

ROCKY - 418

486 DX4-100 SBC

@Copyright 1999. All Rights Reserved.
Manual second edition July01, 1999

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 manufacturer.

In no event will the manufacturer be liable for direct, indirect, special, incidental, or consequential damages arising out of the use or inability to use the product or documentation, even if advised 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-418 is a registered trademark of ICP Electronics Inc., PC/104 is trademarked of PC/104 Consortium, IBM PC is a registered trademark of International Business Machines Corporation. Intel is a registered trademark of Intel Corporation. AMI is registered trademarks of American Megatrends, Inc. Other product names mentioned herein are used for identification purposes only and may be trademarks and/or registered trademarks of their respective companies.

Contents

1. Introduction.....	3
1.1 Specifications	4
1.2 What You Have	5
2. Installation	6
2.1 ROCKY-418's Layout.....	6
2.2 CPU Operation Speed Setting.....	9
2.3 Watch-Dog Timer	9
2.4 DiskOnChip Flash Disk.....	10
2.5 COM2 RS-232,RS-422,or RS-485 setting.....	10
2.6 Free IRQ Setting.....	11
2.7 Clear CMOS Setup.. ..	11
2.8 COM2 RI pin setting.....	11
3. Connection	12
3.1 Floppy Disk Drive Connector.....	12
3.2 IDE Disk Drive Connector	13
3.3 Parallel Port.....	14
3.4 Serial Ports.....	15
3.5 Keyboard/PS2 Mouse Connector.....	16
3.6 External Switches and Indicators.....	17

3.7	External Power Connector.....	17
3.8	External Speaker.....	18
3.9	PC/104 Connection Bus.....	18
4.	AMI BIOS Setup	20
4.1	Getting Start	20
4.2	Standard CMOS Setup.....	21
4.3	Advanced CMOS Setup	22
4.4	Advanced Chipset Setup.....	24
4.5	Peripheral Setup.....	25
4.6	Auto-Detect Hard Disk.....	26
4.7	Change Supervisor/User Password.....	26
4.8	Auto Configuration with Optimal Settings..	27
4.9	Auto Configuration with Fail Safe Settings.....	28
4.10	Save Settings and Exit.....	28
4.11	Exit Without Saving.....	28
	Appendix A. E² KEY Function.....	29
	Appendix B. I/O Information	31
	Appendix C. Watch-Dog Timer..	33

1

Introduction

Welcome to the ROCKY-418 486 DX4-100 Single Board Computer (Version 2.1). The ROCKY-418 is an ISA with PC/104 form factor board, which comes equipped with advanced high-performance chipset ACC Maple. It is designed for the system manufacturers, integrators, or VARs that want to provide all the performance, reliability, and quality at a reasonable price.

All advanced high performance super I/O functions are in the ROCKY-418. And the built-in PC/104 expansion bus let customers easily install over thousands of PC/104 modules from hundreds' vendors in the world. The ROCKY-418 has external power connector that allows it to connect to power supply directly. It is very suitable for your standalone applications.

In addition, the ROCKY-418 provides two 72-pin SIMM (Single In-line Memory Module) sockets to install max. 64MB memory (single side RAM).

1.1 Specifications :

The ROCKY - 418 DX4-100 Single Board Computer provides the following specification:

•• **System :**

- **CPU :** ACC Maple, includes 486 DX4-100 CPU (internal 8KB Cache)
- **Real Time Clock and battery backup :** ST M4T28 Time Keeper (Lithium Battery) for data retention up to ten years.

•• **System Memory :**

- provides two 72-pin SIMM sockets, support up to 64MB DRAM

•• **Input/Output :**

- **IDE hard disk drive interface :** Supports up to two IDE hard disk drives. Can be disabled by BIOS Setup.
- **Floppy disk drive interface :** Supports two 2.88 MB, 1.44MB, 1.2MB, 720KB, or 360KB floppy disk drives. Can be disabled by BIOS Setup.
- **Two high speed Series ports :** NS16C550 compatible UARTs with send/receive 16-byte FIFOs, data rates are independently programmable from 115.2K baud down to 50 baud. Modem control circuitry. RS-232 or RS-422/485 on the COM2.
- **Multi-mode Parallel Port :**

Standard mode - IBM PC/XT, PC/AT, PS/2 compatible bi-directional parallel port.

Enhanced mode - Enhanced parallel port (EPP) compatible with IEEE 1284 specification.

High speed mode - Microsoft and Hewlett Packard extended capabilities port (ECP), compatible with IEEE 1248 specification.

•• **Industrial features :**

- **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 uses hex 043 and 443 to control the watch-dog and generate a system reset.
- **PC/104 expansion bus :** A 64-pin and 40-pin, industrial embedded-PC bus standard.
- **External power connector :** 8-pin male connector (Molex 6410 series compatible)
- **Keyboard connector :** A 5-pin header on board and 6-pin mini-DIN keyboard connector is located on the mounting bracket.

•• **General :**

- **Power Consumption :** max. +5V @ 2.5A (32MB RAM)
- **Operating Temperature :** 0° ~ 60° C (CPU needs Cooler)
- **Humidity :** 5% ~ 95%, non-condense
- **Dimension:** 180mm(W) x 122mm(L), standard AT form factor

1.2 What You Have

In addition to this *User's Manual*, the ROCKY-418 package includes the following items:

- ROCKY-418 486 DX4-100 Single Board Computer
- Printer Cable
- FDD/HDD Cable Sets
- 6-pin Mini-Din to one 5-pin Mini-Din for Keyboard and one 6-pin Mini-Din for PS/2 Mouse Adapter Cable.
- one support disk contains of the needed driver

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

2

Installation

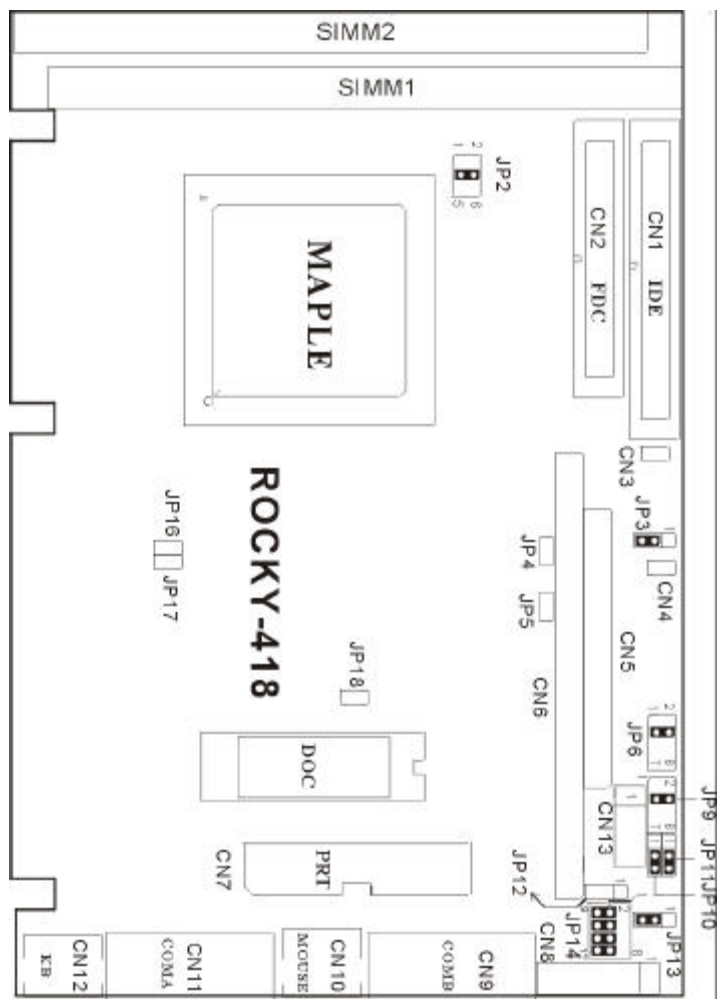
This chapter describes how to install the ROCKY-418. The unpacking information that you should be careful with is described and the layout of ROCKY-418 is shown. The jumpers and switches setting for the ROCKY-418's configuration, such as RS422/485 selection, system clock setting, and watch dog timer setting .etc. are also included.

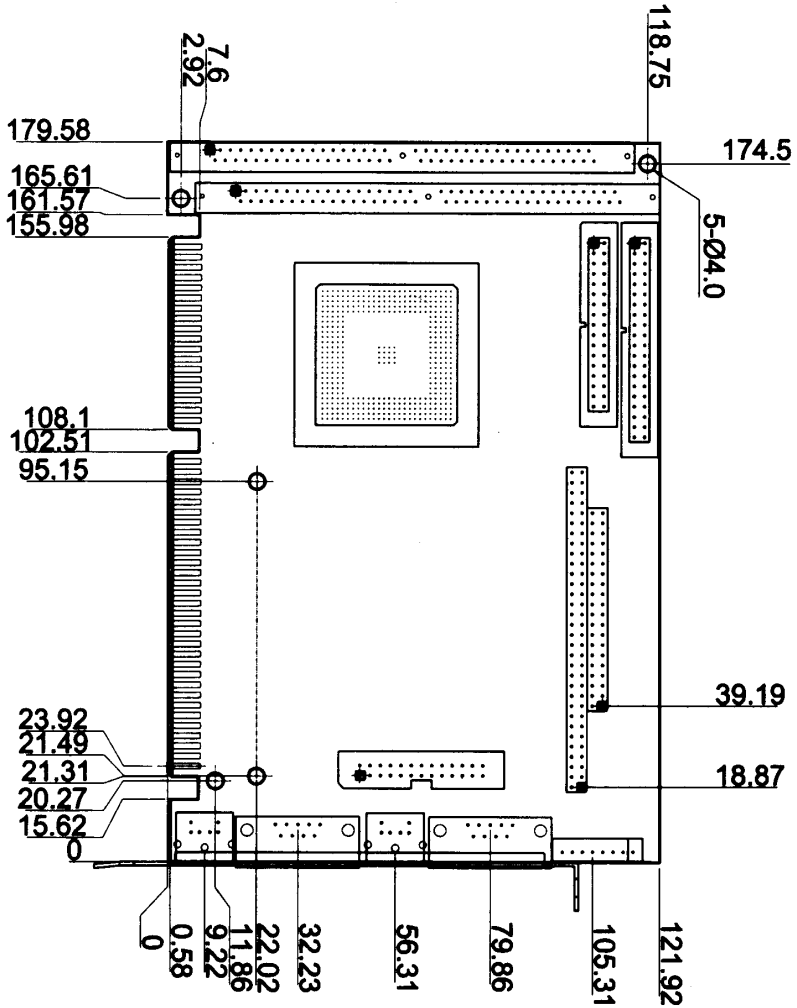
Unpacking Precautions

Some components on ROCKY-418 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-418 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-418 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.

2.1 ROCKY-418's Layout and Dimensions





2.2 CPU Operation Speed Setting

• CPU SPEED SETTING:

The system clock is generated by the AV9155, and the different CPU clock frequency can be selected by JP2 and shown as following table:

JP2	1-2	3-4	5-6
50MHz	ON	OFF	ON
60MHz	OFF	OFF	ON
75MHz	ON	ON	OFF
100MHz	OFF	ON	OFF

2.3 Watch-Dog Timer

The Watch-Dog Timer is enabled by reading 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 port 843H. The Watch-Dog Timer time-out period can be set 1, 2, 10, 20, 110 or 220 sec.

• JP3 : Watch-Dog Timer Type Setting

JP3	DESCRIPTION
1-2	NMI
2-3	RESET

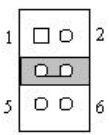
• JP6 : WDT TIME-OUT PERIOD

JP6	1-2	3-4	5-6	7-8
1sec	OFF	OFF	ON	OFF
2sec	OFF	OFF	ON	ON
10sec	OFF	ON	OFF	OFF
20sec	OFF	ON	OFF	ON
110sec	ON	OFF	OFF	OFF
220sec	ON	OFF	OFF	ON

2.4 DiskOnChip™Flash Disk

The DOC (MD-2200-xMB) is 32-pin DIP package. It is software compatible to hard disk and DOS. Customer doesn't need any extra software utility. It is just "plug and play", easy and reliable. Right now the DOC is available in 2MB to 72MB capacity.

- **JP9 : DiskOnChip™Memory Address Setting**

	1-2	CE000
	3-4	D6000
	5-6	DE000

2.5 COM2 RS-232,RS-422 or RS-485 setting

The COM2 (CN9) can be set as RS-232,RS-422,or RS-485 mode by the JP10, JP11 or JP14.

- **JP10,11,14: RS-232/422/485 setting**

COM2 Mode	JP11	JP10	JP14
RS-232	Don't care	2-3	1-9 , 3-10 5-11 , 7-12
RS-422	2-3	1-2	1-2 , 3-4 5-6 , 7-8
RS-485	1-2	1-2	1-2 , 3-4 5-6 , 7-8

Note : IRQ3 and IRQ4 are dedicated to be used for two Serial Ports application

2.6 Free IRQ Setting

COM1 and COM2 will use IRQ3 and IRQ4, respectively, when in use. However, the IRQ3 and IRQ4 can be released by setting JP16 and JP17.

- **JP16 :Free IRQ3 Setting**

OFF	Enable COM2
ON	Disable COM2 (BIOS) IRQ3 Release

- **JP17 :Free IRQ4 Setting**

OFF	Enable COM1
ON	Disable COM1 (BIOS) IRQ4 Release

2.7 Clear CMOS Setup

If you forget the CMOS password, you can clear or reset it by closing the **JP18** for about 3 seconds. After the password has been cleared from your CMOS, set it back to normal operation mode by opening it.

- **JP18 : CLEAR CMOS Setup**

OFF	Normal Operation
ON	CLEAR CMOS

2.8 COM2 RI pin setting

The CN9/COM2 RI pin (pin 9) can be set as RI, +5V or +12V mode.

- **JP12/13 :COM2 RI pin setting**

COMB CN9 Pin 9	JP12	JP13
RI	2-3	Don't Care
+5V	1-2	2-3
+12V	1-2	1-2

3

Connection

This chapter describes how to connect peripherals, switches and indicators to the ROCKY-418 board. You can access most of the connectors from the top of the board while it is installed in the chassis.

3.1 Floppy Disk Drive Connector

ROCKY-418 board comes equipped with a 34-pin daisy-chain driver connector cable. The detailed pin assignment of the connector is specified as following table:

• CN2 : 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	D4IRECTION#
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 IDE Disk Drive Connector

You can attach two IDE (Integrated Device Electronics) hard disk drives to the ROCKY-418 internal controller. The board comes equipped with a 40-pin flat-cable connector. The detailed pin assignment of the connector is specified as following table:

• CN1: 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	IDE CHRDY	28	BALE
29	N/C	30	GROUND
31	IRQ14	32	IOCS16
33	SA1	34	N/C
35	SA0	36	SA2
37	HDC CS0#	38	HDC CS1#
39	HDD ACTIVE#	40	GROUND

3.3 Parallel Port

This port is usually connected to a printer, The ROCKY-418 includes an on-board parallel port, accessed through a 26-pin flat-cable connector CN7. The detailed pin assignment of the connector is specified as following table:

• **CN7 : Parallel Port Connector**

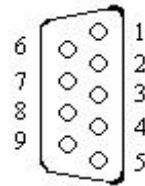
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	STROBE#	2	DATA 0
3	DATA 1	4	DATA 2
5	DATA 3	6	DATA 4
7	DATA 5	8	DATA 6
9	DATA 7	10	ACKNOWLEDGE
11	BUSY	12	PAPER EMPTY
13	PRINTER SELECT	14	AUTO FORM FEED #
15	ERROR#	16	INITIALIZE
17	LPT SELECT LN#	18	GROUND
19	GROUND	20	GROUND
21	GROUND	22	GROUND
23	GROUND	24	GROUND
25	GROUND	26	N/C

3.4 Serial Ports

The ROCKY-418 offers two high speed NS16C550 compatible UARTs with Read/Receive 16 byte FIFO serial ports. These ports let you connect to serial devices or a communication network. Two DB-9 connectors are provided by the ROCKY-418. The detailed pin assignment of the connectors are specified as following tables:

• **CN11 : Serial Port Connector (Port1)**

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)



• **CN9 : Serial Port Connector (Port2)**
RS-232 or RS-422/485

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	DCD/TX2-	6	DSR/RX2+
2	RX/TX2+	7	RTS/RX2-
3	TX	8	CTS
4	DTR	9	RI/+5V/+12V
5	GND	10	N/C

Note: RS-485 Control Programming

The RTS signal is used to control/enable the RS485 output driver. It must be set to 1 for sending data and 0 for receiving data. Please refer to the below table for the function.

RTS	1	0
RS485 driver	output	input

3.5 Keyboard / PS2 Mouse Connector

The ROCKY-418 provides two keyboard connectors and one PS/2 mouse connector. A 5-pin header connector CN13 supports passive backplane applications. Another one is a 6-pin Mini-DIN connector CN12 on the board mounting bracket for single board computer applications. The detailed pin assignment of the connector is specified as following table:

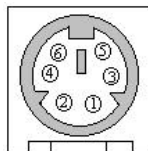
• CN13 : 5-pin Header Keyboard Connector

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



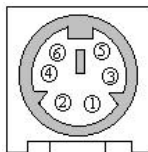
• CN12 : 6-pin Mini-DIN Keyboard Connector

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



• CN10 : 6-pin PS/2 Mouse Connector

PIN NO.	DESCRIPTION
1	MOUSE CLOCK
2	N/C
3	MOUSE DATA
4	GND
5	+5V
6	N/C



3.6 External Switches and Indicators

There are many external switches and indicators for monitoring and controlling your CPU board. These features are completely optional install them if you need them. The detailed pin assignment of the connectors is specified as following table:

• **CN4 : RESET Button Connector**

PIN NO.	DESCRIPTION
1	EXTERNAL RESET
2	GROUND

• **CN3 : IDE HD LED Connector**

PIN-NO	DESCRIPTION
1	HDD ACTIVE#
2	+5V

• **JP4 : POWER LED Connector**

PIN NO.	DESCRIPTION
1	GROUND
2	+5V

3.7 External Power Connector

The ROCKY-418 has an on-board external power connector CN8. You can connect power directly to the CPU board for some single-board-computer (without passive backplane) application.

• **CN8 : EXTERNAL POWER CONNECTOR**

PIN NO.	DESCRIPTION
1	+5V
2	+12V
3	-12V
4	GND
5	GND
6	-5V
7	+12V
8	+5V



3.8 External Speaker

The ROCKY-418 has its own buzzer, you also can connect a external speaker through the connector JP5.

• **JP5 : SPEAKER**

PIN NO.	DESCRIPTION
1	+5V
2	SPEAKER SIGNAL

3.9 PC/104 Connection Bus

The ROCKY-418's PC/104 expansion bus let you attach any kind of PC/104 modules. The PC/104 bus is already become the industrial embedded PC bus standard, so you could easily install over thousands of PC/104 modules from hundreds of venders in the world.

• **CN5 : PC/104-40 CONNECTOR**

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GROUND	21	GROUND
2	SBHE#	22	MCS16#
3	LA23	23	IOCS16#
4	LA22	24	IRQ10
5	LA21	25	IRQ11
6	LA20	26	IRQ12
7	LA19	27	IRQ15
8	LA18	28	IRQ14
9	LA17	29	DACK0#
10	MEMR#	30	DRQ0
11	MEMW#	31	DACK5#
12	SD8	32	DRQ5
13	SD9	33	DACK6#
14	SD10	34	DRQ6
15	SD11	35	DACK7#
16	SD12	36	DRQ7
17	SD13	37	VCC
18	SD14	38	MASTER#
19	SD15	39	GROUND
20	GROUND	40	GROUND

. CN6 : PC/104-60 CONNECTOR

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	IOCHCK#	33	GROUND
2	SD7	34	IRSTDRV
3	SD6	35	VCC
4	SD5	36	IRQ9
5	SD4	37	-5V
6	SD3	38	N/C
7	SD2	39	-12V
8	SD1	40	ZWS#
9	SD0	41	+12V
10	IOCHRDY	42	GROUND
11	AEN	43	SMEMW#
12	LA19	44	SMEMR#
13	LA18	45	IOW#
14	LA17	46	IOR#
15	SA16	47	DACK3#
16	SA15	48	DRQ3
17	SA14	49	DACK1#
18	SA13	50	DRQ1
19	SA12	51	REFRESH#
20	SA11	52	SYSCLK
21	SA10	53	IRQ7
22	SA9	54	N/C
23	SA8	55	IRQ5
24	SA7	56	IRQ4
25	SA6	57	IRQ3
26	SA5	58	N/C
27	SA4	59	TC
28	SA3	60	BALE
29	SA2	61	VCC
30	SA1	62	OSC
31	SA0	63	GROUND
32	GROUND	64	GROUND

NOTE : ROCKY-418 allows directly plug in PC/104 module, it doesn't need PC/104 Connection Kit.

4

AMI BIOS Setup

The ROCKY-418 uses AMI BIOS for system configuration, and 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 Start

When the system is powered on, 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 AMI BIOS Setup program, press key. The following screen will be displayed at this time.

```
AMIBIOS HIFLEX SETUP UTILITY - VERSION 1.20
(C)1998 American Megatrends, Inc. All Rights Reserved

Standard CMOS Setup
Advanced CMOS Setup
Advanced Chipset 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 ↑:Sel F2/F3:Color F10:Save & Exit
```

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 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):	Mon	Jul	26,1999	Base Memory: 0 KB						
Time (hh/mm/ss) :	13:28:24				Extd Memory: 0 MB					
Floppy Drive A:	1.44 MB	3½								
Floppy Drive B:	Not Installed									
	Type	Size	Cyln	Head	HPcom	Sec	LBA Mode	Blk Mode	PIO Mode	32Bit Mode
Pri Master :	Auto									
Pri Slave :	Auto									
Sec Master :	Auto									
Sec Slave :	Auto									
Boot Sector Uirus Protection				Disabled						
Month:	Jan - Dec						ESC:Exit ↑:Sel			
Day:	01 - 31						PgUp/PgDn:Modify			
Year:	1901 - 2099						F2/F3:Color			

To set the Date, for example, press either the arrow or <Enter> button on your keyboard to select one of the fields (Months, Date or Year) then press either <PgUp> or <PgDn> to set it to the current Months, Date and Year. 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 Auto-Detect Hard Disk option in the main menu; the computer will automatically detect the HDD specifications.
3. Manually enter the specifications by yourself from the "User" option.

4.3 Advanced CMOS Setup

This Advanced CMOS Setup is designed for tuning the best performance of the ROCKY-418 board. As for normal operation customers don't have to change any default setting. The default setting is pre-set for most reliable operation.

The following screen will be displayed if you select Advanced CMOS Setup:

AMIBIOS SETUP - ADVANCED CMOS SETUP (C)1998 American Megatrends, Inc. All Rights Reserved		
Quick Boot	Enabled	Available Options: Disabled ▶ Enabled ESC:Exit ↑:Sel PgUp/PgDn:Modify F2/F3:Color
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	
PS/2 Mouse Support	Enabled	
System Keyboard	Absent	
Primary Display	Absent	
Password Check	Setup	
Boot To OS/2	No	
System BIOS Cacheable	Enabled	
C000,16k Shadow	Enabled	
C800,16k Shadow	Disabled	
D000,16k Shadow	Disabled	
D800,16k Shadow	Disabled	

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. The Optimal and Fail-Safe default settings are C:,A:,CDROM.

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.

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.

Primary Display > to define the type of display monitor of the system. The Absent option is for network file servers.

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.

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.

XXXX, 16k Shadow > ROM Shadow is a technique in which BIOS code is copied from slower ROM to faster RAM. If you enable it then the BIOS will be executed from the RAM. Each option allows 16KB segment to be shadowed to the RAM.

4.4 Advanced Chipset Setup

AMIBIOS SETUP - ADVANCED CHIPSET SETUP (C)1998 American Megatrends, Inc. All Rights Reserved		
AT Bus Clock	Automatic	Available Options:
RAS Precharge Time	2T	▶ Automatic
RAS to CAS Read Cycle Delay	2T	14.318MHz
RAS to CAS Write Cycle Delay	2T	CLKSRC/5
CAS Precharge Read Time	1T	CLKSRC/3
CAS Precharge Write Time	1T	CLKSRC/2.5
CAS Width in Read Cycle	2T	CLKSRC/1.5
CAS Width in Write Cycle	1T	CLKSRC/1(00)
		CLKSRC/4
		CLKSRC/2
		24MHz
		ESC:Exit ↑↓:Sel
		PgUp/PgDn:Modify
		F2/F3:Color

AT Bus Clock > to specify the timing for AT Bus. Optimal Setting: Automatic.

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

RAS to CAS Read Cycle Delay > to specify the relative read cycle delay between row and column address strobe.

RAS to CAS Write Cycle Delay > to specify the relative write cycle delay between row and columns address strobe.

CAS Precharge Read Time > to specify the Precharge Read Time for Column Address Strobe.

CAS Precharge Write Time > to specify the write time for Column Address Strobe Precharge.

4.5 Peripheral Setup

AMIBIOS SETUP - PERIPHERAL SETUP (C)1998 American Megatrends, Inc. All Rights Reserved		
OnBoard IDE	Primary	Available Options: Disabled ▶ Primary Secondary
OnBoard FDC	Auto	
OnBoard Serial Port1	3F8h/COM1	
OnBoard Serial Port2	2F8h/COM2	
OnBoard Parallel Port	378h	
Parallel Port Mode	SPP/BPP	
Parallel Port IRQ	7	
Parallel Port DMA Channel	3	
ESC:Exit ↑:Sel PgUp/PgDn:Modify F2/F3:Color		

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

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 1 (/2) > to specify the I/O port address of the serial port 1(/2). If you set it Auto, the BIOS will decide the correct I/O port address, automatically.

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

Parallel Port Mode > to specify the mode of parallel port.

Parallel Port IRQ > to assign certain IRQ to the parallel port.

Parallel Port DMA Channel > available only if the parallel port mode is ECP.

4.6 Auto-Detect Hard Disks

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 4 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.

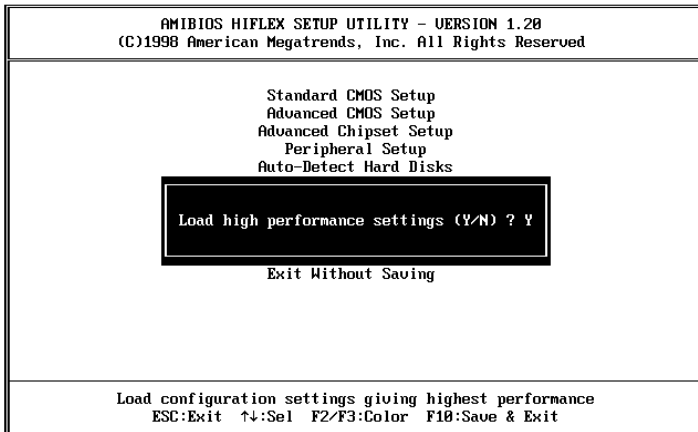
Note: *If your IDE HDD was formatted in previous older system, incorrect parameters may be detected. In this case, you need to enter the correct parameters manually or low-level format the disk.*

4.7 Change Supervisor / User Password



This option sets a password that is used to protect your system and Setup Utility. Supervisor Password has higher priority than User Password. 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 Supervisor Password, you can access every setup option on the main menu but with User Password you can only choose three setup options (USER PASSWORD, SAVE SETTING AND EXIT and EXIT WITHOUT SAVING). To disable these passwords, enter the BIOS SETUP menu with Supervisor Password and then just press the <Enter> key instead of entering a new password when the 'Enter Password' prompt pop-up.

4.8 Auto Configuration with Optimal Settings



This option lets you load the *Optimal* default settings. These settings are *best-case values* which will provide the best performance. Whenever your CMOS RAM is damaged, this Optimal settings will be loaded automatically.

4.9 Auto Configuration with Fail Save Settings



This option lets you load the *Fail Safe* default settings when something happens to your computer so that it cannot boot normally. These settings are not the most optimal settings but are the most stable settings.

4.10 Save Settings and Exit

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

4.11 Exit Without Saving

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

Appendix A. E² Key™ Function

The ROCKY-418 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™ is 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-418' s parallel port, otherwise will be not working.

Appendix B. I/O Information

I/O Address Map

I/O Address Range	Description
000-01F	DMA Controller #1
020-021	Interrupt Controller #1, Master
040-05F	8254 Timer
060-06F	8042 (Keyboard Controller)
070-07F	Real Time Clock, NMI Mask
080-09F	DMA Page Register
0A0-0BF	Interrupt Controller #2
0C0-0DF	DMA Controller #2
0F0	Clear Math Coprocessor Busy
0F1	Reset Math Coprocessor
0F2	Core Logic Programming Configuration
0F8-0FF	Math Coprocessor
1F0-1F8	Fixed Disk
200-207	Game I/O
278-27F	Parallel Printer Port 2 (LPT3)
2E8-2EF	Serial Port 4
2F8-2FF	Serial Port 2
300-31F	Prototype Card
360-36F	Reserved
378-37F	Parallel Printer Port 1 (LPT2)
3B0-3BF	Monochrome Display and Printer Adapter (LPT1)
3C0-3CF	Reserved
3D0-3DF	Color/Graphics Monitor Adapter
3E8-3EF	Serial Port 3
3F0-3F7	Diskette Controller
3F8-3FF	Serial Port 1
443	Watchdog Timer Enable
843 or 043	Watchdog Timer Disable

1st MB Memory Address Map

Memory Address	Description
00000-9FFFF	System Memory
A0000-BFFFF	VGA Buffer
C0000-C7FFF	VGA BIOS
*D6000-DDFFF	DOC 2000
F0000-FFFFFF	System BIOS
1000000-	Extend BIOS

* Default Setting

IRQ Mapping Chart

IRQ0	System Timer	IRQ8	RTC Clock
IRQ1	Keyboard	IRQ9	Unused
IRQ2	Cascade to IRQ Controller	IRQ10	Unused
IRQ3	COM2/COM4	IRQ11	Unused
IRQ4	COM1/COM3	IRQ12	PS/2 Mouse
IRQ5	Unused	IRQ13	FPU
IRQ6	FDC	IRQ14	Primary IDE
IRQ7	Printer	IRQ15	Unused

DMA Channel Assignments

Channel	Function
0	Available
1	Available
2	Floppy Disk (8-bit transfer)
3	Available
4	Cascade for DMA controller 1
5	Available
6	Available
7	Available

Appendix C. 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 caused 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.
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 JP3. To ensure that 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 JP6.

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.
