FalconRay+

Pentium III® / Celeron®
Single Board Computer with
VGA, SCSI, and Ethernet

User's Guide

095-20083-00 Rev. A

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Chapter 1 - Introduction

How to Use This Manual

The manual describes how to configure your FalconRay+ system to meet various operating requirements. It is divided into five chapters, with each chapter addressing a basic concept in the operation of this Single Board Computer.

Chapter 1 : Introduction - presents what is included in the system and gives an overview of product specifications and basic system architecture for this model of single board computer.

Chapter 2 : Hardware Configuration Setting - shows the definitions and locations of jumpers and connectors so that the system can be easily configured.

Chapter 3 : System Installation - describes how to properly mount the CPU, main memory, and M-system flash disk to get a safe installation. In addition, it includes a programming guide for the Watch Dog Timer function and the driver installation procedure for the SCSI controller, graphics controller, and Ethernet controller.

Chapter 4 : BIOS Setup Information - specifies the meaning of each setup parameter and how to get advanced BIOS performance and update a new BIOS. In addition, the POST Checkpoint List provides an error diagnostic procedure.

Chapter 5 : Troubleshooting - gives some hints for building up a valid and working system with the FalconRay+, in terms of hardware and software. Issues addressed are based on customer application history collected over a long period of time, and are presented as the most frequently encountered problems.

The content of this manual is subject to change without prior notice. Changes will be incorporated in new editions of the document. Furthermore, I-Bus/Phoenix may make modifications to the products described in this document at any time. Please contact I-Bus Phoenix for the latest product information.

Chapter 1 - Introduction

Description

The FalconRay+ is an all-in-one single board computer designed to fit a high performance Pentium III / Celeron based CPU and is compatible with high-end computer systems nased on the PCI Local Bus architecture. The on-board Ultra-160/m SCSI adapter, 3D Graphics display, and fast Ethernet interface will bring full functionality and high performance to all segments of the PC market.

This single board computer can run with the Intel Pentium III or Celeron processor, and will support DIMMs up to 512 MB of SDRAM. The enhanced on-board PCI IDE interface can support 4 drives up to PIO mode 4 timing and Ultra DMA/33/66 synchronous mode feature. The on-board Super I/O Chipset integrates one floppy controller, two serial ports, one keyboard controller, one hardware monitor, one IrDA port and one parallel port. Two high performance 16C550-compatible UARTs provide 16-byte transmit/receive FIFOs, and the multi-mode parallel port supports SPP/EPP/ECP function. In addition, two USB (Universal Serial Bus) ports provide high-speed data communication between peripherals and the PC.

The PICMG standard allows the FalconRay+ to work with the legacy ISA, ISA/PCI, or multi-slot PCI-bus backplane. The on-board 32-pin DIP socket supports M-systems DiskOnChip 2000 product up to 144MB. The Watch-Dog Timer function can monitor the system's status. Two 6-pin Mini-DIN connectors are provided to connect a PS/2 Mouse and a Keyboard. The on-board Flash ROM is used to make the BIOS update easier. A standard 5-1/4" drive power connector is reserved to directly get more power energy for large power applications, and the additional 5-pin shrouded connector is reserved for connecting Keyboard interface on the backplane. The high precision Real Time Clock/calendar is built in to support Y2K for accurate scheduling and storing configuration information. One 4-pin header is designed to support ATX power function. All of these features make the FalconRay+ excellent in stand-alone applications.

There are 2 models related to FalconRay+ as follows:

On-board Feature Model	On-board 7892 Ultra 160/m SCSI Host Adapter	On-board 10/100 BaseT 82559 Ethernet Controller	On-board PCI-to-ISA Bridge, DOC, and ISA BUS support
FalconRay+	Yes	Yes	Yes
FalconRay	No	No	Yes

Models without SCSI Host Adapter do not have SCSI diskette drivers and Ultra 160/m SCSI cable accessories.

Check List

The FalconRay+ package includes the following basic items:

- One FalconRay+ single board computer
- One 26-to-DSUB25 Printer cable
- One Serial cable with two COM ports
- One FDC cable
- One IDE cable
- One Ultra-160/m SCSI 68-pin cable with SE/LVD terminator
- One 5-pin to 5-pin keyboard cable for backplane connection
- One 4-pin ATX power control cable for backplane connection
- One CD-Title to support 810e Graphic drivers, LAN driver, and
- SCSI drivers backup
- 4 diskettes for SCSI drivers

If any of these items is damaged or missing, please contact your sales representative and save all packing materials for future replacement and maintenance.

Chapter 1 - Introduction

Product Specifications

- **Main processor**
  - Intel Celeron processor or Intel Pentium III processor
  - CPU bus clock : 66/100/133 MHz
  - CPU core/bus clock ratio : x2 to x8
- **BIOS**
  - AMI system BIOS with 4Mbit Firmware Hub to support DMI, PnP, APM, and ACPI
- **Main Memory**
  - Two 168-pin DIMM sockets, supporting 3.3V SDRAM up to 512MB
  - (No ECC or Registered DIMM Support)
- **L2 Cache Memory**
  - 128KB L2 cache built in Celeron and 256KB in Pentium III processor
- **Chipset**
  - Intel 810E Chipset
- **Bus Interface**
  - Follow PICMG standard (32-bit PCI and 16-bit ISA)
  - Fully complies with PCI bus specification V2.1
- **PCI IDE Interface**
  - Supports two enhanced IDE ports up to four HDD devices with PIO mode 4 and Ultra DMA/33, Ultra DMA/66 mode transfer
- **Floppy Drive Interface**
  - Supports one FDD port up to two floppy drives and 5-1/4”(360K, 1.2MB), 3-1/2” (720K, 1.2MB, 1.44MB, 2.88MB) diskette format and 3-mode FDD (option)
- **Serial Ports**
  - Supports two high-speed 16C550 compatible UARTs with 16-byte T/R FIFOs
- **IR Interface**
  - Supports one 6-pin header for serial Standard Infrared wireless communication

- **Parallel Port**
  - Supports SPP, Bi-direction, EPP/ECP mode
- **USB Interface**
  - Supports two USB (Universal Serial Bus) ports for high speed I/O peripheral devices
- **PS/2 Mouse and Keyboard Interface**
  - Supports two 6-pin Mini-DIN connectors and one 5-pin shrouded connector for PS/2 mouse, keyboard and backplane connection
- **ATX Power Control Interface**
  - One 4-pin header to support ATX power control with Modem Ring-On and Wake-On-LAN function
- **Auxiliary I/O Interfaces**
  - System reset switch, external speaker, Keyboard lock and HDD active LED
- **Real Time Clock/Calendar (RTC)**
  - Supports Y2K Real Time Clock/calendar with battery backup for 7-year data retention
- **Watchdog Timer**
  - 1,8,16,32 sec. and 1,10,30,60 min. time-out intervals by BIOS setting or 255 intervals from 0.5 sec/min. to 254.5 sec/min. by software programming
- **DiskOnChip (DOC) Feature**
  - Reserved one 32-pin socket for M-systems Flash Disk up to 144MB
- **System Monitoring Feature**
  - Monitor CPU and system temperature, operating voltage, and fan status
- **High Driving Capability**
  - Support high driving capability for multi-slots ISA-bus
- **External Power Connector**
  - Support one standard 5-1/4” disk power connector to enhance power driving
- **On-board VGA**
  - Intel 82810E integrate graphics controller with 4MB display cache

Chapter 1 - Introduction

- **On-board Ultra-160/m SCSI**
  - Adaptec AIC-7892 Ultra-160/m SCSI controller to support one 68-pin Interface
- **On-board Ethernet**
  - Intel 82559 Fast Ethernet controller to support RJ-45 interface at 10/100BASE-T speed
- **Power Good**
  - On-board power good generator with 300ms ~ 500ms reset duration
- **Physical and Environmental Requirements**
  - Outline Dimension (L X W) : 338.5mm (13.32") X 121.5mm (4.78")
  - PCB layout : 6 layer
  - Power Requirements : +5V @6.0A (typ.), +12V @100mA, -12V @30mA
  - Operating Temperature : 0? ~ 60? (32? ~ 140?)
  - Storage Temperature : -20? ~ 80?
  - Relative Humidity : 5% to 95%, non-condensing

System Architecture

The block diagram on page 1-9 shows that the FalconRay+ is a highly integrated system solution. The system architecture of FalconRay+ includes two main VLSI chips, 82810E GMCH (Graphics and Memory Controller Hub) and 82801AA ICH (I/O Controller Hub), to support Pentium-II/III processor, SDRAM, 3D graphic display, PCI bus interface, APM, ACPI compliant power management, USB port, SMBus communication, and Ultra DMA/33/66 IDE Master. The on-board super I/O chip, W83627HF, will support PS/2 Keyboard/Mouse, two UARTs, FDC, Hardware Monitor, Parallel, Watch Dog Timer and Infrared interface. In addition, two on-board devices, SCSI and LAN, give the user more flexibility and reliability in a highly-integrated environment.

The 82810E Hub provides integrated memory controller and graphics capability (Direct AGP). This delivers AGP class graphics performance to PCs at a reduced cost. It dynamically allocates and de-allocates system memory for complex 3D textures, preserving the benefits of standard AGP add-in solutions. Its 64-bit AGTL+ based host bus interface, optimized 64-bit DRAM interface supports two 3.3V DIMMs at the maximum bus frequency of 100 MHz. The 32-bit PCI bus interface supports 4 PCI masters for external backplane support.

The 82801AA Hub employs the Accelerated Controller Hub architecture which makes a direct connection from the graphics and memory to IDE controllers, Dual USB ports and PCI cards. It supports 2-channel dedicated Ultra DMA-33/66 IDE master interfaces, full Plug-and-Play compatibility, APIC (Advanced Programmable Interrupt Controller) interface, and internal real-time clock (RTC) to maintain the time and date of a system. It also supports 2-port USB (Universal Serial Bus feature) and PCI 2.1 Compliance operation. It fully supports Operating System Directed Power Management via the Advanced Configuration and Power Interface (ACPI) specification. In addition, it is also linked via the Firmware Hub Link bus to the 82802AB Firmware Hub to support BIOS read/write access. Through the PCI bus, PC87200 PCI-to-ISA bridge is built in as a highly integrated PCI-to-ISA bridge solution.

The Super I/O chip W83627HF integrates two high-speed serial ports, one parallel port, SIR interface, a Watch Dog Timer (WDT) which is enabled by a jumper setting and triggered by software, H/W monitoring, FDD interface and 8042 keyboard controller with PS/2 mouse ports. This parallel port supports one PC-compatible printer port (SPP, bi-direction), Enhanced Parallel Port (EPP) and Extended Capabilities Port (ECP).

The PCI-to-ISA bridge supports a standard 16-bit ISA bus interface which is applied for all slower I/O operations. The FalconRay+ supports DiskOnChip (DOC) for M-systems Flash disk, and ISA buffer driving for special I/O applications and multi-ISA slots.

The FalconRay+ supports detecting and monitoring system temperature, operating voltage and fan status.

The 82802 Firmware Hub stores system BIOS and video BIOS, eliminating a redundant, nonvolatile memory component.

Chapter 1 - Introduction

There are two on-board PCI devices, the Ultra-160/m SCSI interface and the Fast Ethernet port, to support full functionality of the FalconRay+ SBC. The on-board SCSI device uses the Adaptec AIC-7892B Ultra-160/m SCSI controller to support one 68-pin condensed connector up to 160Mbytes/sec data transfer.

The LAN port is powered by an Intel 82559 10/100 Ethernet Controller and supports Fast Ethernet through an RJ-45 port.

The 810E built-in Graphics Controller is implemented by a high performance SGRAM 4MB to support color depths and high resolution up to 1600 x 1200 with 256 colors.

All details of operating relationships are shown in Figure 1-1 FalconRay+ System Block Diagram.

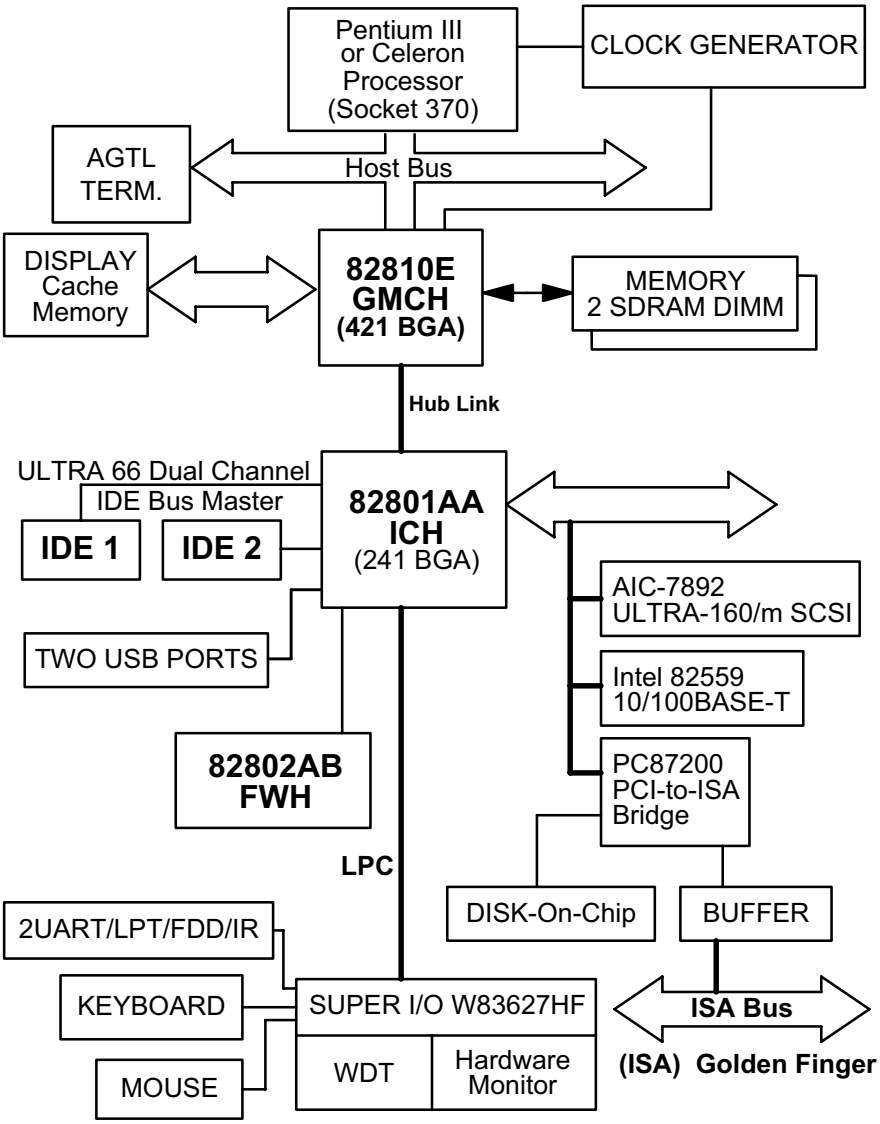

Figure 1-1: FalconRay+ System Block Diagram

Chapter 1 - Introduction

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Chapter 2 - Hardware Configuration Setting

This chapter gives the definitions and shows the positions of jumpers, headers and connectors. All of the configuration jumpers on the FalconRay+ are shipped in the proper position. The default settings as shipped from factory are marked with a star (*).

Jumpers

In general, jumpers on the single board computer are used to select options for certain features. Some of the jumpers are designed to be user-configurable. Others are for testing purpose only and should not be altered. To select any option, cover the jumper cap over (Short) or remove (NC) it from the jumper pins according to the following instructions. NC stands for **"Not Connected"**. (Please refer to Figure 2-1 for jumper positions)

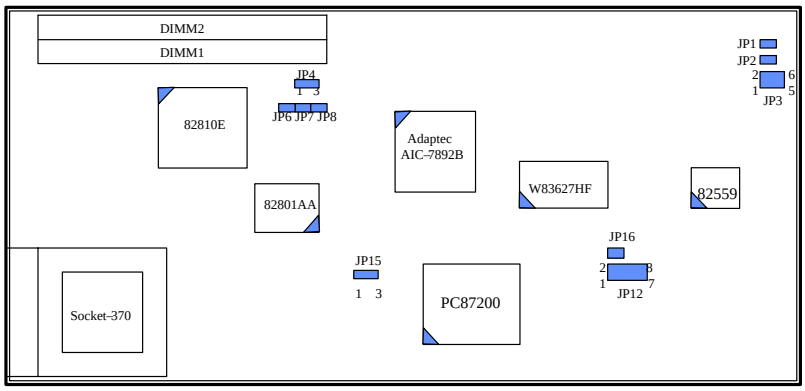

Figure 2-1: FalconRay+ Jumper Locations

Chapter 2 - Hardware Configuration Setting

CPU Jumper Setting

Note: There is no hardware jumper for the CPU core/bus ratio. This configuration is built into the BIOS (Hardware Monitoring Setup Menu)

Disk-On-Chip Jumper Setting (JP12)

JP12	Memory Address Window
1-2	D8000 – D9FFF*
3-4	DA000 – DBFFF
5-6	DC000 – DDFFF
7-8	DE000 – DFFFF

JP16 : Watch Dog Timer Enable/Disable

Short : Enabled hardware WDT function
NC : Disabled hardware WDT function*

Note: To enable WDT, users need to short JP16 to have WDT ready for trigger. Configuring “Watch Dog Timer Controller” option in BIOS Advanced Chipset Setup will then determine when to activate the first WDT trigger. Please refer to Chapter 3 for details.

JP7 : FWH Write Protection

Short : Disabled (flashable)
NC : Enabled (non-flashable)*

Note: This option allows users to enable/disable BIOS chip (Firmware Hub) as a flashable ROM.

JP15 : Onboard Ethernet enable/disable

1-2 : Enable*
2-3 : Disable

JP4 : Onboard SCSI enable/disable

1-2 : Enable*
2-3 : Disable

JP1 : CMOS Clear Function

NC : Normal operation*
Short : Clear CMOS contents

Note: Please refer to Chapter 3 for correct clear CMOS operation.

JP6 : Safe mode enable/disable

Short : Enable
NC : Disable*

Note: Enabling JP6 will force the system to run with x2 core/bus ratio.

JP8 : SCSI Termination

Short : Disable
NC : Enable*

Note: Enable JP8 will produce a SCSI termination onboard.

JP3 : AT/ATX Power Select

3 – 5, 4 – 6 : Select ATX power supply*
1 – 3, 2 – 4 : Select AT power supply

Connectors

I/O peripheral devices and Flash disk will be connected to these interface connectors and DOC socket located on this single board computer.

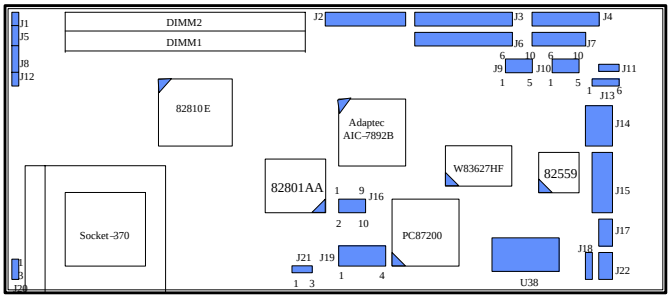

Figure 2-2: FalconRay+ Connector Locations
on Component Side

CONNECTOR	FUNCTION	REMARK
J1	System reset	
J2	On-board Ultra-160/m SCSI interface	One 68-pin connector
J3	IDE 1 (Primary) interface	
J4	Floppy connector	
J5	External speaker interface	
J6	IDE2 (Secondary) interface	
J7	Parallel port connector	
J8	Keyboard lock and power indicator	
J9	COM1 serial port	2 x 5 shrouded header
J10	COM2 serial port	2 x 5 shrouded header
J11	ATX power control interface	Connect to backplane
JP2	ATX power button interface	
J12	IDE1/IDE2/SCSI Active LED Header	LED Indicator
J13	IrDA (infrared) port	
J14	On-board Ethernet interface connector	RJ-45
J15	On-board VGA connector	D-SUB 15
J16	Two-port USB interface	Special cabling
J17	PS/2 mouse connector	6-pin Mini-DIN
J18	External keyboard interface	Connect to backplane
J19	Standard 5-1/4” disk drive power Connector	4-pin connector (pitch : 0.2 inch)
J20	CPU FAN power connector	
J21	Chassis FAN power connector	Connect to backplane
J22	PS/2 keyboard connector	6-pin Mini-DIN
U28	Socket 370	Celeron/P-III CPU
U38	M-system Flash Disk	DIP 32-pin chip
DIMM1 – 2	DIMM socket	3.3V SDRAM

Pin Assignments of Connectors

J1: Reset Header

PIN No	Signal Description
1	Reset
2	Ground

J19 : Standard 5-1/4" Disk Drive Power Connector

PIN No	Signal Description
1	+12V
2	Ground
3	Ground
4	+5V

J7: Parallel Port Connector

PIN No.	Signal Description	PIN No.	Signal Description
1	Strobe#	14	Auto Form Feed#
2	Data 0	15	Error#
3	Data 1	16	Initialization#
4	Data 2	17	Printer Select IN#
5	Data 3	18	Ground
6	Data 4	19	Ground
7	Data 5	20	Ground
8	Data 6	21	Ground
9	Data 7	22	Ground
10	Acknowledge#	23	Ground
11	Busy	24	Ground
12	Paper Empty	25	Ground
13	Printer Select	26	N/C

J2 : Ultra-160/m SCSI Connector (high density 68-pin)

PIN No.	Signal Description	PIN No.	Signal Description
1	LVDP12	35	LVDM12
2	LVDP13	36	LVDM13
3	LVDP14	37	LVDM14
4	LVDP15	38	LVDM15
5	LVDPHP	39	LVDPHM
6	LVDP0	40	LVDM0
7	LVDP1	41	LVDM1
8	LVDP2	42	LVDM2
9	LVDP3	43	LVDM3
10	LVDP4	44	LVDM4
11	LVDP5	45	LVDM5
12	LVDP6	46	LVDM6
13	LVDP7	47	LVDM7
14	LVDPLP	48	LVDPLM
15	Ground	49	Ground
16	DIFFSEN	50	SENSE_A(Pull-up)
17	LVTRMPWR	51	LVTRMPWR
18	LVTRMPWR	52	LVTRMPWR
19	N/C	53	N/C
20	Ground	54	Ground
21	LVATNP	55	LVATNM
22	Ground	56	Ground
23	LVBSYP	57	LVBSYM
24	LVACKP	58	LVACKM
25	LVRSTP	59	LVRSTM
26	LVMSGP	60	LVMSGM
27	LVSELP	61	LVSELM
28	LVCDP	62	LVCDM
29	LVREQP	63	LVREQM
30	LVIOP	64	LVIOM
31	LVDP8	65	LVDM8
32	LVDP9	66	LVDM9
33	LVDP10	67	LVDM10
34	LVDP11	68	LVDM11

J4 : FDC Interface Connector

PIN No.	Signal Description	PIN No.	Signal Description
1	Ground	2	Density Select
3	Ground	4	N/C
5	Ground	6	N/C
7	Ground	8	Index#
9	Ground	10	Motor ENA#
11	Ground	12	Drive Select B#
13	Ground	14	Drive Select A#
15	Ground	16	Motor ENB#
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	N/C	30	Read Data#
31	Ground	32	Head Select#
33	N/C	34	Disk Change#

J9/J10 : Serial Port 2x5 Shrouded Connector

PIN	Signal Description	PIN	Signal Description
1	Data Carrier Detect (DCD)	6	Data Set Ready (DSR)
2	Receive Data (RXD)	7	Request to Send (RTS)
3	Transmit Data (TXD)	8	Clear to Send (CTS)
4	Data Terminal Ready (DTR)	9	Ring Indicator (RI)
5	Ground (GND)	10	N/C

J8 : Keyboard Lock Header

PIN No.	Signal Description
1	+5V (220 ohm pull-up for power LED)
2	N/C
3	Ground
4	Keyboard inhibit
5	Ground

J3/J6: IDE2/IDE1 Interface Connector

PIN No.	Signal Description	PIN No.	Signal 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	DMA REQ	22	Ground
23	IOW#	24	Ground
25	IOR#	26	Ground
27	IOCHRDY	28	Pull-down
29	DMA ACK#	30	Ground
31	INT REQ	32	N/C
33	SA1	34	N/C
35	SA0	36	SA2
37	HDC CS0#	38	HDC CS1#
39	HDD Active#	40	Ground

J11 : ATX Power Control Connector

PIN No.	Signal Description
1	ATX Power Good Signal
2	ATX 5V Stand-by
3	ATX Power On Control
4	Ground

J13: Standard IrDA Header

PIN No.	Signal Description
1	VCC (+5V)
2	IOVSB
3	IRRX
4	Ground
5	IRTX
6	N/C

J12: IDE1/IDE2/SCSI Active LED Header

PIN No.	Signal Description
1	+5V (470 ohm pull-up for HDD LED)
2	HDD Active # (LED cathode terminal)

J5 : External Speaker Header

PIN No.	Signal Description
1	Speaker signal
2	N/C
3	Ground
4	+5V

J2: ATX Power Button Interface

PIN No.	Signal Description
1	Power Button Control Signal
2	Momentary Switch Control Signal

J14: Ethernet RJ-45 Interface Connector

PIN No.	Signal Description
1	TX+
2	TX-
3	RX+
4	Termination to Ground
5	Termination to Ground
6	RX-
7	Termination to Ground
8	Termination to Ground

J17: PS/2 Mouse Connector (6-pin Mini-DIN)

PIN No.	Signal Description
1	Mouse Data
2	N/C
3	Ground
4	+5V
5	Mouse Clock
6	N/C

J15: VGA DSUB-15 Connector

PIN No.	Signal Description
1	R
2	G
3	B
4	N/C
5	Ground
6	Ground
7	Ground
8	Ground
9	N/C
10	Ground
11	N/C
12	MONID1
13	HSYNC
14	VSYNC
15	MONID2

J20: CPU Fan Power Connector

PIN No.	Signal Description
1	Ground
2	+12V
3	FAN_status (pull-up 5V)

J18:External Keyboard Connector

PIN No.	Signal Description
1	Keyboard Clock
2	Keyboard Data
3	N/C
4	Ground
5	+5V

J21: Chassis Fan Power Connector

PIN No.	Signal Description
1	Ground
2	+12V
3	FAN_status (pull-up 5V)

J16: External USB Interface Connector

PIN No.	Signal Description	PIN No.	Signal Description
1	+5V	2	N/C
3	SBD0- (USBP0-)	4	Ground
5	SBD0+ (USBP0+)	6	SBD1+ (USBP1+)
7	Ground	8	SBD1- (USBP1-)
9	N/C	10	+5V

J22 : PS/2 Keyboard Connector (6-pin Mini-DIN)

PIN No.	Signal Description
1	Keyboard Data
2	N/C
3	GND
4	+5V
5	Keyboard Clock
6	N/C

Chapter 3 - System Installation

This chapter gives instructions on how to set up and configure the system. Additional information shows how to install M-systems Flash disk, on-board PCI device, and how to handle the WDT operation in the software program.

Socket 370 Celeron/Pentium-III Processor

Installing CPU

1. Lift the lever of CPU socket outwards and upwards to the opposite end.
2. Align the processor pins with pin holes on the socket. Make sure that the notched corner or dot mark (pin 1) of the CPU corresponds to the socket's bevel end. Press the CPU gently until it fits into place. If this operation is not easy or smooth, don't do it forcibly. Rather check the CPU pins and insure proper alignment before reinserting.
3. Push down the lever to lock the processor chip into the socket.
4. Follow the installation guide of the cooling fan or heat sink to mount it on the CPU surface and lock it on the socket 370.

Removing CPU

1. Unlock the cooling fan first.
2. Lift the lever of the CPU socket outwards and upwards to the opposite end.
3. Carefully lift up the existing CPU to remove it from the socket.
4. Follow the steps for installing a CPU to change to another one or move the lever to the closed position.

Configuring system bus

Please note that the FalconRay+ will automatically detect the system bus based on the CPU that is inserted. Users may then configure the CPU core/bus ratio for the engineering sample processor in BIOS (in Hardware Monitoring Setup).

Chapter 3 - System Installation

Main Memory

The FalconRay+ provides two DIMMs (168-pin Dual In-line Memory Module) to support 3.3V SDRAM (Synchronized DRAM) as the on-board main memory. The maximum memory size is 512 MB. **We recommend using a PC100-compliant memory chip regardless of 66, 100, or 133MHz clock frequencies for FSB.**

For system compatibility and stability, do not use a “no name” memory module. Single or double-sided DIMMs may be used. The two DIMMs can be out of order. Different sizes of SDRAM modules may be installed on DIMM1, DIMM2 or all to boot up system.

Check the contact and lock integrity of the memory module within the socket. It will impact system reliability. Follow normal procedures to install the DRAM module into the memory socket. Before locking, make sure that the module has been fully inserted into the DIMM slot.

NOTE :

(1) To avoid system instability, don’t change any of the DRAM parameters in the BIOS setup to upgrade your system performance without having full technical competence regarding this procedure.

(2) Due to the Intel 810e chipset limitation, ECC or buffered (registered) SDRAM is not supported. In the event of ECC SDRAM being used, the system will respond with a warning message indicating that this type of SDRAM is not supported. However, buffered (registered) SDRAM will simply freeze up the system once installed.

Installing the Single Board Computer

To install the FalconRay+ into standard chassis or proprietary environment, you need to perform the following :

Step 1: Check that all jumper settings are in the proper position.

Step 2: Install and configure the CPU and memory module in the right position.

Step 3: Place the FalconRay+ into the dedicated position in the system.

Step 4: Attach the cables to the existing peripheral devices and secure them.

WARNING

Please ensure that your SBC is properly inserted and secured by its locking mechanism. Otherwise, the system may be unstable or inoperative because of poor contact with the golden finger.

AIC-7892 Ultra-160/m SCSI Host Adapter

The following table shows the jumper position for enabling or disabling the on-board Ultra-160 SCSI function.

JP4	FUNCTION
1-2	Enable on-board SCSI
2-3	Disable on-board SCSI

Drivers Support

The 7892 SCSI driver is found in the SCSI directory of the FalconRay+ CD and floppy diskettes.

On-board Intel 810e Graphics Controller

The Intel 810e chipset is the result of a new design approach to optimize the shared memory architecture while maintaining the cost benefits of integration through Direct AGP and Dynamic Video Memory Technology.

With no additional VGA card inserted in any ISA/PCI slot, this on-board VGA will be the system display output. However, the system will by default switch to the external VGA adaptor if there is such a card, in which case, the on-board 810e graphics feature will be disabled.

Drivers Support

The VGA driver is in the VGA directory of the FalconRay+ CD.

For Windows-95/98, you will find installation files in VGA\win9x\Graphics. Executing “setup.exe” will guide users to complete the driver installation.

For Windows-NT 4.0, you will find installation files in VGA\winnt4\Graphics. Executing “setup.exe” will guide users to complete the driver installation.

Intel 82559 Fast Ethernet Controller

The following table shows the jumper positions for enabling or disabling the on-board Intel 82559 LAN function.

JP15	FUNCTION
1-2	Enable on-board LAN
2-3	Disable on-board LAN

Drivers Support

The 82559 LAN driver is found in the Ethernet directory of the FalconRay+ CD.

On-board LED Indicator

The FalconRay+ provides three LED indicators to show LAN interface status. These messages will give you a guide for troubleshooting.

LED1 (left) (LAN speed LED)
ON : indicates 100Mbps activity
OFF : indicates 10Mbps activity

LED2 (middle) (LAN active LED)
ON : indicates Tx/Rx activity
OFF : no activity

LED3 (right) (LAN Link Integrity LED)
ON : indicates link is good in either 10 or 100 Mbps
OFF : link is bad

810e Chipset & ATA-66

A few hardware features of the 810e chipset are, by default, not recognized by Windows-95/98. It is therefore necessary to load in 810e INF (Incremental Fix) patches to bring up drivers for the OS to recognize these features.

The INF driver is located in the IDE/INF directory of the FalconRay+ CD. (Note : This driver supports only Windows-95, Windows-98, and Windows-98 Second Edition). Executing “setup.exe” will guide users tthrough the complete driver installation.

Also, the 810e chipset supports the ATA-66 mode, which requires the ATA-66 driver for real ATA-66 to function properly. The ATA-66 driver is located in the IDE directory.

After installation, select from the Windows start menu: *Programs -> Intel Ultra ATA Storage -> Companion,* to bring up the user interface. Clicking on the device available in the left pane will prompt the corresponding device information in the right pane.

Note :

(1) This driver supports only Windows-98, Windows-98 Second Edition, and Windows-NT 4.0)

(2) For correct operation of the ATA-66, it is recommended that an 80-pin IDE cable be used, rather than a 40-pin IDE cable, for any IDE device. This will avoid unstable performance.

Hardware Doctor software

Software named “HWDOCTOR” can be found in the CD. This software will detect and report system information through a GUI.
Information detected includes:

(1) CPU Vcore, Vcc1.8, Vcc3.3, system DC voltage

(2) System and CPU temperature

A warning message will be displayed along with a beeping sound if the current reading is outside the upper and lower boundary value. Users may not only monitor the system information, but also configure the boundary values on-line through the GUI.

This software supports Windows-95/98, and Windows-NT 4.0.

Flash BIOS

The following table shows the jumper position to enable and disable the Firmware Hub protection. Disable this protection before flashing a new BIOS file into the BIOS chip.

JP7	FUNCTION
NC	Enable protection
Short	Disable protection

M-systems Flash Disk

FalconRay+ reserves one 32-pin DIP socket for installing the M-systems Flash disk from 2MB to 144MB. This operation structure is running with pure ISA-bus without the PnP (Plug and Play) function. Before installing, make certain that the memory window address jumper setting (**JP12**) is correctly set to prevent a memory mapping I/O resource conflict. Also, be sure to follow the correct DOC (DiskOnChip) installation procedure. Incorrect installation procedure could cause the Flash Chip to be burned out.

Installing DOC

Align the DOC with pin holes on the socket. Make sure that the notched corner or dot mark (pin 1) of the DOC corresponds to notched corner of the socket. Then press the DOC gently until it fits into place. If correctly installed, the Flash disk can be viewed as a normal hard disk to access read/write data.

WARNING : Ensure that the DOC is properly inserted. Reversing the position of the DOC will cause severe damage to it.

FalconRay+ will instruct the user to install and utilize the DOC. If you want to boot from this Flash disk, it is necessary to refer to the application note from M-systems. Advanced information is available from the M-systems product manual or Web-site http://www.m-sys.com

Watch Dog Timer Programming

Enable WDT function

The following table shows the jumper positions for enabling and disabling the Watch Dog Timer (WDT).

JP16	FUNCTION
Short	Enable WDT
NC	Disable WDT

This will prepare the WDT circuit to be triggered. The WDT is now in standby mode. Without adding this jumper, the WDT circuit is always turned-off.

Initialize, re-trigger and stop WDT

With the WDT being in standby mode, users may configure the “Watch Dog Timer Controller” option in BIOS to determine when the WDT will be initialized.

“Enabled” : Automatically initialize WDT at boot up.
“Disabled” : Manually initialize WDT by software at run-time.

After initializing the WDT, the system will reboot if no re-trigger signal is given within a time-out interval.

There are two methods to program the time-out interval. One is to specify it in the BIOS (Advanced Chipset Setup), and the other is through software programming of the super I/O W83627HF chip. The first method is recommended and easier, but it has fewer choices of time-out intervals. The BIOS provides only 8 possible time intervals from 1 second to 60 minutes. The second method is more difficult and complicated, but provides more time-out interval choices.

A test program is available in the WDT directory of the FalconRay+ CD. The program allows users to specify a refresh interval and the system will stay alive if the selected refresh interval is less than the time-out interval specified in BIOS. Otherwise, system will reboot. A programming guide is also included in the FalconRay+ CD.

Clear CMOS operation

The following table shows the jumper positions for enabling and disabling the CMOS Clear Function hardware circuit.

JP1	FUNCTION
NC	Normal Operation
Short	Clear CMOS

To correctly operate the CMOS Clear function, users may apply a jumper over JP1 continuously (this will not consume any power), and configure in the BIOS (Advanced Chipset Setup) the CMOS RAM Clear Function to “Enabled”. Rebooting the system will then produce a “CMOS Check Sum Error” message and hold up the system. Users may then follow the displayed message to load in the BIOS default setting.

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Chapter 4 - BIOS Setup Information

The FalconRay+ is equipped with the AMI BIOS stored in Flash ROM. This BIOS has a built-in setup program that allows users to easily modify the basic system configuration. This type of information is stored in CMOS RAM so that it is retained during power-off. When system is turned on, the FalconRay+ communicates with peripheral devices and checks its hardware resources against the configuration information stored in the CMOS memory. If any error is detected, or the CMOS parameters need to be initially defined, the diagnostic program will prompt the user to enter the SETUP program. Some errors are significant enough to abort the start-up.

Entering Setup

Turn on or reboot the computer. When the message “Hit <DEL> if you want to run SETUP” appears, press <Del> key immediately to enter BIOS setup program.

If the message disappears and it is still necessary to enter Setup, restart the system to try “COLD START” again by turning it OFF and then ON, or touch the ”RESET” button. Or restart from “WARM START” by pressing <Ctrl>, <Alt>, and <Delete> keys simultaneously. If the keys are not pressed at the right time and the system will not boot, an error message will be displayed and you will again be asked to . . .

Press <F1> to Run SETUP or Resume.

In HIFLEX BIOS setup, the keyboard may be used to choose among options or modify the system parameters to match the options of the system. The table below shows all of the keystroke functions in BIOS setup.

EDITING KEYS	FUNCTION
<Tab>	Move to the next field
←↑→↓	Move the next field to the left, above, right, or below
<Enter>	Select in the current field
+ / -	Increments / Decrements a value
<Esc>	Close the current operation and return to previous level
<PgUp>	Returns to the previous option
<PgDn>	Advances to the next option
F2>/<F3>	Select background color
<F10>	Show “Save current settings and exit (Y/N)” in main menu

Chapter 4 - BIOS Setup Information

Main Menu

Upon entering the FalconRay+ AMI BIOS CMOS Setup Utility, the Main Menu will appear on the screen. The Main Menu allows for selecting from eleven setup functions and two exit choices. Use the arrow keys to switch items and press the <Enter> key to accept or enter the sub-menu.

AMI BIOS HIFLEX SETUP UTILITY – VERSION 1.23
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Standard CMOS Setup
Advanced CMOS Setup
Advanced Chipset Setup
Power Management Setup
PCI/Plug and Play Setup
Peripheral Setup
Hardware Monitor 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

NOTE: It is strongly recommended to reload Optimal Setting if CMOS is lost or BIOS is updated.

Advanced CMOS Setup Reference Table

This setup reference table includes all the Optimal, Failsafe, and Other options setting in each BIOS setup item. It is very easy to cross reference. More details can be gained by directly referring to the item description in the sub-section.

ADVANCED CMOS SETUP DEFAULTS

BIOS Setup Items	Optimal Default	Failsafe Default	Other Options
Quick Boot	Enabled	Disabled	
1st Boot Device	IDE-0	IDE-0	IDE-1, IDE-2, IDE-3, Floppy, CDROM, ATAPI ZIP, LS-120, SCSI, Network
2nd Boot Device	Floppy	Floppy	IDE-1, CDROM
3rd Boot Device	CDROM	CDROM	IDE-1, ATAPI, ZIP
4th Boot Device	Disabled	Disabled	IDE-1, CD ROM
Try Other Boot Device	Yes	Yes	No
S.M.A.R.T. for Hard Disks	Disabled	Disabled	Enabled
BootUp Num-Lock	On	On	Off
PS/2 Mouse Support	Enabled	Enabled	Disabled
System Keyboard	Absent	Absent	Present
Primary Display	VGA/EGA	Absent	VGA/EGA, Mono
Password Check	Setup	Setup	Always
Boot To OS/2 > 64MB	No	No	Yes
L1 Cache	WriteBack	WriteBack	WriteThru Disabled
L2 Cache	WriteBack	Disabled	WriteThru
System BIOS Cacheable	Enabled	Disabled	
C000, 16K Shadow	Cached	Cached	Enabled, Disabled
D000, 16K Shadow	Disabled	Disabled	Cached, Enabled

ADVANCED CHIPSET SETUP DEFAULTS

BIOS Setup Items	Optimal Default	Failsafe Default	Other Options
USB Function	Disabled	Disabled	Enabled
USB Keyboard Legacy Support	Enabled	Enabled	Disabled
DRAM Page Closing Policy	Closed	Closed	Open
Memory Hole	Disabled	Disabled	15MB-16MB
DRAM Tras/Trc Cycle time	5/7	5/7	6/8
Address Setup Time (SCLKs)	1	1	0
CAS# Latency (SCLKs)	3 SCLKs	3 SCLKs	2 SCLKs
SDRAM RAS# to CAS# delay	2 SCLKs	2 SCLKs	3 SCLKs
SDRAM RAS# recharge	2 SCLKs	2 SCLKs	3 SCLKs
Graphics Mode Select	UMA 1MB	UMA 1MB	UMA 512MB
Display Cache Window Size	64MB	64MB	32MB
ICH Delayed Transaction	Disabled	Disabled	Enabled
Local Memory Frequency	100 Mhz	100 MHz	133 MHz

**** Display Cache Function ****			
BIOS Setup Items	Optimal Default	Failsafe Default	Other Options
Initialize Display Cache Memory	Enabled	Enabled	Disabled
Paging Mode Control	OPEN	OPEN	Close
RAS-to-CAS	Default	Default	Override
CAS Latency	Slow	Slow	Fast
RAS Timing	Slow	Slow	Fast
RAS Precharge Timing	Slow	Slow	Fast
Watch Dog Timer Controller	Disabled	Disabled	Enabled
Watch Dog Timer Setting	8 sec.	8 sec.	16 ,32 sec., 1,10,30,60 min.
CMOS RAM CLEAR FUNCTION	Disabled	Disabled	Enabled

POWER MANAGEMENT SETUP DEFAULTS

BIOS Setup Items	Optimal Default	Failsafe Default	Other Options
ACPI Standard State	S1/POS	S1/POS	S3/STR
Power Management / APM	Enabled	Disabled	
Video Power Down Mode	Suspend	Disabled	Stand By
Hard Disk Power Down Mode	Stand By	Disabled	Suspend
Standby Time Out (Minute)	Disabled	Disabled	1, 2, 4, 8, 10, 20, 30, 40, 50, 60 Min.
Suspend Time Out (Minute)	Disabled	Disabled	1, 2, 4, 8, 10, 20, 30, 40, 50, 60 Min.
Throttle Slow Clock Ratio	50 %	50 %	12.5%, 25%, 37.5%, 62.5%, 75%, 87.5%
Keyboard & PS/2 Mouse Access	Monitor	Monitor	Ignore
FDC/LPT/COM Ports Access	Monitor	Monitor	Ignore
Primary Master IDE Access	Monitor	Monitor	Ignore
Primary Slave IDE Access	Ignore	Ignore	Monitor
Secondary Master IDE Access	Monitor	Monitor	Ignore
Secondary Slave IDE Access	Ignore	Ignore	Monitor
PIRQ[A] IRQ Active	Ignore	Ignore	Monitor
PIRQ[B] IRQ Active	Ignore	Ignore	Monitor
PIRQ[C] IRQ Active	Ignore	Ignore	Monitor
PIRQ[D] IRQ Active	Ignore	Ignore	Monitor
Power Button Function	On / Off	On / Off	Suspend
Resume On Ring	Enabled	Enabled	Disabled
PME Function Support	Disabled	Disabled	Enabled
Resume On RTC Alarm	Disabled	Disabled	Enabled
RTC Alarm Date	15	15	1-14, 16-31
RTC Alarm Hour	12	12	0-11, 13-23
RTC Alarm Minute	30	30	0-29, 31-59
RTC Alarm Second	30	30	0-29, 31-59

PCI / PnP SETUP DEFAULTS

BIOS Setup Items	Optimal Default	Failsafe Default	Other Options
Plug and Play Aware O/S	No	No	Yes
Clear NVRAM	No	No	Yes
PCI Latency Timer (PCI Clocks)	64	64	32, 96, 128, 160, 192, 224, 248
Primary Graphics Adapter	Add-on VGA	Add-on VGA	OnBoard VGA
PCI VGA Palette Snoop	Disabled	Disabled	Enabled
PCI IDE BusMaster	Disabled	Disabled	Enabled
PCI Slot1 IRQ Priority	Auto	Auto	3, 4, 5, 7, 9, 10, 11
PCI Slot2 IRQ Priority	Auto	Auto	3, 4, 5, 7, 9, 10, 11
PCI Slot3 IRQ Priority	Auto	Auto	3, 4, 5, 7, 9, 10, 11
PCI Slot4 IRQ Priority	Auto	Auto	3, 4, 5, 7, 9, 10, 11
DMA Channel 0	PnP	Pnp	ISA/ EISA
DMA Channel 1	PnP	Pnp	ISA/ EISA
DMA Channel 3	PnP	Pnp	ISA/ EISA
DMA Channel 5	PnP	Pnp	ISA/ EISA
DMA Channel 6	PnP	Pnp	ISA/ EISA
DMA Channel 7	PnP	Pnp	ISA/ EISA
IRQ3	PCI/ PnP	PCI/ PnP	ISA/ EISA
IRQ4	PCI/ PnP	PCI/ PnP	ISA/ EISA
IRQ5	PCI/ PnP	PCI/ PnP	ISA/ EISA
IRQ7	PCI/ PnP	PCI/ PnP	ISA/ EISA
IRQ9	PCI/ PnP	PCI/ PnP	ISA/ EISA
IRQ10	PCI/ PnP	PCI/ PnP	ISA/ EISA
IRQ11	PCI/ PnP	PCI/ PnP	ISA/ EISA
IRQ12	PCI/ PnP	PCI/ PnP	ISA/ EISA
IRQ14	PCI/ PnP	PCI/ PnP	ISA/ EISA
IRQ15	PCI/ PnP	PCI/ PnP	ISA/ EISA

PERIPHERAL SETUP DEFAULTS

BIOS Setup Items	Optimal Default	Failsafe Default	Other Options
OnBoard IDE	Both	Both	Primary, Secondary, Disabled
OnBoard FDC	Auto	Auto	Enabled, Disabled
OnBoard Serial PortA	Auto	Auto	3F8h/COM1, 2F8h/COM2, 3E8h/COM3, 2E8h/COM4, Disabled
OnBoard Serial PortB	Auto	Auto	3F8h/COM1, 2F8h/COM2, 3E8h/COM3, 2E8h/COM4, Disabled
Serial PortB Mode	Normal	Normal	IrDA 1.6us, ASK-IR, IrDA 3/16 Baud
IR Duplex Mode	Half Duplex	Half Duplex	Full Duplex
IR Pin Select	IRRX/IRTX	IRRX/IRTX	SINB/SOUTB
OnBoard Parallel Port	Auto	Auto	Disabled, 378h, 278h, 3BCh
Parallel Port Mode	Bi-Dir	Bi-Dir	EPP, ECP, Normal
EPP Version	N/A	N/A	1.7 , 1.9
Parallel Port IRQ	Auto	Auto	
Parallel Port DMA Channel	N/A	N/A	Auto
Mouse PowerOn Function	Disabled	Disabled	Left-button, Right-button
Keyboard Power On Function	Disabled	Disabled	Any key, Power Key, Specific Key
Specific key for PowerOn	N/A	N/A	Password

HARDWARE MONITOR SETUP DEFAULTS

BIOS Setup Items	Optimal Default	Failsafe Default	Other Options
CPU Ratio Selection	5.0x	2.0x (Safe)	3-4.5x, 5.5-8x
**** System Hardware Monitor ****			
Current CPU Temperature			
Current System Temperature			
Current CPU Fan Speed			
Current Chassis Fan Speed			
CPU VID			
Vcore			
Vcc1.8			
Vcc3.3			
+ 5.000V			
+12.000V			
-12.000V			
- 5.000V			
Vbat			
+5V SB			

Standard CMOS Setup Menu

This setup page includes all the items in a standard compatible BIOS. Use the arrow keys to highlight the item and then use the <PgUp>/<PgDn> or <+>/<-> keys to select the value or number that is desired in each item and press the <Enter> key to select it.

Follow the command keys in the CMOS Setup table to change **Date**, **Time**, **Drive type**, and **Boot Sector Virus Protection Status**.

Advanced CMOS Setup Menu

This setup includes all of the advanced features in the system. The detailed descriptions are specified below.

Quick Boot

Set “Disabled” for normal booting or select “Enabled” to skip minor BIOS test items to obtain a quick boot response.

Boot Up Sequence

This category includes six items to determine which drive computer searches for the Disk Operating System (DOS) first.

The default ARMD (ATAPI Removable Media Device) emulation type is set to popular drive type LS-120 and ATAPI ZIP. There are many choices of devices to boot up the system. User can select “Disabled”, “IDE-0”, “IDE-1”, “IDE-2”, “IDE-3”, “Floppy”, “LS-120”, “ATAPI ZIP”, “CDROM”, “SCSI”, or “NETWORK”.

Boot Up Num-Lock

Select “On” to enable the numeric function of the numeric keypad at boot up, or “Off” to disregard it.

PS/2 Mouse Support

Select “Enabled” to enable PS/2 mouse function, or “Disabled” to release IRQ12 interrupt for other ISA-bus I/O devices.

System Keyboard

This option is used to ignore the “keyboard error” if the *Absent* setting has been selected in your BIOS setup and the system has no keyboard attached.

Primary Display

Choose *Absent*, *VGA/EGA, CGA40x25, CGA80x25,* or *Mono,* to agree with your monitor type. If you select *Absent*, the “CMOS Display Type Wrong” message will be ignored regardless of a mismatched display card.

Password Check

This option enables password checking when the system boots up or runs CMOS Setup. It only takes effect after setting “Change Supervisor Password.”

Setup : This option will force the system to check the password before running Setup if you have already entered the current user password in “Change User Password”. By that time, the system will only be able to boot, but will deny Setup access.

Always : Password prompt appears every boot-up. The system will not boot and will deny access to Setup with an invalid password. If the password has been forgotten, the CMOS must be cleared or BIOS reloaded to allow booting the system

Boot To OS/2 > 64MB

Set this option to “Yes” to support OS/2 environment.

L1 Cache

This option turns the CPU’s Level 1 built-in cache on or off.

L2 Cache

This option turns the CPU’s Level 2 built-in cache on or off.

System BIOS Cacheable

With this option enabled, system performance is enhanced by shadowing and caching the system BIOS. When disabled, this BIOS shadow function will be ignored.

Shadow Memory

Each of the segments provides three options “Disabled”, “Enabled”, and “Cached” for faster adapter’s ROM execution. However this shadow function is Chipset oriented and dependent on system hardware. In general, C000 64k will be allocated for VGA BIOS and set to *Cached* to get higher display performance by the shadowing and caching feature. If the user chooses *Enabled* setting, only the BIOS shadow function is active.

Advanced Chipset Setup Menu

This setup is very important to maintain system stability. Unless technically knowledgeable, do not attempt to change any parameters. The best choice is the optimal default setting.

USB Function

This option will enable the on-chip USB function to support USB (Universal Serial Bus) peripheral devices if user chooses the “Enabled” setting.

USB Keyboard Legacy Support

This feature will be automatically disabled and hidden if user chooses the “Disabled” setting from the foregoing USB Function option. Otherwise, enabling this option provides support for a USB-keyboard without an auxiliary driver under DOS environment.

DRAM Page Closing Policy

This option controls whether the graphic and memory controller hub will precharge one or all banks after a page miss.

Memory Hole

This option allows the end user to specify the location of a memory hole for memory space requirement from ISA-bus cards.

DRAM Tras/Trc Cycle time (SCLKs)

This option controls the number of SDRAM clocks used per access cycle.

Address Setup Time (SCLKs)

This option controls the SDRAM address setup delay time.

CAS# Latency (SCLKs)

This option controls the number of SCLKs between the time a read command is sampled by the SDRAMs and the time the GMCH samples correspondent data from the SDRAMs.

SDRAM RAS# to CAS# delay (SCLKs)

This option controls the number of SCLKs (SDRAM Clock) from a row activate command to a read or write command. If the system has high quality SDRAM installed, set this option to “2 SCLKs” to obtain better memory performance. Normally, the option will be set to 2 SCLKs.

SDRAM RAS# Precharge

This option controls the number of SCLKs for RAS# precharge. If the system has high quality SDRAM installed, set this option to “2 SCLKs” to obtain better memory performance.

Graphics Mode Select

This option selects memory space that is used by video BIOS for handling support of VGA when no GMCH graphics driver is present (e.g., a DOS boot).

Display Cache Windows Size

This option allows for selecting the size of mapped memory for AGP graphic data.

ICH Delayed Transaction

Choose the “Enabled” option to obtain higher PCI bus performance for I/O controller and bridge.

ClkGen Spread Spectrum

This option turns the spread spectrum for EMI control on or off.

Local Memory Frequency

This option selects the operating frequency for the Local Memory Controller

Initialize Display Cache Memory

This option enables or disables the Display Cache Memory

Paging Mode Control

This option controls whether GMCH memory controller tends to leave pages open or pages closed.

RAS-to-CAS

This option selected in units of display cache clock periods indicates the RAS#-to-CAS# delay.

CAS# Latency

This option selects in units of local memory clock periods.

RAS# Timing

This option controls RAS# active to precharge, and refresh to RAS# active delay.

RAS# Precharge Timing

This option controls RAS# precharge in local memory clocks.

Watch Dog Timer Controller

This option controls turning the Watch Dog Timer on or off.

Watch Dog Timer Setting

This option selects the WDT Time-out Interval Setting

CMOS RAM Clear Function

If the system supports Y2K RTC, set this option to *Enabled* to support the hardware CMOS clearing operation.

Power Management Setup Menu

The APM (Advanced Power Management) determines how much power energy can be saved by setting the following items to handle system power resources. The following descriptions will specify the definition of each item in detail.

ACPI Standby State

This option supports ACPI standby state S1(POS) and S3(STR)

S1 Sleeping State

Place the processor into the STPCLK grant state. Throttle the processor's input clock to run duty cycle (See **Throttle Slow Clock Ratio**), placing the processor into the stop clock state. The system clocks (PCI and CPU) are still running during the sleeping state. Any enabled wakeup event should cause the hardware to de-assert the STPCLK# signal to the processor.

S3 Sleeping State

All devices on the computer are turned off except for the system RAM.

Power Management/APM

Use this feature to control system power resources. Set this option to "Enabled" to activate the power management function based on the following parameter settings.

Video Power Down Mode

This option specifies the power conserving state that the VESA VGA video subsystem enters after the specified period of display inactivity has expired.

Hard Disk Power Down Mode

This option specifies the power management state that the HDD enters after the specified period of hard drive inactivity has expired. It is the same as video power control. If user chooses "Stand By" or "Suspend", it will depend on the period of the parameter set in "Stand By Time Out" or "Suspend Time Out".

Stand by Time out (Minutes)

This option specifies the length of system inactivity while the computer is in Full-On power state before the computer is placed in Standby mode. When this length of time expires, the computer enters the Standby Timeout state. In Standby mode, some power use is curtailed.

Suspend Time out (Minutes)

This option is the same as the **Stand by Time out** function. These two features will be enabled to monitor the power of sub-items “Display Activity”, “Serial port”, “Parallel Port”, “Floppy”, “Pri-HDD”, and “Sec-HDD” independently. It is also used to control the CPU throttle running function. None of the sub-items will be effective in the selection of disabling “Stand by Time out” or “Suspend Time out” even if it can be chosen by the user in the BIOS setup menu.

Throttle Slow Clock Ratio

This option specifies the speed at which the system clock runs in power saving modes. The settings are expressed as a duty cycle of the STPCLK# signal. This duty cycle indicates the percentage of time the STPCLK# signal is asserted while in the throttle mode.

Display Activity

This option specifies if BIOS is to monitor activity on the display monitor for power conservation purposes. If set to *Monitor* and the computer is in a power saving state, BIOS watches for video display activity. The computer enters the full on power state if any activity occurs. BIOS reloads the Standby and Suspend timeout timers if activity occurs on the specified IRQ lines. If set to *Ignore*, video display monitor activity is not monitored.

Keyboard & PS/2 Mouse, FDC/LPT/COM Ports, Pri/Sec HDD Access

When set to *Monitor*, these options enable event monitoring on the specified hardware device. If set to *Monitor* and the computer is in a power saving state, BIOS watches for activity on the specified IRQ line. The computer enters the full on power state if any activity occurs. BIOS reloads the Standby and Suspend timeout timers if activity occurs on the specified device. No monitoring activity occurs if the option is set to *Ignore*. The settings for each of these options are Monitor or Ignore.

PIRQ [A/B/C/D] IRQ Active

When set to *Monitor*, these options enable event monitoring on the specified IRQ. If set to *Monitor* and the computer is in a power saving state, BIOS watches for activity on the device with specified IRQ line. The computer enters the full on power state if any activity occurs. BIOS reloads the Standby and Suspend timeout timers if activity occurs on the specified IRQ. No monitoring activity occurs if the option is set to *Ignore*. The settings for each of these options are Monitor or Ignore.

Power Button Function

This item is used to handle soft power on/off regardless of time counting (generally speaking, it is 4 sec) if you set it to *On/Off*. You can easily power on/off the system by pressing the power button (toggle switch) directly. This feature is only available on a system with ATX power control interface. If using a standard AT power supply, this option will be ignored. However choosing the “Suspend” setting, will force the system into suspend mode when the user turns it off unless the power button is pressed continously for more than 4 seconds to get in Soft off function.

Resume On Ring

This item will be used to wake up the system from remote ringing control under Soft Off condition. If the“Disabled” setting is chosen, the system will be not resumed by the ringing of the modem.

PME Function Support

Enabling this option allows your computer to be booted from another computer via a network by sending a wake-up frame or signal.

Resume On RTC Alarm

This option controls an unattended or automatic system power up

- lRTC Alarm Date
- RTC Alarm Hour
- RTC Alarm Minute
- RTC Alarm Second

PCI/Plug and Play Setup

This section describes configuring the PCI bus system. PCI (Peripheral Component Interconnect) is a system which allows I/O devices to operate at speeds nearing CPU's when they communicate with special components.

All of the options described in this section are important and technical and it is strongly recommended that only experienced users could make any changes to the default settings.

Plug and Play Aware O/S

Set this option to "Yes" if the operating system installed in the computer is Plug and Play-aware. BIOS only detects and enables PnP ISA adapter cards that are required for system boot. The Windows 95 operating system detects and enables all other PnP-aware adapter cards. Windows 95 is PnP-aware. Set this option to "No" if the operating system (such as DOS, OS/2, Windows 3.x) does not use PnP. ***This option must be set correctly or PnP-aware adapter cards installed in the computer will not be configured properl****y.*

Clear NVRAM

This option is used to clear NVRAM and check or update ESCD (Extended System Configuration Data) data after system power on. Setting this option to *No* will not clear NVRAM. The operation of update ESCD is effective in a different ESCD data comparision. By selecting the "Yes" setting, the BIOS will update ESCD each time the system powers on.

PCI Latency Timer (PCI Clocks)

This option is used to control the PCI latency timer period (follow PCI clocks). Based on PCI specification 2.1 or later and PCI bus frequency in the system, the user can select a different timer to meet his PCI bus environment.

Primary Graphics Adapter

This option allows the user to specify a primary VGA display from two options : On-board VGA or PCI VGA card.

PCI VGA Palette Snoop

Some non-standard VGA display cards, such as graphics accelerators or MPEG video cards, may not show colors properly. The user can choose the "Enabled" setting to correct this display mismatch problem and support any ISA adapter card installed in the computer requiring VGA palette snooping.

PCI IDE BusMaster

Set this option to *Enabled* to specify that the IDE controller on the PCI local bus has bus mastering capability.

PCI Slot 1/2/3/4 IRQ Priority

These options specify the priority IRQ to be used for any PCI devices installed in PCI expansion slots 1 through 4. The settings are *Auto* (AMIBIOS automatically Determines the priority IRQ), (IRQ) *3*, *4*, *5*, *7*, *9*, *10*, or *11*.

DMA Channel 0/1/3/5/6/7

These options specify if the named DMA channel is available for use on the ISA/EISA bus or PnP (Plug & Play).

IRQ 3/4/5/7/9/10/11/12/14/15

These options specify the bus that the named interrupt request lines (IRQs) are used on. These options allow you to specify IRQs for use by legacy ISA adapter cards. These options determine if AMIBIOS should remove an IRQ from the pool of available IRQs passed to devices that are configurable by the system BIOS. The available IRQ pool is determined by reading the ESCD NVRAM. If more IRQs must be removed from the pool, the end user can use these PCI/PnP Setup to remove the IRQ by assigning the option to the ISA/EISA setting. All IRQs used by on-board I/O are configured as PCI/PnP.

Peripheral Setup

This section describes the I/O resources assignment for all of the on-board peripheral devices.

On Board IDE

This option specifies the onboard IDE controller channels that will be used. The settings are *Disabled*, *Primary*, *Secondary*, or *Both*.

On Board FDC

If the user wants to install a different add-on super I/O card to connect the floppy drives, set this field to *Disabled*. Otherwise, set it to *Auto* to cause BIOS to automatically determine if the floppy controller should be enabled.

On Board Serial Port A/Port B

These fields control the resource assignments of two on-board serial interfaces SIO1 and SIO2. The following lists show current options in On Board Serial Port A/ Port B :

Auto → cannot set serial I/O resources by manual operation
Disabled → indicates on-board COM port function is ineffective
3F8h/COM1 → assign I/O address 3F8h to COM1
2F8h/COM2 → assign I/O address 2F8h to COM2
3E8h/COM3 → assign I/O address 3E8h to COM3
2E8h/COM4 → assign I/O address 2E8h to COM4

Serial PortB Mode

This option controls the resource assignments of on-board Serial PortB. The Serial PortB Mode Select has Four settings Normal, IrDA 1.6us, IrDA 3/16 Baud, and ASK IR.

IR Duplex Mode

IR Duplex Mode has two settings Half Duplex and Full Duplex

IR Pin Select

IR Pin Select has two options IRRX/IRTX and SINB/SOUTB

On Board Parallel Port

There are four optional items *Parallel Port Mode*, *EPP Version*, *Parallel Port IRQ*, and *Parallel Port DMA Channel* used to control the on-board parallel port interface while the user selects the I/O base address manually. The following lists the available options of the on-board parallel port:

Auto → user can not control all of LPT port I/O resources
Disabled → on-board parallel port function is ineffective and N/A
378h → locate IRQ7 for this default I/O address
278h → assign this I/O address to LPT1
3BCh → assign this I/O address to LPT1

Parallel Port Mode :

This option specifies the parallel port mode. ECP and EPP are both bi-directional data transfer schemes that adhere to the IEEE P1284 specifications. This Parallel Port Mode includes four options “Normal”, “Bi-Dir”, “EPP”, and “ECP”.

Setting	Description
Normal	Uni-direction operation at normal speed
Bi-Dir	Bi-direction operation at normal speed
EPP	The parallel port can be used with devices that adhere to the Enhanced Parallel Port (EPP) specification. EPP uses the existing parallel port signals to provide asymmetric bi-directional data transfer driven by the host device.
ECP	The parallel port can be used with devices that adhere to the Extended Capabilities Port (ECP) specification. ECP uses the DMA protocol to achieve data transfer rates up to 2.5 Megabits per second. ECP provides symmetric bi-directional communication.

EPP Version :

This option is only valid if the **Parallel Port Mode** option is set to *EPP*. This option specifies the version of the Enhanced Parallel Port specification that will be used by AMIBIOS.

Parallel Port IRQ :

This option is only valid if the **Onboard Parallel Port** option is not set to *Disabled*. This option sets the IRQ used by the parallel port.

Parallel Port DMA Channel :

This option is only available if **On Board Parallel Port** is set to fixed I/O address and the setting of **Parallel Port Mode** is ECP. This option sets the DMA channel used by ECP-capable parallel port.

Mouse/Keyboard PowerOn Function

This option controls the power up of the computer when the mouse/keyboard receives a click while the computer is in Soft-off mode.

Hardware Monitor Setup

This setup describes the current system status detected by the hardware monitor controller. The status shown on screen will include:

- CPU Ratio Selection
  This option is for unlocked processors only. If the socket 370 processor's Frequency Multiple is locked, setting the Frequency Multiple here will have no effect. This option sets the frequency multiple between the CPU's internal frequency and external frequency. This must be set in conjunction with CPU Bus Frequency to match the speed of the CPU.
- Current System Temperature (Generally indicates the inside temperature of chassis or surface temperature of SBC)
- Current CPU Fan Speed
- Current Chassis Fan Speed
- System operating voltage includes "CPU Vcore", "CPU Vtt", "Vcc3", "+5V", "+12V", "-12V", and "-5V".

BIOS POST Check Point List

AMIBIOS provides all IBM standard Power On Self Test (POST) routines as well as enhanced AMIBIOS POST routines. The POST routines support CPU internal diagnostics. The POST checkpoint codes are accessible via the Manufacturing Test Port (I/O port 80h).

Whenever a recoverable error occurs during the POST, the system BIOS will display an error message explaining the problem in detail so that it can be corrected.

During the POST, the BIOS signals a checkpoint by issuing one code to I/O address 80H. This code can be used to establish how far the BIOS has executed through the power-on sequence and what test is currently being performed. This is done to help troubleshoot a faulty system board.

If the BIOS detects a terminal error condition, it will halt the POST process and attempt to display the checkpoint code written to port 80H. If the system hangs before the BIOS detects the terminal error, the value at port 80H will be the last test performed. In this case, the terminal error cannot be displayed on the screen. The following POST checkpoint codes are valid for all AMIBIOS products with a core BIOS date of 07/15/95 version 6.27 (Enhanced).

Uncompressed Initialization Codes — The uncompressed initialization checkpoint hex codes are listed in order of execution :

Code	Description
D0	NMI is disabled. CPU ID saved. INIT code checksum verification will be started.
D1	Initializing the DMA controller, performing the keyboard controller BAT test, starting memory refresh, and going to 4GB flat mode.
D3	To start memory sizing.
D4	Returning to real mode. Executing any OEM patches and setting the stack.
D5	Passing control to the uncompressed code in shadow RAM at E000:0000h. The INIT code is copied to segment 0 and control will be transferred to segment 0.
D6	Control is in segment 0. Next, checking if <Ctrl><Home> was pressed and verifying the system BIOS checksum. If either <Ctrl><Home> was pressed or the system BIOS checksum is bad, it will next enter checkpoint code E0h. Otherwise, it will enter checkpoint code D7h.
D7	Passing control to interface module.
D8	Main BIOS runtime code is to be decompressed.
D9	Passing control to the main system BIOS in shadow RAM.

Bootblock Recovery Codes — The bootblock recovery checkpoint hex codes are listed in order of execution :

Code	Description
E0	The onboard floppy controller if available is initialized. Beginning the base 512KB memory test.
E1	Initializing the interrupt vector table.
E2	Initializing the DMA and Interrupt controllers.
E6	Enabling the floppy drive controller and Timer IRQs. Enabling internal cache memory.
ED	Initializing the floppy drive.
EE	Starts looking for a diskette in drive A: and reads first sector of the diskette.
EF	A read error occurred while reading the floppy disk in drive A:
F0	Next, searching for the AMIBOOT.ROM file in the root directory.

Code	Description
F1	The AMIBOOT.ROM file is not in the root directory.
F2	Reading and analyzing the floppy diskette FAT to find the clusters occupied by the AMIBOOT.ROM file.
F3	Reading AMIBOOT.ROM file, cluster by cluster.
F4	The AMIBOOT.ROM file is not the correct size.
F5	Disabling internal cache memory.
FB	Detecting the type of Flash ROM.
FC	Erasing the Flash ROM.
FD	Programming the Flash ROM
FF	Flash ROM programming was successful. Next, restarting the system BIOS.

Uncompressed Initialization Codes — The following runtime checkpoint hex codes are listed in order of execution. These codes are uncompressed in F0000h shadow RAM.

Code	Description
03	The NMI is disabled. Checking for a soft reset or a power on condition.
05	The BIOS stack has been built. Next, disabling cache memory.
06	Uncompressing the POST code next.
07	Initializing the CPU and the CPU data area.
08	The CMOS checksum calculation is done.
0B	Performing any required initialization before the keyboard BAT command is issued.
0C	The keyboard controller input buffer is free. Issuing the BAT command to the keyboard controller.
0E	The keyboard controller BAT command result has been verified. Performing any necessary INIT after the K/B controller BATcommand test.
0F	The keyboard command byte is being written.
10	Issuing the pin 23 and 24 blocking and unblocking commands.
11	Checking if the <End> or <Ins> keys were pressed during power on.
12	Initializes CMOS if the *initialize CMOS RAM in every boot* is set or the <End> key is pressed. Going to disable DMA and Interrupt controllers.
13	The video display has been disabled. Port B has been initialized. Initializing the chipset.
14	The 8254 timer test will begin next.

Code	Description
19	The 8254 timer test is over. Starting the memory refresh test.
1A	The memory refresh line is toggling. Checking the 15us on/off time.
23	Reading the 8042 input port and disabling the MEGAKEY Green PC feature next. Making the BIOS code segment writable and performing any necessary configuration before initializing the interrupt vectors.
24	The configuration or setup required before interrupt vector initialization has been completed. Interrupt vector init. is about to begin
25	Interrupt vector initialization is done. Clearing the password if the POST DIAG switch is on.
27	Any initialization before setting video mode to be done.
28	Going for monochrome mode and color mode setting.
2A	Bus initialization system, static, output devices will be done, if present.
2B	Passing control to the video ROM to perform any required configuration before the video ROM test.
2C	Looking for optional video ROM.
2D	The video ROM has returned control to the BIOS POST. Performing any required processing after the video ROM had control.
2E	Completed post-video ROM test processing. If the EGA/VGA controller is not found, performing the display memory read/write test next.
2F	EGA/VGA not found. Display memory R/W test about to begin.
30	Display memory R/W test passed. Looking for retrace checking.
31	Display memory R/W test or retrace checking failed. Performs alternate display retrace checking next.
32	Alternate display memory R/W test passed. Looking for the alternate display retrace checking.
34	Video display checking is over. Setting the display mode.
37	The display mode is set. Displaying the power on message.
38	Initializing the bus input, IPL, and general devices, if present.
39	Displaying bus initialization error message.

Code	Description
3A	The new cursor position has been read and saved. Displaying the *Hit* <*DEL*> message next.
40	Preparing the descriptor tables.
42	Entering protected mode for the memory test.
43	Entered protected mode. Enabling interrupts for diagnostics mode.
44	Interrupts enabled if the diagnostics switch is on. Initializing data to check memory wraparound at 0:0.
45	Data initialized. Checking for memory wraparound at 0:0 and finding the total system memory size.
46	The memory wraparound test has completed. The memory size calculation has been done. Writing patterns to test memory.
47	The memory pattern has been written to extended memory. Writing patterns to the base 640 KB memory test.
48	Patterns written in base memory. Determining the amount of memory below 1MB.
49	The amount of memory below 1MB has been found and verified. Determining the amount of memory above 1MB memory.
4B	The amount of memory above 1MB has been found and verified. Checking for a soft reset and clearing the memory below 1MB for the soft reset next. If this is a power on situation, enter checkpoint 4Eh.
4C	The memory below 1MB has been cleared via a soft reset. Clearing the memory above 1MB.
4D	The memory above 1MB has been cleared via soft reset. Saving the memory size. Going to checkpoint 52h.
4E	The memory test started, but not as the result of a soft reset. Displaying the first 64KB memory size.
4F	Memory size display started. This will be updated during memory test. Performing the sequential and random memory test.
50	Memory testing/initialization below 1MB completed. Going to adjust displayed memory size for relocation and shadowing.
51	The memory size display was adjusted for relocation and shadowing. Testing the memory above 1MB.
52	The memory above 1MB has been tested and initialized. Saving the memory size information.
53	The memory size information and the CPU registers are saved. Entering real mode.
54	Shutdown was successful. The CPU is in real mode. Disabling the Gate A20 line, parity, and the NMI.

Code	Description
57	The A20 address line, parity, and the NMI are disabled. Adjusting the memory size depending on relocation and shadowing.
58	The memory size was adjusted for relocation and shadowing. Clearing the *Hit <DEL>* message.
59	The *Hit <DEL>* message is cleared. The *<WAIT…>* message is displayed. Staring the DMA and interrupt controller test.
60	The DMA page register test passed. To do DMA#1 base register test.
62	DMA#1 base register test passed. To do DMA#2 base register test.
65	DMA#2 base register test passed. To program DMA unit 1 and 2.
66	DMA unit 1 and 2 programming over. Initializing the 8259 interrupt controller.
7F	Extended NMI sources enabling is in progress.
80	The keyboard test has started. Clearing the output buffer and checking for stuck keys. Issuing the keyboard reset command.
81	A keyboard reset error or stuck key was found. Issuing the keyboard Controller interface test command.
82	The keyboard controller interface test completed. Writing the command byte and initializing the circular buffer.
83	Command byte written, Global data init done. Checking for locked key.
84	Locked key checking is over. Checking for a memory size mismatch with CMOS RAM data.
85	The memory size check is done. Displaying a soft error and checking for a password or bypassing Setup.
86	Password checked. About to do programming before setup.
87	The programming before Setup has completed. Uncompressing the Setup code and executing the AMIBIOS Setup utility.
88	Returned from CMOS setup program and screen is cleared. About to do programming after setup.
89	The programming after Setup has completed. Displaying the power on Screen message.
8B	The first screen message has been displayed. The <WAIT…> message is displayed. Performaing the PS/2 mouse check and extended BIOS data area allocation check.
8C	Programming the Setup options.

Code	Description
8D	Going for hard disk controller reset.
8F	Hard disk controller reset done. Floppy setup to be done next.
91	The floppy drive controller has been configured. Configuring the hard disk drive controller.
95	Initializing the bus option ROMs from C800.
96	Initializing before passing control to the adaptor ROM at C800.
97	Initialization before the C800 adaptor ROM gains control has completed. The adaptor ROM check is next.
98	The adaptor ROM had control and has now returned control to BIOS POST. Performing any required processing after the option ROM returned control.
99	Any initialization required after the option ROM test has completed. Configuring the timer data area and printer base address.
9A	Return after setting timer and printer base address. Going to set the RS-232 base address.
9B	Returned after setting the RS-232 base address. Performing any required initialization before the Coprocessor test next.
9C	Required initialization before the Coprocessor test is over. Initializing the Coprocessor.
9D	Coprocessor initialized. Going to do any initialization after Coprocessor test.
9E	Initialization after the Coprocessor test is complete. Checking the extended keyboard, keyboard ID, and Num Lock key next. Issuing the keyboard ID command.
A2	Displaying any soft errors.
A3	Soft error display complete. Going to set keyboard typematic rate.
A4	Keyboard typematic rate set to program memory wait states.
A5	Memory wait state programming is over. Clearing the screen and enabling parity and the NMI.
A7	NMI and parity enabled. Performing any initialization required before passing control to the adaptor ROM at E000.
A8	Initialization before passing control to the adaptor ROM at E000h completed. Passing control to the adaptor ROM at E000h.
A9	Returned from adaptor ROM at E000h control. Performing any initialization required after the E000 option ROM had control.

Code	Description
AA	Initialization after E000 option ROM control has completed. Displaying the system configuration.
AB	Building the multiprocessor table, if necessary.
AC	Uncompressing the DMI data and initializing DMI POST.
B0	The system configuration is displayed.
B1	Copying any code to specific areas.
00	Code copying to specific areas is done. Passing control to INT 19 h boot loader.

Flash BIOS Utility

Utilize AMI Flash BIOS programming utility to update on-board BIOS for the future new BIOS version. Please contact your technical window to get this utility if necessary.

NOTE : Remark or delete any installed Memory Management Utility (such as HIMEM.SYS, EMM386.EXE, QEMM.EXE, …, etc.) in the CONFIG.SYS files before running Flash programming utility.

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Chapter 5 - Troubleshooting

This chapter provides some useful tips to quickly get your FalconRay+ up and running without problems. Since basic hardware installation has been addressed in Chapter 3, this chapter will focus on system integration issues, in terms of backplane setup, BIOS setting, and OS diagnostics.

Backplane setup

Backplane

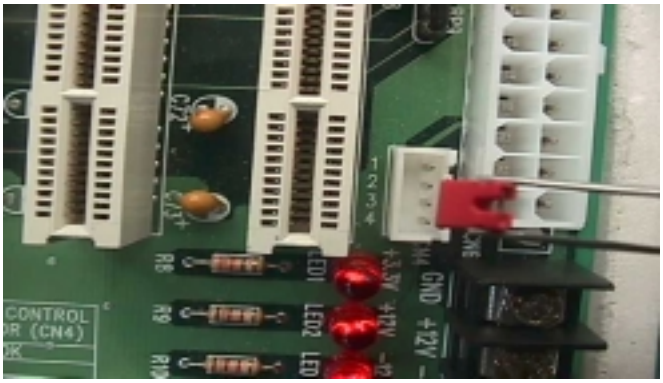
The FalconRay+ is a full-sized SBC, and therefore is able to run on any PICMG backplane, active or passive.

ATX power

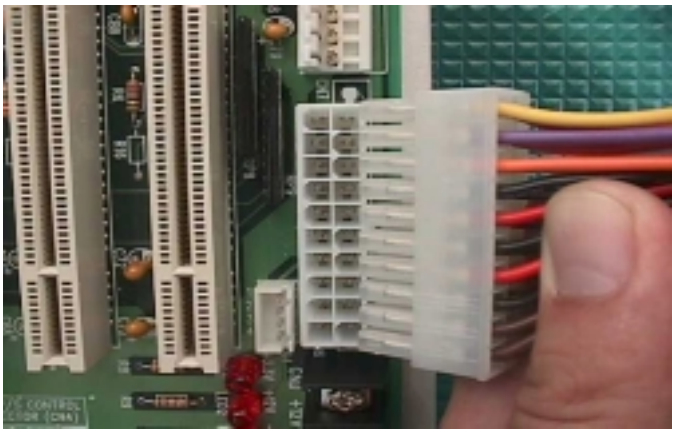
The FalconRay+ is designed to support ATX powering. Refer to the following instruction to apply ATX power to the FalconRay+ and backplane.

Demonstration model: Backplane - ACTI-14P4 / FalconRay+

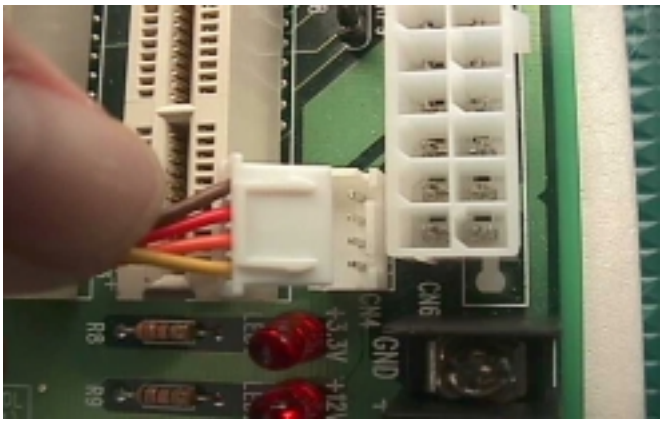
Step 1: Remove the jumper on pin3 and pin4 of connector CN4 (ATX P/S CONTROL CONNECTOR , 4-pin) (see the Figure below). Connector CN4 is on the lower-left side of connector CN7 (ATX POWER CONNECTOR) on the backplane.



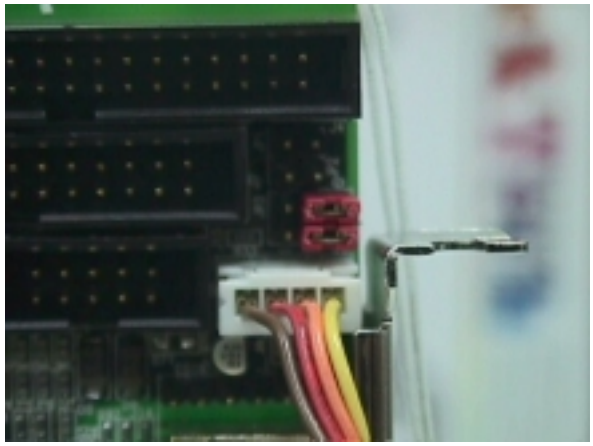
Step 2: Connect the 20-pin power cable of the ATX POWER with connector CN7 (ATX POWER CONNECTOR,20-pin) on the backplane. Connector CN7 is located on the upper-right side of the backplane and is white in color.



Step 3: Plug in a 4-pin power cable to connector CN4 (ATX P/S CONTROL CONNECTOR,4-pin) on the backplane.



Step 4: Find the J11 JUMPER (white in color) on the upper-right side of the SBC. It is marked “J11” besides the J11 connector on the SBC. Connect the other end of the 4-pin power cable with this J11 connector on the SBC.



Step 5: Connect a 2-pin TOGGLE SWITCH to the JP2 connector on the SBC. The JP2 connector (2-pin) is located just above the J11 connector on the SBC.

Step 6: The figure below shows the TOGGLE SWITCH which is used to switch the ATX Power on or off for the SBC. Usually the TOGGLE SWITCH is located on the chassis front panel. Press the switch button once to turn the power on; press it again to turn it off.

Keyboard

Users may adapt a PS/2 keyboard using the PS/2 keyboard interface, J22, on FalconRay+. However, it is also suitable to adapt a standard keyboard using the standard keyboard connector on the backplane, if provided. A standard keyboard needs a 5-pin keyboard connection cable to line-up the external keyboard interface, J18, on the FalconRay+ with the 5-pin keyboard connector on the backplane.

BIOS setting

It is assumed that users have correctly installed modules and connected all the device cables required before turning on AT power. CPU, CPU fan, CPU fan power cable, 168-pin SDRAM, keyboard, mouse, floppy drive, IDE hard disk, printer, VGA connector, device power cables, ATX accessories or P8/P9 power cable are examples that deserve attention. If these modules and devices are not provided and properly connected, malfunction or system failure may occur.

To make sure that the first operation of the FalconRay+ is successful, it is recommended, when performing the boot-up sequence, to hit the "DEL" key and enter the BIOS setup menu in order to achieve a stable BIOS configuration.

Loading the default optimal setting

When prompted with the main setup menu, scroll down to "**Auto Configuration with Optimal Settings,**" and press "Enter" and "Y" to load in the default optimal BIOS setup. This will force your BIOS setting back to the initial factory configuration. It is recommended to do this to be sure the system is running with the BIOS setting that is recommended by IBus/Phoenix. As a matter of fact, users can load in this default BIOS setting any time the system appears to be unstable in its boot up sequence.

Auto Detect Hard Disks

Users commonly select "**Auto Detect Hard Disks**" to load the hard drive status in BIOS memory so as to reduce the time spent in boot-up. However, if the BIOS has kept this information and a different hard drive is applied without redoing the "**Auto Detect Hard Disks**" procedure, the system will fail to identify the hard disks that are actually connected. If you encounter this problem, enter the BIOS setup menu and re-select "**Auto Detect Hard Disks.**"

Another way to avoid this problem is to go to "**Standard COMS Setup**" and in the hard disk status, set the "**Primary Master**" and "**Primary Slave**" to "**Auto**" with their "**32-bit mode**" being set to "**ON**". This will force the system to automatically detect the current attached hard disks during each boot up sequence. It is then no longer necessary to "manually" detect the hard disks each time you go through the boot up sequence.

Note that loading in the default optimal BIOS setting will not change the hard disk detection status back to "**Auto.**" If the default BIOS settings are loaded, the hard disk detection status will remain unchanged.

It is recommended to check the hard disk or CDROM setting in the event that two IDE devices are connected through one IDE port. One of these two devices must be configured as a slave to prevent detection failure of the IDE devices. There can not be two master IDE devices at the same time.

Improper disable operation

Sometimes users will disable a certain device or feature in the BIOS setup for a particular application and then forget to enable it before going to another application where the disabled device is needed. The system will, of course, then fail to operate correctly. Be sure to verify that the devices or ports that you need are not disabled in the BIOS setting. These include floppy drive, COM1/COM2 ports, parallel port, USB ports, external cache, and on-chip VGA display mode.

Users may also wish to disable a certain device/port in order to release an IRQ resource. Examples are

disable COM1 serial port to release IRQ #4
disable COM2 serial port to release IRQ #3
disable parallel port to release IRQ #7
disable PS/2 mouse to release IRQ #12
…..etc.

A quick review of the basic IRQ mapping is given below for your reference.

IRQ #0 : System Counter
IRQ #1 : Keyboard
IRQ #2 : Cascade IRQ
IRQ #3 : COM2
IRQ #4 : COM1
IRQ #5 : Nothing
IRQ #6 : Floppy Disk Controller
IRQ #7 : Printer Port (Parallel Port)
IRQ #8 : CMOS Clock
IRQ #9 : Nothing
IRQ #10 : Nothing
IRQ #11 : Nothing
IRQ #12 : PS/2 mouse
IRQ #13 : Data Processor
IRQ #14 : Primary IDE Controller
IRQ #15 : Secondary IDE Controller

This listing shows which IRQ resources are available to apply additional peripherals. If sufficient IRQ resources are not available, disable some of the devices listed above to release more.

OS diagnostics

What will be presented here is a brief guide for properly enabling the driver for any Microsoft Windows-95/98/NT device, as well as for starting a special function in a specific operating system. For other operating systems, refer to the particular operating system's manual.

ACPI function in Windows-98

Windows-98 is the only operating system so far that supports the ACPI function, in terms of activating suspend-to-RAM feature. To enable Windows-98 shouting for this feature, a special installation command is required:

(1) setup (standard installation)

(2) setup [space] /p [space] j (support ACPI feature)

Booting

Users may sometimes find that Windows-95/98 hangs in its loading sequence. The Windows logo may stay on with no further progress, or there may simply be no display. If this occurs, restart the system and hit "F5" when loading the Windows system to enter "Safe mode". In "Safe mode" users can remove devices that are not properly running or that have been incorrectly installed. After this is done, restart Windows. The devices whose drivers have been removed will be automatically detected again and new drivers will be loaded in if they are in the system database. If not, you will be asked to provide the driver source for installation.

For Windows-NT 4.0 users, it is recommended that the hardware configuration not be changed after the first installation. However, if such a change should become necessary, the situation may be encountered where Windows-NT 4.0 will stop loading and present a whole page of error messages. At this point, reinstallation of the NT hard disk is inevitable. Regular and frequent backups of the data stored on this hard disk is highly recommended because it is almost impossible to reactivate this system except by booting up with another hard disk. If the NT hard disk is installed with FAT16 disk format, boot up the system with any Windows OS. This enables seeing the NT hard disk and retrieving any data needed. However, if the NT hard disk is installed with NTFS disk format, only NTFS will allow the retrieval of data from the NT hard disk.

Display setup

By default, any Windows OS starts with 640 x 480 by 16 colors display. Loading the display driver provided in the FalconRay+ product CDROM will maximize the VGA performance. If using a monitor that Windows cannot identify, set in the display setup menu a system monitor to correctly retrieve the display output. For Windows-NT 4.0 users, because FalconRay+ provides the AGP type on-chip display feature, Service Pack 3.0 or above is required to activate the AGP VGA display feature.

Network setup

1. Windows-95/98 users: Install an ISA/PCI network card in an ISA/PCI slot. Start Windows-95/98 and let Window-95/98 automatically detect your network adapter. Next, provide the driver and complete the installation.

Restarting your windows system is then required. When the restart process is complete, go to Control Panel -> System -> Device Manager to see if the network adapter has been installed properly. A warning sign will appear if it has not been installed properly. Should this occur, remove the network device from the system setup menu and restart windows to re-detect the network adapter.

When the hardware installation is complete, go to Control Panel -> Network to set up the networking configuration. This includes DNS, IP, Gateway. Appropriate protocols are required to support your networking activities. Refer to your system administrator for additional assistance.

2. Windows-NT 4.0 users: Install your network adapter manually in Control Panel -> Network -> Adapter. Drivers are required at this stage. Proceed “Binding” after you load in the driver. Change to Protocol label and load in the protocols that are needed (generally, TCP/IP). Configuring of IP, gateway, and DNS is required for TCP/IP protocol. Proceed again “Binding” after you complete the protocol loading. Restart the system.

Situations may be encountered where the installed network adapter stops working, or an old network driver is still in the system after changing the network card. In this case remove all the network adapters and protocols from the network setup menu and then reload the driver and protocols.

Network setup within Windows-NT 4.0 is not as simple as that within Windows-95/98. Special familiarity and care are required for a successful installation.

Appendix 1 - Glossary of Terms

B

backplane: A device inside the chassis that contains slots, or sockets, for plugging in cards or cables.

bidirectional parallel port: An eight-bit port that can be used for an input as well as an output device.

bus: One or more electrical conductors that transmit power or binary data to the various sections of a computer or any common pathway between hardware devices. A computer bus connects the CPU to its main memory and the memory banks that reside on the control units of the peripheral devices. It is made up of two parts. Addresses are sent over the address bus to signal a memory location, and the data are transferred over the data bus to that location.

C

card cage: A cabinet or metal frame that holds printed circuit cards.

CMOS (Complementary Metal Oxide Semiconductor): A technique of arranging transistors which uses very low power.

D

disk access LED: The LED located on the front control panel that indicates when the hard disk drive is active.

DRAM (Dynamic Random Access Memory): The main memory in your computer. It needs to be refreshed by a memory controller or it loses its information.

drive bay: Area in the chassis where drives are mounted.

E

electrostatic discharge (ESD): Stationary electrical charges in which no current flows. ESD can be prevented by wearing a wrist strap attached to a ground post on a static mat.

Appendix 1 - Glossary of Terms

EMI (ElectroMagnetic Interference): Noise generated by the switching action of the power supply and other system components. Conducted EMI is interference generally conducted into the power line, and is normally controlled with a line filter. Radiated EMI is that portion that radiates into free space. One way to suppress it is by enclosing circuitry in a metal case.

EPROM (Erasable Programmable Read Only Memory): A programmable device which stores information regardless of power.

expansion card: A printed circuit board that plugs into an expansion slot.

F

floppy drive: A device for reading the information contained on external, portable computer disks called floppy disks.

front control panel: The small panel on the front of the computer that contains the power switch, reset switch, Power ON LED, the disk access LED, and the keyboard connector.

H

hard drive: A data storage device. Hard drives magnetically store computer data on spinning internal disks.

hold-down bar: A metal bar located in the I/O bay of the chassis. It is used to keep I/O cards firmly seated in their slots. (There is no hold-down bar in CompactPCI systems.)

I

IDE (Integrated Drive Electronics): A standard of signalling and communicating with a device.

I/O card: A printed circuit board that plugs into an I/O slot.

I/O slot: A slot for plugging in additional I/O cards to expand the capability of a computer.

ISA: The original IBM/PC clone plug-in board standard.

K

keyboard connector: The five-pin connector located on the front control panel.

kilobyte (KB): 1,024 bytes.

L

LED: Light Emitting Diode. Long-lasting light emitters usually used as indicators.

load board: A board having specific resistance to current flow.

P

parallel port: I/O connector used to hook up a printer or other parallel interface device. The parallel port is usually a 25-pin female DB25 connector.

PCI(Peripheral Component Interconnect): An optional slot standard for plug-in boards

port: Ports are used to connect peripheral devices such as external drives and printers to your computer.

power good: Signal used to prevent the computer from starting until the power has stabilized. The power good line switches from 0 to +5 volts within one tenth to one half second after the power supply reaches normal voltage levels. Whenever low input voltage causes the output voltage to fall below operating levels, the power good signal goes back to zero.

power ON/diagnostic LED: The LED located on the front control panel that indicates that power is present in the computer.

power supply: Electrical system that converts AC current from the wall outlet into the DC currents required by the computer circuitry. In a personal computer, +5, -5, +12 and -12 voltages are generated.

power switch: Located on the front control panel, the power switch turns power ON to the computer.

R

RAID (Redundant Array of Independent Disks): A storage technology using an array of two or more disks to redundantly store information. If one disk fails in a RAID array, the unit continues to function without loss of data.

RAM (Random Access Memory): The memory used to execute applications while your computer is turned ON. When you turn your computer OFF, all data stored in RAM is lost.

real-time clock (RTC): A periodic interrupt used to derive local time.

reset switch: Button or key that reboots the computer. All current activities are stopped cold and any data in memory are lost.

retaining bracket: The bracket on the back of the chassis that holds connectors from the board, usually a DB9 for serial port, a DB25 for parallel port, and mini-DIN connectors for keyboard and mouse.

S

SCSI (Small Computer System Interface): A high speed, general purpose interface to storage devices.

serial port: A two-channel port, one channel used for ”In” transmissions and one for ”Out” transmissions.

W

watchdog timer: A device that watches for CPU inactivity and then resets the CPU after a specified duration of inactivity.

LIMITED WARRANTY

I-Bus/Phoenix warrants its manufactured products to be free of defects in material and workmanship for a period of two (2) years from date of delivery to the original purchaser from I-Bus/Phoenix. I-Bus/Phoenix is not liable for any defects in material or workmanship of any peripherals, products or parts which I-Bus/Phoenix does not design or manufacture. However, I-Bus/Phoenix will honor the original manufacturer's warranty for these products (up to a period of two years ?).

During the warranty period, I-Bus/Phoenix will, at its option, repair or replace a defective product at no additional charge to the purchaser, except as set forth in this warranty agreement.

I-Bus/Phoenix will analyze the defective component and the customer will be charged in the following instances:

- No problem found: $150 (U.S. dollars).
- Damage: parts and labor at $150 per hour with a $200 minimum charge (U.S. dollars). Receipt of damaged goods voids the I-Bus/Phoenix warranty.

Repair parts and replacement products will be furnished on an exchange basis and will be either new or reconditioned. All replaced parts and products shall become the property of I-Bus/Phoenix, if such parts or products are replaced under this warranty agreement. In the event a defect is not related to the I-Bus/Phoenix manufactured product, I-Bus/Phoenix shall repair or replace the defective parts at purchaser's cost.

This Limited Warranty shall not apply if the product has been misused, carelessly handled, defaced, modified or altered, or if unauthorized repairs have been attempted by others.

The above warranty is the only warranty authorized by I-Bus/Phoenix and is in lieu of any implied warranties, including implied warranty of merchantability and fitness for a particular purpose.

In no event will I-Bus/Phoenix be liable for any such damage as lost business, lost profits, lost savings, downtime or delay, labor, repair or material cost, injury to person or property or any similar or dissimilar consequential loss or damage incurred by purchaser, even if I-Bus/Phoenix has been advised of the possibility of such losses or damages.

In order to obtain warranty service, the product must be delivered to the I-Bus/Phoenix facility, or to an authorized I-Bus/Phoenix service representative, with all included parts and accessories as originally shipped, along with proof of purchase and a Returned Merchandise Authorization (RMA) number.

The RMA number is obtained, in advance, from I-Bus/Phoenix Customer Service Department and is valid for 30 days. The RMA number must be clearly marked on the exterior of the original shipping container or equivalent. Purchaser will be responsible and liable for any missing or damaged parts. Purchaser agrees to pay shipping charges one way, and to either insure the product or assume the liability for loss or damage during transit. Ship to:

I-Bus/Phoenix

ATTENTION: RMA REPAIR DEPT.

RMA ####

9174 Sky Park Court

San Diego, CA 92123

I-Bus/Phoenix may issue, at its own discretion, an advanced replacement (AR) on a product if it fails within fifteen (15) days from the date of delivery from I-Bus/Phoenix.

Appendix 2 - Limited Warranty

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Appendix 3 - FCC Information

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received including interference that may cause undesired operation.

WARNING: This equipment has been tested and found to comply with the limits for a Class "A" digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at their own expense.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE: This product was FCC verified under test conditions that included the use of shielded I/O cables and connectors between system components. To be in compliance with FCC regulations, the user must use shielded cables and connectors and install them properly.

Appendix 3 - FCC Information

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