ROCKY–3702EV Ver.4.x

Celeron^{TM} & Pentium III Processor

With VGA & Ethernet SBC

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Contents

**ROCKY-3702EV Socket 370 Celeron™ & Pentium III
with AGP VGA & 10/100Mbps Ethernet SBC**

1

Introduction

Welcome to the ROCKY-3702EV Socket 370 Celeron® and Pentium III (FC-PGA) with AGP VGA & 10/100Mbps Ethernet Single Board Computer. The ROCKY-3702EV is a PICMG bus form factor board. It is equipped with high performance Intel® Celeron up to 500MHz and Pentium III (FC-PGA) 500MHz (or above) 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 has a 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 144MB.

An advanced high performance super AT I/O chip – Winbond W83977TF is used in the ROCKY-3702EV board. The on-chip UARTs are compatible with the NS16C550. The parallel port and IDE interface are compatible with IBM PC/AT architecture.

ROCKY-3702EV uses the advanced INTEL 440BX Chipset which is 100% ISA/PCI compatible chipset with PCI 2.1 standard. In addition, this board provides four 168-pin sockets for its on-board DRAM. The DIMM module is 3.3 V SDRAM and max. 256MB for each module.

1.1   Specifications :

- **CPU :** support Intel Celeron® up to 500 MHz , Pentium III (FC-PGA) 500 MHz (or Above) Processor.

- **Bus :** PICMG bus, meets PCI 2.1 standard

- **DMA channels :** 7

- **Interrupt levels :** 15

- **Chipset :** Intel 82440BX 66/100MHz CPU Clock

- **RAM :** Four 168-pin DIMM sockets support SDRAM and EDO RAM module, up to 1GB.

- **AGP VGA Controller :** S3 Trio® 3D/2x AGP VGA Controller
  AGP bus speed : 133MHz
  Screen Resolution up to
  1600 x 1200 64K colors
  1280 x 1024 64K colors
  1024 x 768   16M colors

- **10/100Mbps Ethernet Controller :** Realtek RTL8139 IEEE802.u
  100BASE-TX standard
  Dual Auto-sensing interface to 10Mbps, 100Mbps Network
  RJ45 connector for 10BASE-TX and 100BASE-TX
  Full Duplex capability
  Full Software driver support

- **Ultra DMA/33 (Enhanced PCI 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 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.

- **Multi-I/O Chip :** W83977, all I/O setup by BIOS
  Two 16C550 RS-232C Ports
  One EPP/ECP Parallel Port, Floppy Port

- **Floppy disk drive interface :** two 2.88 MB, 1.44MB, 1.2MB, 720KB, or 360KB floppy disk drives.

- **Two high speed Serial ports :** NS16C550 compatible UARTs

- **Bi-directional Parallel Port**

- **Built-in LM78 Hardware Monitoring System** 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.

- **ISAPLUS^{TM} :** designed to enhance the ISA bus drive capability

- **E^{2}Key :** A special designed 1Kbit EEPROM (non volatile memory) provided to accept read/ write data by customer's program. It is useful to store system ID, Password, Critical Data on the board.

- **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.

- **Flash Disk - DiskOnChip™ :** The Flash Disk provides 100% compatibility with hard disk, supports M-Systems. The built-in True FFS Transparent Flash Block Management and Space Reclamation will let customer to use the Flash Disk with DOS command, no need any extra software utility. The DOC currently is available from 2MB to 144MB.

- **ATX Power Supply function**

- **Mouse & Keyboard Connector :** PS/2 Mouse Port on-board + Ext. Keyboard.

- **Power Consumption :** +5V/6.8A (Celeron 333MHz, 512MB SDRAM) +12V:170mA , -12V:60mA

- **Operating Humidity :** 5 ~ 95 %, non-condensing

1.2 What You Have

In addition to this *User's Manual*, the ROCKY-3702EV package includes the following items:

- ROCKY-3702EV Socket 370 Celeron® & Pentium III with AGP VGA & 10/100Mbps Ethernet SBC

- Printer Cable/RS232 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.

2

Installation

This chapter describes how to install the ROCKY-3702EV. The layout of ROCKY-3702EV is shown on the next page and the Unpacking Precautions that you should be careful with are described on the following page. Also included is the jumpers and switches setting for this board's configuration, such as: CPU type selection, system clock setting and Watchdog timer.

2.1 ROCKY-3702EV 's Layout

< please, refer to the next page >

2.1 ROCKY-3702EV 's Layout
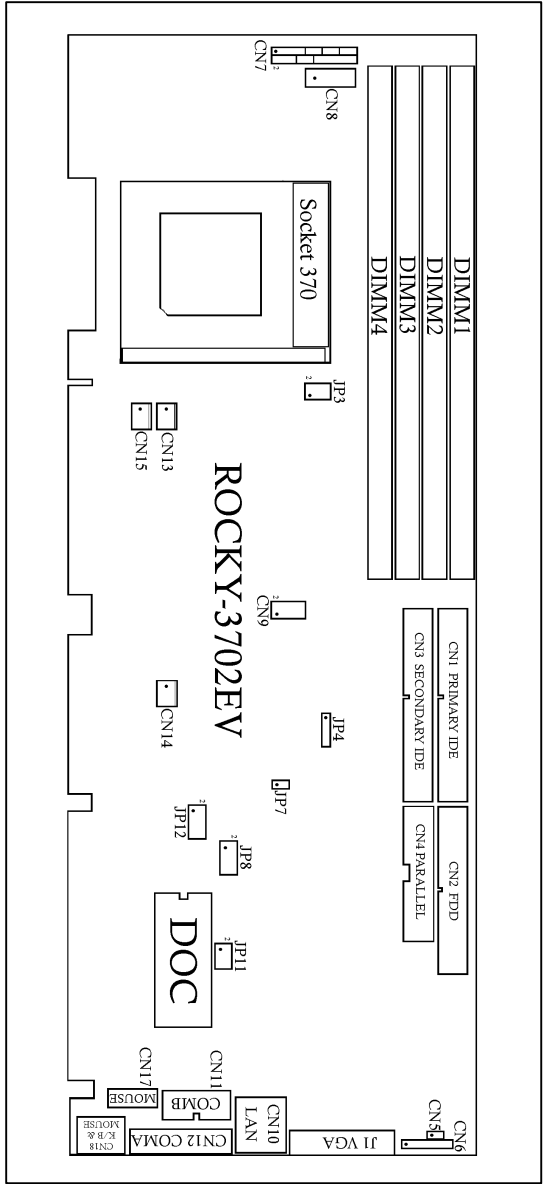
2.2 Unpacking Precautions

Some components on ROCKY-3702EV 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-3702EV 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-3702EV 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.

✓ Do not put your ROCKY-3702EV SBC unprotected on a flat surface because it has components on both sides.

2.3 Setting the CPU of ROCKY-3702EV

. JP3 : CPU FREQUENCY SETTING

FREQUENCY	JP3	
	1-3	2-4
66MHz/100MHz	ON	ON

Note: Intel Celeron CPU will auto-detect 66MHz
        Intel Pentium III (FC-PGA) CPU will auto-detect 100MHz

● JP8 : CPU MULTIPLIER SETTING

Ratio	1-2	3-4	5-6	7-8
3.0 x	ON	OFF	ON	ON
3.5 x	ON	OFF	OFF	ON
4.0 x	OFF	ON	ON	ON
4.5 x	OFF	ON	OFF	ON
5.0 x	OFF	OFF	ON	ON
5.5x	OFF	OFF	OFF	ON
6.0x	**ON**	**ON**	**ON**	**OFF**
6.5x	ON	ON	OFF	OFF
7x	ON	OFF	ON	OFF
7.5x	ON	OFF	OFF	OFF
8x	OFF	ON	ON	OFF

2.4 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 reboot or activate NMI to CPU. The Watch-Dog Timer is disable by reading port 043H.

● JP5 : Watch-Dog Timer Type Setting

PIN NO.	DESCRIPTION
1-2	NMI
2-3	**RESET**

● **JP12 : WDT Time-out Period**

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

2.5 DiskOnChip™ Flash Disk

The DiskOnChip™ (DOC) Flash Disk Chip is produced by M-Systems. Customers don't need any extra software utility because the DOC is 100% compatible to hard disk. It is just "plug and play", easy and reliable. Right now, the DOC is available from 2MB to 144MB.

● **JP11 : DiskOnChip™Memory Address Setting**

PIN NO.	ADDRESS
1-2	CE00 – CFFF
3-4	**D600 – D7FF**
5-6	DE00 – DFFF

2.6 Clear CMOS Setup

If you forget the CMOS password, you can clear or reset it by closing the **JP4**. After JP4 is closed, turn on the power for about 3 seconds then turn it off and open the JP4. Now, the password has been cleared from your CMOS.

● **JP4 : Clear CMOS Setup**

PIN NO.	DESCRIPTION
2-3	**Normal Operation**
3-4	Clear CMOS Setup

Note: 1-4 is for connection with external battery (4=GND)

2.7 PS/2 Mouse

● **JP7 : PS/2 Mouse Setting**

The PS/2 mouse uses IRQ12 while in operation.

JP7	DESCRIPTION
ON	**Enable the PS/2 Mouse, IRQ12**
OFF	Disable the PS/2 Mouse

3

Connection

This chapter describes how to connect peripherals, switches and indicators to the ROCKY-3702EV board.

3.1 Floppy Disk Drive Connector

ROCKY-3702EV board equipped with a 34-pin daisy-chain driver connector cable.

● **CN2 : FDD 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 PCI E-IDE Disk Drive Connector

You can attach four IDE (Integrated Device Electronics) hard disk drives to the ROCKY-3702EV IDE controller.

CN1 (IDE 1) : Primary IDE Connector
CN3 (IDE 2) : Secondary IDE Connector

● **CN1/CN3 : IDE Interface Connector**

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	RESET#	2	GND
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	GND	20	N/C
21	IDE DRQ	22	GND
23	IOW#	24	GND
25	IOR#	26	GND
27	IDE CHRDY	28	GND
29	IDE DACK	30	GND
31	INTERRUPT	32	N/C
33	SA 1	34	N/C
35	SA 0	36	SA 2
37	HDC CS0#	38	HDC CS1#
39	HDD ACTIVE#	40	GND

3.3 Parallel Port

This port is usually connected to a printer, The ROCKY-3702EV 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	GND
19	GND	20	GND
21	GND	22	GND
23	GND	24	GND
25	GND	26	N/C

3.4 Serial Ports

The ROCKY-3702EV offers two high speed NS16C550 compatible UARTs with Read/Receive 16 byte FIFO serial ports (COMA/COMB).

● CN12 : Serial Port 9-pin D-sub 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)

● **CN11 : Serial Port 2x5 pin header Connector (COMB)**

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-3702EV provides one external keyboard ,one external mouse and one PS/2 keyboard & mouse connectors.

● **CN8 : 5-pin Header External Keyboard Connector**

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

● **CN18 : 6-pin Mini-DIN PS/2 Keyboard & Mouse Connector**

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

● **CN17 : PS/2 Mouse 5-pin Header Connector**

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

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 CN7 connector.

● CN7 : Multi Panel

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1.	SPEAKER	2	VCC
3.	N/C	4	N/C
5.	N/C	6	GND
7.	+5V	8	KEYLOCK
9.	RESET SW	10	GND
11.	GND	12	GND
13.	IDE LED	14	N/C
15.	+5V	16	ATX POWER CONTROL
17.	ATX POWER BUTTON	18	ATX 5VSB
19.	ATX 5VSB	20	ATX 5VSB

3.7 USB Port Connector

The ROCKY-3702EV has two built-in USB ports for the future new I/O bus expansion.

● CN9: 2 USB Connectors
Pin 1,3,5,7 for USB 0
Pin 2,4,6,8 for USB 1

PIN NO.	Description	PIN NO.	Description
1	VCC	2	GND
3	SBD0-	4	SBD1+
5	SBD0+	6	SBD1-
7	GND	8	VCC

3.8 IrDA Infrared Interface Port

ROCKY-3702EV built-in IrDA port supports Serial Infrared (SIR) or Amplitude Shift Keyed IR (ASKIR) interface. If you want to use the IrDA port, you have to configure the SIR or ASKIR model in the BIOS's Peripheral Setup's COM2. Then the normal RS-232 COM2 will be disabled.

● **CN6 : IrDA Connector**

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

3.9 VGA Connector

The built-in 15-pin VGA connector can be connected directly to your monochrome CRT monitor as well as high resolution color CRT monitor.

• **J1 : 15-pin Female Connector**

1	RED	9	VCC
2	GREEN	10	GND
3	BLUE	11	N/C
4	N/C	12	DDC DATA
5	GND	13	H-SYNC
6	GND	14	V-SYNC
7	GND	15	DDC CLK
8	GND		

3.10 LAN RJ45 Connector

ROCKY-3702EV 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:

- **CN10 : LAN RJ45 Connector**

1	TX+	5.	N/C
2	TX-	6.	RX-
3.	RX+	7.	N/C
4.	N/C	8.	N/C

- **CN5 : LED Connector for LAN**

1	VCC
2	LAN ACT.

- **LED1,2,3 : On Board LED status for LAN**

LED	STATUS
LED1	TX/RX
LED2	LINK 100
LED3	LINK 10

(Can programming to other status)

3.11 Fan Connector

The ROCKY-3702EV provides one CPU cooling fan connector and two system fan connectors. These connectors can supply 12V/500mA to the cooling fan. The connector has a "rotation" pin which supplies the fan's rotation signal to the system, so the system BIOS knows the fan speed. Please note that only specified fan offers the rotation signal.
- **CN13 : CPU Fan Connector**
- **CN14 : System1 Fan Connector**
- **CN15 : System2 Fan Connector**

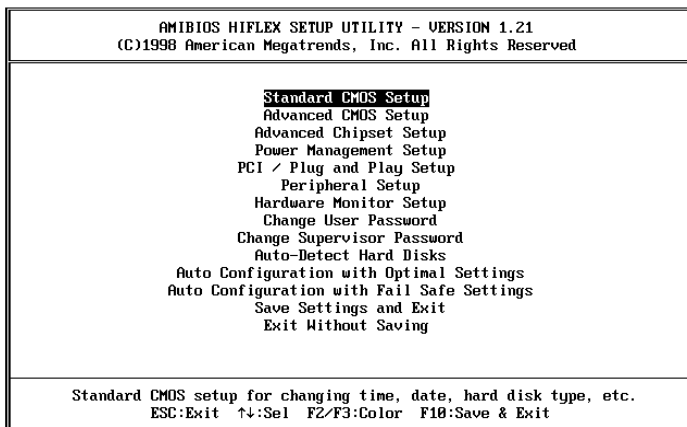| PIN NO.	DESCRIPTION
1	Fan Sensor
2	+12V
3	GND

4

AMI BIOS Setup

The ROCKY-3702EV 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 you turn on the power button, the BIOS will enter the Power-On-Self-Test routines. These routines will be executed for system test and initialization and system configuration verification.

" Hit DEL if you want to run SETUP"

To access AMI PCI/ISA BIOS Setup program, press <Del> key. The following screen will be displayed at this time.

```
                AMIBIOS HIFLEX SETUP UTILITY - VERSION 1.21
              (C)1998 American Megatrends, Inc. All Rights Reserved

                          Standard CMOS Setup
                          Advanced CMOS Setup
                         Advanced Chipset Setup
                         Power Management Setup
                        PCI / Plug and Play Setup
                            Peripheral Setup
                         Hardware Monitor Setup
                          Change User Password
                       Change Supervisor Password
                         Auto-Detect Hard Disks
                   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): Thu Apr 15,1999              Base Memory: 0 KB
Time (hh/mm/ss)  : 14:50:39                     Extd Memory: 0 MB

Floppy Drive A:    1.44 MB 3½
Floppy Drive B:    Not Installed
                                                   LBA  Blk  PIO  32Bit
              Type          Size  Cyln  Head WPcom Sec Mode Mode Mode Mode
Pri Master : Auto                                             On
Pri Slave  : Auto                                            On
Sec Master : Auto                                            On
Sec Slave  : Auto                                            On

Boot Sector Virus Protection    Disabled

Month:  Jan - Dec                               ESC:Exit  ↑↓:Sel
  Day:   01 - 31                                PgUp/PgDn:Modify
 Year: 1901 - 9999                              F1:Help 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.

ROCKY-3702EV Socket 370 Celeron™ & Pentium III with AGP VGA & 10/100Mbps Ethernet SBC

4.3 Advanced CMOS Setup

This Advanced CMOS Setup is designed for tuning the best performance of the ROCKY-3702EV 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:
 1st Boot Device            Floppy             Disabled
 2nd Boot Device            IDE-0           ▶ Enabled
 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
 Primary Display            Absent
 Password Check             Setup
 Boot To OS/2 > 64MB        No
 CPU Serial Number          Enabled
 Cache Bus ECC              Disabled         ESC:Exit  ↑↓:Sel
 System BIOS Cacheable      Enabled          PgUp/PgDn:Modify
 C000,16k Shadow            Cached           F1:Help 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 untill it receives a Ready signal from the HDD. It will also wait for you to press the <Del> 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 **Ma**nagement 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.

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.

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 FOOOH 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

This setup functions are working mostly for Chipset (Intel 440BX). These options are used to change the Chipset's registers. Please carefully change any default setting ,otherwise the system will run unstably.

```
            AMIBIOS SETUP - ADVANCED CHIPSET SETUP
       (C)1998 American Megatrends, Inc. All Rights Reserved

 ******** SDRAM Timing ********            Available Options:
 Configure SDRAM Timing by SPD  Disabled   ▶ Disabled
   SDRAM RAS# to CAS# delay     3 SCLKs       Enabled
   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
 VGA Frame Buffer USWC          Disabled
 PCI Frame Buffer USWC          Disabled
 USWC Write Post                Enabled
 Graphics Aperture Size         64MB
 Search for MDA Resources       Yes
 8bit I/O Recovery Time         1 Sysclk
 16bit I/O Recovery Time        1 Sysclk
 USB Passive Release            Enabled
 PIIX4 Passive Release          Enabled     ESC:Exit  ↑↓:Sel
 PIIX4 Delayed Transaction      Disabled    PgUp/PgDn:Modify
 USB Function                   Disabled    F1:Help F2/F3:Color
```

Configure SDRAM Timing by SPD > *Enabled* will select predetermined optimal values of chipset parameters. When Disabled, chipset parameters return to setup information stored in CMOS.
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 SDRAW 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 **E**rror **C**hecking and **C**orrection 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 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.

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.

4.5   Power Management Setup

```
               AMIBIOS SETUP - POWER MANAGEMENT SETUP
          (C)1998 American Megatrends, Inc. All Rights Reserved

Power Management/APM          Disabled      Available Options:
Green PC Monitor Power State  Off         ▶ Disabled
Video Power Down Mode         Disabled      Enabled
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   ESC:Exit  ↑↓:Sel
Power Button Function         Suspend    PgUp/PgDn:Modify
Ring Resume From Soft Off     Disabled   F1:Help F2/F3:Color
```

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.

4.6   PCI / PLUG AND PLAY Setup

The setup help user handles the ROCKY-3702EV board's PCI function. All PCI bus slots on the system use INTA#, thus all installed PCI slots must be set.

```
            AMIBIOS SETUP - PCI / PLUG AND PLAY SETUP
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Plug and Play Aware O/S       No        Available Options:
Clear NVRAM                   No        ▶ No
PCI Latency Timer (PCI Clocks) 64          Yes
PCI VGA Palette Snoop         Disabled
Allocate IRQ to PCI VGA       Yes
PCI IDE BusMaster             Disabled
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       ESC:Exit  ↑↓:Sel
DMA Channel 7                 PnP       PgUp/PgDn:Modify
IRQ3                          PCI/PnP   F1:Help F2/F3:Color
```

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 > to specify whether BIOS has to clear NVRAM on every boot or not.
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.
PCI IDE BusMaster > to include the BusMastering capability into the IDE Controller on the PCI.
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.

ROCKY-3702EV Socket 370 Celeron™ & Pentium III
with AGP VGA & 10/100Mbps Ethernet SBC

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.

4.7 Peripheral Setup

This setup is working mostly on Multi-I/O Chip (W83977F). The 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 want to use the IrDA port, you have to configure the SIR or ASKIR model in the BIOS's Peripheral Setup's COM2; the RS-232 COM2 will be disabled.

```
              AMIBIOS SETUP - PERIPHERAL SETUP
        (C)1998 American Megatrends, Inc. All Rights Reserved

OnBoard FDC                    Auto          Available Options:
OnBoard Serial PortA           3F8h/COM1      ▶ Auto
OnBoard Serial PortB           2F8h/COM2        Disabled
  Serial PortB Mode            Normal           Enabled
    IR Duplex Mode             N/A
    IrDA Protocol              N/A
OnBoard Parallel Port          378h
  Parallel Port Mode           Normal
  EPP Version                  N/A
  Parallel Port IRQ            7
  Parallel Port DMA Channel    N/A
OnBoard IDE                    Both




                                             ESC:Exit  ↑↓:Sel
                                             PgUp/PgDn:Modify
                                             F1:Help F2/F3:Color
```

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 1(/2). 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 2.

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.
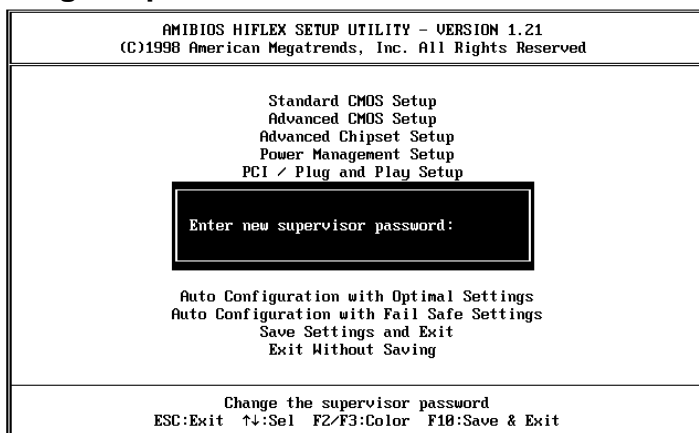
4.8 Hardware Monitor Setup

There is a LM78 chip on your board which can monitor on board system voltage and fan speed. The voltage monitoring will cover +5V,+12V,-12V,and –5V.

```
              AMIBIOS SETUP - HARDWARE MONITOR SETUP
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 CPU Plug & Play              Auto            Available Options:
 CPU Frequency Selection      100 Mhz           Manual
   -=≡ System Hardware Monitor ≡=-            ▶ Auto
     Current System Temperature 48°C/118°F
     CPU1 Fan Speed           5443 RPM
     CPU2 Fan Speed           0 RPM
     Vtt                      1.520 V
     Vcore                    1.984 V
     Vio                      3.392 V
     + 5.000V                 5.113 V
     +12.000V                 12.728 V
     -12.000V                 -12.209 V
     - 5.000V                 -5.124 V



                                             ESC:Exit  ↑↓:Sel
                                             PgUp/PgDn:Modify
                                             F1:Help F2/F3:Color
```

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 CN12/CN13 is correct.

4.9 Change Supervisor / User Password

```
            AMIBIOS HIFLEX SETUP UTILITY - VERSION 1.21
         (C)1998 American Megatrends, Inc. All Rights Reserved

                     Standard CMOS Setup
                     Advanced CMOS Setup
                     Advanced Chipset Setup
                     Power Management Setup
                     PCI / Plug and Play Setup

         ┌──────────────────────────────────────────────┐
         │  Enter new supervisor password:              │
         │                                              │
         └──────────────────────────────────────────────┘

                 Auto Configuration with Optimal Settings
                 Auto Configuration with Fail Safe Settings
                       Save Settings and Exit
                       Exit Without Saving


                    Change the supervisor password
             ESC:Exit  ↑↓:Sel  F2/F3:Color  F10:Save & Exit
```

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.
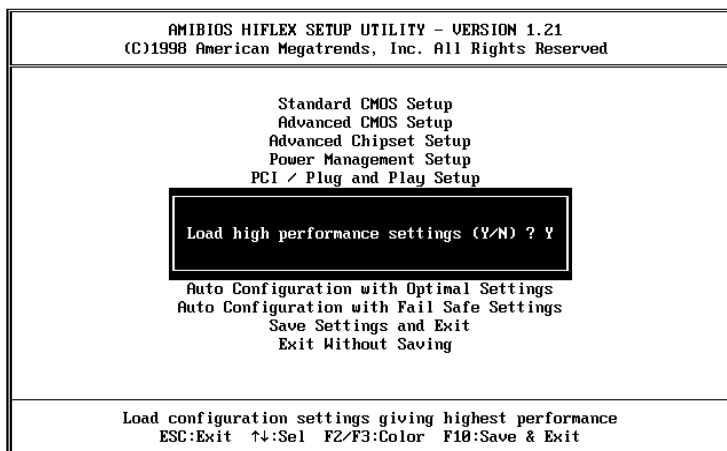
4.10 Auto-Detect Hard Disk

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.

4.11 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.

```
         AMIBIOS HIFLEX SETUP UTILITY - VERSION 1.21
       (C)1998 American Megatrends, Inc. All Rights Reserved

                   Standard CMOS Setup
                   Advanced CMOS Setup
                   Advanced Chipset Setup
                   Power Management Setup
                   PCI / Plug and Play Setup
    ┌──────────────────────────────────────────────────┐
    │                                                  │
    │  Load high performance settings (Y/N) ? Y        │
    │                                                  │
    └──────────────────────────────────────────────────┘
             Auto Configuration with Optimal Settings
            Auto Configuration with Fail Safe Settings
                   Save Settings and Exit
                   Exit Without Saving


         Load configuration settings giving highest performance
           ESC:Exit  ↑↓:Sel F2/F3:Color  F10:Save & Exit
```

4.12 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.

```
            AMIBIOS HIFLEX SETUP UTILITY - VERSION 1.21
         (C)1998 American Megatrends, Inc. All Rights Reserved

                    Standard CMOS Setup
                    Advanced CMOS Setup
                    Advanced Chipset Setup
                    Power Management Setup
                    PCI / Plug and Play Setup

              Load failsafe settings (Y/N) ? Y

             Auto Configuration with Optimal Settings
            Auto Configuration with Fail Safe Settings
                    Save Settings and Exit
                    Exit Without Saving


                Load failsafe configuration settings
         ESC:Exit  ↑↓:Sel  F2/F3:Color  F10:Save & Exit
```

4.13 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.

4.14 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.

5

E^2 Key™Function

The ROCKY-3702EV provides an outstanding E^{2}KEY™ function for system integrator. Based on the E^{2}KEY™, you can free to store the ID Code, Password or Critical Data in the 1Kbit EEPROM. Because the EEPROM is nonvolatile memory, you don't have to worry for losing very important data.

Basically the E^{2}KEY™ 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 E^{2}KEY™ 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 functions for user to integrate their application with E^{2}KEY™ function. These library **(read_e2key and write_e2key)** are written and compiled in C language. 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 E^{2}KEY™'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 E^2KEY™ at certain address. The address range is from 0 to 63. The data value is from 0 to 0xffff. */

To easily start to use the function, please refer to the included EKEYDEMO.C code at first.

Please note that the E^2KEY™ function is based on the working of parallel port. So you should enable the ROCKY-3702EV's parallel port, otherwise it will not work.

Appendix A. Watch-Dog Timer

The WatchDog Timer is provided to ensure that standalone systems can always recover from catastrophic conditions that cause the CPU to crash. This condition may have occurred by external EMI or a software bug. When the CPU stops working 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.

Two I/O ports control the WatchDog Timer :.

| 443 (hex) | Read | Enable to refresh the WatchDog Timer. |
| 043 (hex) | Read | Disable the WatchDog Timer. |

To enable the WatchDog 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 a NMI, depending on the setting of JP7. To ensure that this reset condition does not occur, the WatchDog Timer must be periodically refreshed by reading the same I/O port 433H. 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 WatchDog Timer, otherwise the system will reset.

Appendix B. ATX Power Supply

The following notes show how to connect ATX Power Supply to the backplanes and / or the ISBC card.

A. For backplanes with ATX Connector

1. Please, disconnect the AC cord of the Power Supply from the AC source to prevent sudden electric surge to the board.
2. Please, check the type of your CPU board. All CPU board listed on the next page support ATX power supply but has two types of power switch connection:

   2.1. Type A (through Power Button & +5VSB) : ROCKY-P228BX, ROCKY-P218A, ROCKY-P228, ROCKY-P238V, ROCKY-538TXV, ROCKY-548TX, JUKI-710. Please, refer to this figure:
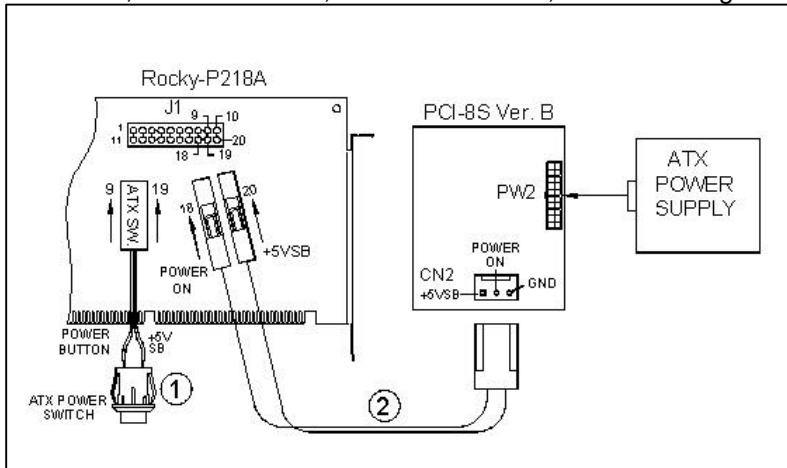
The example shown on this figure is the connection with Rocky-P218A. Connect the ATX power switch to the pin 9 (power button) and pin 19 (+5VSB) of J1 on the board.

2.2. Type B (through Power Button & GND) : PCISA-258EV, PCISA-358SV *(ROCKY-528AGP, ROCKY-528AGP-100).* Please refer to this figure:
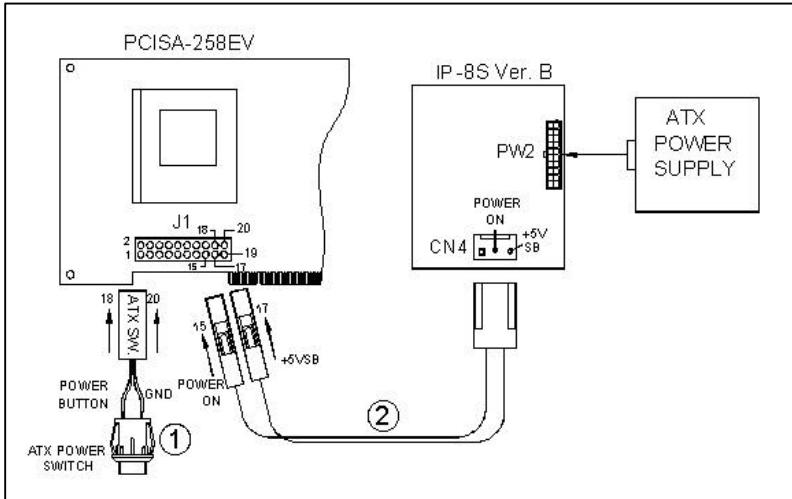
The example shown on this figure is the connection with PCISA-258EV. Connect the ATX power supply switch to the pin 18 (power button) and pin 20 (GND) of J1 on the board.

Note: for ROCKY-528AGP and ROCKY-528AGP-100, the connection is almost the same with the above figure. The only difference thing is the backplane. See the figure below:
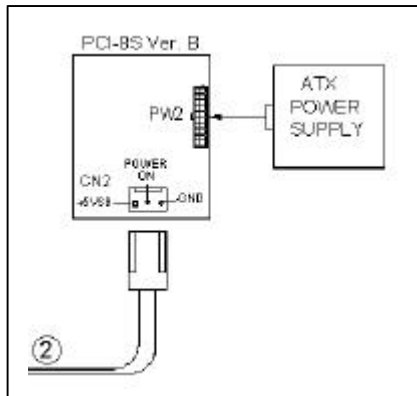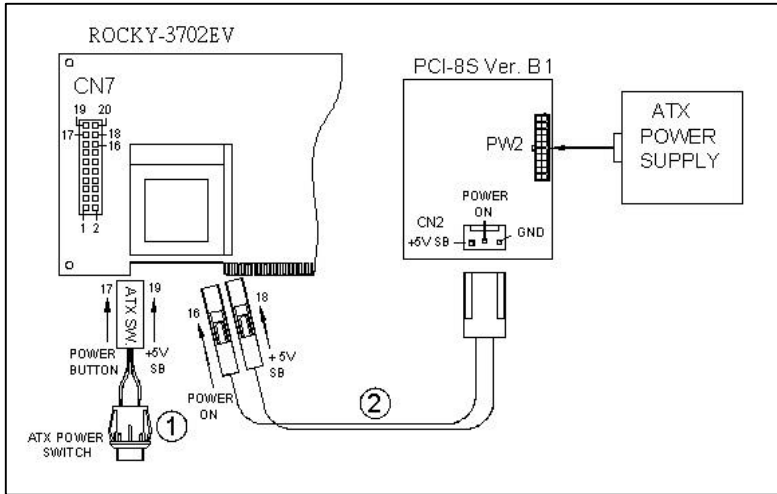

2.3. ROCKY-P258BX (through Power Button & +5VSB):
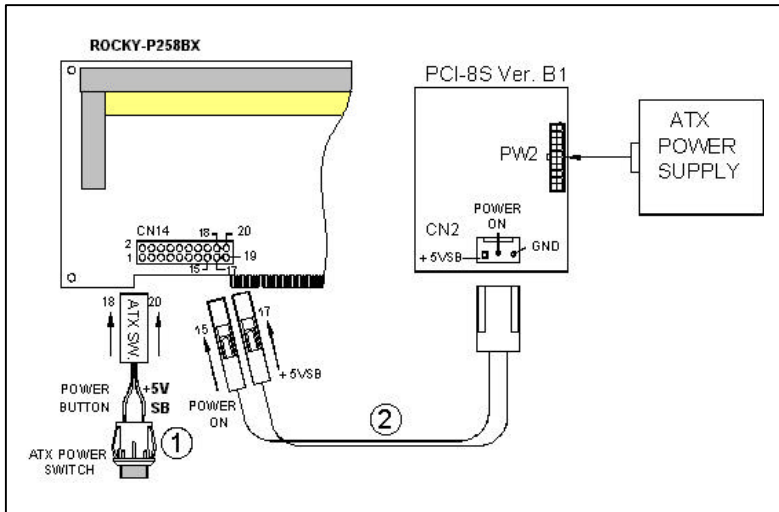
Connect the ATX power supply switch to the pin 18 (power button) and pin 20 (+5VSB) of CN14 on the board.

If you wish to turn off the power supply, please push the ATX power switch button for about 4 sec. And to turn ON the system, simply push the button once.

2.4. ROCKY-3702EV (through Power Button & +5VSB):

Connect the ATX power supply switch to the pin 17 (power button) and pin 19 (+5VSB) of CN7 (multi panel) on the board.

If you wish to turn off the power supply, please push the ATX power switch button for about 4 sec. And to turn ON the system, simply push the button once.
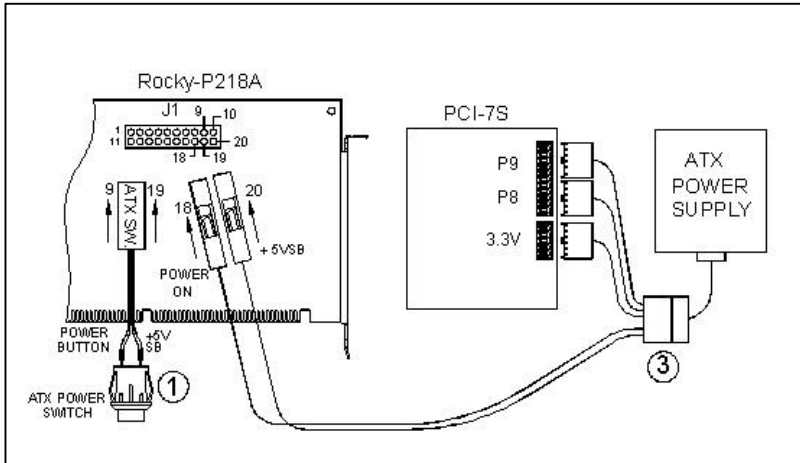
B. For the backplanes without ATX connector.

Refer to the following figure, please follow the steps below:
1. Please disconnect the AC cord of the Power Supply from the AC source to prevent sudden electric surge to the board.
2. Connect the ATX Power Switch to the pin 9 (power button) and 19 (+5VSB) of J1 in the Rocky-P218A ISBC.
3. Connect the ATX Power Switch to the pin 9 (power button) and 19 (+5VSB) of J1 in the Rocky-P218A ISBC(Type A connection)

Note : Some boards are Type B connection (through Power Button and GND).

4. Connect the green cable from the cable kit to the pin 18 (power ON) of J1 in the Rocky-P218A ISBC and connect the purple cable to the pin 20 (+5VSB) of J1.

5. Connect the other port of the cable kit to the ATX power supply.
6. Plug in the AC jack to the AC source, the unit is ready to switch ON now.
7. To turn OFF the power supply, please push the ATX power switch button for about 5 sec. And to turn ON the system, simply push the button once

The following ISBC have the ATX power control function: Rocky-P218A, Rocky-P228, Rocky-P238V, **Rocky-P258BX**, Rocky-548TX, Rocky-538TXV, Juki-710, PCISA-258EV, PCISA-358SV, Rocky-528AGP, Rocky-528AGP-100
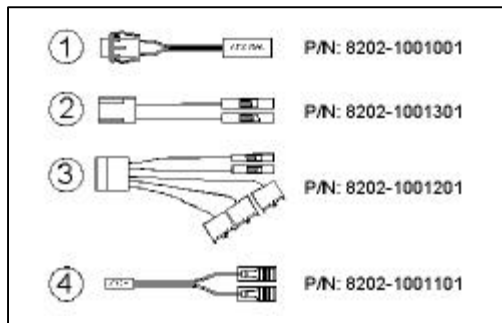
C. For the backplanes with ATX power supply connector

For some SBC without ATX power ON/OFF function, then you can control the ATX power supply through backplane's PS ON connector. Refer to the figure below: for the backplanes with ATX connector, the connection can be made simply as following:

1. Connect the ON/OFF (ordinary one) switch to Pin 2 (PS ON) and Pin 3 (GND) of connector CN2
2. You may now turn the power ON/OFF by the power switch