

ROCKY – P238V
Pentium® II with VGA
SBC

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Introduction

Welcome to the ROCKY-P238V Pentium® II with VGA Single Board Computer. The ROCKY-P238V board is an ISA/PCI form factor board, which comes equipped with high performance Pentium® II 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.

This board built-in DiskOnChip™(DOC) Flash Disk for embedded application. The DOC Flash Disk is 100% compatible to hard disk. User can use any DOS command without any extra software utility. The DOC currently is available from 2MB to 72MB.

An advanced high performance super AT I/O chip – Winbond W83977TF is used in the ROCKY-P238V board. Both on-chip UARTs are compatible with the NS16C550. The parallel port and IDE interface are compatible with IBM PC/AT and XT architecture's.

In addition, the ROCKY-P238V provides S3 VGA on board. The VGA chip is S3 Virge 3D graphics chipset which provides up to 1280 x 1024,256 color resolution. The VGA memory on board is 2MB EDO RAM..

ROCKY-P238V uses the advanced INTEL Chipset,440LX which is 100% ISA/PCI compatible chipset.with PCI 2.1 standard.

1.1 Specifications :

- **CPU** : Pentium® II 233 - 333Mhz Processor
- **Bus** : ISA bus and PCI 32-bit local bus,PCI 2.1 standard
- **DMA channels** : 7
- **Interrupt levels** : 15
- **Chipset** : Intel 440LX
- **Real-time clock/calendar** : in 440LX chipset, backup by industrial Li-battery,3V/850mAH.
- **RAM memory** : Four 168-pin DIMM sockets support SDRAM and EDO RAM module. The max. memory is up to 512MB.
- **Second cache memory** : 512KB Pipelined Burst SRAM in CPU.
- **Ultra DMA/33 IDE Interface** : up to four PCI Enhance IDE hard drives. The Ultra DMA/33 IDE can handle data transfer up to 33MB/s. The best of all is that is new technology is compatible with existing ATA-2 IDE specifications. So there is no need to do any change for customer' s current accessory.
- **Floppy disk drive interface** : two 2.88 MB, 1.44MB, 1.2MB, 720KB, or 360KB floppy disk drives.
- **Two high speed Series ports** : NS16C550 compatible UARTs
- **Bi-directional Parallel Port**
- **Built-in LM78 to monitor power supply voltage and fan speed status.**
- **IrDA port : Support Serial Infrared(SIR) and Amplitude Shift Keyed IR(ASKIR) interface.**
- **USB port : Support 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 was generated when CPU did 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 VIRGE 3D graphics chipset w/ 2MB EDO RAM.

Screen Resolution : 1280 x 1024,256 color,75Hz
1024 x 768, 64K color, 75Hz

- **Flash Disk - DiskOnChip™** The Flash Disk provide 100% compatible with hard disk. The built-in TrueFFS Transparent Flash Block Management and Space Reclamation will let customer to use the Flash Disk with DOS command, no need any extra software utility.
- **Keyboard connector**
- **Mouse** : PS/2 Mouse Port on-board.
- **Power Consumption** : +5V @ 7.8A
(Pentium® II 300MHz,32MB EDO RAM)
+12V @ 240mA , -12V @40mA
- **Operating Temperature** : 0° ~ 55° C (CPU needs Cooler)

1.2 What You Have

In addition to this *User's Manual*, the ROCKY-P238V package includes the following items:

- ROCKY-P238V Pentium® II with VGASingle Board Computer
- Printer/RS-232 cable
- FDD/HDD Cable
- 6-pin Mini-Din to 5-pin Din Keyboard Adapter Cable

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.

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Installation

This chapter describes how to install the ROCKY-P238V. At first, the layout of ROCKY-P238V is shown, and the unpacking information that you should be careful is described. The jumpers and switches setting for the ROCKY-P238V's configuration, such as CPU type selection, system clock setting, and watch dog timer, are also included.

2.1 ROCKY – P238V's Layout

< reference next page >

2.2 Setting the CPU of ROCKY-P238V

- **JP14 : CPU Clock Setting :**

CPU Speed/Clock	JP14
60MHz	1-3
66MHz	2-4

- **JP12 : CPU to Bus Multiple :**

Multiplier	1-2	3-4	5-6	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

**CPU Frequency = CPU Clock x Multiplier for example
Pentium® II 266MHz = 66MHz CPU Clock x 4.0**

2.3 BIOS Flash Type Setting

There are two kind of Flash Chips can be used as BIOS ROM, one is 12V programming and the other is 5V. JP6 is designed to handle the setting.

- **JP6 : Flash Type Setting**

JP6	DESCRIPTION
2-3	5V Flash
1-2	12V Flash

2.4 System Memory DRAM

There are four 168-pin DIMM sockets to accept SDRAM or EDO RAM ,8MB,16MB,32MB,64MB,128MB memory modules. The total capacity is from 8MB to 512MB. Customer can use only one DIMM module and can be populated in any order.

2.5 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 043H.

• JP7 : Watch-Dog Active Type Setting

JP7	DESCRIPTION
2-3	RESET WHEN WDT TIME-OUT
1-2	ACTIVATE NMI TO CPU WHEN WDT TIME-OUT
OPEN	DISABLE WDT

• JP11 : 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

The DiskOnChip™Flash Disk Chip(DOC) is produced by M-Systems. Because the DOC is 100% compatible to hard disk and DOS.Customer don't need any extra software utility. It is just "plug and play",easy and reliable. Right now the DOC is available from 2MB to 72MB.

• JP10 : DiskOnChip Memory Address Setting

Address	JP10
DE00H	1-2
D600H	3-4
CE00H	5-6

2.7 Clear CMOS Setup

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 JP2 pin 2-3 about 3 seconds,then open again. Set back to normal operation mode,close pin 1-2.

- **JP2 : Clear CMOS Setup (Reserve Function)**

JP2	DESCRIPTION
1-2	Normal Operation
2-3	Clear CMOS

2.8 PS/2 Mouse IRQ12 Setting

The on board PS/2 mouse will use IRQ12 when operation.

- **JP3 : IRQ12 Enable/Disable Setting**

JP3	DESCRIPTION
CLOSE	IRQ12 Enable for PS/2 Mouse Operating
OPEN	PS/2 Mouse Disable. IRQ12 to bus

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Connection

This chapter describes how to connect peripherals, switches and indicators to the ROCKY- P238V board.

3.1 Floppy Disk Drive Connector

ROCKY-P238V board equipped with a 34-pin daisy-chain driver connector cable.

• CN3 : 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

You can attach four IDE(Integrated Device Electronics) hard disk drives to the ROCKY-P238V IDE controller.

CN1 (IDE 1) : Primary IDE Connector

CN2 (IDE 2) : Secondary IDE Connector

• **CN1/CN2 : 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

This port is usually connected to a printer, The ROCKY-P238V includes an on-board parallel port, accessed through a 26-pin flat-cable connector CN4.

- **CN4 : 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

The ROCKY-P238V offers two high speed NS16C550 compatible UARTs with Read/Receive 16 byte FIFO serial ports.

- **CN8 : Serial Port DB-9 Connector(ACE0)**

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)

- **CN5 : Serial Port 10-pin Header(ACE1)**

Pin No.	Description	Pin No.	Description
1	DCD	2	DSR
3	RXD	4	RTS
5	TXD	6	CTX
7	DTR	8	RI
9	GND	10	NC

3.5 Keyboard/Mouse Connector

The ROCKY-P238V provides two keyboard/mouse connectors.

- **CN7 : 6-pin Mini-DIN PS2 Mouse Connector**

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

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

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

- **CN9 : 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

3.6 External Switches and Indicators

There are several external switches and indicators for monitoring and controlling your CPU board. All the functions are in the CN11 connector.

CN11 Pin Assignment : (Correct)

1.	Speaker Signal	2.	+5V
3.	N/C	4.	N/C
5.	N/C	6.	Ground
7.	+5V	8.	KeyLock Signal
9.	External Reset	10.	Ground
11.	Ground	12.	Ground
13.	IDE LED	14.	N/C
15.	+5V	16.	Power ON
17.	Power Button	18.	+5Vsb
19.	GND	20.	+5Vsb

3.7 USB Port Connector

The ROCKY- P238V built-in two USB ports for the future new I/O bus expansion.

CN12 : 2 ports USB Connector

Pin 1-4 for USB 0

Pin 5-8 for USB 1

1.	Vcc	5.	GROUND
2.	DATA-	6.	DATA+
3.	DATA+	7.	DATA-
4.	GROUND	8.	Vcc

3.8 IrDA Infrared Interface Port

The ROCKY-P238V built-in a IrDA port which support Serial Infrared(SIR) or Amplitude Shift Keyed IR(ASKIR) interface. When use the IrDA port have to set SIR or ASKIR model in the BIOS' s Peripheral Setup' s COM 2. Then the normal RS-232 COM 2 will be disabled.

- **CN13 : IrDA connector**

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

3.9 Fan Connector

The ROCKY-P238V provides CPU cooling fan connector, chassis fan connector. These connectors can supply 12V/500mA to the cooling fan. In the connector there have a “rotation” pin . The rotation pin is to get the fan' s rotation signal to system. So the system BIOS could recognize the fan speed. Please note only specified fan offers the rotation signal.

- **CN14/CN15 : CPU Fan Connector**

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

3.10 VGA Connector

The ROCKY-P238V built-in 15-pin VGA connector directly to your CRT monitor.

• **CN6 : 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-P238V 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 Start

When power on the system, the BIOS will enter the Power-On-Self-Test 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.

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 the following screen for this setup.

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

This Advanced CMOS Setup is designed for customer's tuning best performance of the ROCKY-P238V board. As for normal operation customers don't have to change any default setting. The default setting is pre-set for most reliable operation.

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

4.4 Advanced Chipset Setup

This setup functions are almost working for ChipSet(Intel 440LX). These options are used to change the ChipSet' s registers. Please carefully change any default setting ,otherwise the system could be running un-stable.

Fixed Memory Hole : Enable or Disable

This setting reserve 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.

4.5 Peripheral Setup

This setup is almost working 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 2. If you are using the IrDA port,you have to set this port accordingly.

4.6 Power Management Setup

Power Management Setup help user handles the ROCKY-P238V 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,

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) have 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"

4.7 PCI / PLUG AND PLAY SETUP

The setup help user handles the ROCKY-P238V board's "PCI" function. All PCI bus slots on the system use INTA#, thus all installed PCI slots must be set to this value..

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.

4.8 Hardware Monitor Setup

The setup help user monitor the ROCKY-P238V 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 have two fan connectors for system and CPU fan.



E² Key™ Function

The ROCKY-P238V 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-P238V' 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 have 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 (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 JP7. 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 group JP11.

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.
