
CSS Laboratories

Single Board Computer SBP-402

User Guide

Version 1.1

Copyright © 2004 CSS Laboratories, Inc. All rights reserved.
ProRack™, MaxPro™ and SBP-402™ are trademarks of CSS Laboratories, Inc.
All other trademarks are owned by their respective companies.

Published by CSS Laboratories, Inc.
1641 McGaw Avenue
Irvine, California 92614
www.csslabs.com

CONTENT

CONTENT 1

Chapter 1. Introduction.....	2
1.1 Product Overview	2
1.2 Specification	3
1.3 Component Placement	6
1.4 Block Diagram	7
Chapter 2. Hardware Setup	8
2.1 Connector Location.....	8
2.1.1 Jumper Reference	9
2.1.2 Connector Reference.....	10
2.2 CPU and DRAM Setting	11
2.3 CMOS Setting.....	11
2.4 Watchdog Timer Setting	12
2.5 Serial ATA Setup Information	12
2.5.1 Parallel ATA and Serial ATA Device Setup.....	13
2.5.2 Parallel ATA and Serial ATA BIOS Setup	13
2.6 Embedded Solid State Disk	15
2.7 Power and Fan Connector	16
2.8 VGA Interface	17
2.9 Ethernet Interface	18
2.10 Audio Interface.....	19
2.11 Switch and Indicator	21
Chapter 3. BIOS Setup	22
Chapter 4. Driver Installation.....	23
Appendix. A I/O Pin Assignment	24
A.1 IDE Port 24	
A.2 Floppy Port.....	25
A.3 Parallel Port.....	26
A.4 Serial Port.....	27
A.5 USB Port	30
A.6 IrDA Port30	
A.7 VGA Port	31
A.8 LAN Port31	
A.9 AT Keyboard Port.....	31
A.10 PS/2 Keyboard and Mouse Port	32
Appendix B. Flash the BIOS.....	33
B.1 BIOS Auto Flash Tool.....	33
B.2 Flash Method.....	33
Appendix C. System Resource	34
C.1 I/O Port Address Map.....	34
C.2 Memory Address Map	37
C.3 IRQ and DMA Resource	38

Chapter 1. Introduction

1.1 Product Overview

The **SBP-402** SBC (Single Board Computer) is an all-in-one industrial full-size PICMG (PCI/ISA)-bus CPU card based on Intel Socket 478 Pentium 4 architecture. With Intel 865G chipset, Intel 865G GMCH and ICH5, **SBP-402** offers the value computing solution including Intel NetBurst micro-architecture, 800/533/400 MHz of FSB, 2 GB DDR SDRAM, Intel Extreme Graphics 2 with Intel Dynamic Video Memory up to 64 MBytes, Dual Intel PRO/1000+ LAN, Hi-Speed USB 2.0 and Compact Flash Type II interfaces.

SBP-402, the ideal solution for the industrial applied computing platform with high computing capacity, cost effect and long life cycle. With Intel's latest technology, the **SBP-402** should be the leading edge of computing capacity for the advanced industrial computing platform with the features as below.

Intel Hyper-Threading Technology

The **SBP-402** supports Intel Hyper-Threading Technology to offer the better computing capacity for the industrial applied computing application. Based on Intel's latest technology, "the Intel Pentium 4 Processor with Hyper-Threading technology allows software programs to "see" two processors and work more efficiently. It will Improve performance and system responsiveness in today's multitasking environments by enabling the processor to execute instruction threads in parallel."

Powerful Computing Capacity

With Intel's latest CPU technology, **SBP-402** supports Intel Socket 478 Pentium 4 CPU at 800 MHz of FSB. The **SBP-402** also provides two GBytes of DDR266/333/400 of system memory capacity.

Hi-Speed USB 2.0 Interface: Intel ICH5 built-in Hi-Speed USB 2.0 controller offers the Hi-Speed USB 2.0 interface with up to 480 Mbps of data transfer bandwidth with the USB bootable setting in the BIOS.

1.2 Specification

General Specification

Form Factor	Full-size PICMG-bus CPU Card / Slot PC PICMG version 1.0 (Rev. 2.0), PCI version 2.0 compliant
CPU	Intel Socket 478 Pentium 4 / Celeron CPU at 400/533/800 MHz FSB (100/133/200MHz x 4) Intel 0.13-/0.18-micron Northwood /Prescott CPU Willamette CPU is not supported Support Intel Hyper-Threading Technology
Memory	Two 184-pin DIMM sockets support up to 2 GBytes DDR266/333/400 SDRAM. (No ECC/register DIMM support)
Chipset	Intel 82865G GMCH and 82801EB ICH5
BIOS	Phoenix-Award 2Mb PnP flash BIOS
Green Function	Power saving mode supported in BIOS with DOZE, STANDBY and SUSPEND modes. ACPI version 1.0 and APM version 1.2 compliant
Watchdog Timer	system reset programmable watchdog timer with 1 to 255 sec./min. of time out value
Real Time Clock	Intel ICH5 built-in RTC with onboard lithium battery
PCI Enhanced IDE	PCI enhanced IDE interface supports dual ports up to 4 ATAPI devices with UltraATA/100 supported
ISA High Drive	ISA 64mA high Drive capacity with TI 245 buffer on both of ISA address and data bus
Serial ATA	Two Serial ATA connectors, data transfer rate up to 150MB/s

Multi-I/O Port

Chipset	Intel 82801EB ICH5 and Winbond W83627HF-AW LPC super-I/O controller
Serial Port	Two RS-232 serial ports. Both with 16C550 compatible UART and 16 bytes FIFO.
USB 2.0 Port	Four Hi-Speed USB 2.0 ports with Intel ICH5 Support 480 Mbps of data transfer rate
Parallel Port	One bi-direction parallel port with SPP/ECP/EPP mode
Floppy Port	One floppy port supports up to two FDD
IrDA Port	One IrDA compliant Infrared interface supports SIR
K/B & Mouse	PS/2 keyboard and mouse ports, AT keyboard port

Solid State Disk Interface

Flash Type	One Compact Flash Type II interface onboard or IDE Pro and DiskOnModule (DOM) solid state disk
Package	50-pin Compact Flash type II socket or 40-pin IDE port (DOC IDE Pro, DiskOnModule)
Capacity	1 GB of CF card or 512 MB of DiskOnModule

VGA Display Interface

Chipset	Intel 865G GMCH built-in Intel Extreme Graphics 2
Video Memory	Intel Dynamic Video Memory with auto detect video memory up to 64 MBytes shared with system memory
Display Type	CRT and LCD monitor
Connector	External DB15 female connector on bracket for CRT Internal 16-pin header for analog VGA display

Ethernet Interface

Chipset	Intel PRO/1000+ LAN interface Primary LAN (LAN1): Intel ICH5 with Intel 82547EI CSA secondary LAN (LAN2): PCI Intel 82540EM
Type	10Base-T/100Base-TX/1000Base-T Full duplex, IEEE802.3U compliant

Audio Interface

Chipset	Intel ICH5 built-in AC97 3D audio controller with Realtek ALC201A codec or ALC650 codec.
----------------	--

Interface	Line-in, line-out, CD-in, Mic-in
	SPDIF is optional for ALC650 codec

Power and Environment

Power Req.	+5V, +12V, -12V DC input from PICMG backplane Additional +12V on 4-pin connector for Pentium 4 PSU
-------------------	---

ATX Function	3-pin ATX interface with 5V standby and power-on
---------------------	--

Dimension	338 (L) x 122 (H) mm, standard PICMG form factor
------------------	--

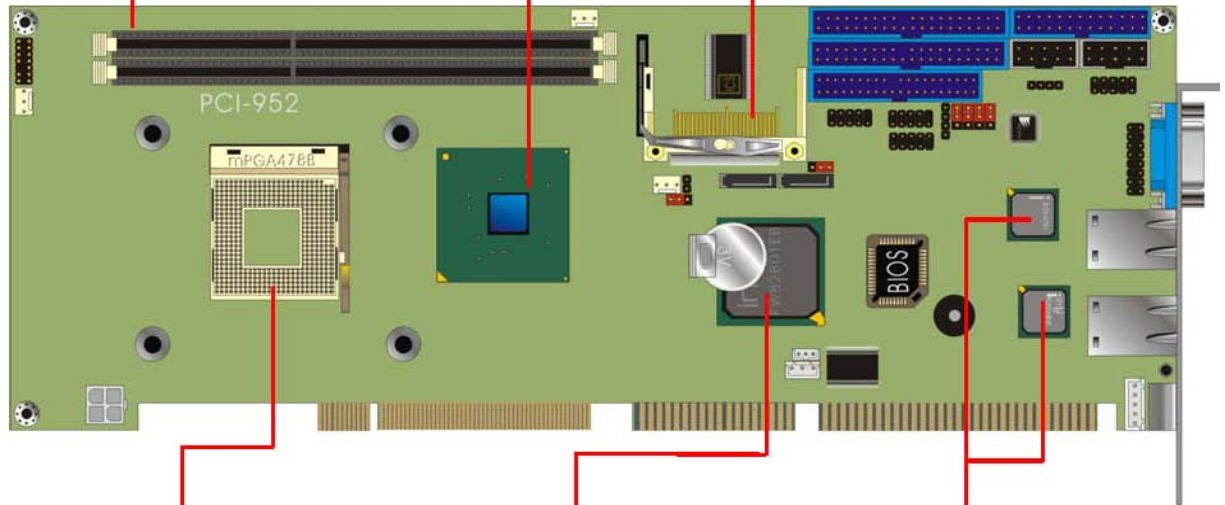
Temperature	Operating within 0 ~ 60oC (32 ~ 140oF) Storage within -20 ~ 85oC (-4 ~ 185oF)
--------------------	--

1.3 Component Placement

System Memory
2 x 184-pin DIMM Sockets
2 GB DDR266/333/400 SDRAM

Intel 865G GMCH
Built-in Intel
Extreme Graphics 2

Compact Flash Type
II Socket



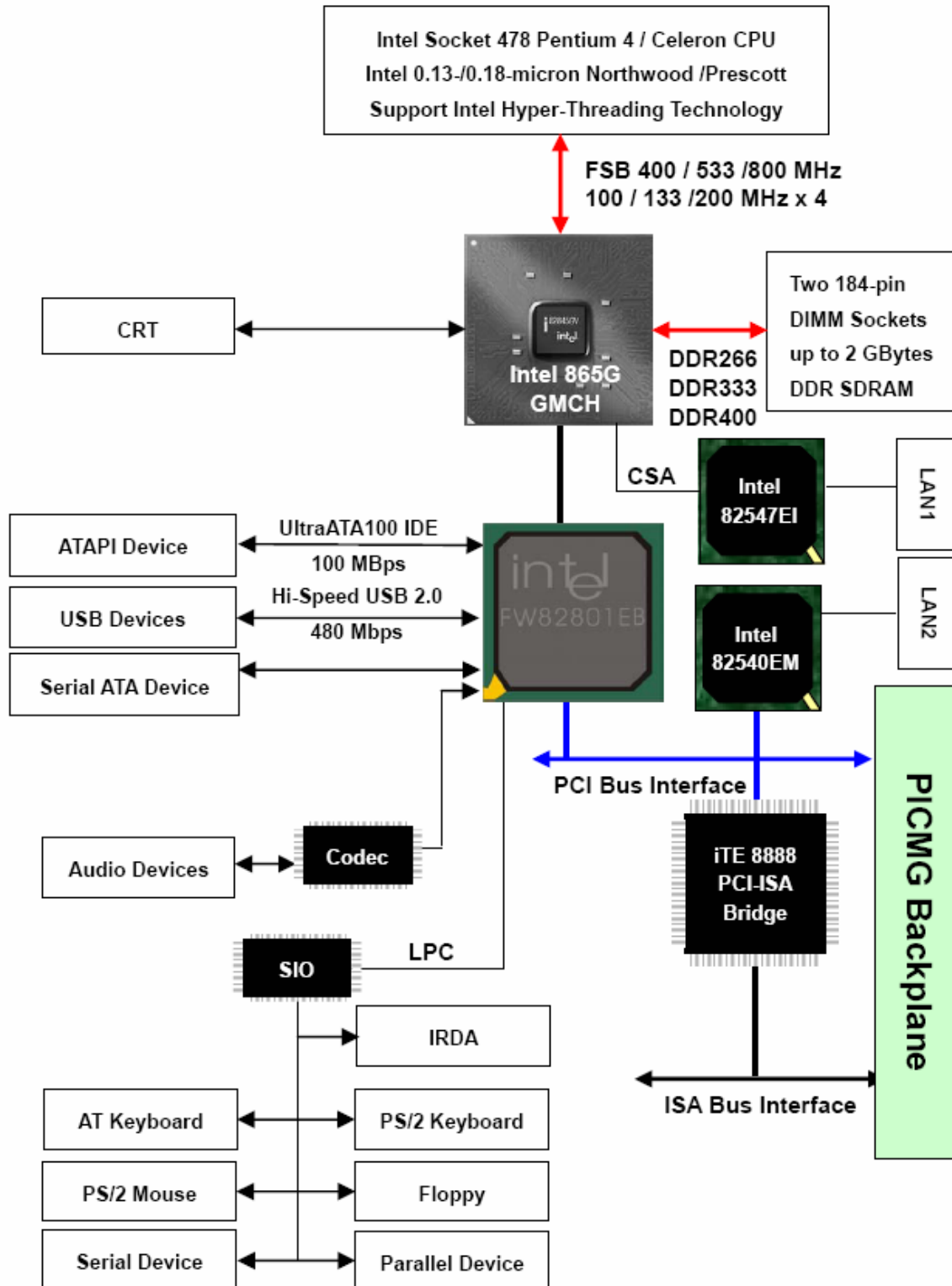
mPGA478 CPU Socket
Intel Pentium 4 / Celeron
800/533/400 MHz FSB

Intel 82801EB ICH5
Built-in Hi-Speed
USB 2.0 Interface

Dual Intel PRO/1000+ LAN
Intel ICH5 with 82547EI
and PCI Intel 82540EM

1.4 Block Diagram

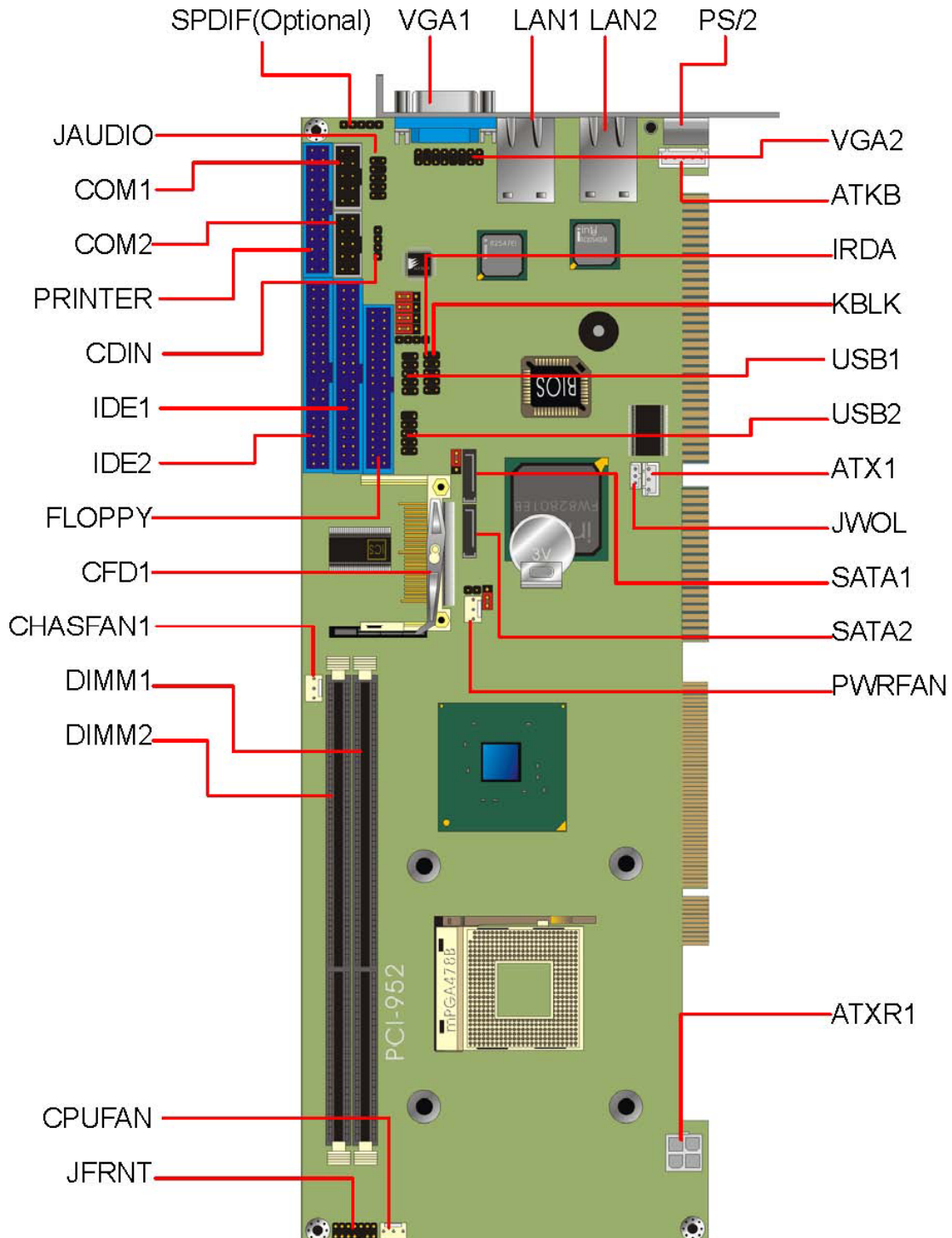
Intel Socket 478 Pentium 4 / Celeron CPU Intel 0.13-/0.18-micron Northwood /Prescott Support Intel Hyper-Threading Technology



Chapter 2. Hardware Setup

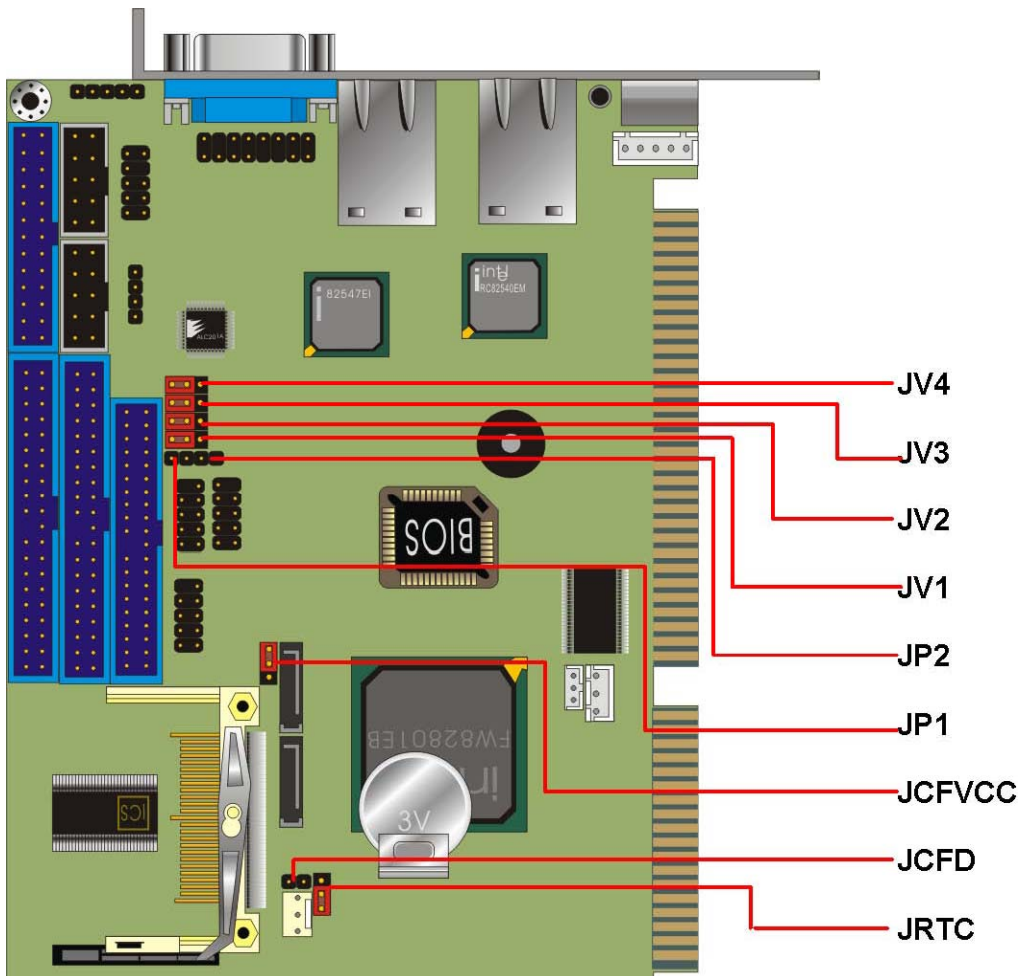
This chapter contains the information for installation of hardware. The install procedure includes jumper settings, CPU and memory installation, fan, I/O and panel connections.

2.1 Connector Location



2.1.1 Jumper Reference

Jumper	Function	Section
JRTC	COMS Operate / Clear Setting	2.3
JP1/JP2	IDE Power Supply Setting	2.5
JCFD	Compact Flash Card Setting	2.5
JCFVCC	Compact Flash Card Voltage Setting	2.5
JV1/JV2/JV3/JV4	COM3 Power Supply Setting	A.4



2.1.2 Connector Reference

Internal Onboard Connector

Connector	Function	Remark
CPU	MicroPGA478 CPU Socket	Standard
DIMM1/2	184-pin DIMM Socket	Standard
IDE1/2	40-pin Primary / Secondary IDE Port	Standard
FLOPPY	34-pin Floppy Port	Standard
PRINTER	26-pin Parallel Port	Standard
COM1/2	10-pin COM1/2 Serial Port	Standard
USB1/2	10-pin 1st / 2nd (3rd / 4th) USB Port	Standard
IRDA	5-pin SIR IrDA Port	Standard
ATKB	5-pin AT Keyboard Connector	Standard
ATXR1	4-pin Additional +12V Power Connector	Standard
ATX1	3-pin ATX Signal Connector	Standard
JFRNT	14-pin Switch and Indicator Connector	Standard
CPUFAN	3-pin +12V CPU Fan Connector	Standard
SYSFAN	3-pin +12V System Fan Connector	Standard
PWRFAN	3-pin +12V System Fan Connector	Standard
VGA2	16-pin Internal VGA Port	Standard
JAUDIO	10-pin Audio Port	Standard
CDIN	4-pin CD-in Interface	Standard
JWOL	3-pin Wake-On-LAN Interface	Standard
CFD1	50-pin Compact Flash Card Socket	Standard
SATA1/2	Serial ATA connectors	Standard
KBLK	4-pin KEY LOCK connector	Standard

External Connector on Bracket

Connector	Function	Remark
VGA1	DB15 Female VGA Connector	Standard
LAN1	RJ45 LAN1 Connector	Standard
LAN2	RJ45 LAN2 Connector	Standard
PS2	6-pin MiniDIN PS/2 Keyboard & Mouse	Standard

2.2 CPU and DRAM Setting

SBP-402 is based on Intel Socket 478 architecture with Intel 865G chipset, supports Intel Socket 478 Pentium 4 / Celeron, Northwood/Prescott CPU at 800/533/400 MHz FSB.

Please note that 865G chipset does not support Willamette CPU.

System memory of this board supports up to 2 GBytes DDR266/333/400 SDRAM on two 184-pin DIMM sockets.

Please notices that Intel 865G GMCH **DOESN'T** support ECC and register DIMM.

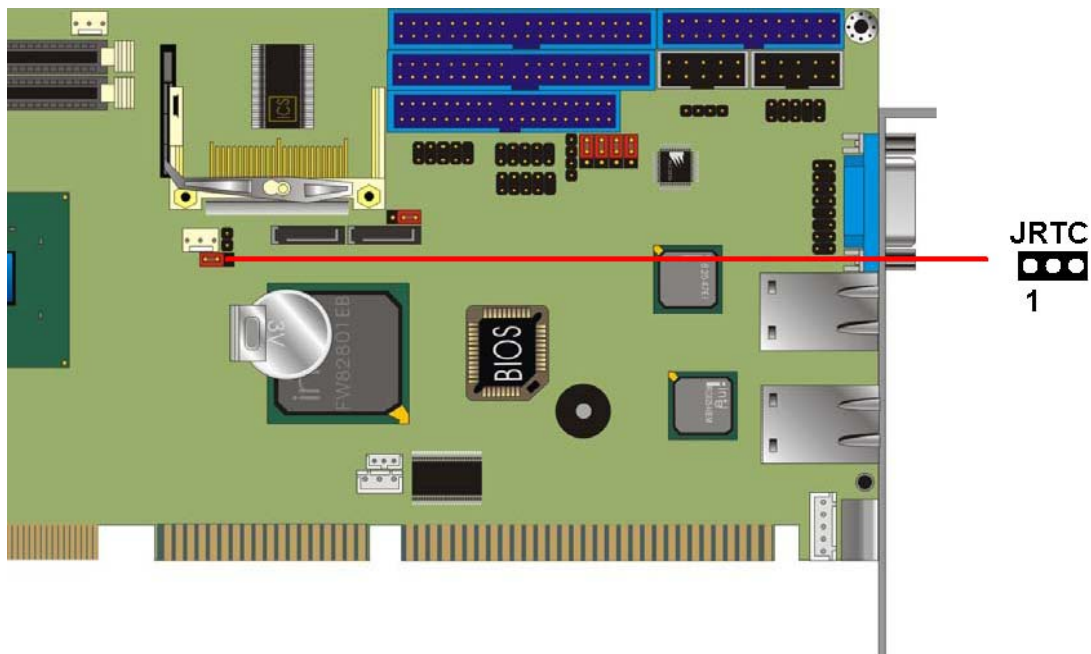
2.3 CMOS Setting

The board's data of CMOS can be setting in BIOS. If the board refuses to boot due to inappropriate CMOS settings, here is how to proceed to clear (reset) the CMOS to its default values.

Jumper: **JRTC**

Type: onboard 3-pin header

JRTC	Mode
1-2	Clear CMOS
2-3	Normal Operation (Default)



2.4 Watchdog Timer Setting

The watchdog timer makes the systems auto-reset while it stop to work for a period. The onboard watchdog timer can be setup as system reset.

Program Sample

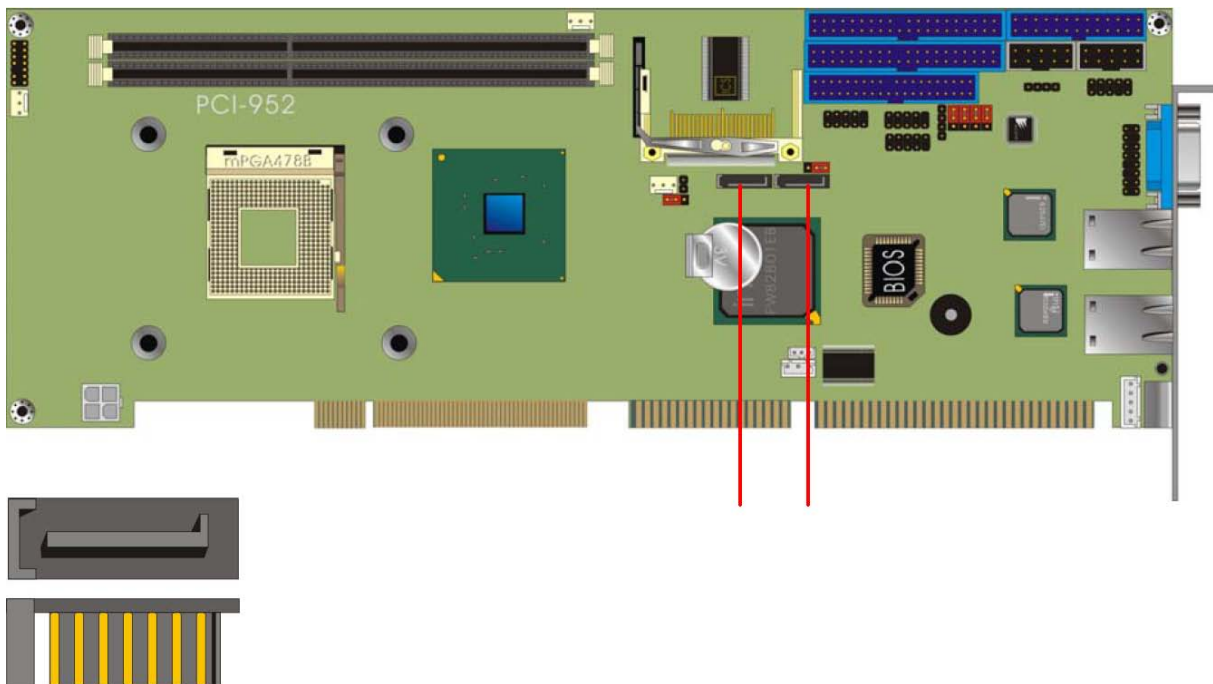
Watchdog timer setup as system reset with 5 second of timeout

```
2E, 87
2E, 87
2E, 07
2F, 08          Logical Device 8
2E, 30          Activate
2F, 01
2E, F5          Set as Second*
2F, 00
2E, F6          Set as 5
2F, 05
```

*Minute: bit 3 = 0; Second: bit 3 = 1

2.5 Serial ATA Setup Information

The board provide the last technology IDE connector. This two slim type connector of Serial ATA are for fast IDE data transfer. Nowadays the Serial ATA can provide the data transfer rate up to 150MB/sec. This is better than the traditional Parallel ATA (Ultra ATA/133) interface for 133MB/sec.



2.5.1 Parallel ATA and Serial ATA Device Setup

The ICH5 has defined the device usage below:

New OS IDE mode: ICH5 can work with up to 6 IDE Drivers under Windows 2000 or Windows XP.

Traditional OS IDE mode: ICH5 can only work with up to 4 IDE Drivers under MS-DOS, Windows 98 or Windows ME, and Windows NT 4.0.

Operating System	Parallel ATA		Serial ATA	
	Primary (2 Devices)	Secondary (2 Devices)	SATA1 (1 Device)	SATA2 (1 Device)
Windows 2000/XP	Y	Y	Y	Y
Windows 98/ME/NT4.0				
Type 1	Y(Primary)	X	Y(Secondary)	Y(Secondary)
Type 2	X	Y(Secondary)	Y(Primary)	Y(Primary)
Type 3	Y(Primary)	Y(Secondary)	X	X

2.5.2 Parallel ATA and Serial ATA BIOS Setup

When you install the IDE drivers, please see the BIOS setup form below.

```

Phoenix - AwardBIOS CMOS Setup Utility
OnChip IDE Device

IDE HDD Block Mode      [Enabled]
On-Chip Primary PCI IDE [Enabled]
IDE Primary Master PIO  [Auto]
IDE Primary Slave PIO   [Auto]
IDE Primary Master     [ ]
IDE Primary Slave     [ ]
On-Chip Secondary     [ ]
IDE Secondary Master   [ ]
IDE Secondary Slave   [ ]
IDE Secondary Master   [ ]
IDE Secondary Slave   [ ]

*** On-Chip Serial ATA
On-Chip Serial ATA     [ ]
Serial ATA Port0       [ ]
Serial ATA Port1       [ ]

On-Chip Serial ATA
Disabled      ..... [ ]
Auto          ..... [ ]
Combined Mode ..... [ ]
Enhanced Mode ..... [ ]
SATA Only    ..... [ ]

Item Help
Menu Level  >>

[Enabled]: Disabled
[Auto]: Auto arrange
Combined Mode: SATA
SATA are combined
Max. of 2 IDE drives
each channel.
Enhanced Mode:
Supports both SATA and
ATA. Max. of 6 IDE
drives are supported.
[ATA Only]: SATA is
not operating in legacy
mode.

↑↓←→: Move  Enter: Select  +/-/PU/PD: Value  F10: Save  ESC: Exit  F1: General Help
F5: Previous Values  F6: Fail-Safe Defaults  F7: Optimized Defaults
  
```

On-Chip Serial ATA configuration:

This option allow you to setup your Serial ATA work with the modes below:

1. **Disable** : this will disable any Serial ATA Device.
2. **Auto** : this will allow you to let the BIOS auto configure your IDE drivers if you don't know how to select the mode.
3. **Combined Mode**: this will let you configure the Serial ATA and Parallel ATA enforced to max of 2 IDE devices on each Serial and Parallel ATA.
4. **Enhance Mode**: this will allow you to enable the max 6 IDE drivers. (Notice! This mode only can work under Windows 2000/XP).
5. **SATA Only Mode** : This allow you to force the Serial ATA work in legacy mode.

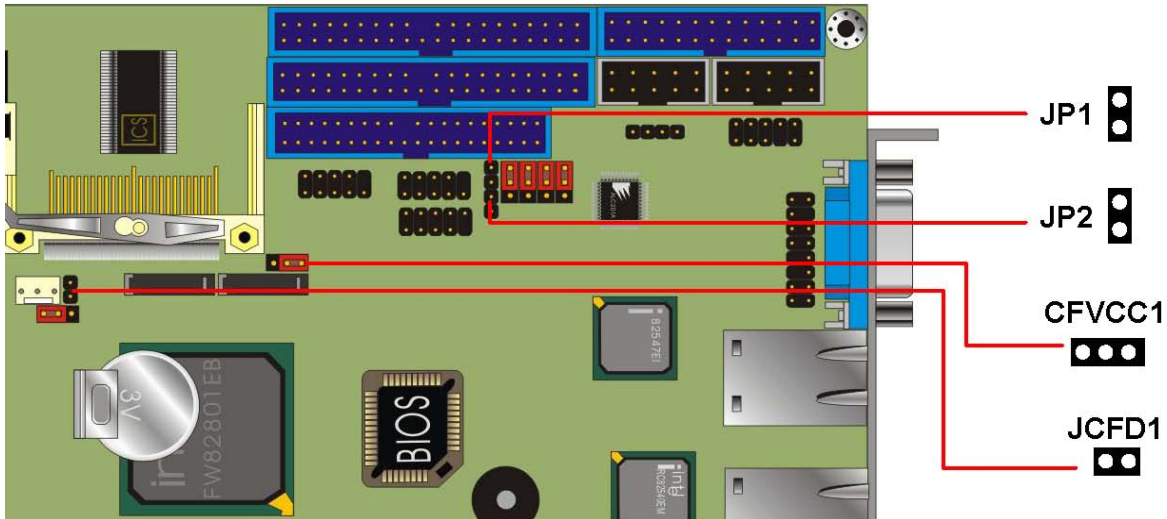


Serial ATA Port Mode:

When you configure the Serial ATA in Combine Mode or Enhanced mode or SATA Only Mode, you can configure each driver to work as master or slave mode.

2.6 Embedded Solid State Disk

The board supports Compact Flash Card Type II and IDE-based DiskOnChip IDE Pro and DiskOnModule (DOM) embedded flash disk. The onboard 40-pin IDE box header supports normal DOM (DiskOnModule) or M-systems DiskOnChip IDE Pro flash disk. The IDE pin-20 for Voltage 5V support can be set as JP1 and JP2. The Compact Flash Interface can support with IDE Master or Slave Mode on Jumper **JCFD1**.



Jumper: JCFD1

Type: onboard 2-pin header

JCFD1

JCFD1	CompactFlash Address
ON	Master (Default)
OFF	Slave

Jumper: CFVCC1

Type: onboard 3-pin header

CFVCC1

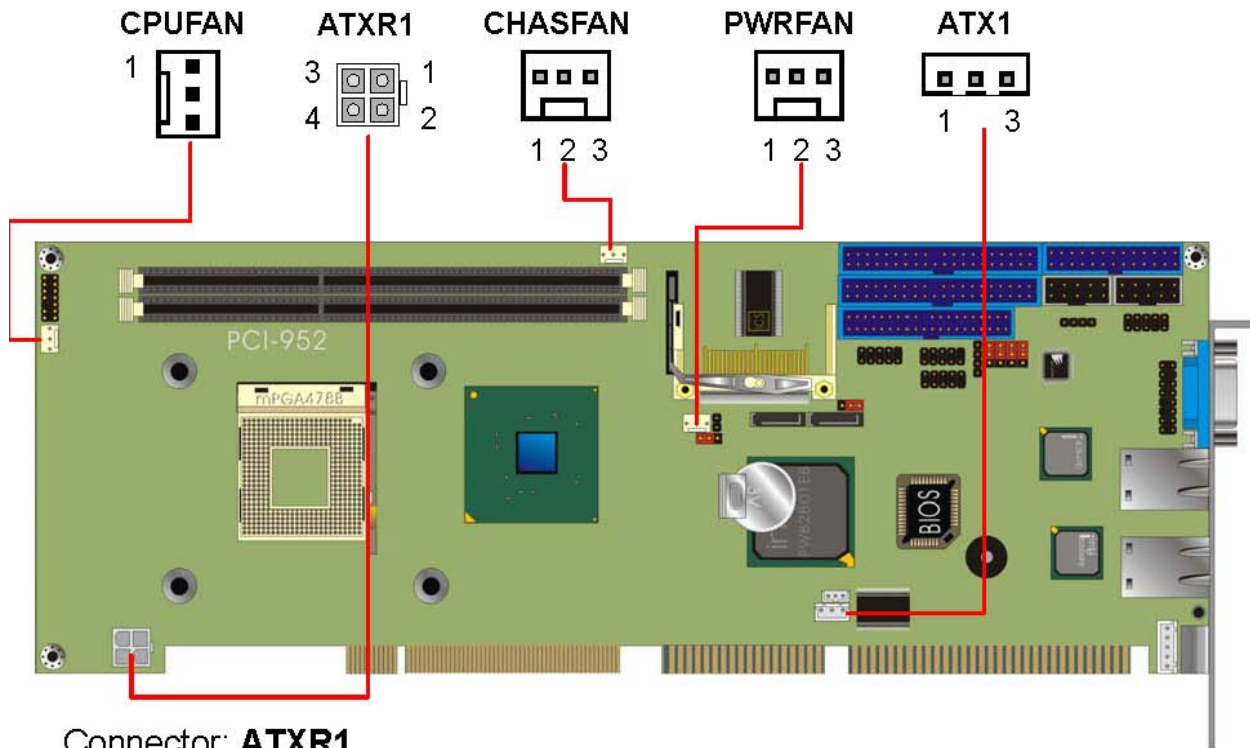
CFVCC1	CompactFlash Voltage
1-2	5V (Default)
2-3	3.3V

Jumper: JP1/JP2

Type: onboard 2-pin header

JP1/JP2C	IDE1/IDE2 5V power supply
ON	5V
OFF	N/C (Default)

2.7 Power and Fan Connector



Connector: **ATXR1**

Type: 4-pin standard Pentium 4 additional +12V power connector

Pin	Description	Pin	Description
1	+12V	2	+12V
3	Ground	4	Ground

Connector: **ATX1**

Type: 3-pin ATX wafer connector

Pin	Description	Pin	Description	Pin	Description
1	5V Standby	2	Ground	3	Power On

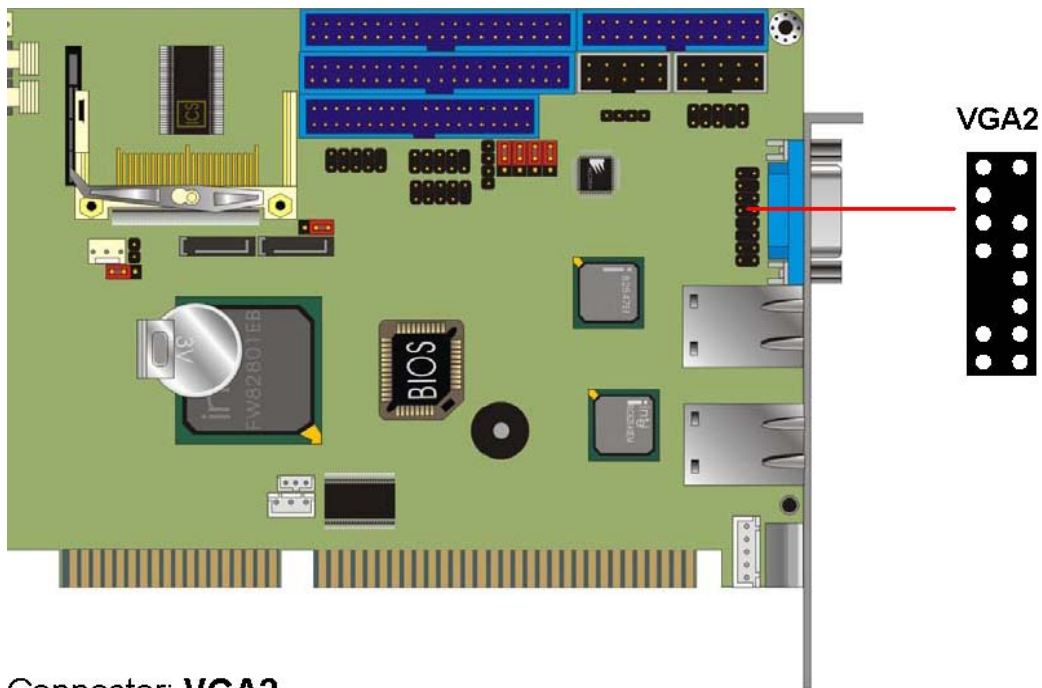
Connector: **CPUFAN, SYSFAN, PWRFAN**

Type: 3-pin fan wafer connector

Pin	Description	Pin	Description	Pin	Description
1	Ground	2	+12V	3	Fan Control

2.8 VGA Interface

The board is integrated with Intel 865G GMCH chipset built-in Intel Extreme Graphics with 266 MHz VGA core, 256-bit 3D engine and Intel Dynamic Video Memory up to 64 MBytes shared with system memory. The CRT / analog VGA interface includes one external DB15 female connector on bracket and one internal 16-pin header on board.



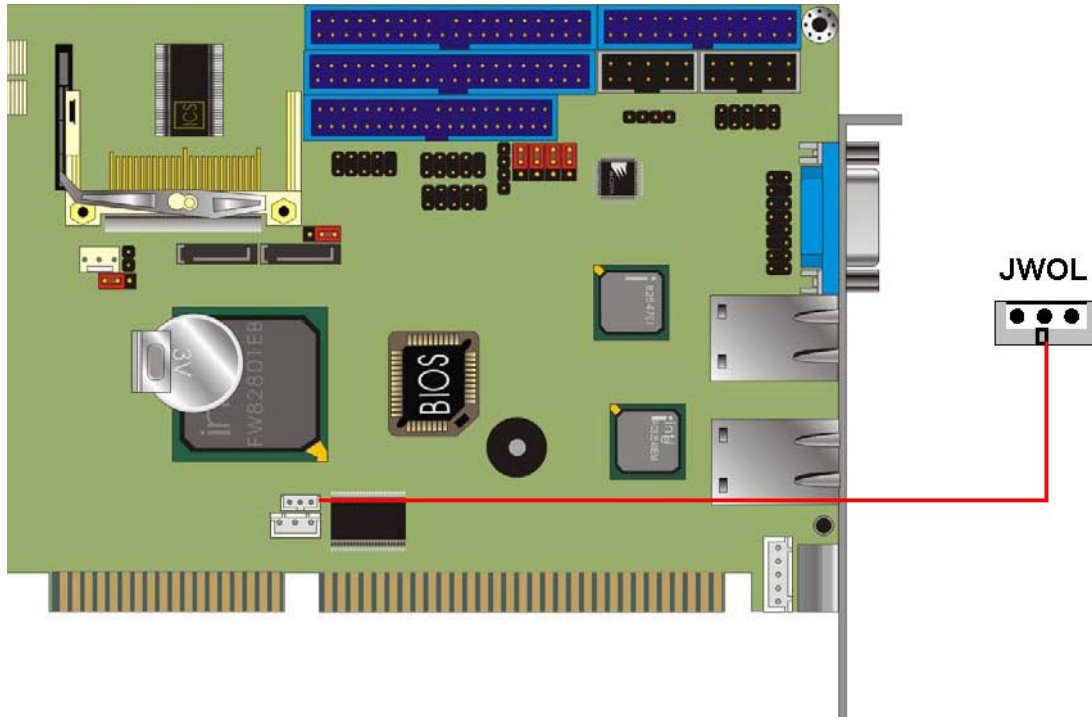
Connector: **VGA2**

Type: 16-pin (2 x 8) 2.54-pitch header

Pin	Description	Pin	Description
1	Red	9	Green
2	Blue	10	N/C
3	Ground	11	Ground
4	Ground	12	Ground
5	N/C	13	Ground
6	N/C	14	Data
7	HSYNC	15	VSYNC
8	N/C	16	N/C

2.9 Ethernet Interface

The board integrated with Dual Intel PRO/1000+ Gigabit Ethernet interface at the type of 10Base-T/100Base-TX/1000Base-T auto-switching with full duplex and IEEE 802.3U compliant. Both of them connect via RJ45 connectors on bracket. The primary LAN interface is controlled by Intel ICH5 with Intel 82547EI via CSA and setting as LAN1. The secondary LAN interface is controlled by Intel 82540EM chipset and setting as LAN2.



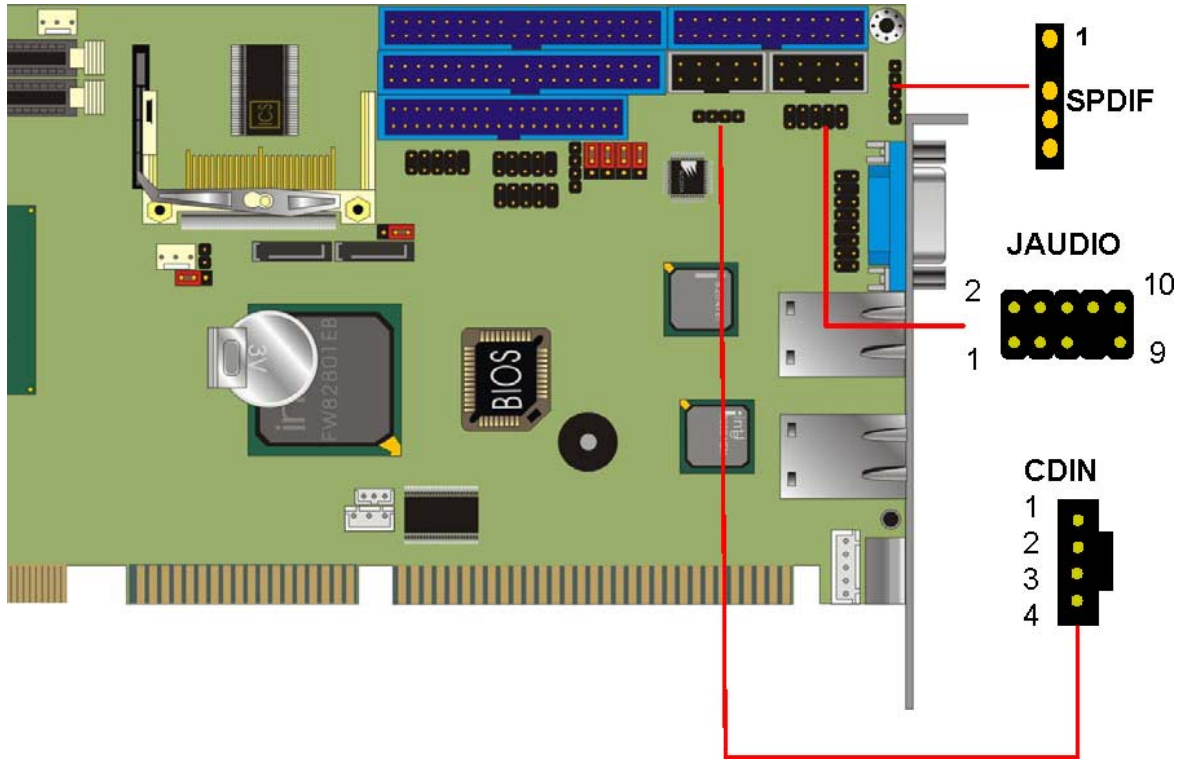
Connector: **JWOL**

Type: onboard 3-pin (1 x 3) wafer connector

Pin	1	2	3
Description	WOL-Ctrl	Ground	+5V Standby

2.10 Audio Interface

The board integrates with AC97 3D audio interface by Intel ICH5 and Realtek ALC201A codec, provides line-in, line-out, Mic-in and CD-in interfaces for industrial applications with audio function. SPDIF is optional for Realtek ALC650 codec.



Connector: **JAUDIO**

Type: 10-pin (2 x 5) 2.54-pitch header

Pin	Description	Pin	Description
1	Line – Left	2	Ground
3	Line – Right	4	MICIN
5	MICIN	6	Ground
7	N/C	8	Line Out – Left
9	Line Out – Right	10	Ground

Connector: **CDIN**

Type: 4-pin header

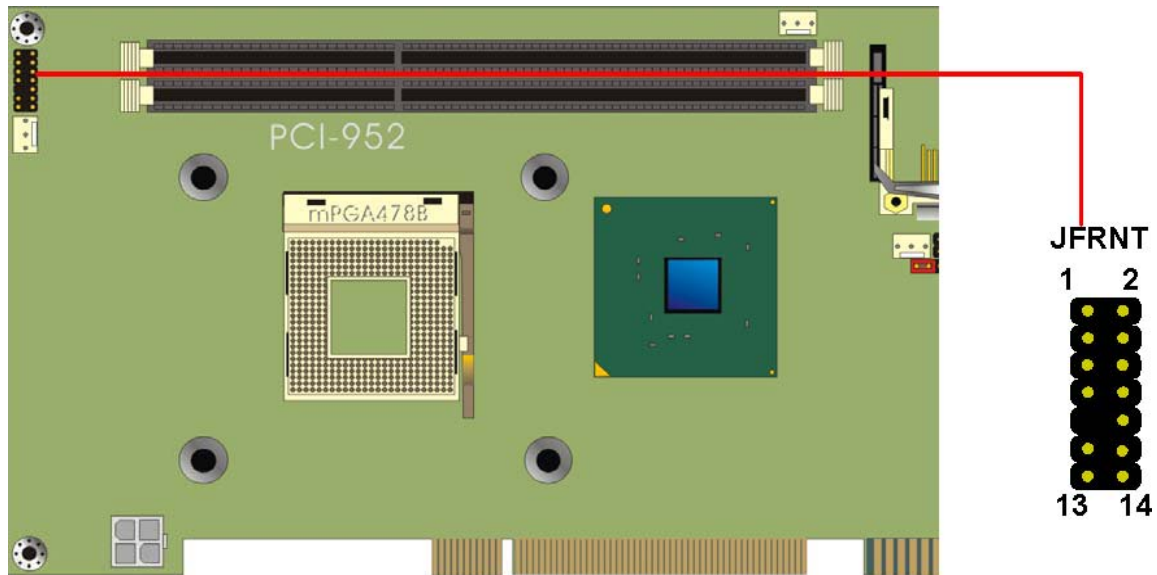
Pin	Description
1	CD – Left
2	Ground
3	Ground
4	CD – Right

Connector: **SPDIF(Optional for ALC650)**

Type: 5-pin header

Pin	Description
1	AC5Vt
2	N/C
3	SPDIFOUT
4	GND
5	SPDIFIN

2.11 Switch and Indicator



Connector: **JFRNT**

Type: onboard 14-pin (2 x 7) 2.54-pitch header

Function	Signal	PIN		Signal	Function	
IDE LED	Vcc (+)	1		2	(+) Vcc	
	Active	3		4	N/C	
Reset	Reset	5		6	GND	Power LED
	GND	7		8	Vcc	
N/C		9		10	N/C	Speaker
Power	PWRBT	11		12	N/C	
Button	5VDU	13		14	SPK	

Chapter 3. BIOS Setup

The single board computer uses the Award BIOS for the system configuration. The Award BIOS in the single board computer is a customized version of the industrial standard BIOS for IBM PC AT-compatible computers. It supports Intel x86 and compatible CPU architecture based processors and computers. The BIOS provides critical low-level support for the system central processing, memory and I/O sub-systems.

The BIOS setup program of the single board computer let the customers modify the basic configuration setting. The settings are stored in a dedicated battery-backed memory, NVRAM, retains the information when the power is turned off. If the battery runs out of the power, then the settings of BIOS will come back to the default setting.

The BIOS section of the manual is subject to change without notice and is provided here for reference purpose only. The settings and configurations of the BIOS are current at the time of print, and therefore they may not be exactly the same as that displayed on your screen.

To activate CMOS Setup program, press key immediately after you turn on the system. The following message "Press DEL to enter SETUP" should appear in the lower left hand corner of your screen. When you enter the CMOS Setup Utility, the Main Menu will be displayed as **Figure 3-1**. You can use arrow keys to select your function, press <Enter> key to accept the selection and enter the sub-menu.

Figure 3-1. CMOS Setup Utility Main Screen

Phoenix – Award BIOS CMOS Setup Utility	
>Standard CMOS Features	>Frequency/Voltage Control
>Advanced BIOS Features	Load Fail-Safe Defaults
>Advanced Chipset Features	Load Optimized Defaults
>Integrated Peripherals	Set Supervisor Password
>Power Management Setup	Set User Password
>PnP / PCI Configurations	Save & Exit Setup
>PC Health Status	Exit Without Saving
Esc : Quit	↑ ↓ → ← : Select Item
F10 : Save & Exit Setup	

Chapter 4. Driver Installation

The driver CD contains folders for the following where the drivers can be found.

Install Chipset Driver

The selection helps you to install the INF of related chipset interface.

Install VGA Driver

The selection helps you to install the driver of onboard VGA interface.

Install LAN Driver

The selection helps you to install the driver of onboard LAN interface.

Install Audio Driver

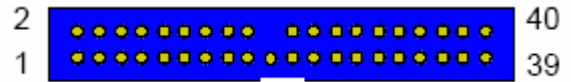
The selection helps you to install the driver of onboard audio interface.

Install USB 2.0 Driver

The selection helps you to install the driver of onboard USB 2.0 interface.

Appendix. A I/O Pin Assignment

A.1 IDE Port

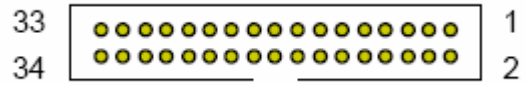


Connector: **IDE1, IDE2**

Type: 40-pin (2 x 20) 2.54-pitch box header

Pin	Description	Pin	Description
1	Reset	2	Ground
3	D7	4	D8
5	D6	6	D9
7	D5	8	D10
9	D4	10	D11
11	D3	12	D12
13	D2	14	D13
15	D1	16	D14
17	D0	18	D15
19	Ground	20	N/C
21	REQ	22	Ground
23	IOW-/STOP	24	Ground
25	IOR-/HDMARDY	26	Ground
27	IORDY/DDMARDY	28	IDESEL
29	DACK	30	Ground
31	IRQ	32	N/C
33	A1	34	CBLID
35	A0	36	A2
37	CS0 (MASTER CS)	38	CS1 (SLAVE CS)
39	LED ACT	40	Ground

A.2 Floppy Port

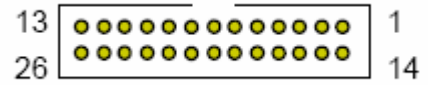


Connector: **FLOPPY**

Type: 34-pin (2 x 17) 2.54-pitch header

Pin	Description	Pin	Description
1	Ground	2	DRIVE DENSITY SELECT 0
3	Ground	4	DRIVE DENSITY SELECT 1
5	Ground	6	N/C
7	Ground	8	INDEX
9	Ground	10	MOTOR ENABLE A
11	Ground	12	DRIVER SELECT B
13	Ground	14	DRIVER SELECT A
15	Ground	16	MOTOR ENABLE B
17	Ground	18	DIRECTION
19	Ground	20	STEP
21	Ground	22	WRITE DATA
23	Ground	24	WRITE GATE
25	Ground	26	TRACK 0
27	Ground	28	WRITE PROTECT
29	Ground	30	READ DATA
31	Ground	32	HEAD SELECT
33	Ground	34	DISK CHANGE-

A.3 Parallel Port



Connector: **Printer**

Type: 26-pin (2 x 13) 2.54-pitch box header

Pin	Description	Pin	Description
1	STROBE	14	AUTO FEED
2	D0	15	ERROR-
3	D1	16	INITIALIZE
4	D2	17	SELECT INPUT
5	D3	18	Ground
6	D4	19	Ground
7	D5	20	Ground
8	D6	21	Ground
9	D7	22	Ground
10	ACKNOWLEDGE	23	Ground
11	BUSY	24	Ground
12	PAPER EMPTY	25	Ground
13	SELECT+	26	N/C

A.4 Serial Port

A.4.1 Onboard RS-232C Serial Port



Connector: **COM1**

Type: 10-pin (2 x 5) 2.54-pitch header

Pin	Description	Pin	Description
1	MDCD1	2	MSIN1
3	MSO1	4	MDTR1
5	Ground	6	MDSR1
7	MRTS1	8	MCTS1
9	MRI1	10	N/C



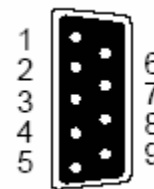
Connector: **COM2**

Type: 10-pin (2 x 5) 2.54-pitch header

Pin	Description	Pin	Description
1	MDCD2	2	MSIN2
3	MSO2	4	MDTR2
5	Ground	6	MDSR2
7	MRTS2	8	MCTS2
9	MRI2	10	N/C

Connector : **COM3** (Optional)

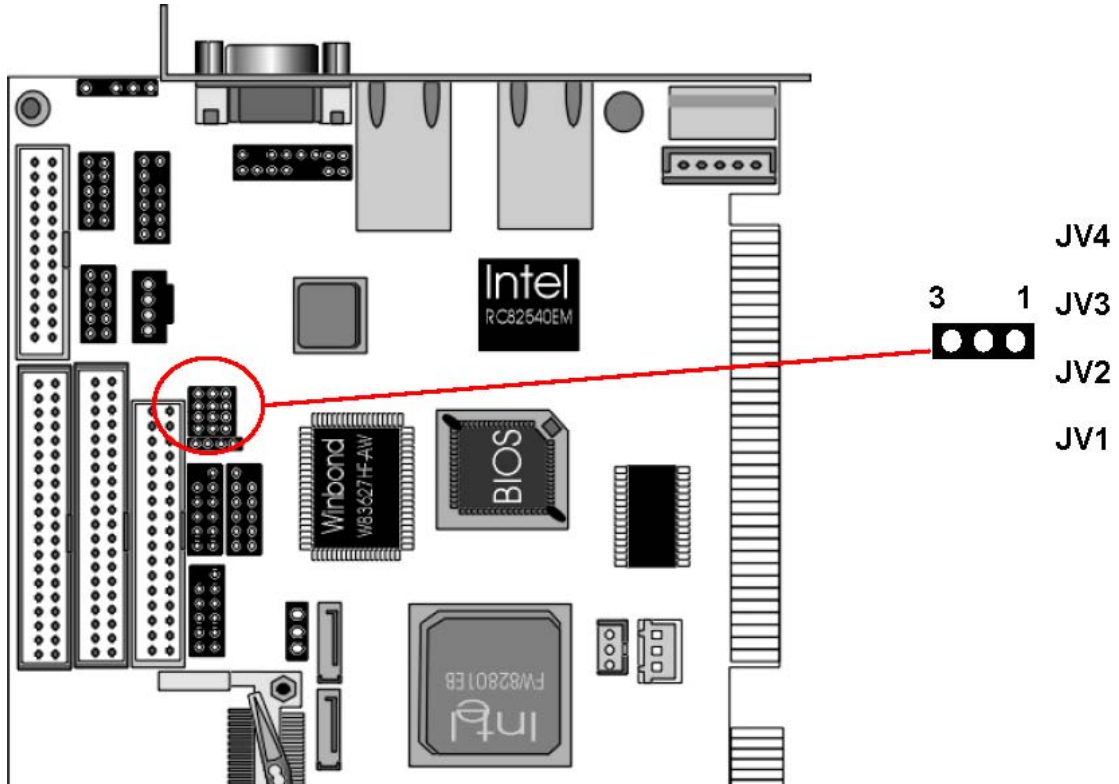
Type: 9-pin D-sub male connector on bracket



Pin	Description	Pin	Description
1	MDCD1	2	MSIN1
3	MSO1	4	MDTR1
5	Ground	6	MDSR1
7	MRTS1	8	MCTS1
9	MR11		

**Jumper: JV1/JV4 for COM1/COM3
JV2/JV3 for COM2**

Jumper	1-2	2-3
JV1	+12V	MRI/1 (Default)
JV2	+12V	MRI/2 (Default)
JV3	+5V	MDCD2 (Default)
JV4	+5V	MDCD1 (Default)



A.5 USB Port

Connector: **USB1, USB2**

Type: 10-pin (2 x 5) header for dual USB Ports



Pin	Description	Pin	Description
1	Vcc	2	Vcc
3	Data0-	4	Data1
5	Data0+	6	Data1+
7	Ground	8	Ground
9	Ground	10	N/C

A.6 IrDA Port

Connector: **IRDA**

Type: 5-pin (1 x 5) 2.54-pitch header for SIR Port

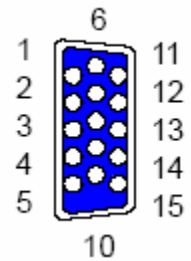


Pin	Description
1	Vcc
2	Ground
3	IRRXD
4	Ground
5	IRTXD

A.7 VGA Port

Connector: **VGA1**

Type: 15-pin D-sub female connector on bracket

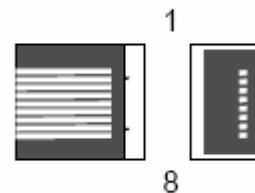


Pin	Description	Pin	Description	Pin	Description
1	RED	6	Ground	11	N/C
2	GREEN	7	Ground	12	5VCDA
3	BLUE	8	Ground	13	HSYNC
4	N/C	9	LVGA5V	14	VSYNC
5	Ground	10	Ground	15	5VCLK

A.8 LAN Port

Connector: **LAN1, LAN2**

Type: RJ45 connector with LED on bracket

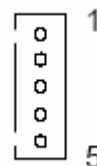


Pin	1	2	3	4	5	6	7	8	9	10
Description	TRD0+	TRD0-	TRD1+	TRD1-	NC	NC	TRD2+	TRD2-	TRD3+	TRD3-

A.9 AT Keyboard Port

Connector: **ATKB**

Type: 5-pin box header



Pin	1	2	3	4	5
Description	CLK	DATA	N/C	Ground	Vcc

A.10 PS/2 Keyboard and Mouse Port

Connector: **PS2**

Type: 6-pin MiniDIN connector on bracket



Pin	1	2	3	4	5	6
Description	KBD	MSD	Ground	N/C	KBC	MSC

Note: The PS/2 connector supports standard PS/2 keyboard directly or both PS/2 keyboard and mouse through the PS/2 Y-type cable. The cable is the standard on packing list.

Appendix B. Flash the BIOS

B.1 BIOS Auto Flash Tool

The board is based on Award BIOS and can be updated easily by the BIOS auto flash tool. You can download the tool online at the address below:

<http://www.award.com>

File name of the tool is “awdfash.exe”, it's the utility that can write the data into the BIOS flash ship and update the BIOS.

B.2 Flash Method

1. 1. Get the “.bin” file including the image of new BIOS you want to update.
2. 2. Power on the system and flash the BIOS.
3. 3. Re-star the system.

Appendix C. System Resource

C.1 I/O Port Address Map

Address	Range Device
x0000 - x000F	Direct Access Memory Controller
x0010 - x001F	Motherboard Resource
x0020 - x0021	Programmable Interrupt Controller
x0022 - x003F	Motherboard Resource
x0040 - x0043	System Clock
x0044 - x005F	Motherboard Resource
x0060 - x0060	Standard 101/102-Key or Microsoft Natural Keyboard
x0061 - x0061	System Clock
x0062 - x0063	Motherboard Resource
x0064 - x0064	Standard 101/102-Key or Microsoft Natural Keyboard
x0065 - x006F	Motherboard Resource
x0070 - x0073	System CMOS/ Real-time Clock
x0074 - x007F	Motherboard Resource
x0080 - x0090	Programmable Interrupt Controller
x0091 - x0093	Motherboard Resource
x0094 - x009F	Direct Access Memory Controller
x00A0 - x00A1	Programmable Interrupt Controller
x00A2 - x00BF	Motherboard Resource
x00C0 -x00DF	Direct Access Memory Controller
x00E0 - x00EF	Motherboard Resource
x00F0 - x00FF	Numeric Data Processor
x0170 - x0177	Intel(R) 82801EB Ultra ATA Storage Controllers
x0170 - x0177	Secondary IDE controller (dual fifo)
x01F0 - x01F7	Intel(R) 82801EB Ultra ATA Storage Controllers
x01F0 - x01F7	Primary IDE controller (dual fifo)
x0201 - x0201	Gameport Joystick
x02F8 - x02FF	Communication Port (COM2)
x0330 - x0331	MPU-401 Compatible
x0376 - x0376	Intel(R) 82801EB Ultra ATA Storage Controllers
x0376 - x0376	Secondary IDE controller (dual fifo)
x0378 - x037F	Printer Port (LPT1)

x03B0 - x03BB	Intel(R) 82865G Graphics Controller
x03C0 -x03DF	Intel(R) 82865G Graphics Controller
x03F0 - x03F5	Standard Floppy Controller
x03F6 - x03F6	Intel(R) 82801EB Ultra ATA Storage Controllers
x03F6 - x03F6	Primary IDE controller (dual fifo)
<hr/>	
x03F7 - x03F7	Standard Floppy Controller
x03F8 - x03FF	Communication Port (COM1)
x0400 - x04BF	Motherboard Resource
x04D0 -x04D1	Motherboard resource
x0500 - x051F	Intel(R) 82801EB SMBus Controller - 24D3
x0778 - x077B	Printer Port (LPT1)
x0A78 - x0A7B	Motherboard resource
x0B78 - x0B7B	Motherboard resource
x0BBC - x0BBF	Motherboard resource
x0CF8 - x0CFF	PCI Bus
x0E78 - x0E7B	Motherboard resource
x0F78 - x0F7B	Motherboard resource
x0FBC - x0FBF	Motherboard resource
x9000 - x901F	Intel(R) PRO/1000 CT Desktop Connection
x9000 - x9FFF	Intel(R) 82865G\PE\IP PCI to CSA bridge - 2573
xA000 - xA03F	Intel(R) PRO/1000 MT Desktop Adapter
xA000 - xAFFF	Intel(R) 82801EB PCI Bridge - 244E
xB000 - xB01F	Intel(R) 82801EB USB Universal Host Controller -24D2
xB400 - xB41F	Intel(R) 82801EB USB Universal Host Controller -24D4
xB800 - xB81F	Intel(R) 82801EB USB Universal Host Controller -24D7
xBC00 - xBC1F	Intel(R) 82801EB USB Universal Host Controller -24DE
xC000 -xC007	Intel(R) 82865G Graphics Controller
xC400 -xC407	Intel(R) 82801EB Ultra ATA Storage Controllers
xC400 -xC407	Primary IDE controller (dual fifo)
xC800 -xC803	Intel(R) 82801EB Ultra ATA Storage Controllers
xC800 -xC803	Primary IDE controller (dual fifo)
xCC00 - xCC07	Intel(R) 82801EB Ultra ATA Storage Controllers
xCC00 - xCC07	Secondary IDE controller (dual fifo)
xD000 -xD003	Intel(R) 82801EB Ultra ATA Storage Controllers
xD000 -xD003	Secondary IDE controller (dual fifo)
xD400 -xD407	Primary IDE controller (dual fifo)
xD400 -xD40F	Intel(R) 82801EB Ultra ATA Storage Controllers
xD408 -xD40F	Secondary IDE controller (dual fifo)
xDC00 - xDCFF	Realtek AC'97 Audio

xE000 - xE03F	Realtek AC'97 Audio
xF000 - xF007	Primary IDE controller (dual fifo)
xF000 - xF00F	Intel(R) 82801EB Ultra ATA Storage Controllers
xF008 -xF00F	Secondary IDE controller (dual fifo)

C.2 Memory Address Map

Address	Range Device
x00000000 - x0009FFFF	System board extension for ACPI BIOS
x000A0000 - x000AFFFF	Intel(R) 82865G Graphics Controller
x000B0000 - x000BFFFF	Intel(R) 82865G Graphics Controller
x000C0000 - x000CA1FF	Intel(R) 82865G Graphics Controller
x000CA200 - x000CBFFF	System board extension for ACPI BIOS
x000E0000 - x000EFFFF	System board extension for ACPI BIOS
x000F0000 - x000F7FFF	System board extension for ACPI BIOS
x000F8000 - x000FBFFF	System board extension for ACPI BIOS
x000FC000 - x000FFFFF	System board extension for ACPI BIOS
x00100000 - x0F7EFFFF	System board extension for ACPI BIOS
x0F7F0000 -x0F7FFFFF	System board extension for ACPI BIOS
xE8000000 - xEFFFFFFF	Intel(R) 82865G\PE\P Processor to I/O Controller -2570
xF0000000 - xF7FFFFF	Intel(R) 82865G Graphics Controller
xF8000000 - xF9FFFFF	Intel(R) 82801EB PCI Bridge - 244E
xF9000000 - xF901FFFF	Intel(R) PRO/1000 MT Desktop Adapter
xF9020000 - xF903FFFF	Intel(R) PRO/1000 MT Desktop Adapter
xFA000000 - xFA01FFFF	Intel(R) PRO/1000 CT Desktop Connection
xFA000000 - xFA0FFFFF	Intel(R) 82865G\PE\P PCI to CSA bridge -2573
xFA100000 - xFA17FFFF	Intel(R) 82865G Graphics Controller
xFA180000 - xFA1803FF	Intel USB 2.0 Enhanced Host Controller
xFA181000 - xFA1811FF	Realtek AC'97 Audio
xFA182000 - xFA1820FF	Realtek AC'97 Audio
xFEC00000 - xFEC00FFF	System board extension for ACPI BIOS
xFEC01000 - xFED8FFFF	System board extension for ACPI BIOS
xFEE00000 - xFEE00FFF	System board extension for ACPI BIOS
xFFB00000 - xFFBFFFFF	System board extension for ACPI BIOS
xFFFF0000 - xFFFFFFF	System board extension for ACPI BIOS

C.3 IRQ and DMA Resource

C.3.1 IRQ

IRQ Number	Device
0	Secondary IDE controller (dual fifo)
0	Intel(R) 82801EB Ultra ATA Storage Controllers
0	System Clock
1	Standard 101/102-Key or Microsoft Natural Keyboard
2	Programmable Interrupt Controller
3	Communication Port (COM2)
4	Communication Port (COM1)
5	Primary IDE controller (dual fifo)
5	Intel(R) 82801EB Ultra ATA Storage Controllers
5	Intel(R) 82801EB USB Universal Host Controller -24DE
5	Intel(R) 82801EB USB Universal Host Controller -24D7
5	Intel(R) 82801EB USB Universal Host Controller -24D2
5	Intel(R) 82865G Graphics Controller
5	ACPI IRQ Holder for PCI IRQ Steering
5	ACPI IRQ Holder for PCI IRQ Steering
6	Standard Floppy Controller
7	Printer Port (LPT1)
8	System CMOS/ Real-time Clock
9	Intel(R) PRO/1000 MT Desktop Adapter
9	Realtek AC'97 Audio
9	Intel(R) 82801EB SMBus Controller -24D3
9	ACPI IRQ Holder for PCI IRQ Steering
9	SCI IRQ used by ACPI bus
10	MPU-401 Compatible
11	Intel USB 2.0 Enhanced Host Controller
11	Intel(R) 82801EB USB Universal Host Controller -24D4
11	Intel(R) PRO/1000 CT Desktop Connection
11	ACPI IRQ Holder for PCI IRQ Steering
11	ACPI IRQ Holder for PCI IRQ Steering
12	PS/2 Compatible Mouse
13	Numeric Data Processor
14	Primary IDE controller (dual fifo)
14	Intel(R) 82801EB Ultra ATA Storage Controllers
15	Secondary IDE controller (dual fifo)

C.3.2 DMA

Channel	Device
0	(free)
1	(free)
2	Standard Floppy Disk Controller
3	(free)
4	Direct Memory Access Controller
5	(free)
6	(free)
7	(free)
