Size	64MB
8bit I/O Recovery Time	1 Sysclk
16bit I/O Recovery Time	1 Sysclk
USB Passive Release	Enabled
PIIX4 Passive Release	Enabled
PIIX4 Delayed Transaction	Disabled
USB Function	Disabled
USB Keyboard Legacy Support	Disabled
Available Options: ▶ Disabled Enabled	
ESC:Exit ↑:Sel PgUp/PgDn:Modify F2/F3:Color	

Configure SDRAM Timing by SPD > The **Serial Presence Detect** is a 2048bits EEPROM which contains of the data of the chip module, capacity, timing, voltage, etc. The system will configure the SDRAM timing according to the data in the SPD when it is set enabled.

SDRAM RAS# to CAS# delay > to specify the relative delay between row and column address strobe form SDRAM.

SDRAM RAS# Precharge > this option specifies the length of time for Row Address Strobe form SDRAM to precharge.

SDRAM CAS# Latency > to specify the CAS latency timing form SDRAM DRAM.

DRAM Integrity Mode > to choose DRAM Integrity Mode; *ECC/EC* will enable the **Error Checking and Correction** DRAM integrity mode.

DRAM Refresh Rate > to specify the timing for DRAM Refresh

Memory Hole > to specify the location of a memory hole in the CMOS RAM. This setting reserves 15MB to 16MB memory address space for ISA expansion cards that specifically require

this setting. Memory from 15MB and up will be unavailable to the system because expansion cards can only access memory up to 16MB.

VGA Frame Buffer USWC > to specify whether or not a caching of the video A000-BFFF RAM is allowed. *Enabled* will give you better system performance.

PCI Frame Buffer USWC > to specify whether or not a caching of the PCI VGA frame buffer is allowed.

USWC Write Post > to Enable or Disable the use of Uncacheable, Speculatable, Write-Combined memory.

Graphics Aperture Size > to define the size of Graphics Aperture.

Search for MDA Resources > to allow the BIOS to search for MDA resources or not.

8bit I/O Recovery Time > to define the length of time for 8 bit I/O recovery.

16bit I/O Recovery Time > to define the length of time for 16 bit I/O recovery.

USB Passive Release > to specify whether or not PIIX4 is allowed to use Passive Release while transferring control data for USB transactions.

PIIX4 Passive Release > *Enabled* will let the Passive Release mechanism encoded when CPU to PCI bus accesses.

PIIX4 Delayed Transaction > to enable or disable the embedded 32-bit posted write buffer which supports delay transaction.

USB Function > to enable or disable the USB (Universal Serial Bus) functions.

ATX Power Supply Controller > to Enable or Disable ATX Power Supply

4.5 Power Management Setup

Power Management Setup helps user handle the ROCKY-P288EV board's "green" function. The features could shut down the video display and hard disk to save energy for example. The power management setup screen is as following:

AMIBIOS SETUP - POWER MANAGEMENT SETUP (C)1998 American Megatrends, Inc. All Rights Reserved		
Power Management/APM	Enabled	Available Options: Disabled ▶ Enabled
Green PC Monitor Power State	Off	
Video Power Down Mode	Disabled	
Hard Disk Power Down Mode	Disabled	
Standby Time Out (Minute)	Disabled	
Suspend Time Out (Minute)	Disabled	
Throttle Slow Clock Ratio	50-62.5%	
Modem Use IO Port	N/A	
Modem Use IRQ	N/A	
Display Activity	Ignore	
Device 6 (Serial port 1)	Monitor	
Device 7 (Serial port 2)	Monitor	
Device 8 (Parallel port)	Ignore	
Device 5 (Floppy disk)	Monitor	
Device 0 (Primary master IDE)	Monitor	
Device 1 (Primary slave IDE)	Ignore	
Device 2 (Secondary master IDE)	Monitor	
Device 3 (Secondary slave IDE)	Ignore	
Power Button Function	Suspend	
Ring Resume From Soft Off	Disabled	
		ESC:Exit ↑:Sel PgUp/PgDn:Modify F1:Help F2/F3:Color

Power Management/APM : Disable, Max Saving, Min Saving, or User Defined > Max Saving puts the system into power saving mode after a brief inactivity period. Min Saving is almost the same as Max Saving except that the inactivity period is longer. User Defined allows you to set power saving options according to your requirement.

Note : **Advanced Power Management(APM)** has to be installed to keep the system time updated when the computer enters suspend mode activated by the Power Management.

Under DOS environment, you need to add

DEVICE=C:\DOS\POWER.EXE in your CONFIG.SYS

Under Windows 3.x and Windows 95, you have to install Windows with APM feature. A battery and power cord icon labeled "Power" will appear in the "Control Panel"

Power Management/APM > to enable or disable the Advanced Power Management feature.

Green PC Monitor Power State > to specify the power state of the monitor after the specified period of display-idle has ended.

Video Power Down Mode > to specify the power state of the VESA VGA video subsystem after the specified period of display-idle has ended.

Hard Disk Power Down Mode > to specify the power state of the hard disk after the specified period of hard drive-idle has ended.

Standby Time Out (Minute) > to specify the length of the system-idle period while the system is in full power on state. After this period of time has ended, the system will go into Standby state.

Suspend Time Out (Minute) > to specify the length of the system-idle period while the system is in Standby state. After this period of time has ended, the system will go into Suspend state.

Throttle Slow Clock Ratio > to specify the speed of system clock under power saving state. The figure is a ratio between power conserving and normal state CPU clock.

Modem Use IO Port > to assign a port for modem.

Modem Use IRQ > to assign an IRQ for modem

Display Activity > to specify if BIOS has to monitor display activity or not.

Device X > to monitor specified device IRQ or Ignore.

Power Button Function > to specify how the power button on the chassis is operated.

4.6 Peripheral Setup

This setup mainly works for Multi-I/O Chip(W83977F). These options are used to change the Chipset's registers. Please carefully change any default setting to meet your application need perfectly. The only special concern is Onboard Serial Port B. If you are using the IrDA port, you have to set this port accordingly.

AMIBIOS SETUP - PERIPHERAL SETUP (C)1998 American Megatrends, Inc. All Rights Reserved		
OnBoard FDC	Enabled	Available Options: Auto Disabled ▶ Enabled ESC:Exit ↑:Sel PgUp/PgDn:Modify F2/F3:Color
OnBoard Serial PortA	3F8h/COM1	
OnBoard Serial PortB	2F8h/COM2	
Serial PortB Mode	Normal	
IR Duplex Mode	N/A	
IrDA Protocol	N/A	
OnBoard Parallel Port	378h	
Parallel Port Mode	Normal	
EPP Version	N/A	
Parallel Port IRQ	?	
Parallel Port DMA Channel	N/A	
OnBoard IDE	Both	

Onboard FDC > to enable the FDC on your board. If you set it Auto, the BIOS will decide if the FDC should be enabled, automatically).

Onboard Serial Port A (/B) > to specify the I/O port address of the serial port A(/B). If you set it Auto, the BIOS will decide the correct I/O port address, automatically.

Serial Port B Mode > to specify the mode of serial port B.

IR Duplex Mode > to specify the mode of IR device that is connected to the IR port.

IrDA Protocol > to specify the function mode if an IrDA mode is selected.

Onboard Parallel Port > to specify the I/O port address of the parallel port.

Parallel Port Mode > to specify the mode of parallel port. The options are:

Normal (normal parallel port mode),

Bi-Dir (supports bidirectional transfer),

EPP (supports devices that comply with the Enhanced Parallel Port specification),

ECP (supports devices that comply with the Extended Capabilities Port).

Parallel Port IRQ > to assign certain IRQ to the parallel port. The optimal and fail-safe settings are 7.

Parallel Port DMA Channel > available only if the parallel port mode is ECP. The optimal and fail-safe settings are 3.

Onboard IDE > to define which on-board IDE controller channel(s) to be used. Available options are: Primary, Secondary, Both and Disabled.

4.7 PCI / PLUG AND PLAY SETUP

The setup helps users handle the ROCKY-P288EV board's "PCI" function. All PCI bus slots on the system use INTA#, thus all installed PCI slots must be set to this value.

AMIBIOS SETUP - PCI / PLUG AND PLAY SETUP (C)1998 American Megatrends, Inc. All Rights Reserved		
Plug and Play Aware O/S	No	Available Options:
Clear NVRAM	No	▶ No
PCI Latency Timer (PCI Clocks)	64	Yes
Primary Graphics Adapter	PCI	
PCI VGA Palette Snoop	Disabled	
Allocate IRQ to PCI VGA	Yes	
OffBoard PCI IDE Card	Auto	
OffBoard PCI IDE Primary IRQ	Disabled	
OffBoard PCI IDE Secondary IRQ	Disabled	
PCI Slot1 IRQ Priority	Auto	
PCI Slot2 IRQ Priority	Auto	
PCI Slot3 IRQ Priority	Auto	
PCI Slot4 IRQ Priority	Auto	
DMA Channel 0	PnP	
DMA Channel 1	PnP	
DMA Channel 3	PnP	
DMA Channel 5	PnP	
DMA Channel 6	PnP	
DMA Channel 7	PnP	
IRQ3	PCI/PnP	
		ESC:Exit ↑:Sel PgUp/PgDn:Modify F1:Help F2/F3:Color

Plug and Play Aware O/S > Yes or No

When PNP OS is installed, interrupts may be reassigned by the OS when the setting is Yes. When a non-PNP OS is installed or to prevent reassigning of interrupt settings, select setting to No.

Plug and Play Aware O/S > Yes or No

When PNP OS is installed, interrupts will be reassigned by the OS when the setting is Yes. When a non-PNP OS is installed or to prevent reassigning of interrupt settings, select setting to No.

Clear NVRAM > if yes, BIOS will auto-clear NVRAM on every boot.

On Board PCI SCSI Controller > to enable and disable the on board PCI SCSI Controller

PCI Latency Timer (PCI Clocks) > to define the latency timing (PCI clock) for all PCI devices on the PCI bus.

PCI VGA Palette Snoop > this option is useful only for system with more than one VGA devices connected to it through different bus (one PCI and one ISA). To enable those various VGA devices to handle signal from the CPU on each set of palette registers of every video devices, it must be set *Enabled*.

Allocate IRQ to PCI VGA > to allocate IRQ to PCI VGA, answer Yes and vice versa.

Offboard PCI IDE Card > to specify if an offboard PCI IDE card is installed in your computer or not. You must specify the slot number on the board which will be used for the card.

Offboard PCI IDE Primary (/Secondary) IRQ > to specify the PCI interrupt that is assigned to the Primary (/Secondary) IDE channel on the offboard PCI IDE controller.

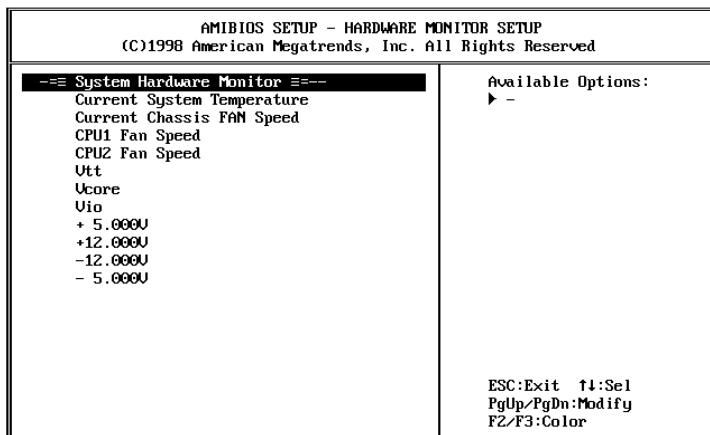
PCI Slot (1,2,3,4) IRQ Priority > to specify the IRQ priority to be used by the PCI devices on slot 1 to 4.

DMA Channel (0,1,3,5,6,7) > to indicate whether or not the DMA channel is assigned for a PnP or ISA card.

IRQ (3,4,5,7,9,10,11,14,15) > to assign the displayed IRQ to be used by a legacy ISA adapter card. The settings are ISA/EISA or PCI/PnP.

4.8 Hardware Monitor Setup

This setup helps users monitor the ROCKY-P288EV board's on board system voltage and fan speed. The function is implemented by on board LM78 chip. The voltage monitoring will cover +5V,+12V,-12V,and -5V. And there are three fan connectors for chassis and CPU fans.



Note: normal CPU Fan RPM is over than 5000 RPM. If your CPU Fan RPM is less than that figure, something is wrong and the CPU will be in overheat condition. Make sure that the connection at CN17/CN18 is correct.

5

E² Key™ Function

The ROCKY-P288EV provides an outstanding E²KEY™function for system integrator. Based on the E²KEY™you could free to store the ID Code, Pass Word, or Critical Data in the 1Kbit EEPROM. Because the EEPROM is nonvolatile memory, you don't have to worry the losing of the very important data.

Basically the E²KEY™s based on a 1Kbit EEPROM which is configured to 64 words(from 0 to 63). You could access(read or write) each word at any time.

When you start to use the E²KEY™you should have the utility in the package. The software utility will include four files as follows,

README.DOC
E2KEY.OBJ
EKEYDEMO.C
EKEYDEMO.EXE.

The E2KEY.OBJ provides two library function for user to integrate their application with E²KEY™function. These library (**read_e2key** and **write_e2key**) are written and compiled in C format. Please check the following statement, then you will know how to implement it easily.

unsigned int read_e2key(unsigned int address)

```
/* This function will return the E2KEY™s data at address. The
address range is from 0 to 63. Return data is one word,16 bits */
void write_e2key(unsigned int address,unsigned data)
/* This function will write the given data to E2KEY™at address.
The address range is from 0 to 63. The data value is from 0 to
0xffff. */
```

To easy start to use the function, please refer the include
EKEYDEMO.C code at first.

Please note the E²KEY™ function is based on the working of
parallel port. So you should enable the ROCKY-P288EV's
parallel port, otherwise will be not working.

Appendix A. Watch-Dog Timer

The Watch-Dog Timer is provided to ensure that standalone systems can always recover from catastrophic conditions that caused the CPU to crash. This condition may be occurred by external EMI or a software bug. When the CPU stops working correctly, hardware on the board will either perform a hardware reset (cold boot) or a non-maskable interrupt (NMI) to bring the system back to a known state.

The Watch-Dog Timer is controlled by two I/O ports.

443 (hex)	Read	Enable the refresh the Watch-Dog Timer.
043/843 (hex)	Read	Disable the Watch-Dog Timer.

To enable the Watch-Dog Timer, a read from I/O port 443H must be performed. This will enable and activate the countdown timer which will eventually time out and either reset the CPU or cause an NMI depending on the setting of JP11. To ensure this reset condition does not occur, the Watch-Dog Timer must be periodically refreshed by reading the same I/O port 443H. This must be done within the time out period that is selected by jumper group JP10.

A tolerance of at least 30% 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 Watch-Dog Timer, otherwise the system will reset.

Appendix B. I/O Address Map

• I/O Address Map

I/O Address Map	Description
000-01F	DMA Controller #1
020-021	Interrupt Controller # 1, Master
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
0F0-0F0	Clear Math Coprocessor Busy
0F1-0F1	Reset Math Coprocessor
0F8-0FF	Math Coprocessor
170-1F7	VIR BUS Master PCI IDE Controller
278-27F	Parallel Printer Port 2
2E8-2EF	Serial Port 4
2F8-2FF	Serial Port 2
294-297	PCI bus
376-376	VIR BUS Master PCI IDE Controller
378-37F	Parallel Printer Port 1
3B0-3DF	Standard AGP Graphic Adapter
3E8-3EF	Serial Port 3
3F0-3F7	Floppy Disk Controller
3F8-3FF	Serial Port 1
443	Watch dog timer enable
843/043	Watch dog timer disable

1 st MB Memory Address Map

Memory address	Description
00000-9FFFF	SYSTEM MEMORY
A0000-BFFFF	VGA BUFFER
C0000-C7FFF	VGA BIOS
C8000-CFFFF	NO USE
D6000-D7FFF	DEFAULT DOC2000 ADDRESS
E0000-FFFFF	SYSTEM BIOS
100000	EXTEND MEMORY

IRQ Mapping Chart

IRQ0	System Timer	IRQ8	RTC clock
IRQ1	Keyboard	IRQ9	USB
IRQ2	IRQ Controller	IRQ10	ON BOARD ETHERNET
IRQ3	COM2/COM4	IRQ11	NO USE
IRQ4	COM1/COM3	IRQ12	PS/2 mouse
IRQ5	VGA	IRQ13	FPU
IRQ6	FDC	IRQ14	Primary IDE
IRQ7	Printer	IRQ15	Secondary IDE

DMA Channel Assignment

Channel	Function
0	Available
1	Available
2	Floppy disk
3	Available
4	Cascade for DMA controller 1
5	Available
6	Available
7	Available