

EPI-1813

基于 Luna Pier Refresh 平台的低
功耗 EPI 主板

**EPI Motherboard Based on Luna
Pier Refresh Platform with Low
Power Consumption**

Version: C00



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安全使用小常识

1. 产品使用前，务必仔细阅读产品说明书；
2. 对未准备安装的板卡，应将其保存在防静电保护袋中；
3. 在从防静电保护袋中拿出板卡前，应将手先置于接地金属物体上一会儿（比如 10 秒钟），以释放身体及手中的静电；
4. 在拿板卡时，需佩戴静电保护手套，并且应该养成只触及及其边缘部分的习惯；
5. 为避免人体被电击或产品被损坏，在每次对主板、板卡进行拔插或重新配置时，须先关闭交流电源或将交流电源线从电源插座中拔掉；
6. 在需对板卡或整机进行搬动前，务必先将交流电源线从电源插座中拔掉；
7. 对整机产品，需增加 / 减少板卡时，务必先拔掉交流电源；
8. 当您需连接或拔除任何设备前，须确定所有的电源线事先已被拔掉；
9. 为避免频繁开关机对产品造成不必要的损伤，关机后，应至少等待 30 秒后再开机。

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第一章 产品介绍

简介

EPI-1813系列主板是基于Intel® Luna Pier Refresh平台开发的符合研祥EPI2.0规范的全长卡主板。

主板采用板载Intel® Atom™D510（双核）/D410（单核）处理器 + ICH8M的技术方案实现。此板板载的超低功耗处理器内部集成了内存控制器和图形控制器。板上提供1个SO-DIMM DDR2插槽和板载1GB DDR2内存（板载内存可选），最大内存容量可达2GB。支持VGA、LVDS显示；2个10/100/1000Mbps网络接口，其中LAN1支持网络唤醒；1个HDA音频接口；3个SATA II硬盘接口，1个CF卡接口；8个USB 2.0接口；2个COM口，其中COM1支持Modem唤醒；1个并口；1个PS/2键盘鼠标接口；扩展符合研祥EPI2.0规范；主板采用底板ATX电源供电。

此产品可广泛应用于环保，数控，交通等领域。

机械尺寸、重量与环境

- 外形尺寸：351.5mm（长）×146.7mm（宽）×30.2mm（高）
- 净重：0.45Kg；
- 工作环境：
 - 温度：0℃～60℃；
 - 湿度：5%～90%（非凝结状态）；
- 贮存环境：
 - 温度：-20℃～80℃；
 - 湿度：5%～90%（非凝结状态）；

典型功耗

CPU: 板载Intel® Atom™D510 内存: DDRII 800 MHz 2GB Samsung

- +5V@1.52A; +5%/-3%;
- +3.3V@0.55A; +5%/-3%;
- +12V@0.42A; +5%/-3%;

微处理器

板载Intel® Atom™ D510 (双核) /D410 (单核) 处理器, 内部集成了内存控制器和图形控制器。

芯片组

Intel® Atom™D510/D410处理器 + ICH8M。

系统内存

提供1个SO-DIMM DDR2插槽和板载1GB DDR2内存(板载内存可选), 支持Un-buffered Non-ECC内存。支持最大内存容量2GB, 支持的内存频率为667MHz。

显示功能

采用CPU内置集成图形控制器, 支持VGA、单通道18位LVDS显示。VGA支持最大分辨率及刷新率为2048×1536@60Hz; LVDS支持的最大分辨率为1366×768。

网络功能

提供2个10/100/1000Mbps网络接口, LAN1可支持网络唤醒功能。

音频功能

采用ALC888音效芯片, 支持HDA, 支持MIC-in/Line-in/Line-out功能。

电源特性

主板采用底板ATX电源供电，支持ACPI1.0b规范，支持S0、S1、S4、S5状态。

扩展总线

1组EPI总线扩展连接器，符合研祥EPI2.0规范。通过EPI 2.0总线标准底板，可扩展PCI和ISA接口。

Watchdog功能

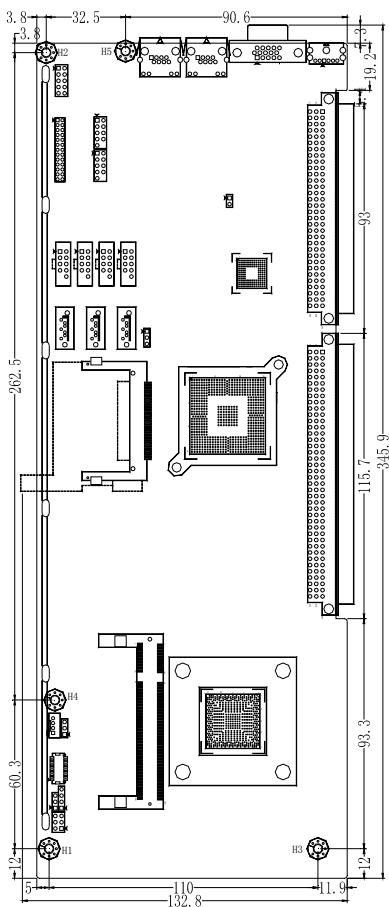
- 255级，可编程按分或秒；
- 支持看门狗超时中断或复位系统。

I/O接口

- 提供 2 个串口，支持 RS-232 模式，采用 2×5pin 插针引出，其中 COM1 支持 Modem 唤醒功能；
- 提供 1 个并口，采用 2×13pin 插针引出；
- 提供 3 个 SATA II 接口；
- 提供 1 个 CF 卡接口（TYPE2 型接口）；
- 提供 8 个 USB2.0 接口，采用 2×5pin 插针引出；
- 提供 1 个 PS/2 接口，采用二合一接口形式引出。

第二章 安装说明

产品外形尺寸图

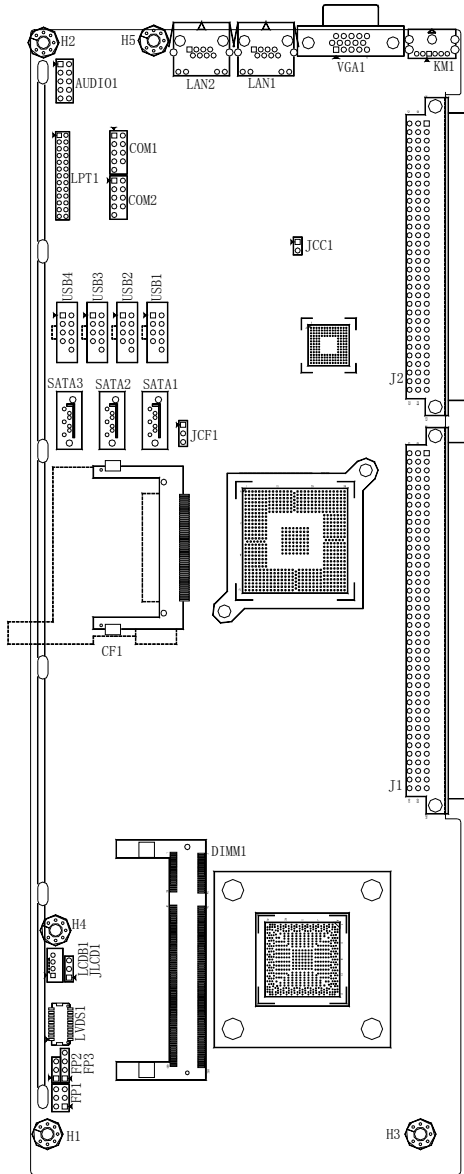


单位：mm

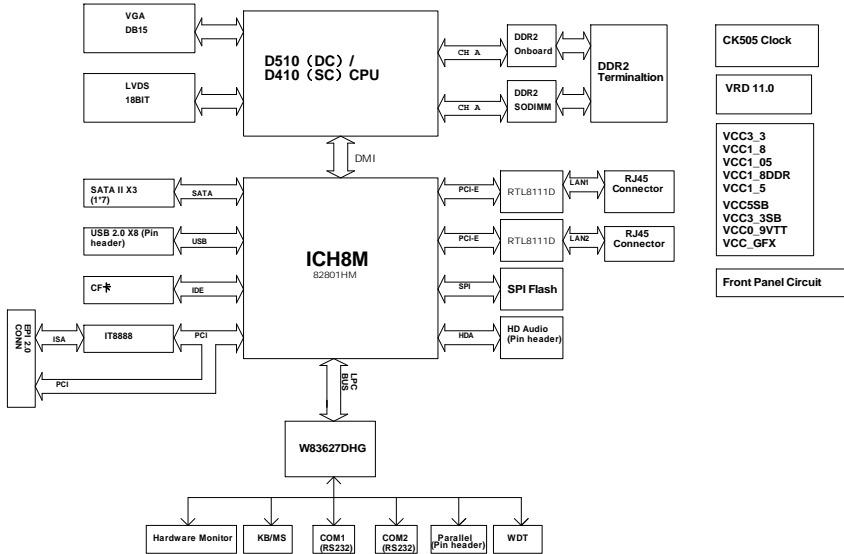
警告！

请务必选择合适的螺钉和使用正确的安装方法（包括板卡定位、CPU、散热器等安装），否则可能损坏板。此板推荐 H1~H5 使用 M3×6 GB9074. 4-88 螺钉。

接口位置示意图



架构图




提示：如何识别跳线、接口第一脚

- 1、观察插头、插座旁边的文字标记，通常用“1”或加粗的线条或三角符号表示。
- 2、看看背面的焊盘，通常方型焊盘为第一脚。

跳线设置

JCC1: CMOS内容清除/保持设置 (脚距: 2.54mm)

CMOS由板上钮扣电池供电。清CMOS会导致永久性消除以前系统配置并将其设为原始(工厂设置)系统设置。其步骤:(1)关闭计算机,断开电源;(2)瞬间短接JCC1插针;(3)开计算机;(4)启动时按屏幕提示按键进入BIOS设置,重新加载最优缺省值;(5)保存并退出设置。设置方式如下:

	设置	功能
 JCC1	1-2 开路	正常工作状态(Default)
	1-2 短路	清除 CMOS 内容, 所有 BIOS 设置恢复成出厂值。

JLCD1: LCD工作电压选择 (脚距: 2.54mm)

不同的 LCD 屏电压可能不同, 本板提供了 3.3V 和 5V 两种电压选择, 当所选择的 LCD 电压与所使用的 LCD 屏的工作电压一致时, LCD 屏才能正常显示。设置方式如下:

	设置	功能
 JLCD1	1-2 短路	+3.3V(Default)
	2-3 短路	+5V

JCF1: CF卡工作电压选择 (脚距: 2.54mm)

不同的 CF 卡的工作电压可能不同, 本板提供了 3.3V 和 5V 两种电压选择, 当所选择的 CF 卡工作电压与所使用的 CF 卡工作电压一致时, 才能保证系统的稳定性。设置方式如下:

	设置	功能
 JCF1	1-2 短路	+3.3V
	2-3 短路	+5V(Default)

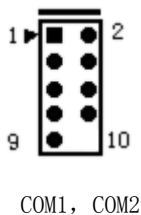
系统内存的安装

本板提供 1 条 200Pin DDR II SO-DIMM 插槽 (DIMM1)。安装内存条时, 要注意以下几点:

- 拨开内存槽两边的耳扣, 安装时先将内存条的缺口和内存槽的缺口对准后再向下用力压到位。
- 使用符合该主板 Intel® Chipset 所支持的 1.8V DDR II 667MHz 规格的内存, 主板支持最大内存容量达 2GB。
- 最好选择带 SPD (内存自动识别功能) 的内存条, 以保证内存条工作稳定。

串口

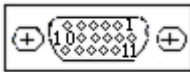
提供 2 个 2×5Pin 插针串口 (脚距: 2.54mm), 支持 RS-232 模式, 管脚定义如下:



管脚	信号名称
1	DCD#
2	RXD
3	TXD
4	DTR#
5	GND
6	DSR#
7	RTS#
8	CTS#
9	RI#
10	NA

显示接口

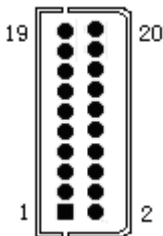
1、 本板提供1个标准DB15 VGA接口，管脚定义如下：



VGA1

管脚	信号名称	管脚	信号名称
1	Red	2	Green
3	Blue	4	NC
5	GND	6	GND
7	GND	8	GND
9	+5V	10	GND
11	NC	12	DDCDATA
13	HSYNC	14	VSYNC
15	DDCCLK		

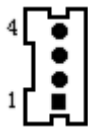
2、 本板提供1个单通道18位LVDS接口（LVDS1；脚距：1.0mm）。管脚定义如下：



LVDS1

管脚	信号名称	管脚	信号名称
1	LVDS_D0+	2	LVDS_D0-
3	GND	4	GND
5	LVDS_D1+	6	LVDS_D1-
7	GND	8	GND
9	LVDS_D2+	10	LVDS_D2-
11	GND	12	GND
13	CLK+	14	CLK-
15	GND	16	GND
17	NC	18	NC
19	VDD	20	VDD

LCD背光控制接口



LCDB1

(脚距: 2.0mm)

管脚	信号名称
1	VCC_LCDBKLT
2	LCD_BKLTCTL
3	LCD_BKLTEN
4	GND

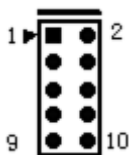
注: VCC_LCDBKLT---+12V背光电源 (此脚电流限制在1A以下);

LCD_BKLTCTL---背光控制 (该信号由Pineview D输出, 为PWM信号, 电压幅值0V~3.3V, 占空比在0~100%之间);

LCD_BKLTEN ---背光使能, 高有效。

音频接口

提供1个2×5Pin插针音频接口 (脚距: 2.54mm), 管脚定义如下:



AUDIO1

管脚	信号名称	管脚	信号名称
1	LOUT_R	2	LOUT_L
3	GND_AUDIO	4	GND_AUDIO
5	LIN_R	6	LIN_L
7	GND_AUDIO	8	GND_AUDIO
9	MIC_L	10	MIC_R

SATA接口

提供3个SATA插座, 管脚定义如下:



SATA1~SATA3

管脚	信号名称
1	GND
2	TX+
3	TX-
4	GND
5	RX-
6	RX+
7	GND

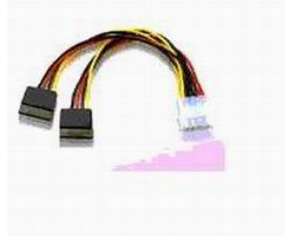
SATA硬盘热插拔

SATA 硬盘热插拔需注意：

- (1) 硬盘必须支持：SATA 2.0 接口，并且采用 15 芯 SATA 硬盘电源接口。
- (2) 芯片组驱动程序支持 SATA 硬盘的热插拔。
- (3) 不能对操作系统所在的 SATA 硬盘进行带电热插拔。



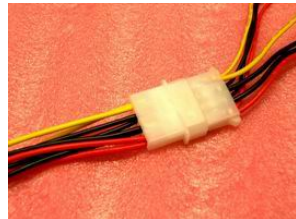
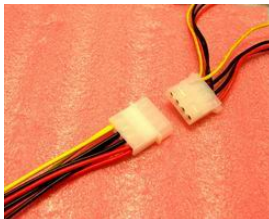
SATA 硬盘数据线



SATA 硬盘电源线

请按照如下步骤进行 SATA 硬盘热插拔，否则，操作不当会导致硬盘损坏和数据丢失。

热插入SATA硬盘步骤：



步骤1：请将SATA电源线1x4-针脚(白色)一端接到电源适配器的1x4-针脚电源线一端。



步骤2：将SATA 数据线接到主板上的SATA接口。



步骤3: 将SATA电源线15-针脚接口(黑色)一端接到SATA硬盘。



步骤4: 将SATA数据线接到SATA硬盘。

热拔出SATA硬盘步骤:

步骤 1: 从设备管理器中卸载该硬盘。



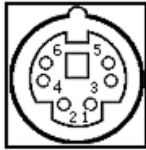
步骤 2: 从 SATA 硬盘一侧拔去 SATA 数据线。



步骤 3: 从 SATA 硬盘一侧拔去 SATA 15-针脚电源线接口(黑色)。

二合一鼠标键盘接口

本板提供1个二合一鼠标键盘插座。

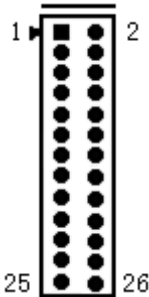


KM1

管脚	信号名称
1	KB_DATA
2	MS_DATA
3	GND
4	+5V
5	KB_CLK
6	MS_CLK

并口

本板提供1个2×13Pin插针并口（脚距：2.0mm）。

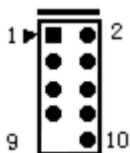


LPT1

管脚	信号名称	管脚	信号名称
1	STB#	2	AFD#
3	PD0	4	ERR#
5	PD1	6	INIT#
7	PD2	8	SLIN#
9	PD3	10	GND
11	PD4	12	GND
13	PD5	14	GND
15	PD6	16	GND
17	PD7	18	GND
19	ACK#	20	GND
21	BUSY	22	GND
23	PE	24	GND
25	SLCT	26	NC

USB接口

本板提供4组2×5Pin插针的USB接口（脚距：2.54mm），可连接8个标准的USB设备。管脚定义如下：

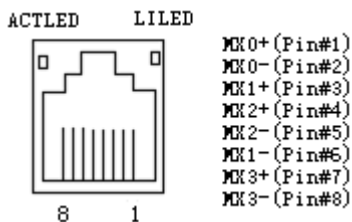


USB1~USB4

管脚	信号名称	管脚	信号名称
1	+5V	2	+5V
3	USB1_Data-	4	USB2_Data-
5	USB1_Data+	6	USB2_Data+
7	GND	8	GND
9	NA	10	GND

网络接口

本板提供2个10/100/1000Mbps网络接口（LAN1、LAN2）。其中LAN1支持网络唤醒功能。ACTLED和LILED是以太网接口两边的绿色和双色LED，它们显示着LAN的活动指示状态和网络速度指示状态。请参考以下每一个LED的状态描述：

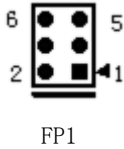


LAN1、LAN2

ACTLED (单色：绿色灯)	网络活动 指示状态	LILED (双色：橙绿双色)	网络速度 指示状态
		绿色	1000Mbps
闪烁	有数据传输	橙色	100Mbps
灭	无数据传输	灭	10Mbps

状态指示控制接口

ATX电源开关及硬盘指示灯接口（脚距：2.54mm）



管脚	信号名称	管脚	信号名称
1	PWRBTN#	2	GND
3	GND	4	RESET#
5	HDD_LED-	6	HDD_LED+

电源指示灯接口（脚距：2.54mm）



管脚	信号名称
1	PWR_LED+
2	NC
3	GND

扬声器输出接口（脚距：2.54mm）



管脚	信号名称
1	SPEAKER
2	NC
3	GND
4	+5V

CF接口

本板提供1个标准CF卡插座（CF1）。

管脚	信号名称	管脚	信号名称
1	GND	26	CD1#
2	D3	27	D11
3	D4	28	D12
4	D5	29	D13
5	D6	30	D14
6	D7	31	D15
7	CS0#	32	CS1#
8	GND	33	VS1#
9	ATASEL#	34	IOR#
10	GND	35	IOW#
11	GND	36	WE#
12	GND	37	IRQ
13	VCC	38	VCC
14	GND	39	CSEL#
15	GND	40	VS2#
16	GND	41	RESET#
17	GND	42	IORDY
18	A2	43	DREQ
19	A1	44	DACK#
20	A0	45	DASP#
21	D0	46	ATA66_DET
22	D1	47	D8
23	D2	48	D9
24	WP/IOCS16#	49	D10
25	CD2#	50	GND

第三章 BIOS功能简介

简介

BIOS (Basic Input and Output System: 基本输入输出系统) 固化在 CPU 板上的闪存存储器中, 主要功能包括: 初始化系统硬件, 设置各系统部件的工作状态, 调整各系统部件的工作参数, 诊断系统各部件的功能并报告故障, 给上层软件系统提供硬件操作控制接口, 引导操作系统等。BIOS 提供用户一个菜单式的人机接口, 方便用户配置各系统参数设置, 控制电源管理模式, 调整系统设备的资源分配等等。

正确设置 BIOS 各项参数, 可使系统稳定可靠地工作, 同时也能提升系统的整体性能。不适当的甚至错误的 BIOS 参数设置, 则会使系统工作性能大为降低, 使系统工作不稳定, 甚至无法正常工作。

BIOS参数设置

每当系统接通电源, 正常开机后, 便可看见进入 BIOS 设置程序提示的信息。此时(其它时间无效), 按下提示信息所指定的按键(通常为键)即可进入 BIOS 设置程序。

CMOS 中 BIOS 设置内容被破坏时, 系统也会要求进入 BIOS 设置或选择某种默认设置值。

通过BIOS修改的所有设置值都保存在系统的CMOS存储器中, 该CMOS存储器由电池供电, 即使切断外部电源, 其内容也不会丢失, 除非执行清除CMOS内容的操作。

注意! BIOS的设置直接影响到电脑的性能, 设置错误的参数将造成电脑的损坏, 甚至不能开机, 请清CMOS后再使用BIOS内置缺省值来恢复系统正常运行。

由于本公司不断研发更新BIOS, 其设置界面也会略有不同, 以下的画面供您参考, 有可能跟您目前所使用的BIOS设置程序不完全相同。

BIOS基本功能设置

当SETUP程序启动之后，您可以看到CMOS Setup Utility主画面如下：

BIOS SETUP UTILITY	
System Overview	←→ Select Screen ↑↓ Select Item + - Change Field Tab Select Field F1 General Help F10 Save and Exit ESC Exit
Processor Type : Intel(R) Atom(TM) CPU D510 @ 1.66GHz Speed :1666MHz Cores :2	
System Memory Size :1015MB	
System Time [00:47:55] System Date [Mon 01/11/2010]	
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◆ Main

➤ System Time

选择此选项，用< + > / < - >来设置目前的时间。以时/分/秒的格式来表示。各项目合理的范围是：Hour/时(00-23)， Minute/分(00-59)， Second/秒(00-59)。

➤ System Date

选择此选项，用< + > / < - >来设置目前的日期。以月/日/年的格式来表示。各项目合理的范围是：Month/月(Jan.-Dec.)， Date/日(01-31)， Year/年(最大至 2099)， Week/星期(Mon. ~ Sun.)。

◆ **Advanced**

BIOS SETUP UTILITY	
Advanced Settings	Configure CPU
WARNING:Setting wrong values in below sections may cause system to malfunction	
<ul style="list-style-type: none"> ▶CPU Configuration ▶IDE Configuration ▶Super I/O Configuration ▶ISA I/O Decode Configuration ▶ISA Memory Decode Configuration ▶Hardware Health Configuration ▶USB Configuration ▶Power Management Configuration ▶Clock Generator Configuration 	←→ Select Screen ↑ ↓ Select Item Enter Go to Sub Screen Tab Select Field F1 General Help F10 Save and Exit ESC Exit
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➤ **CPU Configuration**

BIOS SETUP UTILITY	
Configure advanced CPU settings	
Brand String:	
Intel(R) Atom(TM) CPU D510 @ 1.66GHz	
Frequency; :1.66GHz	
FSB Speed; :667MHz	←→ Select Screen
Cache L1; :48 KB	↑ ↓ Select Item
Cache L2; :1024 KB	+ - Change Field
Ratio Actual Value :10	Tab Select Field
Hyper Threading Technology [Enabled]	F1 General Help
	F10 Save and Exit
	ESC Exit
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● **Hyper Threading Technology**

Intel Hyper Threading Technology功能的控制开关。

➤ **IDE Configuration**

BIOS SETUP UTILITY	
IDE Configuration	
ATA/IDE Configuration	[Enhanced]
Configure SATA as	[IDE]
▶ Primary IDE Master	: [Not Detected]
▶ Primary IDE Slave	: [Not Detected]
▶ Secondary IDE Master	: [Not Detected]
▶ Secondary IDE Slave	: [Not Detected]
▶ Third IDE Master	: [Not Detected]
▶ Third IDE Slave	: [Not Detected]

← → Select Screen
 ↑ ↓ Select Item
 + - Change Field
 Tab Select Field
 F1 General Help
 F10 Save and Exit
 ESC Exit

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● **ATA/IDE Configuration**

此选项用来配置ATA的工作模式，Enhanced和Compatible分别对应增强模式和兼容模式。

● **Configure SATA as**

SATA控制器的类型选择，对应IDE和AHCI选择项，仅在ATA/IDE。

Configuration为增强模式时才支持AHCI。

AHCI功能同时需要硬件芯片和操作系统支持。

● **Legacy IDE Channels**

配置兼容模式下IDE通道类型，对应SATA Only，SATA Pri，PATA Sec和PATA Only选择项。

● **Primary~Third IDE Master/Slave**

*** Type**

Not Installed: 系统没有检测到IDE设备

AUTO: 系统开机自动检测IDE参数

CD/DVD: 用于ATAPI CDRROM

ARMD: 用于各种模拟IDE设备

*** LBA/Large Mode**

用于设置是否支持LBA模式。

*** Block(Multi-sector Transfer)**

用于设置是否支持多扇区同时传输的功能。

*** PIO Mode**

用于PIO模式设置。

*** DMA Mode**

用于DMA模式设置。

*** S. M. A. R. T**

此选项用于设置是否启用硬盘S. M. A. R. T功能，只对支持该功能的硬盘有效。

*** 32Bit Data Transfer**

此选项用于使能32位的硬盘访问模式，可以使硬盘读写速度达到最佳。

● **AHCI Port0~2**

AHCI 端口配置菜单，仅在SATA控制器配置成AHCI或RAID时显示。

*** SATA Port0~2**

Auto: 系统开机自动检测SATA设备。

Not Installed: 关闭该端口，不做检测。

*** S. M. A. R. T**

此选项用于设置是否启用硬盘S. M. A. R. T功能，只对支持该功能的硬盘有效。

➤ **Super I/O Configuration**

BIOS SETUP UTILITY	
Configure Super I/O Chipset	Allows BIOS to Enable or Disable Floppy Controller.
Floppy A [Disabled]	
OnBoard Floppy Controller [Enabled]	←→ Select Screen
Serial Port1 Address [3F8/IRQ4]	↑ ↓ Select Item
Serial Port2 Address [2F8/IRQ3]	+ - Change Field
Parallel Port Address [378]	Tab Select Field
Parallel Port Mode [Normal]	F1 General Help
Parallel Port IRQ [IRQ7]	F10 Save and Exit
	ESC Exit
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● **Floppy A**

软盘驱动器类型配置。

● **OnBoard Floppy Controller**

用于使能软驱控制器。

● **Serial Port 1 Address**

(缺省值为3F8H/IRQ4)，设定主机板上串口1的地址及IRQ，选项有：Disabled、3F8H/IRQ4、3E8/IRQ4、2E8/IRQ3、2F8H/IRQ3。

● **Serial Port 2 Address**

(缺省值为2F8H/IRQ3)，设定主机板上串口2的地址及IRQ，选项有：Disabled、3F8H/IRQ4、3E8/IRQ4、2E8/IRQ3、2F8H/IRQ3。

● **Parallel Port Address**

设定主机板上并口的地址，地址缺省值为378。

● **Parallel Port Mode**

设定主机板上并口的模式。

● **Parallel Port IRQ**

设定主机板上并口的中断。

➤ **ISA I/O Decode Configuration**

BIOS SETUP UTILITY	
Configure ISA I/O Address	
Decode I/O Space 0	[Enabled]
Decode I/O Base 0	[0100h]
Decode I/O Size 0	[64 Bytes]
Decode I/O Space 1	[Enabled]
Decode I/O Base 1	[0140h]
Decode I/O Size 1	[32 Bytes]
Decode I/O Space 2	[Enabled]
Decode I/O Base 2	[0200h]
Decode I/O Size 2	[128 Bytes]
Decode I/O Space 3	[Enabled]
Decode I/O Base 3	[0300h]
Decode I/O Size 3	[64 Bytes]
Decode I/O Space 4	[Enabled]
Decode I/O Base 4	[0340h]
Decode I/O Size 4	[32 Bytes]
Decode I/O Space 5	[Enabled]
Decode I/O Base 5	[0A70h]
Decode I/O Size 5	[16 Bytes]
	←→ Select Screen ↑ ↓ Select Item + - Change Field Tab Select Field F1 General Help F10 Save and Exit ESC Exit
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● **Decode I/O Space(0-5)**

I/O解码空间开关(n)。

● **Decode I/O Base(0-5)**

I/O解码空间基地址。

● **Decode I/O Size(0-5)**

I/O解码空间大小。

➤ **ISA Memory Decode Configuration**

BIOS SETUP UTILITY	
Configure ISA Memory Address	←→ Select Screen
Memory Space 0 [Disabled]	↑ ↓ Select Item
Memory Space 1 [Disabled]	+ - Change Field
Memory Space 2 [Disabled]	F1 General Help
Memory Space 3 [Disabled]	F10 Save and Exit
	ESC Exit
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● **Memory Space(0-3)**

Memory解码空间开关。

● **Decode MEM Base(0-3)**

Memory解码空间基地址。

● **Decode Size(0-3)**

Memory解码空间大小。

➤ **Hardware Health Configuration**

BIOS SETUP UTILITY	
Hardware Health Configuration	Enables Hardware Health Monitoring Device
System Temperature : 30°C/86°F	
CPU Temperature : 37°C/98°F	
Vcore : 1.136 V	←→ Select Screen
V3.3 : 3.296 V	↑ ↓ Select Item
V5.0 : 5.094 V	+ - Change Field
V12.0 : 12.196 V	Tab Select Field
VBAT : 3.152 V	F1 General Help
	F10 Save and Exit
	ESC Exit
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- **System Temperature**

当前系统温度，一般主板上热敏电阻监测。

- **CPU Temperature**

当前CPU温度。CPU的温度由板上的温度传感器监测。

- **Vcore**

CPU核心电压。

- **V3.3/ V5.0/ V12.0**

开关电源输出电压。

- **VBAT**

电池电压监测。

➤ **USB Configuration**

BIOS SETUP UTILITY	
USB Configuration	Enables USB host controllers.
USB Devices Enabled :	
1 Keyboard, 1 Drive	
USB Function [8 USB Ports]	←→ Select Screen
USB 2.0 Controller [Enabled]	↑ ↓ Select Item
Legacy USB Support [Auto]	+ - Change Field
▶ USB Mass Storage Device Configuration	F1 General Help
	F10 Save and Exit
	ESC Exit
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- **USB Function**

此选项设置USB控制器的数量，即确定支持几个USB控制器，通常一个控制器有两个USB接口。

- **USB 2.0 Controller**

此选项用来选择是否支持USB 2.0 控制器。

- **Legacy USB Support**

此选项用于支持传统的USB设备（键盘，鼠标，存储设备等），当该项设为Enabled时，即使不支持USB的操作系统如DOS下也能使用USB设备。

- **USB Mass Storage Device Configuration**

此选项用于配置USB块存储设备，其中包括Reset 延时设置及枚举类型。

➤ **Power Management Configuration**

BIOS SETUP UTILITY	
Power Management Configuration	
ACPI APIC Support	[Enabled]
Restore on AC Power Loss	[Last state]
Resume on RTC Alarm	[Disabled]
	←→ Select Screen ↑ ↓ Select Item + - Change Field F1 General Help F10 Save and Exit ESC Exit
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- **ACPI APIC Support**

此选项用于打开或关闭ACPI OS下的APIC（高级中断控制器）。

- **Restore on AC Power Loss**

使用该选项可以设置计算机在交流电停电而后再来电时系统所处状态。

“Power Off”，让系统处于关机状态，“Power On”，系统自动开启，“Last State”，则保持到断电前的状态。

- **Resume on RTC Alarm**

此项用来打开或关闭系统闹钟，当到达指定时间时，会将系统从节电模式甚至关机状态唤醒，该功能必须有ATX电源的支持。

➤ **Clock Generator Configuration**

BIOS SETUP UTILITY	
Configure Clock Generator	←→ Select Screen
Spread Spectrum [Enabled]	↑ ↓ Select Item
Auto PCI Clock [Enabled]	+ - Change Field
	F1 General Help
	F10 Save and Exit
	ESC Exit
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● **Spread Spectrum**

此选项用来控制时钟信号的展频功能。

● **Auto PCI Clock**

此选项用来实现PCI槽上设备的自动侦测，如果槽上无设备，则关闭该槽对应的时钟信号。

◆ **Chipset**

BIOS SETUP UTILITY	
Advanced Chipset Settings	
WARNING: Setting wrong values in below sections may cause system to malfunction.	
North Bridge Chipset Configuration	
DRAM Frequency [Auto]	
Configure DRAM Timing by SPD [Enabled]	←→ Select Screen
Initiate Graphic Adapter [PCI/IGD]	↑ ↓ Select Item
Boot Display Device [CRT+LVDS]	Enter Go to Sub Screen
Flat Panel Type [800x600/S/18/G104S]	F1 General Help
UserDefine Panel Type [Disabled]	F10 Save and Exit
	ESC Exit
South Bridge Chipset Configuration	
Onboard Audio Controller [Enabled]	
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➤ **DRAM Frequency**

配置DRAM的频率，此处建议使用自动，手动更改配置可能会因为DRAM不支持而不开机。

➤ **Configure DRAM Timing by SPD**

BIOS按照SPD芯片上的内容配置SDRAM内存的时序。绝大多数内存条上有一个保存内存时序和容量等参数的一个小芯片，即SPD芯片。

➤ **Initiate Graphic Adapter**

此选项用于指定优先启动的显示设备类型。

➤ **Boot Display Device**

此选项用于选择开机默认的显示输出设备。

➤ **Flat Panel Type**

此选项用于选择Flat Panel的分辨率。

➤ **UserDefine Panel Type**

可以根据用户自定义配置平板显示类型。

➤ **Onboard Audio Controller**

选择是否打开声卡控制器。

◆ **PCIPnP**

BIOS SETUP UTILITY	
Advanced PCI/PnP Settings	
WARNING: Setting wrong values in below sections may cause system to malfunction.	
IRQ3	[Available]
IRQ4	[Available]
IRQ5	[Available]
IRQ7	[Available]
IRQ9	[Available]
IRQ10	[Available]
IRQ11	[Available]
IRQ14	[Available]
IRQ15	[Available]
←→ Select Screen ↑ ↓ Select Item + - Change Field F1 General Help F10 Save and Exit ESC Exit	
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➤ **IRQ3~15**

此系列选项用以指定对应IRQ号是PNP方式还是保留给ISA使用。

◆ **Boot**

BIOS SETUP UTILITY	
Boot Settings	
Quick Boot [Enabled]	←→ Select Screen
Quiet Boot [Disabled]	↑ ↓ Select Item
Waite For 'F1' If Error [Enabled]	Enter Go to Sub Screen
Boot Device Priority	F1 General Help
	F10 Save and Exit
	ESC Exit
1 st Boot Device [USB:aigo USB DISK]	
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➤ **Quick Boot**

配置在BIOS引导期间是否允许跳过某些项的测试，减少BIOS引导时间。

➤ **Quiet Boot**

配置是否显示OEM LOGO内容。

➤ **Wait For 'F1' If Error**

配置在系统出错时是否提示按”F1”键。

➤ **1st~4th Boot Device**

配置系统启动时优先权高低的启动设备。

◆ Security

BIOS SETUP UTILITY	
Security Settings	Install or Change the password
Supervisor Password :Not Installed	
User Password :Not Installed	←→ Select Screen
	↑ ↓ Select Item
Change Supervisor Password	Enter Change
Change User Password	F1 General Help
	F10 Save and Exit
	ESC Exit
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➤ Change User/ Supervisor Password

当按Change User/ Supervisor Password后，在对话框中输入新的密码后，此栏会显示用户密码已安装。

◆ Exit

South Bridge Configuration	
Exit Options	Exit system setup after saving the changes.
Save Changes and Exit	
Discard Changes and Exit	
Discard Changes	←→ Select Screen
	↑ ↓ Select Item
	Enter Go to Sub Screen
Load Optimal Defaults	F1 General Help
Load Failsafe Defaults	F10 Save and Exit
	ESC Exit
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➤ Save Changes and Exit

当您完成了所有的修改操作，想将原来的设置参数覆盖掉时，可执行此项功能，新的设置参数将保存在CMOS的存储器中。要执行此操作，先选定此选项并按下< Enter >键，再按< Enter >键即可退出。

➤ **Discard Changes and Exit**

当您所做的任何更改设置的动作不想存入CMOS的存储器中，可先选定此选项并按下< Enter >键，再按<Enter >键即可退出。

➤ **Discard Changes**

当您所做的任何更改设置的动作有误而需要忽略时，可先选定此选项并按下< Enter >键，然后可以再次进入相应选项进行重新设置。

➤ **Load Optimal Defaults**

此菜单用于在你的系统配置中装入缺省值。这些缺省设置是最优的，可以发挥所有硬件的高性能。

➤ **Load Failsafe Defaults**

该选项的功能是将各项设置初始化为实现最基本的和最安全的系统功能的值。要执行此项功能，先选中此选项按下< Enter >即可，接着系统会在屏幕上显示出要您确认的信息，按下< Enter >键确定执行该项功能。

x86 平台下BIOS所要管理的系统资源

这里的系统资源我们定义三种：I/O端口地址，IRQ中断号和DMA号。

◆ **DMA**

级别	功能
DMA0	DRAM 刷新
DMA1	未分配
DMA2	未分配
DMA3	未分配（有时用于硬盘）
DMA4	用于 DMAC 的级联
DMA5	未分配
DMA6	未分配
DMA7	未分配

◆ APIC

高级可编程中断控制器。在现代P4以上级别的主板中，大都支持APIC，可以提供多于16个中断源，如IRQ16—IRQ23，部分主板如支持PCI-X的主板可以有长达28个中断源。但要启用该功能必须相应的操作系统支持，目前只有windows 2000以上的操作系统支持。

◆ IO端口地址

系统I/O地址空间总共有64K，每一外围设备都会占用一段I/O地址空间。下表给出了本CPU卡部分设备的I/O 地址分配，由于PCI设备（如PCI网卡）的地址是由软件配置的，表中没有列出。

地 址	设备描述
000h - 00Fh	DMA 控制器#1
020h - 021h	可编程中断控制器#1
040h - 043h	系统计时器
060h - 064h	标准 101/102 键盘控制器
070h - 071h	实时时钟, NMI
080h - 09Fh	DMA 页寄存器
0A0h - 0A1h	可编程中断控制器#2
0C0h - 0DFh	DMA 控制器#2
0F0h - 0FFh	数据数值处理器
1F0h - 1F7h	主要 IDE 通道
274h - 279h, A79h	PnP 组态寄存器端口
2F8h - 2FFh	串行端口 #2 (COM2)
378h - 37Fh	并行端口#1 (LPT1)
3F6h - 3F6h	主要 IDE 通道
3F8h - 3FFh	串行端口#1 (COM1)
400h - 41Fh	SMBus 控制器

◆ IRQ中断分配表

系统共有15个中断源，有些已被系统设备独占。只有未被独占的中断才可分配给其它设备使用。ISA设备要求独占使用中断；只有即插即用ISA设备才可由BIOS或操作系统分配中断。而多个PCI设备可共享同一中断，并由BIOS或操作系统分配。下表给出了X86平台部分设备的中断分配情况，但没有给出PCI设备所占用的中断资源。

级别	功能
IRQ0	系统计时器
IRQ1	标准 101/102 键或 Microsoft 键盘
IRQ2	可编程的中断控制器
IRQ3	串口#2
IRQ4	串口#1
IRQ5	保留
IRQ6	保留给软驱控制器
IRQ7	并口
IRQ8	系统 CMOS/实时时钟
IRQ9	ACPI
IRQ10	保留
IRQ11	保留
IRQ12	PS/2 鼠标
IRQ13	数学协处理器
IRQ14	主 IDE
IRQ15	保留

第四章 驱动程序安装说明

本产品的驱动程序可依据配套光盘内容安装，在此不做介绍。

附录

Watchdog编程指引

本板提供一个可按分或按秒计时的，最长达255级的可编程看门狗定时器(以下简称WDT)。通过编程，WDT超时事件可用来将系统复位或者产生一个可屏蔽中断。

本主板可使用的中断号为：3, 4, 5, 7, 9, 10, 11。使用前请把BIOS Setup界面PCIPnP组中对应的IRQ号选项值改成Reserved。

以下用C语言形式提供了WDT的编程范例，对WDT的编程需遵循以下步骤：

- 进入WDT编程模式
- 设置WDT工作方式/启动WDT/关闭WDT

(1) 进入WDT编程模式。

```
#define INDEX_PORT    0x2E
#define DATA_PORT    0x2F

outportb(INDEX_PORT, 0x87);
outportb(INDEX_PORT, 0x87);
outportb(INDEX_PORT, 0x07);
outportb(DATA_PORT, 0x08);
outportb(INDEX_PORT, 0x30);
outportb(DATA_PORT, 0x01);
```

(2) 配置WDT工作方式，复位或中断方式，选择一种：

```
unsigned char oldval;
outportb(INDEX_PORT, 0x2d);
oldval = inportb(DATA_PORT);
```

a. 配置WDT成复位工作方式

```
oldval &= 0xfe;
outportb(DATA_PORT, oldval);
```


b. 配置WDT成中断工作方式

```
oldval |= 0x01;
outputb(DATA_PORT, oldval);
outputb(INDEX_PORT, 0xf7);
outputb(DATA_PORT, IRQ_NO); /*此处请用需要使用的中断号替换掉常量IRQ_NO, 文档前端已经列出可使用中断号的范围*/
```

(3) 配置WDT按分或秒计时:**a. 按分计时:**

```
outputb(INDEX_PORT, 0xf5);
outputb(DATA_PORT, 0x08);
```

b. 按秒计时:

```
outputb(INDEX_PORT, 0xf5);
outputb(DATA_PORT, 0x00);
```

(4) 启动/禁止WDT**a. 启动WDT:**

```
outputb(INDEX_PORT, 0xf6);
outputb(DATA_PORT, TIME_OUT_VALUE); /*请以超时时间单位数量(0x01~0xFF)替换掉常量TIME_OUT_VALUE*/
```

b. 停止WDT:

```
outputb(INDEX_PORT, 0xf6);
outputb(DATA_PORT, 0x00);
```

常见故障分析与解决

序号	故障现象	故障分析解决
1	BIOS 设置不能保存	分析：可能是 CMOS 电池的问题。
		解决方法：用万用表测量 CMOS 电池，电压不足就更换新电池，重新设置保存。
2	时可开机时不可开机	分析：可能是电源接触不良，从主板电源插座上拔下电源，发现主板电源插针某根插针经多次用力插压，已经倒向一边。
		解决方法：关机拔下电源插头，用镊子将弯曲的电源插针弄直插上电源开关，重新启动，多次试验，没有出现此类故障。
3	当接上 U 盘时，系统提示一个高速设备接到一个低速接口上。	分析：U 盘是高速 USB2.0，接到电脑上有提示一个高速设备接到一个低速接口上，说明主板的接口被认为是一个 USB1.1 的接口。
		解决方法：将主板上 USB 高速传输模式打开即可。不同的主板有不同的设置。一般是将 USB 设备选项中的 FULLSPEED 改为 HISPEED 即可。
4	更换新内存后屏幕无显示，呈现黑屏状态，无法正常进入系统，换上原来的内存仍然无法启动。	分析：可能是由于在插拨内存的过程中操作不当引起主板上部件工作不正常，需要重点检查主板上与内存相关的电路。
		解决方法：首先检查内存、显卡等硬件，结果显示这些硬件都没有问题，都可以正常使用。仔细检查主板上内存插槽周围的电路，最终发现第一个内存插槽里的两根与内存金手指接触的针脚搭在一起，对照第二个内存插槽没有该现象，由此判断是第一个内存插槽短路了。用镊子小心地将两根针脚拨回原处，插上内存，重新启动，系统顺利启动。

序号	故障现象	故障分析解决
5	更换光驱后系统无法启动	<p>分析：可能是由于在安装光驱时不小心碰撞了硬盘的数据线，从而使硬盘数据线接口接触不良导致的，或者是硬盘和光驱上的主从跳线设置不正确。</p> <p>解决方法：首先对硬盘数据线和硬盘及主板上的 IDE 接口进行检查，发现没有问题；然后检查主从跳线的设置，发现硬盘和光驱连接在不同的数据线上，而且硬盘和光驱的跳线都设置为主盘，从而导致硬盘无法启动；将光驱的跳线设置为从盘，重新安装好。</p>
6	进入系统后无法检测到 PCI 卡	<p>分析：确认 PCI 卡功能是否正常；将 PCI 卡重插或插入其他 PCI 插槽，看能否正常；了解使用的电源类型（是 AT 还是 ATX）；了解客户的 PCI 卡的电压需求。</p> <p>解决方法：如 PCI 卡功能问题，更换 PCI 卡解决；重插或插入其他 PCI 插槽即可正常，则为 PCI 卡与插槽接触问题。如果使用的是 AT 电源，但 PCI 卡需要 3.3V 电压，因为 AT 电源不提供 3.3V 电压，电源需更换为 ATX 电源方可使用 PCI 卡。（建议：在选购电源时，先了解所使用的 PCI 卡是否需要 3.3V 电压。）</p>
7	找不到外接设备	<p>分析：没有连接；没有装驱动；设备已坏。</p> <p>解决方法：查看设备与主板的连接线是否正常，如正常则更换正常连接线确定连接无问题；重新安装设备驱动，看是否可以识别；检测设备是否正常；如设备正常考虑与主板是否兼容。</p>



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Safety Instructions

1. Before handling your product, read the user's manual carefully;
2. Any board or card not ready to be installed shall be kept in the anti-static packaging;
3. Before taking board or card from anti-static packaging, put your hand on grounded metal object for a while (about 10 seconds) to eliminate static on your body;
4. While holding a board or card, please do wear static protective gloves; always hold a board by its edges;
5. Before inserting, removing or re-configuring motherboard or expansion card, first disconnect the computer and peripherals from their power sources;
6. Before removing boards or computer, turn off all power resources firstly and disconnect the power cord from power source;
7. For PC Box products, when inserting or removing boards, disconnect the computer and peripherals from the power sources firstly;
8. Before connecting or unplugging any equipment, make sure all power cords are unplugged in advance;
9. To avoid unnecessary damage caused by turning on/off computer frequently, wait at least 30 seconds before re-turning on the computer.

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Chapter 1 Product Introduction

Overview

EPI-1813 series is a full-size motherboard, which is developed basing on Intel[®] Luna Pier Refresh platform and is compliant with EVOC EPI2.0 specification.

The motherboard adopts Intel[®] Atom[™]D510 (dual-core) / D410 (single-core) processor + ICH8M technique scheme on-board. The on-board ultra-low power consumption processor interior integrates memory controller and graphic controller. It provides one SO-DIMM DDR2 slot and on-board 1GB DDR2 memory (the on-board memory is optional), up to 2GB. It supports VGA and LVDS display; two 10/100/1000Mbps LAN ports, LAN1 supports Wake-on-LAN function; one HDA audio connector; three SATA II hard disk connectors; one CF card connector; eight USB 2.0 ports; two COMs, COM1 supports Modem wake-up function; one parallel port; one PS/2 keyboard and mouse connector; expansion is compliant with EVOC EPI2.0 specification; the motherboard adopts ATX power supply from carrier.

The product can be widely applied in the fields such as environment protection, numerical control and transportation, etc.

Mechanical Dimension, Weight and Environment

- Dimension: 351.5mm (L) × 146.7mm (W) × 30.2mm (H);
- Net Weight: 0.45Kg;
- Operating Environment:
 - Temperature: 0°C ~ 60°C;
 - Humidity: 5% ~ 90% (non-condensing);
- Storage Environment:

Temperature: -20°C ~ 80°C;

Humidity: 5% ~ 90% (non-condensing);

Typical Consumption

CPU: on-board Intel® Atom™ D510 Memory: DDRII 800 MHz 2GB Samsung

- +5V@1.52A; +5%/-3%;
- +3.3V@0.55A; +5%/-3%;
- +12V@0.42A; +5%/-3%;

Microprocessor

Intel® Atom™ D510 (dual-core)/D410 (single-core) processor on-board, interior integrates memory controller and graphic controller.

Chipset

Intel® Atom™D510/D410 processor + ICH8M;

System Memory

Provide one SO-DIMM DDR2 slot and on-board 1GB DDR2 memory (the on-board memory is optional), support Un-buffered Non-ECC memory. The maximum memory capacity supported is up to 2GB while the supported memory frequency is 667MHz.

Display Function

Adopt CPU built-in integrated graphic controller, support VGA and single-channel 18-bit LVDS display. The maximum resolution and refresh frequency supported by VGA is 2048×1536@60Hz while the maximum resolution supported by LVDS is 1366×768.

LAN Function

Provide two 10/100/1000Mbps LAN ports; LAN1 supports Wake-on-LAN function.

Audio Function

Adopt ALC888 sound effect chip, support HDA and MIC-in/Line-in/Line-out function.

Power Feature

The board adopts ATX power supply from carrier, support ACPI1.0b specification and the status of S0, S1, S4 and S5.

Expansion Bus

A set of EPI bus expansion connector comply with EVOC EPI2.0 specification. It can expand PCI and ISA connectors via standard EPI 2.0 bus carrier.

Watchdog Function

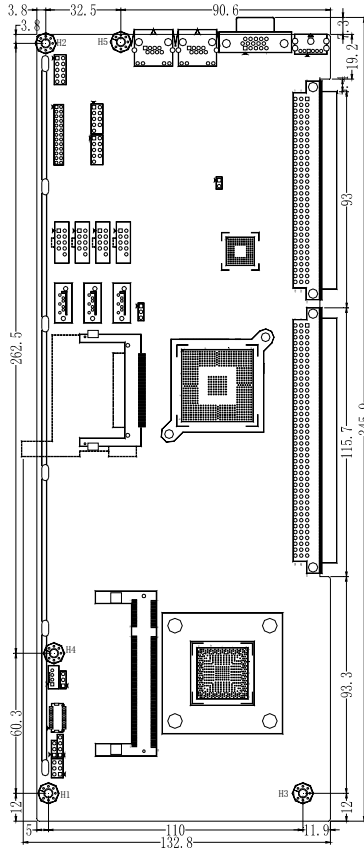
- 255 levels, programmable by minute or second;
- Support watchdog timeout interrupt or reset system.

I/O Connector

- Two RS-232 COMs, educed out via 2×5pin headers; COM1 supports Modem wake-up function;
- One parallel port, educed out via 2×13pin header;
- Three SATA II connectors;
- One CF card connector (TYPE2 connector);
- Eight USB2.0 ports, educed out via 2×5pin headers;
- One PS/2 connector, educed out via a 2-in-1 connector.

Chapter 2 Installation

Product Outline

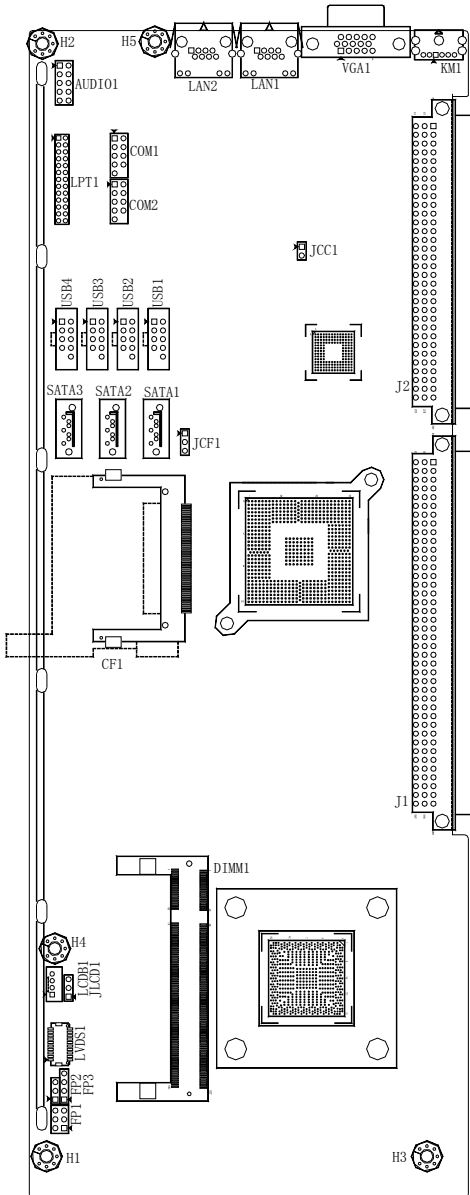


Unit: mm

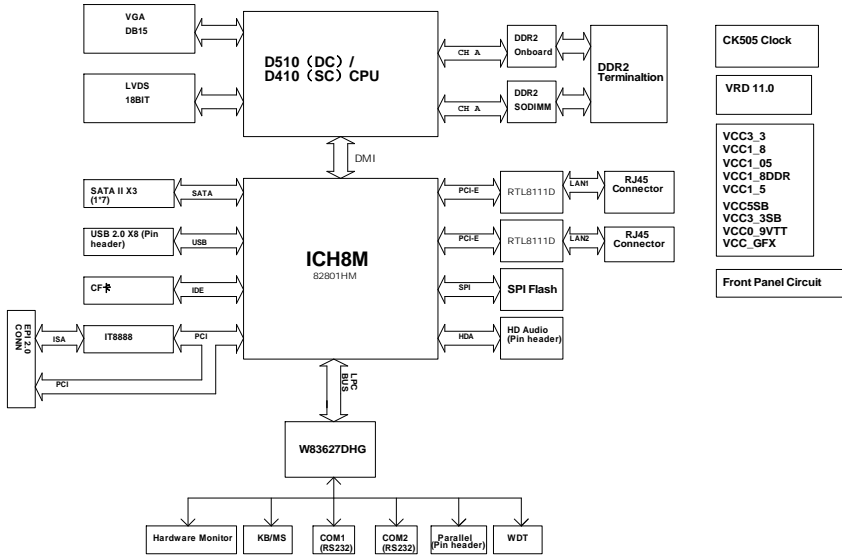
Warning!

Please adopt appropriate screws and proper installation methods (including board allocation, CPU and heat sink installation, etc); otherwise, the board may be damaged. It is recommended to use M3×6 GB9074.4-88 screws at H1 ~ H5.

Locations of Connectors



Structure




Tip: How to identify the first pin of the jumpers and connectors

1. Observe the letter beside the socket, it would be marked with “1” or thickened lines or triangular symbols;
2. Observe the solder pad on the back, the square pad is the first pin;

Jumper Setting

JCC1: Clear/Keep CMOS Setting (Pin Distance: 2.54mm)

CMOS is powered by the button battery on board. Clear CMOS will restore original settings (factory default). The steps are listed as follows: (1) Turn off the computer and unplug the power cable; (2) Instantly short circuit JCC1; (3) Turn on the computer; (4) Follow the prompt on screen to enter BIOS setup when booting the computer, load optimized defaults; (5) Save and exit. Please set as follows:

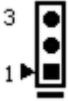


Setup	Function
1-2 Open	Normal (Default)
1-2 Short	Clear the contents of CMOS, all BIOS setting will restore to factory default values.

JCC1

JLCD1: Select LCD Operating Voltage (Pin Distance: 2.54mm)

Different LCD screens have different voltages; the board provides two voltage options, 3.3V and 5V. Only when the selected LCD voltage is in accord with the LCD voltage in use, can the LCD screen display normally. Please set as follows:

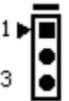


Setup	Function
1-2 Short	+3.3V(Default)
2-3Short	+5V

JLCD1

JCF1: Select CF Card Operating Voltage (Pin Distance: 2.54mm)

Different CF cards have different operating voltages; the board provides two voltage options, 3.3V and 5V. Only when the selected CF card operating voltage is in accord with the CF card operating voltage in use, can the system stability be ensured. Please set as follows:



Setup	Function
1-2 Short	+3.3V
2-3 Short	+5V(Default)

JCF1

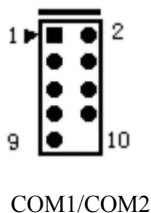
Install System Memory

The board provides one 200Pin DDRII SO-DIMM memory slot (DIMM1). Pay attention as follows when installing the memory bank:

- Open the buckles beside the memory slot. During installation, aim at the gaps between memory bank and memory slot and press properly to connect them;
- The 1.8V DDRII 667MHz memory supported by Intel® Chipset can be used; the maximum memory capacity is up to 2GB.
- It is recommended to use memory bank with SPD to ensure stable operation.

Serial Port

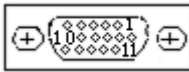
Provide two 2×5Pin RS-232 serial ports (Pin Distance: 2.54mm); the pin definitions are as follows:



Pin	Signal Name
1	DCD#
2	RXD
3	TXD
4	DTR#
5	GND
6	DSR#
7	RTS#
8	CTS#
9	RI#
10	NA

Display Connector

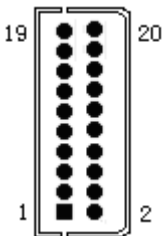
- The board provides one standard DB15 VGA connector; the pin definitions are as follows:



VGA1

Pin	Signal Name	Pin	Signal Name
1	Red	2	Green
3	Blue	4	NC
5	GND	6	GND
7	GND	8	GND
9	+5V	10	GND
11	NC	12	DDCDATA
13	HSYNC	14	VSYNC
15	DDCCLK		

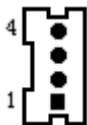
- The board provides one single-channel 18-bit LVDS connector (LVDS1; Pin Distance: 1.0mm). The pin definitions are as follows:



LVDS1

Pin	Signal Name	Pin	Signal Name
1	LVDS_D0+	2	LVDS_D0-
3	GND	4	GND
5	LVDS_D1+	6	LVDS_D1-
7	GND	8	GND
9	LVDS_D2+	10	LVDS_D2-
11	GND	12	GND
13	CLK+	14	CLK-
15	GND	16	GND
17	NC	18	NC
19	VDD	20	VDD

LCD Backlight Control Connector



LCDB1

(Pin Distance: 2.0mm)

Pin	Signal Name
1	VCC_LCDBKLT
2	LCD_BKLTCTL
3	LCD_BKLTEN
4	GND

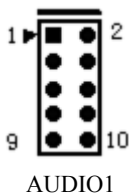
Note: VCC_LCDBKLT---+12V backlight power (the current of the pin shall be limited below 1A);

LCD_BKLTCTL---backlight control (This signal is output via Pineview D as PWM signal; voltage amplitude is between 0V ~ 3.3V while the duty cycle is between 0 ~ 100%);

LCD_BKLTEN ----backlight enabling, active high.

Audio Connector

Provide one 2×5Pin audio connector (Pin Distance: 2.54mm); the pin definitions are as follows:



AUDIO1

Pin	Signal Name	Pin	Signal Name
1	LOUT_R	2	LOUT_L
3	GND_AUDIO	4	GND_AUDIO
5	LIN_R	6	LIN_L
7	GND_AUDIO	8	GND_AUDIO
9	MIC_L	10	MIC_R

SATA Connector

Provide three SATA sockets; the pin definitions are as follows:



SATA1 ~ SATA3

Pin	Signal Name
1	GND
2	TX+
3	TX-
4	GND
5	RX-
6	RX+
7	GND

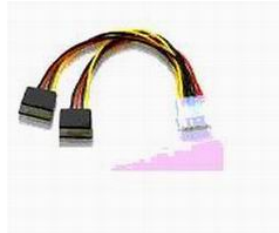
Hot-swap of SATA Hard Disk

Notices for hot-swap of SATA hard disk:

1. The hard disk shall support SATA 2.0 and use 15-pin SATA hard disk power connector.
2. The driver of chipset shall support the hot-swap of SATA hard disk.
3. Hot-swap of SATA hard disk with the operating system is forbidden when system is power-on.



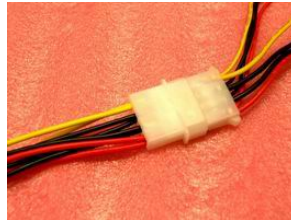
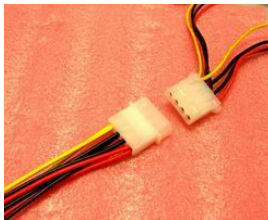
SATA Data Cable



SATA Power Cable

Please carry out hot plug as follows, improper operation may destroy the hard disk or result in data lost.

Hot Plug



Step 1: Please plug the 1 x 4 pin SATA power connector (white) into the power adapter.



Step 2: Please connect the SATA data cable to the SATA connector on board.



Step 3: Please connect the 15-pin SATA power connector (black) to the SATA hard disk.



Step 4: Please connect the SATA data cable to the SATA hard disk.

Hot Unplug

Step 1: Uninstall the hard disk from the device manager.



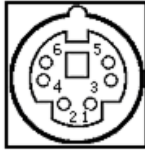
Step 2: Unplug the data cable from the SATA hard disk.



Step 3: Unplug the SATA 15-pin power connector (black) from the SATA hard disk.

2-in-1 Mouse and Keyboard Connector

The board provides one 2-in-1 mouse and keyboard socket.

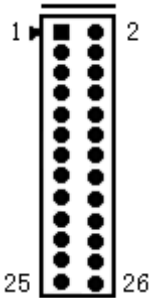


KM1

Pin	Signal Name
1	KB_DATA
2	MS_DATA
3	GND
4	+5V
5	KB_CLK
6	MS_CLK

Parallel Port

The board provides one 2×13Pin parallel port (Pin Distance: 2.0mm).

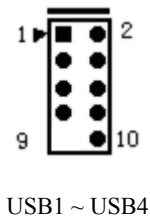


LPT1

Pin	Signal Name	Pin	Signal Name
1	STB#	2	AFD#
3	PD0	4	ERR#
5	PD1	6	INIT#
7	PD2	8	SLIN#
9	PD3	10	GND
11	PD4	12	GND
13	PD5	14	GND
15	PD6	16	GND
17	PD7	18	GND
19	ACK#	20	GND
21	BUSY	22	GND
23	PE	24	GND
25	SLCT	26	NC

USB Port

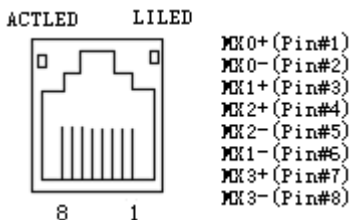
The board provides four sets of 2×5Pin USB ports (Pin Distance: 2.54mm), which can connect with eight standard USB devices. The pin definitions are as follows:



Pin	Signal Name	Pin	Signal Name
1	+5V	2	+5V
3	USB1_Data-	4	USB2_Data-
5	USB1_Data+	6	USB2_Data+
7	GND	8	GND
9	NA	10	GND

LAN Port

The board provides two 10/100/1000Mbps LAN ports (LAN1 and LAN2), among which LAN1 supports Wake-on-LAN function. ACTLED and LILED are the green and dual color LEDs beside the Ethernet port, which respectively indicates the activity status and speed of LAN. Please refer to the status description for each LED:

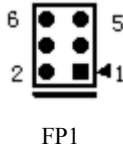


LAN1/LAN2

ACTLED (Green)	LAN Activity Indicator	LILED (Dual Color: O/G)	LAN Speed Indicator
		Green	1000Mbps
Blink	Data Transmitting	Orange	100Mbps
Off	No Data to Transmit	Off	10Mbps

Status Indicator and Control Connector

ATX Power Switch and HDD Indicator Connector (Pin Distance: 2.54mm)



Pin	Signal Name	Pin	Signal Name
1	PWRBTN#	2	GND
3	GND	4	RESET#
5	HDD_LED-	6	HDD_LED+

Power Indicator Connector (Pin Distance: 2.54mm)



Pin	Signal Name
1	PWR_LED+
2	NC
3	GND

Loudspeaker Output Connector (Pin Distance: 2.54mm)



Pin	Signal Name
1	SPEAKER
2	NC
3	GND
4	+5V

CF Socket

The board provides one standard CF card socket (CF1).

Pin	Signal Name	Pin	Signal Name
1	GND	26	CD1#
2	D3	27	D11
3	D4	28	D12
4	D5	29	D13
5	D6	30	D14
6	D7	31	D15
7	CS0#	32	CS1#
8	GND	33	VS1#
9	ATASEL#	34	IOR#
10	GND	35	IOW#
11	GND	36	WE#
12	GND	37	IRQ
13	VCC	38	VCC
14	GND	39	CSEL#
15	GND	40	VS2#
16	GND	41	RESET#
17	GND	42	IORDY
18	A2	43	DREQ
19	A1	44	DACK#
20	A0	45	DASP#
21	D0	46	ATA66_DET
22	D1	47	D8
23	D2	48	D9
24	WP/IOCS16#	49	D10
25	CD2#	50	GND

Chapter 3 BIOS Setup

BIOS Overview

BIOS (Basic Input and Output System) is solidified in the flash memory on the CPU board. Its main functions include: initialize system hardware, set the operating status of the system components, adjust the operating parameters of the system components, diagnose the functions of the system components and report failures, provide hardware operating and controlling interface for the upper level software system, guide operating system and so on. BIOS provides users with a human-computer interface in menu style to facilitate the configuration of system parameters for users, control power management mode and adjust the resource distribution of system device, etc.

Setting the parameters of the BIOS correctly could enable the system operating stably and reliably; it could also improve the overall performance of the system at the same time. Inadequate even incorrect BIOS parameter setting will decrease the system operating capability and make the system operating unstably even unable to operate normally.

BIOS Parameter Setup

Prompt message for BIOS setting may appear once powering on the system. At that time (inefficient at other time), press the key specified in the prompt message (usually) to enter BIOS setting.

When the BIOS setting in CMOS is destroyed, system may also require entering BIOS setting or selecting certain default value.

All the setup values modified by BIOS are saved in the CMOS storage in system. The CMOS storage is powered by battery; unless clearing CMOS contents, or else its contents will not be lost even if powered off.

Note! BIOS setting will influent the computer performance directly. Setting parameter improperly will cause damage to the computer; it may even unable to power on. Please use the internal default value of BIOS to restore the system.

Our company is constantly researching and updating BIOS, its setup interface may be a bit different. The figure below is for reference only; it may be different from your BIOS setting in use.

Basic Function Setting for BIOS

After starting SETUP program, the main interface of CMOS Setup Utility will appear:

BIOS SETUP UTILITY	
System Overview	←→ Select Screen ↑↓ Select Item + - Change Field Tab Select Field F1 General Help F10 Save and Exit ESC Exit
Processor Type : Intel(R) Atom(TM) CPU D510 @ 1.66GHz Speed :1666MHz Cores :2 System Memory Size :1015MB System Time [00:47:55] System Date [Mon 01/11/2010]	
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◆ Main

➤ System Time

Choose this option and set the current time by < + > / < - >, which is displayed in format of hour/minute/second. Reasonable range for each option is: Hour (00-23), Minute (00-59), Second (00-59).

➤ System Date

Choose this option and set the current date by < + > / < - >, which is displayed in format of month/date/year. Reasonable range for each option is: Month (Jan.-Dec.), Date (01-31), Year (Maximum to 2099), Week (Mon. ~ Sun.).

◆ **Advanced**

BIOS SETUP UTILITY	
Advanced Settings	Configure CPU
WARNING: Setting wrong values in below sections may cause system to malfunction ▶ CPU Configuration ▶ IDE Configuration ▶ Super I/O Configuration ▶ ISA I/O Decode Configuration ▶ ISA Memory Decode Configuration ▶ Hardware Health Configuration ▶ USB Configuration ▶ Power Management Configuration ▶ Clock Generator Configuration	←→ Select Screen ↑↓ Select Item Enter Go to Sub Screen Tab Select Field F1 General Help F10 Save and Exit ESC Exit
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➤ **CPU Configuration**

BIOS SETUP UTILITY	
Configure advanced CPU settings	
Brand String:	
Intel(R) Atom(TM) CPU D510 @ 1.66GHz	
Frequency; :1.66GHz	←→ Select Screen
FSB Speed; :667MHz	↑↓ Select Item
Cache L1; :48 KB	+ - Change Field
Cache L2; :1024 KB	Tab Select Field
Ratio Actual Value :10	F1 General Help
Hyper Threading Technology [Enabled]	F10 Save and Exit
	ESC Exit
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● **Hyper Threading Technology**

Control switch for Intel Hyper Threading Technology function.

➤ **IDE Configuration**

BIOS SETUP UTILITY	
IDE Configuration	
ATA/IDE Configuration	[Enhanced]
Configure SATA as	[IDE]
▶ Primary IDE Master	:[Not Detected]
▶ Primary IDE Slave	:[Not Detected]
▶ Secondary IDE Master	:[Not Detected]
▶ Secondary IDE Slave	:[Not Detected]
▶ Third IDE Master	:[Not Detected]
▶ Third IDE Slave	:[Not Detected]
←→ Select Screen ↑↓ Select Item + - Change Field Tab Select Field F1 General Help F10 Save and Exit ESC Exit	
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● **ATA/IDE Configuration**

This option is used to configure the operating mode of ATA; there are two options for this item: Compatible and Enhanced.

● **Configure SATA as**

SATA controller type selection, it is corresponding with the options of IDE and AHCI. Only when ATA/IDE Configuration is under Enhanced mode, is AHCI supported.

AHCI function requires supports from hardware chip and OS.

● **Legacy IDE Channels**

Configure the IDE channel type under Compatible mode; it is corresponding with the options of SATA Only, SATA Pri, PATA Sec and PATA Only.

● **Primary ~ Third IDE Master/Slave**

*** Type**

Not Installed: IDE device cannot be detected by system;

AUTO: automatic detection of IDE parameters when power on;

CD/DVD: used for ATAPI CDROM;

ARMD: used for various analog IDE devices.

*** LBA/Large Mode**

Used to set whether to support LBA mode or not.

*** Block(Multi-sector Transfer)**

Used to set whether to support multi-sector simultaneous transfer or not.

*** PIO Mode**

Used for PIO mode setting.

*** DMA Mode**

Used for DMA mode setting.

*** S.M.A.R.T**

Used to set whether to enable S.M.A.R.T function and it is only effective for the hard disk supporting this function.

*** 32Bit Data Transfer**

This option is used to enable 32-bit hard disk accessing mode, which could optimize hard disk read and write speed.

● **AHCI Port 0 ~2**

Configuration menu for AHCI port, it is displayed only when the SATA controller is configured to AHCI or RAID.

*** SATA Port0 ~ 2**

Auto: automatic detection of SATA devices when power on;

Not Installed: disable the port and detection.

*** S.M.A.R.T**

Used to set whether to enable S.M.A.R.T function and it is only effective for the hard disk supporting this function.

➤ **Super I/O Configuration**

BIOS SETUP UTILITY	
Configure Super I/O Chipset	Allows BIOS to Enable or Disable Floppy Controller.
Floppy A [Disabled]	←→ Select Screen
OnBoard Floppy Controller [Enabled]	↑↓ Select Item
Serial Port1 Address [3F8/IRQ4]	+ - Change Field
Serial Port2 Address [2F8/IRQ3]	Tab Select Field
Parallel Port Address [378]	F1 General Help
Parallel Port Mode [Normal]	F10 Save and Exit
Parallel Port IRQ [IRQ7]	ESC Exit
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- **Floppy A**
Configure the floppy driver type.
- **OnBoard Floppy Controller**
Used to enable floppy driver controller.
- **Serial Port 1 Address**
(Default value is 3F8H/IRQ4), set the address and IRQ of COM1 on motherboard. The options are: Disabled, 3F8H/IRQ4, 3E8/IRQ4, 2E8/IRQ3 and 2F8H/IRQ3.
- **Serial Port 2 Address**
(Default value is 2F8H/IRQ3), set the address and IRQ of COM2 on motherboard. The options are: Disabled, 3F8H/IRQ4, 3E8/IRQ4, 2E8/IRQ3 and 2F8H/IRQ3.
- **Parallel Port Address**
Set the address of the parallel port on motherboard and the default value is 378.
- **Parallel Port Mode**
Set the parallel port mode on motherboard.
- **Parallel Port IRQ**
Set the IRQ of the parallel port on motherboard.

➤ **ISA I/O Decode Configuration**

BIOS SETUP UTILITY	
Configure ISA I/O Address	
Decode I/O Space 0	[Enabled]
Decode I/O Base 0	[0100h]
Decode I/O Size 0	[64 Bytes]
Decode I/O Space 1	[Enabled]
Decode I/O Base 1	[0140h]
Decode I/O Size 1	[32 Bytes]
Decode I/O Space 2	[Enabled]
Decode I/O Base 2	[0200h]
Decode I/O Size 2	[128 Bytes]
Decode I/O Space 3	[Enabled]
Decode I/O Base 3	[0300h]
Decode I/O Size 3	[64 Bytes]
Decode I/O Space 4	[Enabled]
Decode I/O Base 4	[0340h]
Decode I/O Size 4	[32 Bytes]
Decode I/O Space 5	[Enabled]
Decode I/O Base 5	[0A70h]
Decode I/O Size 5	[16 Bytes]
	←→ Select Screen ↑↓ Select Item + - Change Field Tab Select Field F1 General Help F10 Save and Exit ESC Exit
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● **Decode I/O Space(0-5)**

Decode IO space switch (n).

● **Decode I/O Base(0-5)**

Decode IO space base address.

● **Decode I/O Size(0-5)**

Decode IO space size.

➤ **ISA Memory Decode Configuration**

BIOS SETUP UTILITY	
Configure ISA Memory Address	←→ Select Screen
Memory Space 0 [Disabled]	↑↓ Select Item
Memory Space 1 [Disabled]	+ - Change Field
Memory Space 2 [Disabled]	F1 General Help
Memory Space 3 [Disabled]	F10 Save and Exit
	ESC Exit
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● **Memory Space(0-3)**

Decode Memory space switch.

● **Decode MEM Base(0-3)**

Decode Memory space base address.

● **Decode Size(0-3)**

Decode Memory space size.

➤ **Hardware Health Configuration**

BIOS SETUP UTILITY	
Hardware Health Configuration	Enables Hardware Health Monitoring Device
System Temperature : 30°C/86°F	
CPU Temperature : 37°C/98°F	
Vcore : 1.136 V	←→ Select Screen
V3.3 : 3.296 V	↑↓ Select Item
V5.0 : 5.094 V	+ - Change Field
V12.0 : 12.196 V	Tab Select Field
VBAT : 3.152 V	F1 General Help
	F10 Save and Exit
	ESC Exit
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- **System Temperature**

Current system temperature, it is monitored by thermal resistor on motherboard.

- **CPU Temperature**

Current CPU temperature, it is monitored by temperature sensors on motherboard.

- **Vcore**

CPU core voltage;

- **V3.3/ V5.0/ V12.0**

Turn on/off power to output voltage.

- **VBAT**

Monitor the voltage of the battery.

➤ **USB Configuration**

BIOS SETUP UTILITY	
USB Configuration	Enables USB host controllers.
USB Devices Enabled :	
1 Keyboard, 1 Drive	
USB Function [8 USB Ports]	←→ Select Screen
USB 2.0 Controller [Enabled]	↑↓ Select Item
Legacy USB Support [Auto]	+ - Change Field
▶ USB Mass Storage Device Configuration	F1 General Help
	F10 Save and Exit
	ESC Exit
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- **USB Function**

This option sets the amount of USB controller; that is to confirm how many USB controllers it supports. One controller usually supports two USB ports.

- **USB 2.0 Controller**

This option is used to select whether to support USB 2.0 controller.

- **Legacy USB Support**

This option is used to support legacy USB devices (keyboard, mouse and storage device); when this option is set to Enabled, the USB device could be used even if under OS that doesn't support USB, such as DOS.

- **USB Mass Storage Device Configuration**

This option is used to configure the USB mass storage device, including Reset delay setting and enumeration type.

➤ **Power Management Configuration**

BIOS SETUP UTILITY		
Power Management Configuration		
ACPI APIC Support	[Enabled]	←→ Select Screen
Restore on AC Power Loss	[Last state]	↑↓ Select Item
Resume on RTC Alarm	[Disabled]	+ - Change Field
		F1 General Help
		F10 Save and Exit
		ESC Exit
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- **ACPI APIC Support**

This option is used to enable or disable APIC under ACPI OS.

- **Restore on AC Power Loss**

This option could set the system status when the computer is re-electrified after powered off under AC. “Power Off” is to make the system at power off status; “Power On” is to make the system power on automatically; “Last State” is to recover the status before powering off.

- **Resume on RTC Alarm**

This option is used to enable or disable the system clock. When the specified time is expired, it will wake the system from power saving mode, even from power off mode. This function shall be supported by ATX power.

➤ **Clock Generator Configuration**

BIOS SETUP UTILITY	
Configure Clock Generator	←→ Select Screen
Spread Spectrum [Enabled]	↑↓ Select Item
Auto PCI Clock [Enabled]	+ - Change Field
	F1 General Help
	F10 Save and Exit
	ESC Exit
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● **Spread Spectrum**

This option is used to control the spread spectrum of clock signal.

● **Auto PCI Clock**

This option is used to realize the automatic detection of the device on PCI slot; if there is no device on the slot, it will disable the relevant clock signal on that slot.

◆ **Chipset**

BIOS SETUP UTILITY	
Advanced Chipset Settings	
WARNING: Setting wrong values in below sections may cause system to malfunction.	
North Bridge Chipset Configuration	
DRAM Frequency [Auto]	
Configure DRAM Timing by SPD [Enabled]	←→ Select Screen
	↑↓ Select Item
Initiate Graphic Adapter [PCI/IGD]	Enter Go to Sub Screen
Boot Display Device [CRT+LVDS]	F1 General Help
Flat Panel Type [800x600/S/18/G104S]	F10 Save and Exit
UserDefine Panel Type [Disabled]	ESC Exit
South Bridge Chipset Configuration	
Onboard Audio Controller [Enabled]	
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- **DRAM Frequency**
Configure the frequency for DRAM; it is recommended to use automatic modification instead of manual modification; otherwise, it will not be able to power on because it is not supported by DRAM.
- **Configure DRAM Timing by SPD**
BIOS configures the time sequence of the SDRAM according to the contents of the SPD chip. Most of the memory bank has one small chip to save the time sequence and capacity of the memory, i.e. the SPD chip.
- **Initiate Graphic Adapter**
This option is used to specify the booted priority of video device type.
- **Boot Display Device**
This option is used to select the default video output device when booting.
- **Flat Panel Type**
This option is used to select the resolution of the Flat Panel.
- **UserDefine Panel Type**
Configure the panel display type according to user define.
- **Onboard Audio Controller**
Select whether to enable the audio card controller.

◆ **PCIPnP**

BIOS SETUP UTILITY	
Advanced PCI/PnP Settings	
WARNING: Setting wrong values in below sections may cause system to malfunction.	
IRQ3	[Available]
IRQ4	[Available]
IRQ5	[Available]
IRQ7	[Available]
IRQ9	[Available]
IRQ10	[Available]
IRQ11	[Available]
IRQ14	[Available]
IRQ15	[Available]
←→ Select Screen ↑↓ Select Item + - Change Field F1 General Help F10 Save and Exit ESC Exit	
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➤ **IRQ3~ 15**

This option is used to specify whether the IRQ number is PNP mode or reserved for ISA.

◆ **Boot**

BIOS SETUP UTILITY	
Boot Settings	←→ Select Screen
Quick Boot [Enabled]	↑↓ Select Item
Quiet Boot [Disabled]	Enter Go to Sub Screen
Waite For 'F1' If Error [Enabled]	F1 General Help
Boot Device Priority	F10 Save and Exit
1 st Boot Device [USB: aigo USB DISK]	ESC Exit
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➤ **Quick Boot**

During BIOS booting period, configure whether to permit skipping certain test to reduce BIOS booting time.

➤ **Quiet Boot**

Configure whether to display the content of OEM LOGO.

➤ **Wait For 'F1' If Error**

Configure whether to prompt pressing "F1" during system error.

➤ **1st ~4th Boot Device**

Configure the priority of the boot sequence for devices when the system boots.

◆ **Security**

BIOS SETUP UTILITY	
Security Settings	Install or Change the password
Supervisor Password :Not Installed	←→ Select Screen ↑↓ Select Item Enter Change F1 General Help
User Password :Not Installed	
Change Supervisor Password	
Change User Password	
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➤ **Change User/ Supervisor Password**

After pressing Change User/ Supervisor Password and input new password in the dialog box, this column will indicate that user's password has been installed.

◆ **Exit**

South Bridge Configuration	
Exit Options	Exit system setup after saving the changes.
Save Changes and Exit	←→ Select Screen ↑↓ Select Item Enter Go to Sub Screen F1 General Help F10 Save and Exit ESC Exit
Discard Changes and Exit	
Discard Changes	
Load Optimal Defaults	
Load Failsafe Defaults	
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➤ **Save Changes and Exit**

When you have finished all the changes and want to cover the original parameters, you may implement this operation and save the new parameters into CMOS storage. To implement this operation, you may choose this option and press < Enter >; press < Enter > again to exit.

➤ **Discard Changes and Exit**

If you do not want to save the change into CMOS storage, please choose this option and press < Enter >; press < Enter > again to exit.

➤ **Discard Changes**

If error occurs in your change and the changes need to be neglected, please choose this option and press < Enter > in order to enter corresponding options again and reset it.

➤ **Load Optimal Defaults**

This menu is used to input default value in system configuration. These default values are optimized and could give play to the high capability of all hardware.

➤ **Load Failsafe Defaults**

The function of this option is to initialize the setup of each option to realize the most fundamental and secure system functional value. To implement this function, choose this option and press < Enter >; messages to be confirmed will display on the screen, press < Enter > to implement this function.

System Resource Managed by BIOS under X86 Platform

We define three kinds of system resources here: I/O port address, IRQ interrupt number and DMA number.

◆ **DMA**

Level	Function
DMA0	DRAM Refresh
DMA1	Unassigned
DMA2	Unassigned
DMA3	Unassigned (sometimes used for hard disk)
DMA4	Used for DMAC Cascade
DMA5	Unassigned
DMA6	Unassigned
DMA7	Unassigned

◆ **APIC**

Advanced programmable interrupt controller. Most motherboards above P4 level support APIC and provide more than 16 interrupt sources, like IRQ16 - IRQ23; while some others can have up to 28 interrupt sources, such as motherboard supporting PCI-X. However, relevant OS are required to enable that function, and currently, only the OS above Windows 2000 could support that function.

◆ **IO Port Address**

There is 64K for the system I/O address space. Each peripheral will occupy portion of the space. The table below shows parts of the distribution of the I/O address. As the address of PCI device (e.g. PCI network card) is configured by software, it is not listed in this table.

Address	Device Description
000h - 00Fh	DMA Controller #1
020h - 021h	Programmable Interrupt Controller #1
040h - 043h	System Timer
060h - 064h	Standard 101/102 Keyboard Controller
070h - 071h	Real Time Clock, NMI
080h - 09Fh	DMA Page Register
0A0h - 0A1h	Programmable Interrupt Controller #2
0C0h - 0DFh	DMA Controller #2
0F0h - 0FFh	Numeric Data Processor
1F0h - 1F7h	Primary IDE Channel
274h - 279h, A79h	PnP Configuration Register Port
2F8h - 2FFh	COM2
378h - 37Fh	LPT1
3F6h - 3F6h	Primary IDE Channel
3F8h - 3FFh	COM1
400h - 41Fh	SMBus Controller

◆ **IRQ Assignment Table**

There are 15 interrupt sources of the system. Some are occupied by the system devices. Only the ones that are not occupied can be distributed. The ISA devices claim to engross the interrupt. Only the plug and play ISA devices can be distributed by the BIOS or the OS. And several PCI devices share one interrupt through the distribution of BIOS or OS. The diagram below shows parts of the interrupt distribution under X86 platform, but it does not show the interrupt source occupied by the PCI devices.

Level	Function
IRQ0	System Timer
IRQ1	Standard 101/102 Key or Microsoft Keyboard
IRQ2	Programmable Interrupt Controller
IRQ3	Serial Port #2
IRQ4	Serial Port #1
IRQ5	Reserved
IRQ6	Reserved for Floppy Drive Controller
IRQ7	Parallel Port
IRQ8	System CMOS/Real Time Clock
IRQ9	ACPI
IRQ10	Reserved
IRQ11	Reserved
IRQ12	PS/2 Mouse
IRQ13	Maths Co-processor
IRQ14	Primary IDE
IRQ15	Reserved

Chapter 4 Install the Drivers

The driver program of this product could refer to the equipped CD and is omitted here.

Appendix

Watchdog Programming Guide

This board provides a programmable watchdog timer (WDT) up to 255 levels and time by minute or second. Watchdog timeout event can be programmed to reset system or generate maskable interrupts.

The available IRQ numbers for this board are: 3, 4, 5, 7, 9, 10 and 11.

Please modify the corresponding IRQ number in PCIPnP of BIOS Setup interface into “Reserved” before using.

The following describes WDT program in C language. The steps to program WDT are listed as follows:

- Enter WDT programming mode;
- Set WDT operating mode/enable WDT/disable WDT.

(1) Enter WDT Programming Mode

```
#define INDEX_PORT 0x2E
#define DATA_PORT 0x2F

outportb(INDEX_PORT, 0x87);
outportb(INDEX_PORT, 0x87);
outportb(INDEX_PORT, 0x07);
outportb(DATA_PORT, 0x08);
outportb(INDEX_PORT, 0x30);
outportb(DATA_PORT, 0x01);
```

(2) Configure WDT operating mode, reset mode or interrupt mode:

```
unsigned char oldval;
outportb(INDEX_PORT, 0x2d);
oldval = inportb(DATA_PORT);
```

a. **Configure WDT to reset mode**

```
oldval &= 0xfe;
outputb(DATA_PORT, oldval);
```

b. **Configure WDT to interrupt mode**

```
oldval |= 0x01;
outputb(DATA_PORT, oldval);
outputb(INDEX_PORT, 0xf7);
outputb(DATA_PORT, IRQ_NO); /*Please replace the constant
IRQ_NO with the interrupt number need to be used. The available range of the
interrupt number has been listed in the beginning of this chapter.*/
```

(3) Configure WDT to time by minute/second:

a. **Time by minute:**

```
outputb(INDEX_PORT, 0xf5);
outputb(DATA_PORT, 0x08);
```

b. **Time by second:**

```
outputb(INDEX_PORT, 0xf5);
outputb(DATA_PORT, 0x00);
```

(4) Enable/Disable WDT

a. **Enable WDT:**

```
outputb(INDEX_PORT, 0xf6);
outputb(DATA_PORT, TIME_OUT_VALUE); /*Please replace the
constant TIME_OUT_VALUE with the unit number of timeout value (0x01 ~
0xFF)*/
```

b. **Disable WDT:**

```
outputb(INDEX_PORT, 0xf6);
outputb(DATA_PORT, 0x00);
```

Troubleshooting and Solutions

NO.	Phenomenon	Troubleshooting and Solution
1	BIOS setting cannot be saved	<p>Analysis: it could be the problem of the CMOS battery.</p> <p>Solution: measure the CMOS battery via multi-meter; if the voltage is insufficient, replace the battery; re-set the BIOS and save again.</p>
2	The computer can be power-on occasionally	<p>Analysis: it may be caused by ill connection. Remove the power from power socket on motherboard, you may detect that certain pin of the motherboard power has been collapsed to one side after several times insertion.</p> <p>Solution: power off the computer and remove the power plug; erect the bended power pin with tweezers and re-insert in the power socket. Reboot the computer and test for several times until the problem no longer exists.</p>
3	When connecting with U disk, the system prompts that a high-speed device has been connected with a low-speed	<p>Analysis: U disk is a high-speed USB2.0; when connecting with the computer, it prompts that a high-speed device has been connected with a low-speed connector, which indicates that the connector on motherboard is regarded as a USB1.1 port.</p> <p>Solution: enable the USB high-speed transmission mode on motherboard. Different motherboards may have different settings. Modify the FULLSPEED option to HISPEED in USB device option.</p>
4	The screen has no display after replacing with a new memory and cannot enter system; even when the former memory is re-installed, the system cannot be booted as well.	<p>Analysis: it could be resulted from improper operation when inserting or removing the memory and cause abnormal operation of the components on motherboard. Focus on the circuit related to the memory on motherboard.</p> <p>Solution: check the hardware such as memory, video card first; if it shows that the hardware are all OK, then check the circuit around the memory slot on motherboard carefully; you may detect that the two pins connected with the golden finger in the first memory slot are shorted while the second memory slot is normal, then you may know that there is short circuit in the first memory slot. Remove the two pins to their original location with tweezers carefully, insert the memory, reboot the system and the system will be booted smoothly.</p>

NO.	Phenomenon	Troubleshooting and Solution
5	The system cannot be booted after replacing a CD-ROM	<p>Analysis: the data cable of the hard disk may get knocked when installing the CD-ROM, which leads to ill connection of the hard disk data cable, or the master and slave jumpers on hard disk and CD-ROM are wrongly set.</p> <p>Solution: check the data cable of the hard disk and the IDE connectors on hard disk and motherboard first; if there are no problem, then check the master and slave jumper setting. You may detect that the hard disk and CD-ROM are connected with different data cables while their jumpers are all set to master; thus, the hard disk cannot be booted. Set the CD-ROM jumper to slave and then re-install it.</p>
6	No PCI card can be detected after entering the system	<p>Analysis: make sure the PCI card functions normally; re-insert the PCI card or insert it into another PCI slot to see whether it is normal; find out the power type in use (AT or ATX); find out users' requirement for the PCI card voltage.</p> <p>Solution: if the PCI card functions abnormally, replace it with a new one; if it functions normally when re-inserted or inserted in another PCI slot, then there is something wrong between the PCI card and the slot. If AT power is adopted and the PCI card requires 3.3V voltage, then the AT power shall be replaced with ATX power because AT power cannot provide 3.3V voltage. (Suggestion: when purchasing power, please check whether the PCI card in use requires 3.3V voltage or not).</p>
7	Cannot find peripheral devices	<p>Analysis: devices are not connected; no drivers are loaded; devices are broken.</p> <p>Solution: check whether the cable between the device and the motherboard is normal; if it is normal, replace it with a new cable to make sure the connection is OK. Re-install the device driver and check whether it can be recognized; check whether the device is normal; if the device is normal, then check whether the device is compatible with the motherboard.</p>