

ROCKY-558EV
Pentium® ,VGA & 10/100Mbps
Ethernet SBC

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Introduction

Welcome to the ROCKY-558EV Pentium® w/ VGA & 10/100Mbps Ethernet Single Board Computer. The ROCKY-558EV board is an PICMG bus form factor board, which equipped with high performance Pentium® CPU and advanced high performance VGA and Ethernet, 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 VGA chip – Winbond W9970CF is used in the ROCKY-558EV board. The W9970CF integrated Video Graphics Accelerator in a single chip.

In addition, the ROCKY-558EV provides two 168-pin DIMM sockets for its on-board DRAM. DIMM module is 3.3V SDRAM.and max. 128MB for one module.

The board' s RTL8139 network chipset provides 10Mbps or 100Mbps Ethernet with auto-sensing function.

ROCKY-558EV uses the advanced ALI Chipset Aladdin 4+ which is 100% ISA/PCI compatible chipset with PCI 2.1 standard.

1.1 Specifications :

The ROCKY-558EV Pentium® w/ VGA & 10/100Mbps Ethernet Single Board Computer provides the following specification:

- **CPU** : Pentium® MMX up to 233Mhz, AMD K6 up to 300MHz processor, Cyrix 6x86MX, IDT C6 processor
- **Bus** : PICMG bus, meet PCI 2.1 standard
- **DMA channels** : 7
- **Interrupt levels** : 15
- **Chipset** : ALI Aladdin 4+
- **VGA** : Winbond W9970CF

Resolution : 1024x768, 256 color

More information : www.winbond.com.tw

- **Ethernet** : Built-in the RTL8139 Chipset
IEEE 802.3u 100BASE-TX standard
Auto-sensing interface to 10Mbps or 100Mbps networks
Full duplex capability

More information : www.realtek.com.tw

- **Real-time clock / calendar** : backup by industrial Li Battery. .
- **RAM memory** : up to 256MB SDRAM
- **Second Cache memory** : 512KB Pipelined Burst SRAM on board
- **Ultra DMA/33 IDE Interface** : up to two PCI Enhance IDE hard drives. The Ultra DMA/33 IDE can handle data transfer up to 33MB/s. The best of all is that this 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
- **Standard/EPP/ECP Parallel Port**

- **IrDA port : Support Serial Infrared(SIR) and Amplitude Shift Keyed IR(ASKIR) interface.**
- **USB port : Support USB port 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.
- **Flash Disk - DiskOnChip™:** The Flash Disk provides 100% compatible with hard disk.
- **Keyboard connector**
- **Mouse :** PS/2 Mouse Port on-board.
- **Power Consumption :** +5V @ 5.5A
(Pentium® MMX-200,32MB SDRAM)
+12V @ 160mA , -12V@60mA
- **Operating Temperature :** 0° ~ 55° C (CPU needs Cooler)

1.2 What You Have

In addition to this *User's Manual*, the ROCKY-558EV package includes the following items:

- ROCKY-558EV Pentium® w/ VGA &10/100MBps Ethernet SBC
- RS-232/Printer Cable
- FDD/HDD Cable
- 6-pin Mini-Din to Keyboard and Mouse 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-558EV. At first, the layout of ROCKY-558EV is shown, and the unpacking information that you should be careful is described. The jumpers and switches setting for the ROCKY-558EV's configuration, such as CPU type selection, system clock setting, and watch dog timer, are also included.

2.1 ROCKY-558EV's Layout

< reference next page >

2.2 Setting the CPU of ROCKY-558EV

- CPU Clock Setting :

CPU Speed/Clock	JP3 7-8	JP3 9-10	JP3 11-12
55MHz	CLOSE	CLOSE	OPEN
60MHz	CLOSE	OPEN	OPEN
66MHz	OPEN	OPEN	OPEN
75MHz	OPEN	CLOSE	CLOSE
83MHz	CLOSE	OPEN	CLOSE

- CPU to Bus Multiple :

Multiplier	JP3 1-2	JP3 3-4	JP3 5-6
1.5 x	OPEN	OPEN	OPEN
2 x	CLOSE	OPEN	OPEN
2.5 x	CLOSE	CLOSE	OPEN
3 x	OPEN	CLOSE	OPEN
3.5 x	OPEN	OPEN	OPEN
4 x	CLOSE	OPEN	CLOSE
4.5 x	CLOSE	CLOSE	CLOSE

**CPU Frequency = CPU Clock x Multiplier for example
Pentium® 200MHz = 66MHz CPU Clock x 3**

- CPU Core Voltage Selection :

Please check the CPU Core Voltage before you install the CPU. Right now new Intel MMX CPU is dual voltages for core and I/O, the I/O is 3.3V but the core is 2.8V. This kind of CPU design will enhance the low power consumption capability. As for the general Pentium® CPU is one voltage for I/O and Core - 3.3V, 3.4V, or 3.5V

- JP4 CPU Core Voltage Setting :

CPU Core Voltage	JP4 1-2	JP4 3-4	JP4 5-6	JP4 7-8
3.5V(P54C/CS) VRE	CLOSE	CLOSE	CLOSE	CLOSE
3.4V(P54C/CS) STD	OPEN	CLOSE	CLOSE	CLOSE
3.3V	CLOSE	OPEN	CLOSE	CLOSE
3.2V	OPEN	OPEN	CLOSE	CLOSE
3.1V	CLOSE	CLOSE	OPEN	CLOSE
3.0V	OPEN	CLOSE	OPEN	CLOSE
2.9V	CLOSE	OPEN	OPEN	CLOSE
2.8V (P55C)	OPEN	OPEN	OPEN	CLOSE
2.7V	CLOSE	CLOSE	CLOSE	OPEN
2.6V	OPEN	CLOSE	CLOSE	OPEN
2.5V	CLOSE	OPEN	CLOSE	OPEN
2.4V	OPEN	OPEN	CLOSE	OPEN
2.3V	CLOSE	CLOSE	OPEN	OPEN
2.2V	OPEN	CLOSE	OPEN	OPEN
2.1V	CLOSE	OPEN	OPEN	OPEN
2.0V	OPEN	OPEN	OPEN	OPEN

• **JP1/JP2 Dual / Single CPU Voltage setting :**

Vcore & VIO	JP1 1-2	JP1 3-4	JP2 1-2	JP2 3-4
Pentium (P54C) IDT C6	OPEN	OPEN	CLOSE	CLOSE
Pentium MMX AMD K6 Cyrix 6x86MX Dual Voltage	CLOSE	CLOSE	OPEN	OPEN

• **Cyrix 6x86MX PR Rating Table**

(Vcore : 2.9V ,dual voltage)

PR Rating	Bus MHz	CPU Core MHz	Clock Multiplier
6x86MX-PR150	60	120	2x
6x86MX-PR166	66	133	2x
6x86MX-PR166	60	150	2.5x
6x86MX-PR200	75	150	2x
6x86MX-PR200	66	166	2.5x
6x86MX-PR200	60	180	3x
6x86MX-PR233	75	188	2.5x
6x86MX-PR233	66	200	3x
6x86MX-PR233	83	166	2x
6x86MX-PR266	66	233	3.5x
6x86MX-PR266	75	225	3x
6x86MX-PR266	83	208	2.5x

• AMD K6 MMX Rating Table(Dual Voltage)

Product Name	Core Freq	Vcore	Bus MHz	Multiplier
K6-233 model 6	233MHz	3.2V	66	3.5x
K6-200 model 6	200MHz	2.9V	66	3x
K6-166 model 6	166MHz	2.9V	66	2.5x
K6-300 model 7	300MHz	2.2V	66	4.5x
K6-266 model 7	266MHz	2.2V	66	4x
K6-233 model 7	233MHz	2.2V	66	3.5x

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 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

• **JP8: 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

2.4 DiskOnChip™Flash Disk

The DiskOnChip™Flash Disk Chip(DOC) is produced by M-Systems. Because the DOC is 100% compatible to hard disk and DOC. 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. **The MD-2200-xMB series DOC will share only 8KB memory address.**

• **JP9 : DiskOnChip Memory Address Setting**

JP9	Address
1-2	CE000 – CFFFF
3-4	D6000 – D7FFF
5-6	DE000 – DFFFF

2.5 BIOS Flash Type Setting

There have 12V or 5V programming Flash and 1MB or 2MB flash BIOS possible to be used in the board. And each type flash need

a

specified jumper setting.

- **JP6: BIOS Flash Type Setting**

This jumper is by factory setting

JP6	DESCRIPTION
1-3	12V programming
2-4	1MB
3-5	5V programming
2-4	1MB
1-3	12V programming
4-6	2MB
3-5	5V programming
4-6	2MB

3

Connection

This chapter describes how to connect peripherals, switches and indicators to the ROCKY-558EV board.

3.1 Floppy Disk Drive Connector

ROCKY-558EV board equipped with a 34-pin daisy-chain driver connector cable.

• J7 : 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-558EV IDE controller.

Please note the IDE support Ultra DMA/33 high performance interface.

- **J5 : Primary IDE Interface Connector**
- **J6 : Secondary 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	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	NC
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-558EV includes an on-board parallel port, accessed through a 26-pin flat-cable connector J9.

• J9 : 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	26	N/C

3.4 Serial Ports

The ROCKY-558EV offers two high speed NS16C550 compatible UARTs with Read/Receive 16 byte FIFO serial ports.

• J15 : Serial Port DB-9 Connector(COMA)

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)

• J13 : Serial Port 10-pin Header(COMB)

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

3.5 Keyboard/Mouse Connector

The ROCKY-558EV provides keyboard and mouse connectors on the bracket and board each.

- **J1 : 5-pin Header Keyboard Connector**

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

- **J14 : 5-pin Header Mouse Connector**

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

- **J16 : 6-pin Mini-DIN Keyboard / Mouse Connector**

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

3.6 External Switches and Indicators

There are many external switches and indicators for monitoring and controlling your CPU board.

• **J2 : General Connectors**

2.	5V	1.	Speaker Signal
4.	NC	3.	NC
6.	GND	5.	NC
8.	KEYLOCK	7.	5V
10.	GND	9.	RESET
12.	GND	11.	GND
14.	NC	13.	HDD LED
16.	Suspend Control	15.	5V
18.	5V Standby	17.	Switch Control Signal
20.	5V Standby	19.	GND

3.7 USB Port Connector

The ROCKY-558EV built-in dual USB ports for the future new I/O bus expansion.

• **J8 : USB Connector**

1.	5V	2.	GND
3.	-DATA1	4.	+DATA0
5.	+DATA1	6.	-DATA0
7.	GND	8.	5V

3.8 IrDA Infrared Interface Port

The ROCKY-558EV 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 COM2. Then the normal RS-232 COM2 will be disabled.

• **JP10 : IrDA connector**

PIN NO.	DESCRIPTION
---------	-------------

1	VCC
2	NC
3	IR-RX
4	Ground
5	IR-TX

3.9 VGA Connector

The ROCKY-558EV built-in 15-pin VGA connector directly to your CRT monitor.

• **J11 : 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		

3.10 Lan RJ45 Connector

The ROCKY-558EV built-in a RJ45 Lan connector..

• **J12 : Lan RJ45 Connector**

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

• **CN1 LED Connector(2-pin header) for Lan**

1.	5V
2.	10Mbps
3.	5V
4.	100Mbps
5.	5V
6.	Active

3.11 CPU Fan Connector

The ROCKY-558EV provides a connector for CPU cooling fan.

• **J10 CPU Fan Connector**

1.	N/C
2.	12V
3.	GND

3.12 External Battery Connector

The ROCKY-558EV built-in a 3V/850mAH industrial Li-battery for CMOS and RTC backup. When normal operation will not need external battery to backup the data.

• **J4 : External Battery Connector**

PIN NO.	DESCRIPTION
1	External Battery +
2	NC
3	N/C
4	Ground

Please note the J4 pin 2-3 should be short for the internal battery operation.



AMI BIOS Setup

The ROCKY-558EV 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 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 HIFLEX SETUP UTILITY, 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 BIOS Features Setup is designed for customer's tuning best performance of the ROCKY-558EV board. As for normal operation customers don't have to change any default setting. The default setting is pre-set for most reliable operation.

4.4 Advanced Chipset Setup

This setup functions are almost working for ChipSet These options are used to change the ChipSet' s registers. Please carefully change any default setting ,otherwise the system could be running unstable.

4.5 Peripheral Setup

This setup is almost working for Multi-I/O Chip(in ALI Aladdin 4+ system chipset). 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 Port2. 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-558EV 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 or Enable

Enable APM puts the system into power saving mode after a brief inactivity period.

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 PCI / Plug and Play Setup help user handles the ROCKY-558EV board's "PCI" function. All PCI bus slots on the system use INTA#, thus all installed PCI slots must be set to this value.



E² Key™ Function

The ROCKY-558EV 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-558EV' 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 JP8.

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.
