IPC-860 祥睿 X6

高性能嵌入式工控机

High-performance Embedded PC

Version: C02

法律资讯

警告提示

为了您的人身安全以及避免财产损失，必须注意本手册中的提示。人身安全的提示用一个警告三角表示，仅与财产损失有关的提示不带警告三角。警告提示根据危险等级由高到低如下表示。

⚠危险
表示如果不采取相应的小心措施，将会导致死亡或者严重的人身伤害。

⚠警告
表示如果不采取相应的小心措施，可能导致死亡或者严重的人身伤害。

⚠小心
表示如果不采取相应的小心措施，可能导致轻微的人身伤害。

注意
表示如果不注意相应的提示，可能会出现不希望的结果或状态。

合格的专业人员

本文件所属的产品/系统只允许由符合各项工作要求的合格人员进行操作。其操作必须遵照各自附带的文件说明，特别是其中的安全及警告提示。由于具备相关培训及经验，合格人员可以察觉本产品/系统的风险，并避免可能的危险。

EVOC产品

请注意下列说明：

⚠警告
EVOC产品只允许用于目录和相关技术文件中规定的使用情况。如果要使用其他公司的产品和组件，必须得到EVOC推荐和允许。正确的运输、储存、组装、装配、安装、调试、操作和维护是产品安全、正常运行的前提。必须保证允许的环境条件。必须注意相关文件中的提示。

免责声明

本公司保留对此手册更改的权利，产品后续相关变更时，恕不另行通知。对于任何因安装、使用不当、超规格使用而导致的直接、间接、有意或无意的损坏及隐患概不负责。

订购产品前，请向经销商详细了解产品性能是否符合您的需求。

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保修条款：

产品保修期两年。用户如另有要求，以双方签署的合同为准。

欲获更多信息请访问：

研祥网站：http://www.evoc.com

研祥技术支持邮箱：support@evoc.com**（国际）、**support@evoc.cn**（国内）**

免费客服热线： 4008809666

文档说明

本文档适用范围

本文档适用于EVOC IPC-860型号。

约定

在本文档中，术语“整机”或“产品”有时特指EVOC IPC-860产品。

说明

安全相关注意事项

为避免财产损失以及出于个人安全方面的原因，请注意本入门指南中关于安全方面的信息。 文中使用警告三角来指示这些安全信息，警告三角的出现取决于潜在危险的程度。

历史

本说明书发布版本：

版本	时间
B00	2015.4
C00	2015.7
C01	2015.9
C02	2015.9

安全须知

通用安全说明

⚠小心
除非您阅读过相关的安全说明，否则请不要扩展您的设备。

本设备符合相关的安全措施要求。如果您对在规划环境中安装的有效性存有疑问，请联系您的服务代表。

维修

只能由经过授权的人员对设备进行维修。

⚠警告
未经授权打开设备以及不当修理都可能导致设备严重损坏或危及用户安全。

系统扩展

仅安装专为此设备设计的系统扩展设备。安装其它扩展设备可能会损坏系统并违反无线电干扰抑制规定。请联系技术支持团队或设备购买地，以了解可安全安装的系统扩展设备。

⚠小心
如果因安装或更换系统扩展设备而将设备损坏，担保将失效。

电池

只能由合格人员来更换电池。

⚠小心
如果未按指示更换电池，将会有爆炸危险。 只能使用相同类型的电池或制造商建议的同等类型的电池来更换。用过的电池必须按照当地法规来处理。

⚠警告
存在爆炸及释放有害物质的风险！为此，请勿将锂电池投入火中、焊接到池体、打开、短路、颠倒正负极或加热到 100℃以上，应按规定进行处理，使其避免受到阳光直射、受潮和凝露。

ESD 指令

可以通过下面的标签来识别含有静电敏感设备(ESD, electrostatic sensitive devices) 的模块：

在操作含有 ESD 的模块时，请严格遵守下面提到的准则：

- 在操作含有 ESD 的模块之前，请务必导去身体上的静电（例如，通过触摸接地物体）。
- 所有设备和工具必须不能带有静电。
- 在安装或卸下含有 ESD 的模块之前,请务必要拔出电源插头并卸下电池。
- 只能通过其边缘来操作装配有 ESD 的模块。
- 请勿触摸含有 ESD 的模块上的任何连接器针脚或导体。

目　录

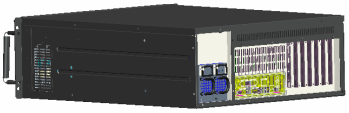
1.产品介绍

1.1 概述

IPC-860 是一款 19 寸 4U 上架式工业级机箱。

整体前面板极富创意的酷美外型，尽显高端、大气、强固、抗振、设备感的观感效果，更具价值感，机箱是采用优质的金属钢板外壳，具有极好的强度及刚度；内部系统结构采用大功率风扇直接对系统进行散热，具有良好通风散热性能；支持多达 4 个 3.5″ 抽拉硬盘模组（兼容 2 个减振硬盘模组）；可以配合工业冗余电源或者工业 PS2 ATX 单电源，保证了整机系统的稳定运行；可以支持 EPE 工业长卡、ATX 工业母板、EATX 服务器主板，既可以满足一般工业领域应用高存储要求的系统需要，也可以满足需要高性能处理能力的场合使用，另外还可以满足多扩展应用的场合；门盖内侧有用户互动显示模块(LCM),具有触摸功能，具有时尚的 UI 界面，可实现关机、信息显示、状态监测、进程管理、日志管理等,实现真正意义上的互动设计，在合上机箱门盖后仍可以透过门盖相应位置的观察窗看到指示灯状态、互动模块状态。

此款产品可广泛应用在银行安防监控系统、智能楼宇管理系统（IBMS）、综合保安管理系统（ISMS）、综合交通管理系统（ITMS）、 机器视觉、工作站、保险、证券等行业录音监听监控系统等。



1.2 规格

项目		定义
主要功能指标	扩展性能	➢ 可安装主板：EPE 标准全长卡、ECO 标准单板、EATX 服务器主板 ➢ 可安装电源：标准 2U 工业冗余电源、标准 PS2 ATX 单电源
	存储功能	➢ 当采用减振硬盘模组时， 最多支持 2 个 3.5″ 抽拉硬盘 ➢ 当采用非减振硬盘模组时， 最多支持 4 个 3.5″ 抽拉硬盘
	机箱自带接口及按键	➢ 前置 2 个 USB2.0 接口 ➢ ATX 电源开关、复位开关、电源灯、硬盘灯、AC220V 指示灯
主要性能指标	外形尺寸（不含挂耳）	440mm（宽）×177mm（高）×552mm（深）
	净重	约 20Kg（不包含包装、配件重量）
	颜色	设备颜色：PF-金刚黑
	温度	➢ 工作温度： 当采用 SVE-2901 服务器主板时，工作温度：0℃～40℃ 当采用 ECO 单板或 EPE 全长卡时，工作温度：0℃～50℃ ➢ 存储温度：-20℃～60℃
	湿度	5%～90%（非凝结状态）

	电磁兼容性	➢ 辐射骚扰：GB 9254-2008 A 级 ➢ 传导骚扰：GB 9254-2008 A 级 ➢ GB/T 17626.2.2006 静电放电（2）级 ➢ GB/T 17626.4-2006 脉冲群抗扰度（2）级 ➢ GB/T 17626.5-2008 浪涌（冲击）抗扰度（2）级
	可靠性	➢ 平均无故障工作时间：MTBF≥5000h ➢ 平均维修时间：MTTR≤20Min
	安全性	满足 GB4943 的基本要求
	机械环境适应性	➢ 抗振动： 当采用 SVE-2901 服务器主板时：5-17Hz/1mm 振幅，17-200Hz/1.0g 加速度（关机状态） 当采用 ECO 单板或 EPE 全长卡时:5-17Hz/1mm 振幅，17-200Hz/1.0g 加速度（开机状态） ➢ 抗冲击：10g 加速度，11ms 周期 ➢ 噪音： 当采用 SVE-2901 服务器主板时，噪音≤70dB 当采用 ECO 单板或 EPE 全长卡时，噪音≤50dB
	电源特性	➢ 输入电压/频率：220VAC/50Hz ➢ 整机功耗：49.5W（待机状态）; 整机功耗：149.6W（运行 MaxPower 100%）

注意：

由于大容量硬盘（如 4TB 及以上容量硬盘）需要的侦测时间相对较长，使用大容量硬盘时,如果主板 BIOS 默认的硬盘侦测时间较短,开机时偶尔会出现找不到硬盘现象，这时需要将主板 BIOS 中的硬盘侦测时间设置适当延长。

当整机搭配 SVE-2901 主板时，内存安装方法（示例仅参考，详细配置见主板说明书）：

配置条件		安装方法	
CPU 数量	内存数量	内存安装位置	CPU 安装位置
1	1-4	P1-DIMMA1、P1-DIMMB1、P1-DIMMC1 或 P1-DIMMD1	CPU1
	5-8	P1-DIMMA1、P1-DIMMB1、P1-DIMMC1 或 P1-DIMMD1 超过的数量可插在 P1-DIMMA2、P1-DIMMB2、P1-DIMMC2 或 P1-DIMMD2	
2	2	P1-DIMMA1、P2-DIMME1	CPU1 & CPU2
	4	P1-DIMMA1、P1-DIMMB1、P2-DIMME1、P2-DIMMF1	
	6	P1-DIMMA1、P1-DIMMB1、P1-DIMMC1、P1-DIMMD1、P2-DIMME1、P2-DIMMF1	
	8	P1-DIMMA1、P1-DIMMB1、P1-DIMMC1、P1-DIMMD1、P2-DIMME1、P2-DIMMF1、P2-DIMMG1、P2-DIMMH1	
	10-16	P1-DIMMA1、P1-DIMMB1、P1-DIMMC1、P1-DIMMD1、P2-DIMME1、P2-DIMMF1、P2-DIMMG1、P2-DIMMH1、超过的数量可任意插在空余插槽	

注意：

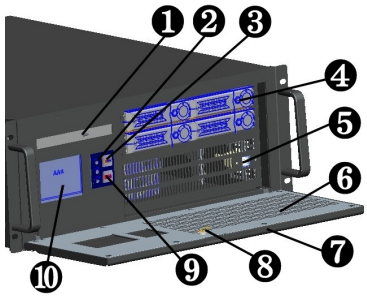
1、同一块主板上 ECC 内存和 non-ECC 内存不能同时混用；

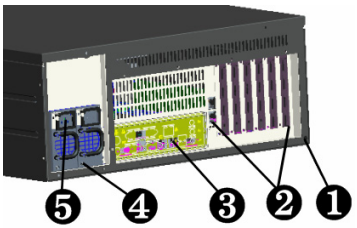
2、同一块主板上 UDIMM 和 RDIMM 不能同时混用；

3、同一块主板上 LRDIMM 不能同时和其它类型 DIMM 混用。

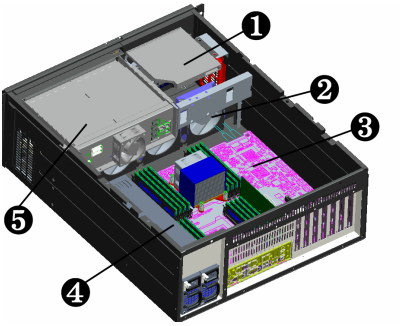
1.3 使用说明

1.3.1 外部功能

设备正视图	位置	描述
	1	超薄光驱
	2	状态显示
	3	开关按钮
	4	抽拉硬盘盒（硬盘顺序上排从左到右是 SATA1 和 SATA2，下排从左到右是 SATA3 和 SATA4）
	5	2×USB 接口
	6	海绵过滤网（位于前门的后面）。请定期检查滤垫是否变脏，并在必要时更换
	7	可上锁的前门，避免接触而引发安全问题。此门有磁性吸附功能，开锁后需手动打开
	8	门锁
	9	复位按钮
	10	LCM 显示模块

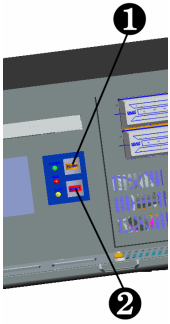
设备后视图	位置	描述
	1	接地螺钉
	2	扩展插槽
	3	I/O 接口
	4	冗余电源模块（可选）
	5	冗余电源模块的电源插口

1.3.2 内部布局

设备内部布局图	位置	描述
	1	光驱
	2	风扇模组
	3	主板
	4	电源
	5	硬盘模组

1.3.3 操作控件

⚠小心
设备执行硬件复位时可能会丢失数据。

控件按钮	位置	描述
	1	ATX电源开关 用于开关设备的开/关按钮
	2	复位按钮 按钮信号将触发硬件复位

1.4 状态指示灯

显示	含义	LED	描述
POWER	设备状态显示	不亮	设备停止运行
		绿色	设备运行中
HDD	显示硬盘访问	不亮	无访问
		黄色	访问
AC 220V	状态显示	不亮	AC 220V 断开
		红色	AC 220V 连通

2.应用规划

2.1 运输

包装好的产品能以任何交通工具，运往任何地点，在长途运输时不得装在敞开的船舱和车厢中，中途转运时不得存放在露天仓库中，在运输过程中不允许和易燃、易爆、易腐蚀的物品同车（或其他运输工具）装运，并且产品不允许经受雨、雪或液体物质的淋湿与机械损坏。

2.2 贮存

产品贮存时应存放在原包装箱内，存放产品的仓库环境温度为 0℃～40℃，相对湿度为 20%～85%。仓库内不允许有各种有害气体、易燃、易爆炸的产品及有腐蚀性的化学物品，并且无强烈的机械振动、冲击和强磁场作用。包装箱应垫离地面至少 10cm，距离墙壁、热源、冷源、窗口或空气入口至少 50cm。

小心
损坏设备的风险！ **在寒冷天气状况下运输设备时，应注意温度的极端变化。 这种情况下，请确保设备上或设备内部没有形成水滴（凝露）。如果设备上形成了凝露，请至少等待12个小时后再接通设备。**

2.3 开箱及检查交付的设备

2.3.1 开箱检查设备

设备开箱时请注意以下几点：

- 建议您不要丢弃原包装材料。 请保留原包装材料以备再次运输设备时使用。
- 请将附带文档存放在安全的地方。 初始调试设备时需用到该文档，并且它是设备的一部分。
- 检查交付的设备，查看是否在运输途中造成了任何明显的损坏。
- 验证所运货物是否包含完整的设备以及您单独订购的附件。 如有任何不符或存在运输损坏，请联系客户服务人员。

2.3.2 记录设备的标识数据

注意
在维修时或失窃后，可凭借这些唯一的编号来识别设备，请不要撕毁。

序列号：位于设备箱体（如下图所示）

2.4 外部环境条件

规划项目时，应考虑以下条件：

- 操作说明提供的规范中所指定的气候和机械环境条件。
- 请避免极端环境条件。设备应注意防尘、防潮及防热。
- 请勿使设备受到阳光直射。
- 请确保其它组件或机柜侧面距设备上方和下方的距离至少分别为 50 mm 和 100 mm。
- 请勿盖住设备的通风口。
- 应始终遵守该设备所允许的安装位置要求。
- 所连接或安装的 I/O 不得在设备中生成大于 0.5 V 的反向电压。

3. 安装产品

3.1 安装信息

在安装设备前，请阅读以下安装说明。

注意
在开关柜中进行安装时，请遵守装配准则及相关的DIN/VDE要求或者国家/地区特定的规章。

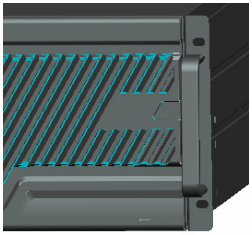
3.2 安装方式

■19″ 上架式　　□桌面式（台面式）　　□嵌入面板式

□壁挂式　　□VESA 标准支撑臂　　□手提便携式

□其他方式_____

3.2.1 19″ 上架式安装

<table>
<tr>
<td rowspan="2">  </td>
<td>步骤：如左图所示，用螺钉把机器固定在机柜上</td>
</tr>
<tr>
<td>注意事项：整机一定要放置在托板上或导轨上，严禁只用前面板螺钉固定整机。</td>
</tr>
</table>

4. 设备连接

4.1 连接前的注意事项

⚠警告
所连接或内置的外围设备不得接入极性相反的设备。

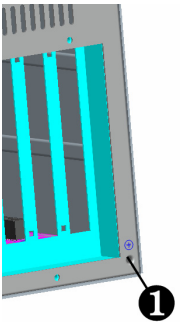
⚠警告
本设备只能在接地电源网络上运行。禁止在未接地或阻抗接地的电源网络上进行操作。

⚠警告
使用的设备额定电压必须符合本产品电源特性。

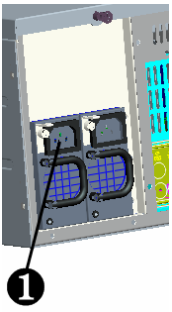
注意
只能连接经认可适合工业应用的外围设备。设备运行时，可以连接热插拔 I/O 模块（USB）。无热插拔功能的I/O设备只能在设备断开电源后进行连接。

4.2 接地连接

低阻抗接地连接更有助于将外部电缆、信号电缆或连接 I/O 模块的电缆所生成的干扰释放到接地系统。

接地端子	
设备上的接地端子 ①（大表面、大面积接触）必须与安装有设备的机柜或设备的中央接地母线连接。最小导线横截面不能小于2.5㎜^{2}，接地电阻最大不能大于0.1Ω。	

4.3 将设备连接到电源

将设备连接到电源的步骤	
将电源线连接到该插口①，插入前请确认输入电压符合本产品的电源特性	

⚠危险
雷暴雨期间断开电源和数据电缆。

注意
必须断开电源连接器才能将设备与电源完全隔离。

5.软件介绍

软件名称	说明	支持范围
BPI	BIOS 编程接口规范，提供软件访问硬件的统一接口	本公司所有 X86 主板整机（2011.10月份之后推出的产品）
eManager	在 BPI 基础上开发的平台管理应用软件，方便用户对其工控设备的状态查询，日志记录，和基本工控常用功能（WDT，GPIO，引导顺序）等	所有支持 BPI 的主板整机均可运行 eManager，子功能视具体主板而定。对于不支持的，可以提供定制服务（具体费用请咨询客服）
eDisk	在 BIOS Flash 中虚拟一个软盘，并提供 Linux 及 Windows 的驱动，供系统下访问	视具体产品而定，产品默认支持的则免费提供；（默认不支持的，可以提供定制服务，收费标准依据采购量定，或会涉及硬件更改）
eCon-XPE	标准 XPE 体验系统	试用版免费提供，正式版需要购买微软的 License，有特殊需求，需要定制开发费用（具体费用请咨询客服）

5.1 BPI介绍

BPI(BIOS Programming Interface)是一种跨平台的，易维护的，支持 32 位操作系统保护模式下访问硬件的软件接口规范。BPI 是硬件和应用软件之间的纽带，其目的是为应用层提供平台无关的操作硬件的标准接口（以库函数的形式呈现，类似标准 C 的库函数），应用软件工程师无需关心主板具体的硬件实现方案。用户利用 BPI 库就可以快速开发出自己的软件产品，而且在主板硬件升级时，无需修改应用层软件，原来的软件就可在新的平台上正常运行。BPI 大大提高了产品的开发速度和降低产品的维护成本。BPI 架构如图 1 所示：

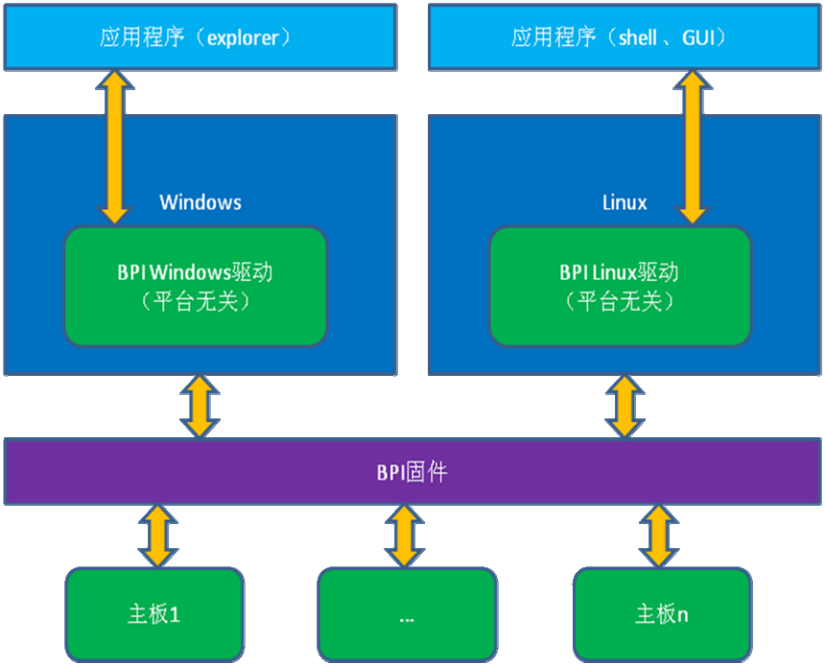


图 1 BPI 架构

1. BPI 支持功能

1) 看门狗

支持看门狗启动，停止及喂狗功能。

2) GPIO

支持 GPIO 输入输出编程。

3) 硬件监控

支持主板 CPU 温度，系统温度，风扇转速及主板核心电压侦测，如 CPU Core 电压，V12.0，电池电压等。

4) Flash 编程

主板上默认提供了一个 OEM Flash 空间，用于存储用户私有数据，如密钥，产品序列号等，大小可通过 BPI 库函数获取。

用户可以根据应用需求利用 BPI 库进行二次开发，例如：

1) 通过侦测 CPU 温度，如果温度过高，触发蜂鸣器报警。

2) 通过对 GPIO 编程来控制外设等。

2. BPI 的优点

1) 平台无关性

BPI 向应用层提供的接口，即 BPI 库函数是平台无关的，因此使用 BPI 库函数开发的软件，无需做任何修改，就可直接在支持 BPI 功能的新硬件平台上正常运行，具有良好的可移植性。

2) 安全性和可靠性高

访问硬件的 BPI 库函数由主板开发商编写，并经过严格测试，可避免因对系统硬件操作不当，造成系统异常问题。

3) 易维护

传统方式的 WDT 及 GPIO 编程与硬件密切相关，测试及调试复杂，且需要维护不同平台的软件，而使用 BPI 库开发的软件，只要维护一套软件即可。

4) 成本低

用户使用 BPI 开发应用程序，不会增加额外的硬件或软件成本。应用软件工程师利用 BPI 库函数可以很方便地进行二次开发，无需关注具体硬件的访问细节，可大大降低产品开发难度和缩短开发周期，帮助系统集成商产品快速上市。

5.2 FMI简介

FMI(Firmware Management Interface)是基于 BPI 规范开发的管理软件，目前 FMI 支持日志管理 eLog、虚拟磁盘 eDisk、eLogo，eOrder 和产品 SN 管理功能，其测试程序详见说明书光盘 eManager 软件。

1) 日志管理 eLog

详细记录计算机使用情况，如第一次开机时间，测试完成时间，出厂时间，每次开关机时间，系统总的开机次数，非法关机次数，计算机总的在线时长，CPU 总的心跳次数。日志管理信息可以为失效分析和产品升级提供非常有价值的参考信息。

2) 虚拟磁盘 eDisk

eDisk 是一个虚拟的板载磁盘设备，出厂时默认为一个可引导进入 DOS 系统的软驱设备，用于系统维护。用户可以根据需求修改 eDisk 的用途，如存放用户私有数据或 EVOC 的一键还原系统 eBack 软件。

3) eLogo

为用户更换计算机的 OEM LOGO 提供有效，简单，安全可靠的方法，无需定制 BIOS，用户只需把 OEM LOGO 放到 eDisk 中，下次开机或重启时，BIOS 自动为用户更新 OEM Logo。

4) eOrder

解决工控领域用户对设备的特殊引导顺序的需求，允许用户在 BIOS Setup 或操作系统下设定设备的特殊引导顺序。

5) 产品 SN 管理

BPI 库地址：见光盘中的“Sofware\Chinese\BPI”

或者“Sofware\English\BPI”

BPI 库函数使用手册

安装“BPI X Setup.exe”后，默认自动生成 BPI 库函数使用手册在“开始”→“程序”→“EVOC” →“evoc_bpi_x”中可以找到使用说明。

5.3 eManager管理软件介绍

eManager 软件是研祥自主研发的设备管理平台软件。利用 eManager 软件，可以进行系统运行异常监测，GPIO 输入输出模式及电平的设置，实时监测温度、风扇、电压状态，在 OS 系统下修改引导设备的顺序，预测硬盘寿命等功能，帮助客户有效的使用及管理设备。 软件具有以下功能:

- 看门狗(WDT)
- GPIO
- 硬件侦测
- Flash 读写
- 引导设备更新
- 硬盘 SMART 信息

5.3.1 运行环境

软件运行所需的文件为 EVOC_BPI_DLL.dll、ImagedataDll.dll、BPIIo.sys、DiskSMARTInfo.dll，需.net Framework 环境。支持 Windows2000 及更高版本的 32 位系统。

5.3.2 功能

1、欢迎界面

软件打开后显示友好的欢迎界面，如下图所示。

2、看门狗(WDT)

看门狗效果图如下所示。

使用方法：首先进行配置，模式为复位模式，计时单位选择分或者秒，超时时间范围从 1-255 间任意数字。配置完成后按左边“开始”按钮，看门狗开始倒计时工作，“当前计时”处显示当前倒计时值，复位模式下倒计时等于 0 时机器重启，倒计时过程中可按下“喂狗”按钮将重新开始从配置的超时时间开始倒计时；按下“停止”按钮为停止看门狗工作。看门狗正在倒计时时退出程序也会停止看门狗工作。“自动喂狗”选项框选中后，在倒计时过程中，计时时间小于 3 秒自动喂狗。

功能：可监控系统是否正常运行，并对异常进行复位。当系统出现异常时，

看门狗无法自动喂狗，倒计时结束后系统重启，从系统错误中恢复。

3、GPIO

GPIO 效果图如上图所示。

使用方法：默认状态不启用 GPIO，避免用户程序也存在 GPIO 设置时与之冲突。GPIO 最大支持 64Pin 显示，界面上超过 8Pin 时以滚动条的形式显示，GPIO 的输入输出模式在相应的单选框内设置，电位的高低状态用绿灯显示，灯亮表示高电位，灯灭表示低电位，GPIO 为输出模式时可改变电位状态，通过右边对应的“设置”按钮切换电位状态。如果是网络型号主板则会把该主板特有的 LED 灯显示出来，并可进行设置。

功能：进行 GPIO 和 LED 网络灯的设置

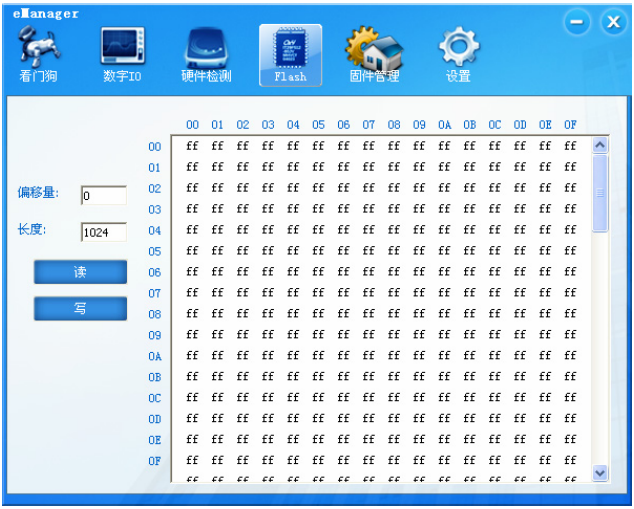
4、硬件检测

硬件检测效果图如上图所示。

使用方法：软件切换至硬件检测界面后，自动获取温度、风扇转速、电压等参数信息，每隔 2S 刷新一次。

功能：实时获取硬件工作状态。

5、Flash 读写



Flash 读写效果图如上图所示。

使用方法：通过设置偏移量和长度对 Flash 进行读写，修改编辑框中的数据时需保持对齐。

功能：把加密数据写入 Flash 中，用户软件可配合 Flash 读写进行绑定。写入的数据不随断电、换硬盘等操作丢失。

注意：Flash 芯片的擦除寿命理论上是 10 万次，为保证芯片的正常使用，应尽量避免频繁的进行 Flash 读写操作；在写数据过程中，保持电源稳定，避免断电导致数据丢失。

5.3.3 固件管理

1、引导设备

引导设备效果图如上图所示。

使用方法：在右图的下拉列表中修改引导设备的顺序，然后点击更新生效，下次开机时则按设定的顺序引导进入系统。

功能：实现在操作系统下对引导设备的顺序进行更改。

2、硬盘 SMART

硬盘 SMART 效果图如上图所示。

使用方法：在下拉列表中选择硬盘，然后列表框中则会现在影响硬盘性能的 SMART 信息。

功能：查看影响硬盘性能的 SMART 属性，帮助预测硬盘的使用寿命，避免硬盘损坏导致数据丢失。

3、用户编程

用户可以直接使用 eManager 软件进行设备的管理，如果用户打算自己编写软件，可以参照光盘中附带 VB、VC、C++Builder、Delphi 的完整例程及 BPI 编程接口使用手册。

5.4 eDisk介绍

eDisk 是集成于主板上的一段 flash 存储空间，通过主板附带的 eDisk 驱动程序，用户可以像访问普通磁盘一样在 eDisk 上进行文件的存储，eDisk 不存在机械部件，所以其抗震性、安全性都要高于机械硬盘，但由于 eDisk 的容量较小（不同主板 eDisk 的大小可能不一样，一般在 512Kbytes～5Mbytes 之间），仅供用户存储有限的关键数据。

5.4.1 驱动程序

eDisk 包含 Windows 和 Linux 两部分驱动程序，下面列出了 eDisk 驱动所支持的操作系统版本：

- Windows XP（32 位）
- Windows 7 （32 位）
- Fedora 10 （32 位）
- Fedora 14 （32 位）

注：eDisk Linux 驱动一般支持内核版本高于 2.6.24 的 32 位 Linux 系统，在 Fedora 10 （32 位）、Fedora 14（32 位）系统下验证通过。

eDisk 驱动程序只支持 FAT 文件系统。

5.4.2 Windows下eDisk驱动程序的安装/卸载方法

Windows 下 eDisk 驱动程序为 **Setup** 安装形式，用户在目标平台（主板或整机）安装完 Windows 系统后，直接运行 eDisk 驱动程序目录下的 Setup.exe 程序，并按安装向导提示安装，安装完成后重启系统即可。

用户如果要卸载 eDisk 驱动程序，则打开 Windows 的“控制面板”，进入“添加删除程序”窗口找到 eDisk 驱动程序，点击卸载程序按钮后按卸载程序向导卸载 eDisk 驱动程序，卸载完成后重启系统。

5.4.3 Windows下eDisk的使用方法

eDisk 驱动程序安装完成并重启系统后，可以在“我的电脑”中看到名为“本地磁盘（Z:)”一个磁盘，该磁盘即是 eDisk 磁盘，用户可以像操作普通硬盘分区一样对该分区进行“格式化”（只支持 FAT 文件系统)，“复制”、“粘贴”、“删除”文件等操作。

5.4.4 Linux下eDisk的使用方法

在 Linux 系统下，因为不同系统内核版本不一样，在 Linux 系统中使用 eDisk 驱动需要进行如下三个步骤：

1. 编译驱动：

   make clean

   make

2. 加载驱动：

   insmod oem_driver.ko

3. 挂载设备：

   mount /dev/ramdisk /mnt

之后，就可以对 /mnt 目录进行读写了。

在第 3 步之前如果需要格式化，则可以执行如下指令：

mkfs.vfat /dev/ramdisk

4. 使用之后，卸载驱动

   umount /mnt

   rmmod oem_driver.ko

5.5 eCon-XPE系统介绍

eCon-XPE是一款基于Windows Embedded Standard 2009开发工具开发出来的嵌入式操作系统，它与Windows XP Professional拥有相同的核心，它不但拥有Windows XP 专业版的常用功能和属性以及应用软件兼容性，而且还拥有增强写保护等Windows XP 系统所不具备的功能，如EWF（系统增强过滤写保护）等。 同时，eCon-XPE操作系统还集成EVOC BPI和系统logo自定义软件。

5.5.1 增强型写入过滤器 (EWF)

1、用途和功能

EWF（Enhanced Write Filter，增强型写入过滤器）是一种只能在 Windows Embedded操作系统上使用的功能。它提供可由用户组态的写保护。

增强型写入过滤器可用于从写保护介质（如 CD-ROM）引导 Windows Embedded Standard 2009、对各个分区进行写保护设置并根据需要调整文件系统的性能（例如，使用 CF 卡时）。

使用 EWF 可将对 CF 卡的写访问次数减至最少。这一点非常重要，因为 CF 卡的写入周期由于技术原因而受到限制。因此，建议在使用 CF 卡时启用 EWF。

小心
每个分区仅激活一个写入过滤器 - 否则可能导致数据丢失。 EWF预装在 SIMATIC IPC 映像中。 确保在一个分区上仅启用一个写入过滤器，否则可能导致数据丢失。

说明
默认情况下，Windows Embedded Standard 2009 禁用增强型写入过滤器。对操作系统进行设置后，应该备份数据，然后启用 EWF。

2、设置 EWF

EWFMGR.EXE 程序可用于安装、启用或禁用 EWF。使用命令提示符来调用该程序。 可提供下列功能：

功能	命令
写保护驱动器 C: 开启	ewfmgr c:-enable
写保护驱动器 C:禁用（接受修改后的文件）	ewfmgr c:-commitanddisable
驱动器 C: 上的已修改文件接受	ewfmgr c:-commit
显示关于 EWF 驱动程序的信息	ewfmgr c:
显示帮助	ewfmgr c:/h

说明
影响写保护的 EWF 命令在下一引导过程后才生效。

增强型写入过滤器 (EWF) 的使用特点

- 电源出现故障时，如果启用了 EWF，则在引导顺序之后对驱动器 C: 所做的更改将丢失。

为防止电源故障时数据丢失，建议使用 USV。

- 关闭设备前，可将可读写 EWF RAM 中的文件保存到 CF 卡或硬盘中。要执行此操作，请在命令提示符中输入以下命令：

ewfmgr c:-commitanddisable

然后重新启动系统。

ewfmgr c:-enable

然后重新启动系统。

说明

如果系统设置为自动调整夏时制调整的时钟，则每次引导系统时，不带中央时间管理且激活了 EWF 的系统都会在夏时制时间或标准时间期间将时钟拨快或拨慢一个小时。

出现此行为的原因是，Windows Embedded Standard 2009 有一个注册表条目，该条目检测是否已针对夏令时调整了时钟。由于此文件还防止 EWF 进行修改，因而在引导顺序期间标记会丢失，而且会再次进行调整。

因此，建议您禁用自动调整并手动更改时钟。

步骤：

1. 关闭 EWF 过滤器 (ewfmgr c: -commitanddisable) 并重新启动系统。

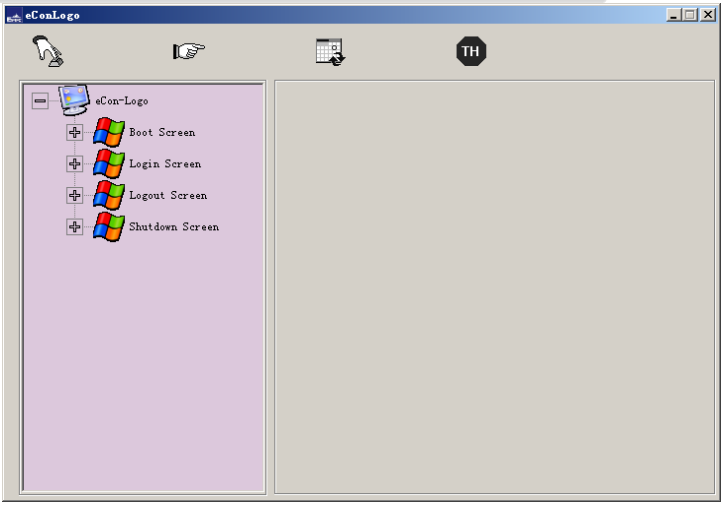
2. 在“控制面板”(Control Panel) 中禁用自动调整。通过菜单命令“开始 > 控制面板 > 日期和时间”(Start > Control Panel > Date and Time) 打开“时区”(Time Zone) 选项卡，清除其中的“自动按夏令时调整时间”(Automatically adjust clock for daylight saving changes) 复选框的复选标记。

3. 再次启用 EWF (ewfmgr c: -enable) 并重新启动系统。

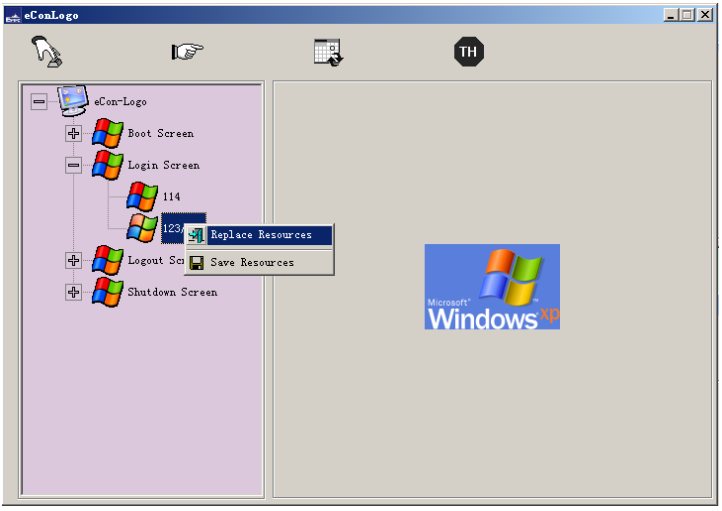
5.5.2 Logo自定义软件

logo自定义软件是一款用来更换操作系统logo的工具软件，它实现了操作系统开机logo、登录logo、注销logo以及关机logo的更换。使用方法如下所示：

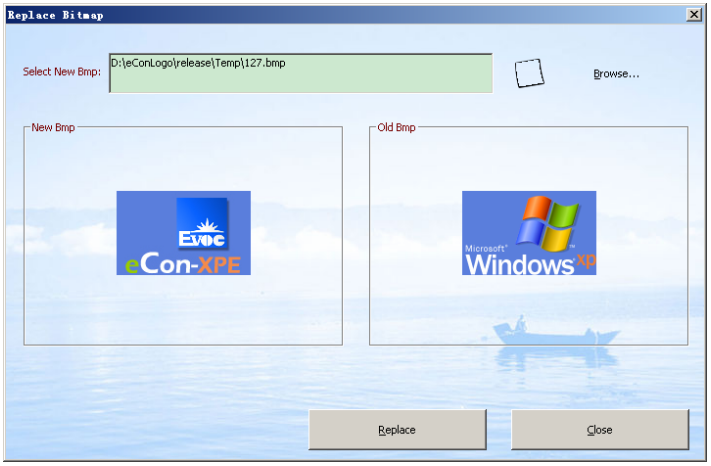
开始菜单->程序->EVOC->eConLogo,运行Logo自定义软件，如下图所示：



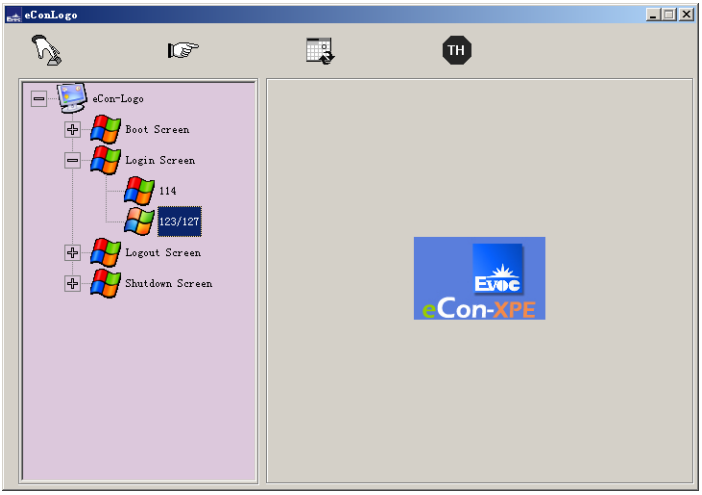
选择Login Screen开始替换登录画面Logo：



点击Replace Resource跳转到替换界面，选择需要替换的图片：



点击Replace即可完成替换。



点Change Login Screen Logo完成替换，重启计算机即可看到效果。同理，可以更改开机logo。

小心
如果在当前系统下使用该软件，更换注销与关机 logo 时，会提示需要进 DOS 系统或 WinPE 系统替换相关文件。如果在 WinPE 下运行该软件，可直接完成替换。

5.6 LCM软件使用说明及配置文件烧录和校准方法

5.6.1 LCM软件使用说明

一、软件概述

1、软件功能

研祥智能科技股份有限公司开发的基于触控 LCM 屏的工业控制软件通过一个低成本的 LCM 显示屏实现用户对工控机的操作及维护，可同时满足工控领域用户对工控机操作的便利性，健康状态监控和成本控制的需求。LCM 点阵触摸液晶屏，具有触摸功能，时尚的用户界面设计，实现工控领域真正意义上的互动设计，给客户带来前所未有的体验及价值感。

主要包括以下四个模块：

a、系统信息模块（Info）

获取系统基本配置信息，包括整机名称，主板名称，CPU 型号，内存型号及容量，硬盘型号及容量。

b、状态信息模块(Status)

该模块监控系统的健康状况，包括 CPU 占用率，内存占用率，网卡上/下行流量，CPU 风扇转速，系统风扇转速，CPU 温度，系统温度，硬盘温度，主板核心电压。

c、系统配置模块(Config)

该模块的功能是实现用户对机器的配置，包括设置系统时间，设置开机密码，设置报警阀值（如 CPU/SYS 温度高温报警，硬盘剩余容量过低等），进程管理（启动/停止/重新启动某个系统进程或用户程序），关机功能（包括立即关机，多少秒之后关机，每天定时关机）和定时开机。

d、日志模块

监控系统日志，软件日志，设备枚举和主板日志。其中主板日志详细记录主板的每次开/关机时间，系统总的运行时间，总的启动次数，非法关机次数（即现场非法掉电次数）等信息，这信息能够为用户产品更新换代和分析某些故障提供有参考价值的信息，如根据系统总的运行实际预测产品换代时间，根据非法关机次数，预测工业现场是否经常非法掉电情况等。

2、软件使用配置

LCM 屏与主机（Host）通过串口交互信息，工控机一般有多个串口，此软件默认使用 COM2，用户也可根据需求，通过修改 LCM 配置文件 lcmd.conf 选择 LCM 与主机通信的串口，建议使用默认设置。

二、运行环境

1、硬件

因 LCM 屏采用串口与主机通信，因此工控机必须至少有一个 RS232 串口，本软件对系统其它方面没有特殊需求。

2、软件环境

Windows 运行环境

名称	描述
软件环境	Windows XP、Win7、Windows Server2003/2008/2012 32bit 和 64bit 系统均支持
编程语言	Visual Studio2008 C++

Linux 运行环境

名称	描述
软件环境	Redhat/CenOS 32bit 和 64bit 系统均支持
编程语言	C 语言 + Shell 脚本

备注：LCM 模块显示内容 Linux 系统下可定制。

三、详细使用说明

1、软件安装

本软件支持 Windows 和 Linux 操作系统，下面分别介绍 Windows 和 Linux 操作系统下 LCMD 软件的安装。

1.1 、Windows 系统下 lcmd 软件安装

Windows 系统下 lcmd 是一个可执行的应用程序，无需安装，直接运行即可。

1.2、 Linux 系统下 lcmd 软件安装

a、解压软件包

```
# tar -xvf LCM_for_IPC-860_A00.tar.gz
```

b、进入 lmcd 软件目录

```
# cd LCM_for_IPC-860_A00
```

c、 执行安装脚本 install.sh，自动完成 lcmd 程序的安装及运行环境的配置

```
# ./install.sh
```

2、开机 LOGO

LCM 屏上电开机后，会显示一个具有动画效果的开机 LOGO，其主界面如图 1 所示：

图 1 LCM 屏 LOGO

触控 LOGO 上的任何位置，LCM 屏会切换到软件的主界面，如图 2 所示：

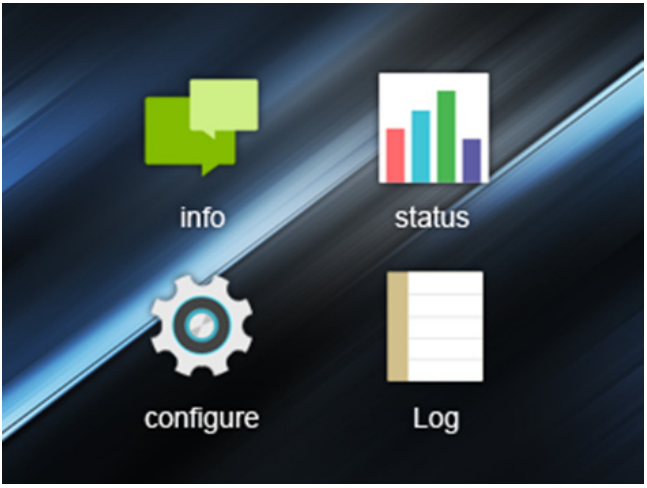


图 2 lcmd 软件主界面

3、系统信息

Lcmd 软件会读取系统的基本硬件配置信息，包括整机名称，主板名称，CPU 型号，内存型号及容量，硬盘型号及容量。如图 3 所示：

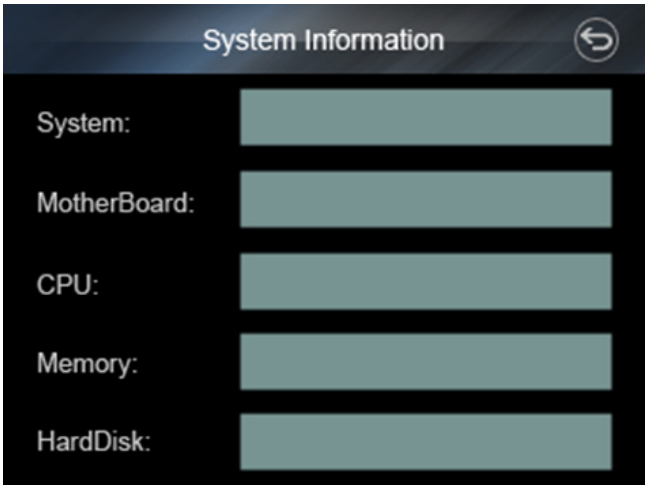


图 3 系统硬件配置信息

4、系统健康状态监控

lcmd 软件可实时监控系统的健康状况，，包括 CPU 占用率，内存占用率，网卡上/下行流量，CPU 风扇转速，系统风扇转速，CPU 温度，系统温度，硬盘温度，主板核心电压。如图 4 所示：

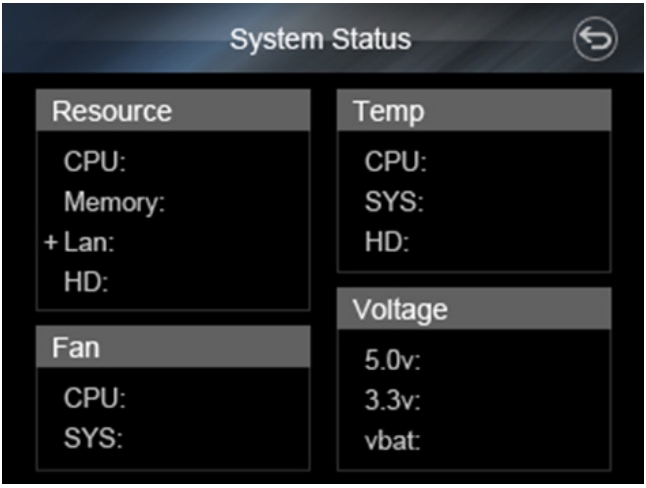


图 4 系统健康状态监控

其中系统资源（Resource）模块中的网卡前面的”+”表示系统中有多个网卡，用户可触控 Lan 所在行查看系统中所有网卡的详细信息，包括网卡设备名称，IP 地址，MAC 地址，上行流量，下行流量，如图 5 所示：

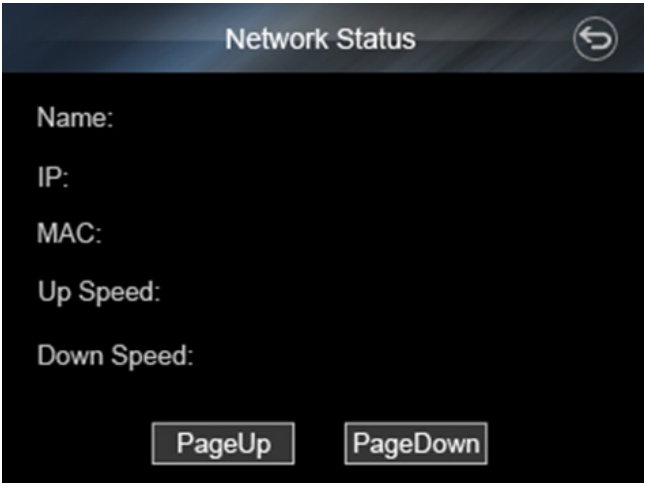


图 5 查看网卡信息

5、系统配置

系统配置的功能是实现用户对机器的管理，包括设置系统时间，设置开机密码，设置报警阀值（如 CPU/SYS 温度高温报警，硬盘剩余容量过低等），进程管理（启动/停止/重新启动某个系统进程或用户程序），关机功能（包括立即关机，多少秒之后关机，每天定时关机）和定时开机。系统设置主页面如 6 所示：

图 6 系统配置页面

5.1、设置系统时间

用户可以系统时间设置(Time Set)模块设置系统时间，如图 7 所示：

图 7 设置系统时间

5.2、设置工控机开机密码

密码设置（Password）模块，用于设置或清除开机密码功能，用户可通过此功能，设置开机密码，禁止非授权用户操作工控机。本软件的 BIOS 模块会在工控机的 BIOS POST 阶段检测用户是否设置开机密码，禁止非授权用户操作工控机，用户可通过 LCM 屏输入密码，也可通过键盘输入密码。本软件方案中的开机密码具有高安全性，LCM 的开机密码存放在 LCM 屏的 Flash 中，它不会因为 BIOS CMOS 掉电或操作系统被破坏而丢失。如图 8 所示：

图 8 设置开机密码

5.3、网络配置

用户可网络配置模块 Network 设置系统中各网卡的静态 IP 地址，子网掩码，网关和 DNS，也可以通过”DHCP IP”按钮由 lcmd 软件通过 DHCP 服务动态分配 IP 地址。如图 9 和图 10 所示：

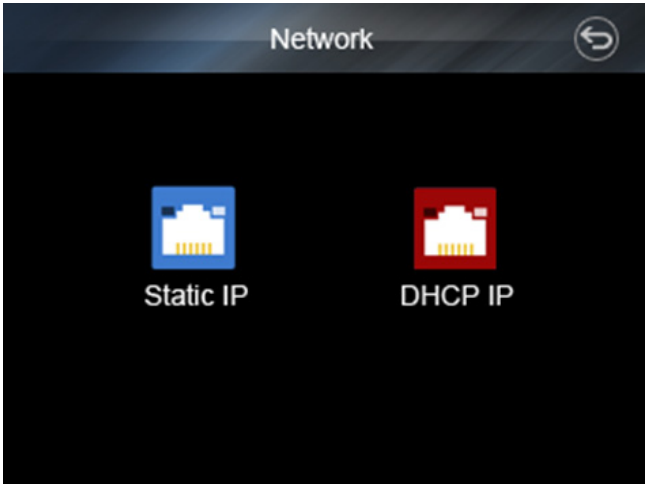


图 9 选择网卡 IP 配置方式

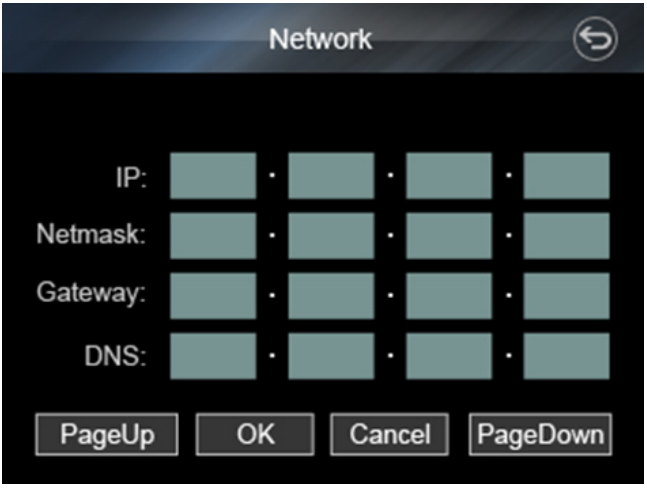


图 10 手动设置 IP 地址

5.4 设置报警阀值

用户可通过此模块设置 CPU/SYS 温度高温报警，硬盘剩余容量过低报警的阀值，如图 11 所示：

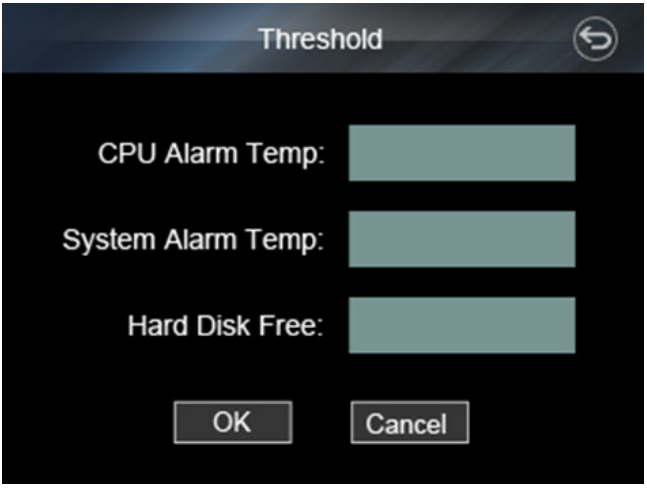


图 11 报警阀值设置

如果用输入 0 表示取消报警，非 0 表示设置报警阀值有效。例如：CPU Alarm Temp 的值为 75，表示用户设置 CPU 温度高于 75 度时，系统报警。Hard Disk Free 的值为 0，表示用户不需监控硬盘剩余容量。

5.5、进程管理

通过进程管理模块用户能执行或停止自己编写的应用的应用程序，也可启动，停止或重启启动系统中的某个服务，如 http 服务，ftp 服务等。

LCM 屏软件提供两种方式来管理用户或系统程序，详细描述如下：

a、 用户通过 LCM 屏的软键盘手动输入要执行或停止的程序，如图 12 所示：此时要求用户输入程序的完整路径和参数，否则 lcmd 软件无法知道应用程序所在的位置。

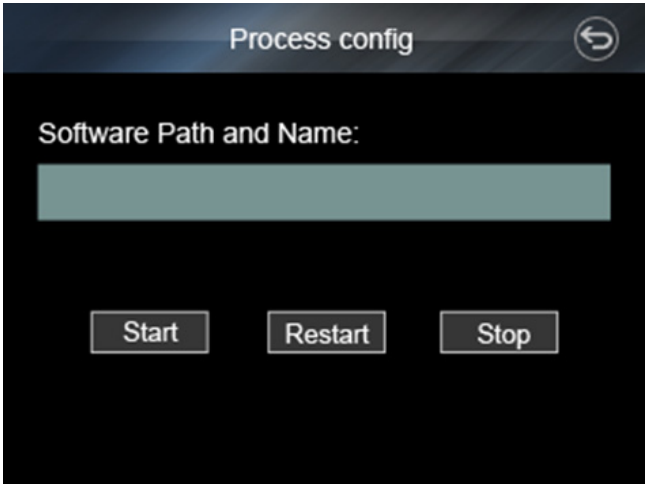


图 12 进程管理

b、 通过配置文件 conf/process.conf 配置文件按照指定格式设定用户要管理的程序，如图 13 所示：

```
#process name                    type
/root/test,                      USER
#service iptables,               SYSTEM_SERVICE
```

图 13 进程管理配置文件

配置文件格式描述如下：

1）‘#’表示注释

2）进程类型

A. USER 表示用户程序，需要完整的程序路径及参数

B. SYSTEM_SERVICE 表示系统服务

3）进程名称和类型之间用逗号分隔

5.6、关机设置

用户可通过此模块实现对工控机的周期性维护和保养，关机页面如图 14 所示：

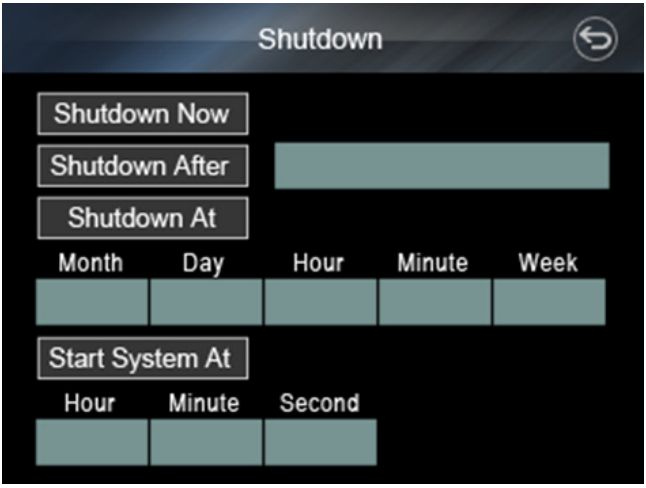


图 14 关机页面

用户通过此模块可以执行如下功能：

a、立即关机（Shutdown Now）

点此按钮后，系统会立刻执行关机操作。

b、多少秒之后关机（Shutdown After）

定时关机操作，系统会在用户设定的时间（单位：秒）之后关机，如果此项值为 0，表示禁用定时关机操作。

c、某个时间点定时关机(Shutdown At)

此功能实现用户在某个时间点定时关机，其参数的含义描述如下：

1） 月份(Month)

表示在某个月定时关机，有效值为 0～12，0 表示不区分月份，表示任意月份都执行关机操作。

2） 日（day）

表示在某日定时关机，有效值为 0～31，0 表示不区分日期，表示任意日期都执行关机操作。

3） 小时(hour)

表示在第几点钟关机，有效值为 0～23，0 表示不区分几点钟，表示任意小时都执行关机操作。

4） 分钟(minute)

表示在第几分钟关机，有效值为 0～59，0 表示不区分分钟。

5） 星期几(Week)

表示在某个星期几定时关机，有效值为 0～7，0 表示不区分星期几，1～6 分别表示星期一到星期六，7 表示星期日

6） 如果“月-日-小时-分钟-星期几”的值全为 0，表示禁用此功能。

应用案例：

A. 每周六 23：30 定时关机的设置

月-日-小时-分钟-星期几： 0 0 23 30 6

B. 设置在 11 月 11 日 11：11 分关机

月-日-小时-分钟-星期几： 11 11 11 11 0

d、 定时开机(Start System At)

用户可通过此功能,设置每天定时开机(前提是工控机的AC电源是接通的)。它的参数含义与关机时定义一致，此处不再赘述。例如：每天 8:30:30 开机。

备注：Windows 下定时开机功能需定制 BIOS。

5.7、重启设置

用户通过此模块实现对工控机的重启操作，包括立即重启，多少秒之后重启，定时重启，其参数含义与关机时定义一致，此处不再赘述。其页面如图 15 所示：

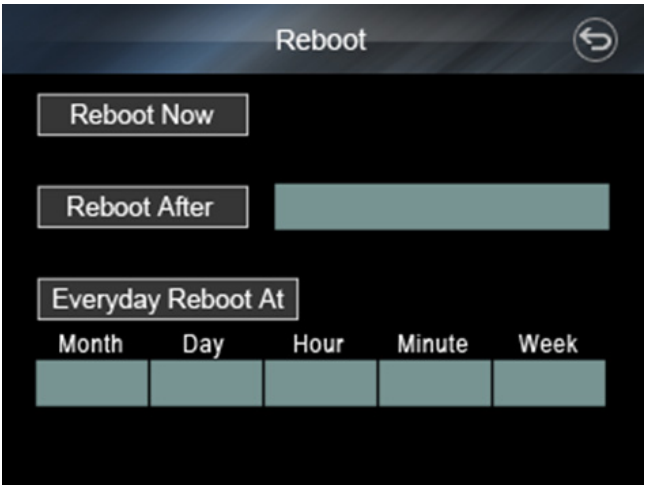


图 15 重启设置

5.8、用户信息设置

用户信息设置，包括语种选择，支持英文和中文；变量信息设置，此功能为用户提供了一种二次开发控制接口，为用户开发增加了一种控制方法；文本显示信息，用户可以控制送显自己的文字信息。其页面如图 16 所示：

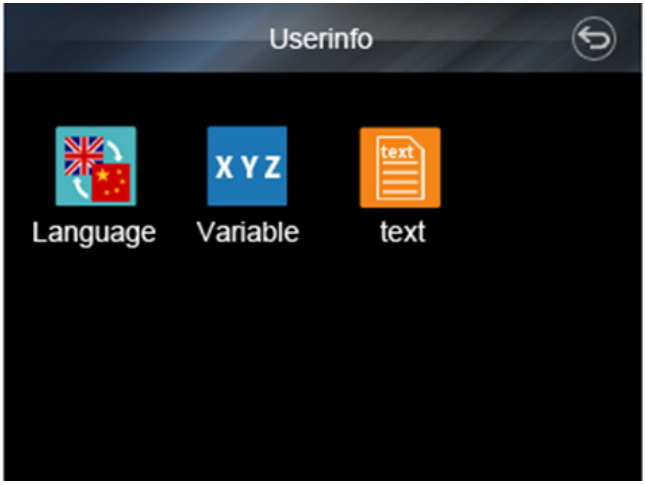


图 16 用户信息

备注：变量和文本功能，Linux 暂未开发。

a、语言选择

此软件支持中文和英文两种语言，用户可通过语言(language)菜单进行语言选择。如图 17 所示：

图 17 语言选择

b、变量设置

在此功能下用于设置变量信息，变量信息设置包括类型、名称、参数、描述。类型支持字符串和正整数，用户可以按自己规定进行相应转换。现开放出 30 个可使用变量存储空间。屏幕中输入，程序中读取，即用户可以输入自己定义的变量信息，然后会保存到 flash 中。利用我们提供的接口函数可以实现读取变量信息，基于此用户可以实现自己的程序功能，会让二次开发更加灵活方便。控制如图 18 所示：

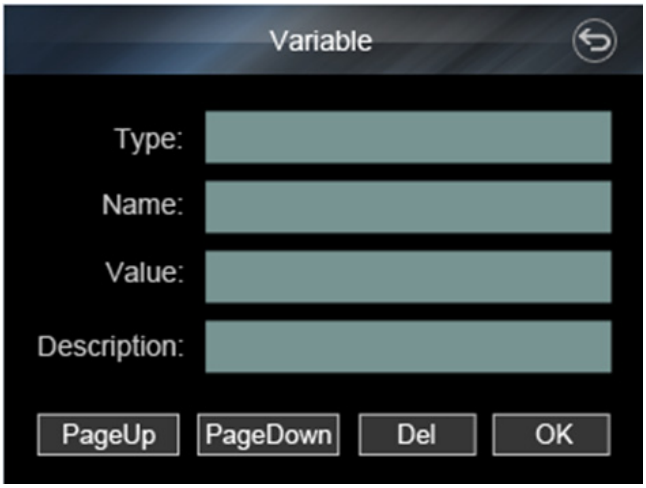


图 18 变量设置

c、文本显示

此功能用于显示文本信息，用户可以送显一些用户信息，如功能介绍、产品信息等。控制如图 19 所示：

图 19 用户信息

6、日志管理

监控系统日志，用户软件日志，报警事件日志，主板日志和 PCI 设备枚举。因 LCM 屏的资源受限，每种类型的日志只会显示最近 100 条。日志管理主页面如图 20 所示：

图 20 日志管理

6.1 系统日志

该模块的功能主要是为了方便用户查看操作系统中出现报警信息，为用户维护工控机提供有价值的参考信息，包括系统警告，错误，FAIL 等日志报警日志。日志显示页面如图 21 所示：

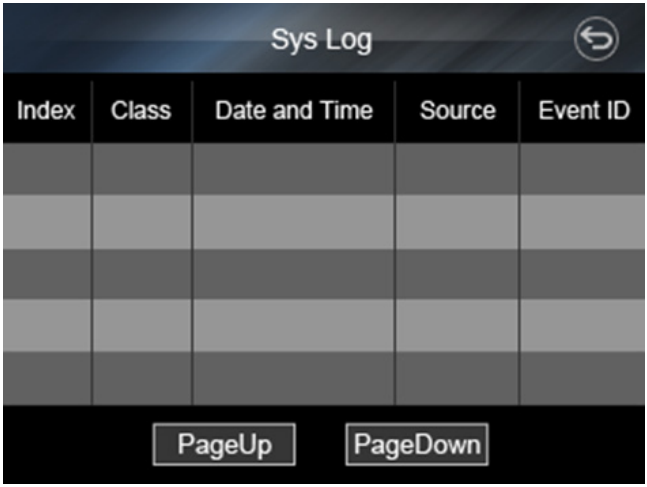


图 21 日志显示页面

6.2 软件日志

软件日志的功能是为了满足特殊用户对自己开发的应用程序日志的监控和显示的需求。用户只要将自己开发的软件的日志按照特定的格式存储在 log 目录下，且文件名为 sw.log 即可，lcmd 会自动将用户软件显示到 LCM 屏上，其显示页面格式与图 18 一致。

日志文件格式如图 22 所示，共分为五个字段，每个字段用分行隔开，分别对应图 21 的五个字段。

```
1;Warning;Oct 21 11:32:49;hdd temp alarm; 123
2;Warning;Oct 21 11:32:50;cpu temp alarm; 125
3;Warning;Oct 21 11:33:36;hdd free space alarm; 127
4;Warning;Oct 21 11:33:39;cpu temp alarm; 128
5;Warning;Oct 21 11:33:42;hdd temp alarm; 129
```

图 22 软件日志文件格式

6.3 报警日志

报警日志的功能是 lcmd 软件会根据用户在系统配置模块中的报警阀值，每

隔 10 分钟（此处选择每隔 10 分钟一次，因为太频繁可能会影响系统的性能，也会造成日志迅速增大）读取一次 CPU 温度，系统温度和硬盘剩余容量，如果当前值超过用户设定的报警阀值，lcmd 软件会将此报警事件记录到报警日志中，用户通过报警日志菜单可查看报警事件的详细信息。

6.4 主板日志

主板日志（Board Log）监控工控机主板使用情况。如果主板支持研祥固件管理技术（FMI），则主板日志能够详细记录主板的每次开/关机时间，系统总的运行时间，总的启动次数，非法关机次数（即现场非法掉电次数）等信息，这信息能够为用户产品更新换代和分析某些故障提供有参考价值的信息，如根据系统总的运行实际预测产品换代时间，根据非法关机次数，预测工业现场是否经常非法掉电情况等。FMI 日志管理的日志文件如图 23 所示，其中”Abnormal PowerOff”表示用户没有正常关机，而是直接拔工控机的电源，这是一个不好的习惯，容易对工控机及其外设造成损坏，缩短其使用寿命，甚至容易造成用户数据丢失或破坏。

```
BIOS Name:C9140054 Ver:C00
BPI Version     : 2.0
FMI Version     : 1.0
eLog Function   : Enabled
eDisk Function : Enabled
eOrder Function: Disabled
Power On Hours: 16
Boot Times      : 1035
Abnormal PowerOff Times: 13
First Boot Time    : 2014-11-14 17:32:43
PowerOn Time : 2014-11-18 13:53:04
PowerOff Time: Abnormal PowerOff
PowerOn Time : 2014-11-18 13:51:52
PowerOff Time: Abnormal PowerOff
PowerOn Time : 2014-11-18 13:30:15
PowerOff Time: Abnormal PowerOff
PowerOn Time : 2014-11-18 11:41:30
PowerOff Time: Abnormal PowerOff
```

图 23 主板日志

6.5 日志导出

此模块的功能是将系统日志，软件日志，报警日志和主板日志导出到一个文件 lcm.log 中，生成一个完整的日志报告。

6.6 设备枚举

此功能是枚举系统所有的 PCI 设备，默认显示 100 条，用户想查看更多的日志可以去查看 log 目录下面的 pci_devices.log 日志文件，如图 24 所示：

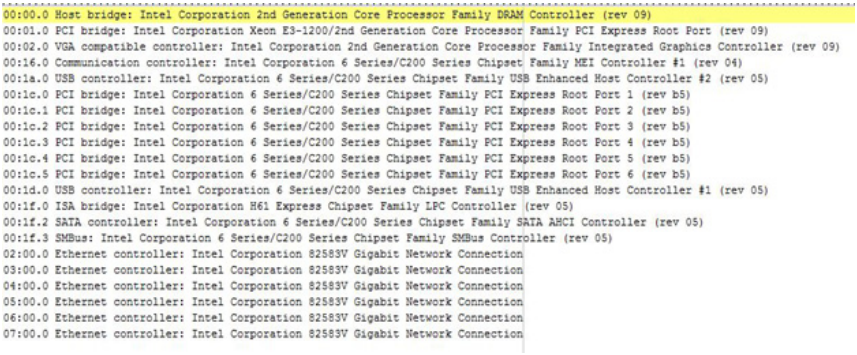


图 24 PCI 设备枚举

5.6.2 LCM配置文件烧录和校准方法

一、概述

LCM 模块配置文件及图片数据

1、烧录方法

2、校准步骤

一准备数据（将压缩包中 DWIN_SET 文件夹放入 SD 卡根目录）

1、准备一张空白 Micro SD 卡

2、将 SD 卡格式化为 FAT32

3、将压缩包中 DWIN_SET 文件夹 放入 SD 卡根目录

4、如下图所示，G 盘为 SD 卡，将 DWIN_SET 文件夹放入 G 盘。

即打开 G 盘，将看到一个 DWIN_SET 文件夹， 打开 DWIN_SET 文件，其中存在如图 1 所示文件

图 1 LCM 烧录代码

二、烧录 LCM 模块配置文件

烧录方式：SD 卡在线烧录

1、 机器断电

2、 将存有 DWIN_SET 文件夹的 SD 卡插入 LCM 模块 SD 卡插槽

3、 开机上电

4、 LCM 模块上电后会出现蓝屏闪烁几次，表示正在刷写，等待其完成，出现开机主页，如 图 2 所示， 即表示烧录完成，烧录完成后，必须再执行校准步骤，见校准描述

图 2 LCM 主页面

三、校准 LCM 触摸屏

1、点击主页面，切换到图 3 页面，然后快速（4s 内）点击 LCM 模块非触摸区域 20 次以上（点击 图 3 任意一个红色方框区域）。

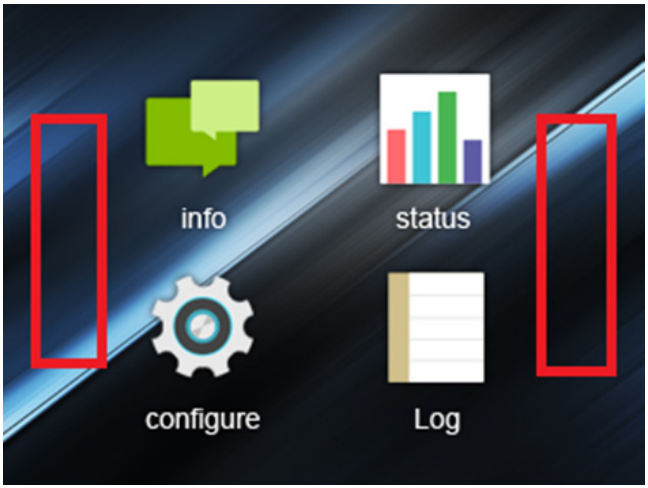


图 3

2、校准过程，依次点击图 4，图 5，图 6 所示“十字交叉线” 即可。

图 4

图 5

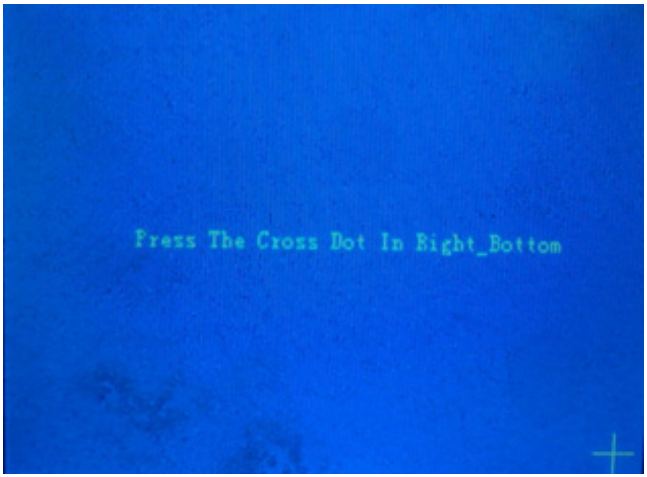


图 6

3、点击所有的 “十字交叉线“后将回到图 7 界面。

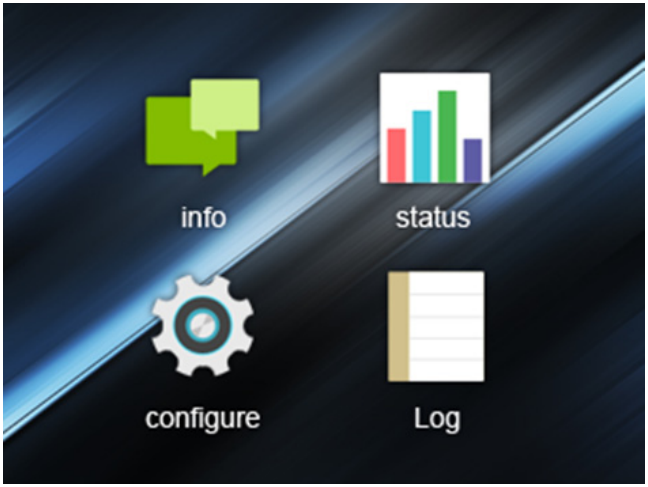


图 7

4、结束烧录，拔下 SD 卡，进行下一台机器 LCM 模块烧录。

备注：

1、所有机器只需要共用一张存有烧录配置文件的 SD 卡即可；

2、烧录和校准完成后，必须拔下 SD 卡；

3、烧录方式为在线烧录；

4、SD 卡建议采用 Sandisk 品牌。

6. 扩展安装

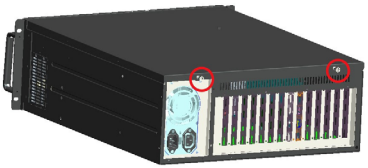
6.1 打开设备

⚠小心
仅能由经过授权和符合条件的人员来打开设备。在保修期内，只允许用户安装扩展内存和扩展卡模块

⚠小心
设备包含的电子元件可能会被静电电荷损坏。因此，打开设备前需要采取预防措施。 请参见“ESD 准则”中有关操作静电敏感组件的 ESD 准则

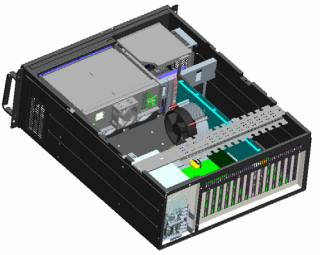
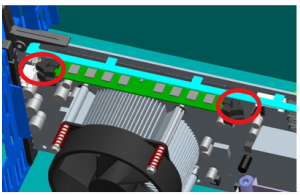
准备工作

将设备与电源隔离。

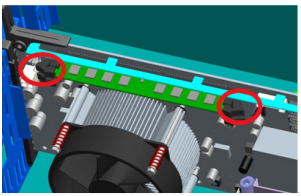
打开设备的步骤		
1	松开图示2颗松不脱钉	
2	卸下箱盖时先将箱盖向机箱后IO方向拉动，然后向上抬起即可卸下箱盖。	

6.2 内存扩展

拆卸内存模块

拆卸内存模块的步骤		
1	打开设备	
2	松开压条的2个螺钉卸掉压条	
3	打开内存固定夹	
4	小心的向上取下内存模块	

安装内存模块

安装内存模块的步骤		
1	将内存放置在主板上的插槽内	
2	小心的将内存推回到插槽内，直到两边固定夹与内存完全契合	

显示当前内存组态

设备启动时系统可以自动检测到新的内存。

6.3 光驱和硬盘扩展

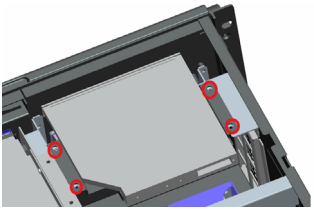
⚠小心
只能由经授权的合格人员更换驱动器

准备工作

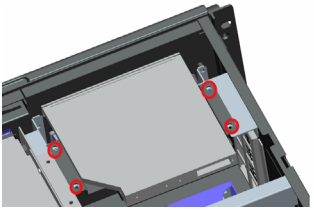
将设备与电源隔离。

6.3.1 光驱扩展

拆卸光驱

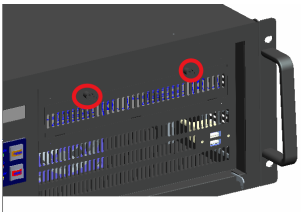
拆卸光驱的步骤		
1	打开设备	
2	卸掉光驱支架的4个螺钉及线材连接	
3	卸下光驱支架	
4	卸掉装光驱的4颗螺钉（左右各两颗）	
5	小心的卸下光驱	

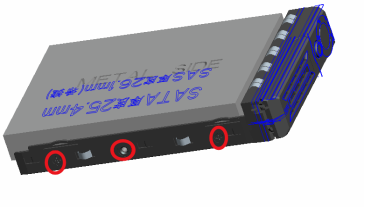
安装光驱

安装光驱的步骤		
1	将光驱装在光驱支架上	
2	对准光驱支架安装孔，锁紧4颗螺钉	
3	合上设备	

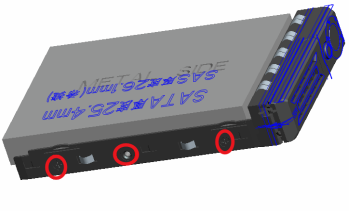
6.3.2 硬盘扩展

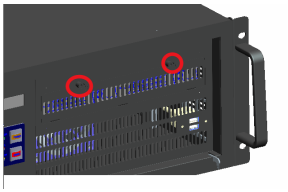
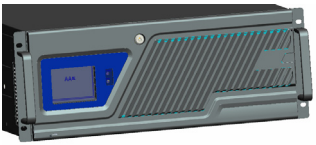
拆卸硬盘

拆卸硬盘的步骤		
1	开锁打开门板	
2	拧开硬盘挡板的2个松不脱钉，取下挡板	

3	按下硬盘盒的按钮，抽出硬盘	
4	拧下硬盘盒上装硬盘的螺钉，将硬盘取下	

安装硬盘

安装硬盘的步骤		
1	拧上硬盘盒上装硬盘的螺钉，将硬盘装上	
2	将硬盘盒插入硬盘模组内，将硬盘盒扳手合上扣紧	

3	将硬盘挡板装在内面板上，并将2个松不脱锁紧	
4	合上前门板，锁上门锁	

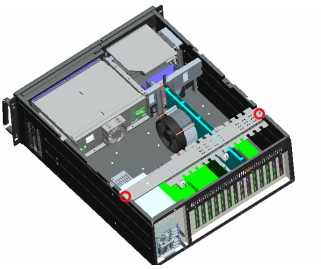
6.4 安装/卸下可插拔的扩展卡

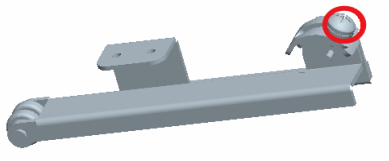
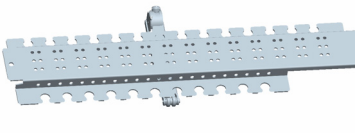
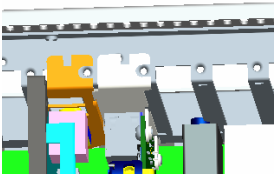
准备工作

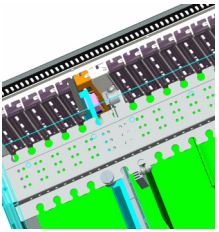
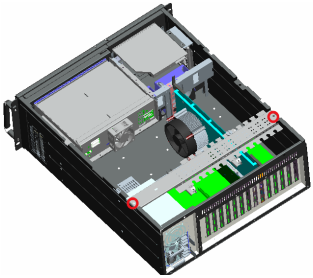
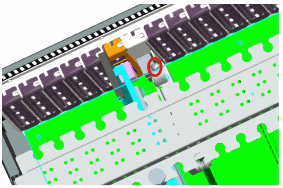
将设备与电源断开。

⚠小心
PCB 上的电子元件对静电放电非常敏感。在操作这些组件时务必确保采取正确的预防措施。 请参见有关操作静电敏感组件的 ESD 说明“ESD 准则”。

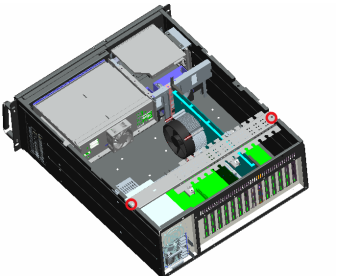
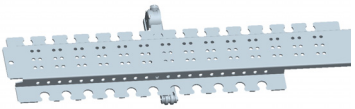
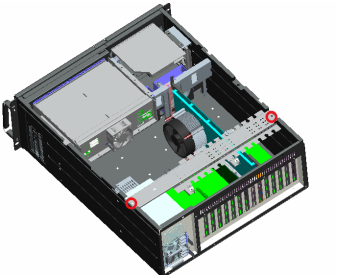
安装扩展卡

安装扩展卡的步骤		
1	打开设备	
2	松开压条的2个螺钉卸掉压条	

3	将可调节支架上锁紧螺钉预锁紧	
4	将可调节支架安装在压条上需要扩展的槽位上	
5	松开需要扩展的对应槽位的空白键仔的螺钉，取下空白键仔	
6	小心的将扩展卡插入对应槽位，并锁紧键仔螺钉	

7	将安装好可调节支架的压条安装在箱体上。需将板卡卡入到可调支架的橡胶压垫的卡槽内	
8	锁紧压条的2个螺钉	
9	用力按住可调支架的橡胶压垫压紧扩展卡后，锁紧可调支架上的螺钉	
10	合上设备	

拆卸扩展卡

拆卸扩展卡的步骤		
1	打开设备	
2	松开压条的2个螺钉卸掉压条	
3	卸掉可调节支架，放进配件盒中，以备后续使用	
4	安装好空白键仔	
5	锁紧压条的2个螺钉	
6	合上设备	

7. 设备维护

7.1 卸下和安装硬件组件

7.1.1 执行维修

只能由经过授权的人员对设备进行维修。

⚠警告
未经授权擅自打开或对设备维修不当可导致设备的严重损坏或危及用户安全。

每次打开设备前将设备与电源断开。

- 仅安装专为此设备设计的系统扩展设备。如果安装其它扩展设备，可能会损坏该设备或违反关于射频抑制的安全要求和规章。请联系技术支持团队或设备购买地，以了解可安全安装的系统扩展设备。
- 如果因安装或更换系统扩展设备而将设备损坏，担保将失效。

责任范围

对因使用第三方设备或组件而造成的功能损害，本公司不承担任何责任。

7.1.2 预防性维护

为了保持较高的系统可用性，我们建议对易磨损设备组件进行预防性更换。下表给出了这种更换的时间间隔。

组件	更换时间间隔
硬盘	3 年
CMOS 备用电池	5 年

7.1.3 更换备用电池

更换电池前的注意事项

⚠小心
存在损坏的风险！ 始终使用同类型锂电池或者制造商推荐的锂电池进行更换。

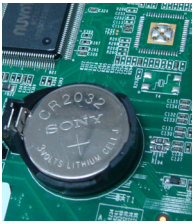
处理

⚠小心
废弃电池必须按照当地法规来处理。

准备工作

说明
1. 记下BIOS Setup 的当前设置或将设置保存为 BIOS Setup“退出”Exit）菜单中的用户配置文件；
2. 在 BIOS 说明中提供了一个列表，可在其中记下这些信息；
3. 将设备与电源断开。

更换电池

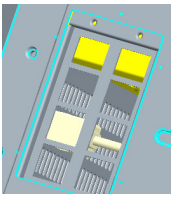
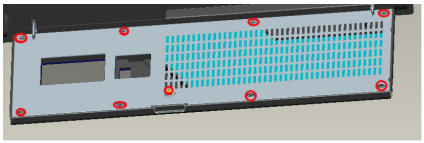
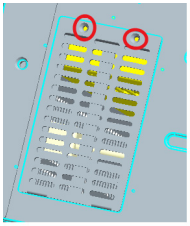
更换电池的步骤		
1	打开设备	
2	卸掉主板。注意：将主板放置在有防静电保护的桌面上	
3	按下卡住电池的弹片，卸下电池。	
4	将新电池放进电池卡座中，并卡紧	
5	安装好主板	
6	合上设备	

重新组态 BIOS Setup

如果更换电池的时间超过 30 秒，设备的组态数据将丢失。 这种情况下需要重新组态BIOS Setup。

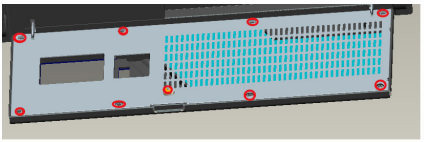
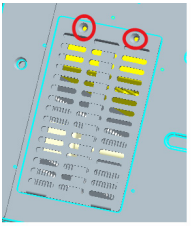
7.1.4 防尘网拆装与维护

7.1.4.1 防尘网安装

1	将防尘网放入槽内	 
2	将防尘网盖盖上，用螺钉锁紧防尘网盖。注意：门后的防尘网盖锁紧后还要将锁舌装上用螺母锁紧	 

注意
为了保证系统散热和通风状况良好，避免防尘网被灰尘堵住，必须定期清洗防尘网。建议至少 3 个月定期清洗一次，机房防尘环境较差的清洗频率应更高，防尘网在使用一年左右更换一次。

7.1.4.2 防尘网拆卸

1	拧下防尘网盖的螺钉，取下防尘网盖。 注意：门后的防尘网盖需要先将锁舌的螺母拧开取下锁舌	 
2	取下防尘网	

7.2 驱动程序安装说明

本产品的驱动程序安装及主板详细信息请参考整机配套光盘，在此不做介绍。

8. 尺寸图

8.1 尺寸图概述

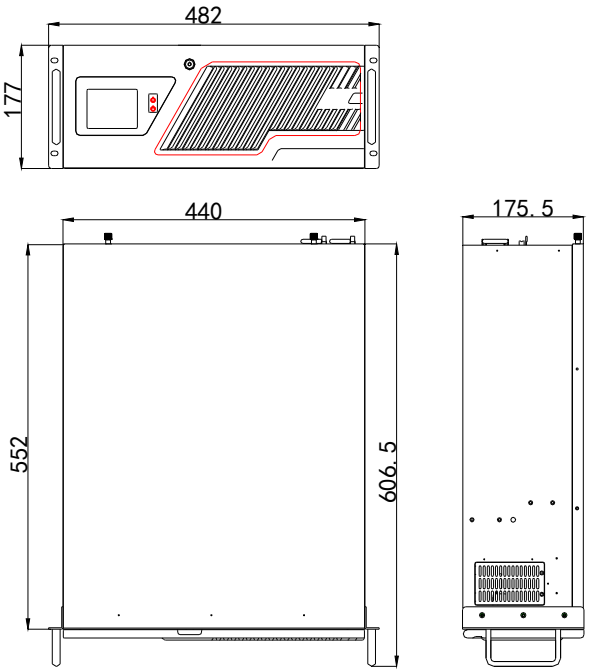
本节包含以下尺寸图：

产品外形尺寸图

产品安装尺寸图

说明
尺寸图中的单位通常为毫米

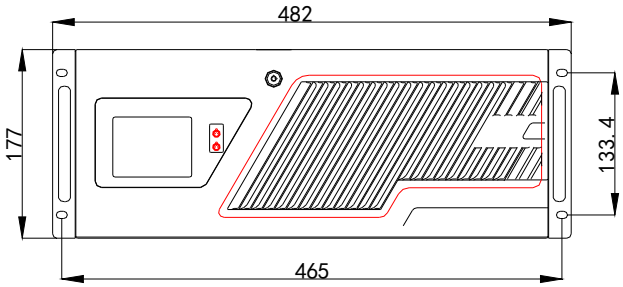
8.2 产品外形尺寸图



单位：mm

8.3 安装尺寸图

8.3.1 产品安装尺寸图



单位：mm

9. 附录

9.1 常见故障分析与解决

常见故障	可能原因	纠正或避免错误
设备不能运行	无电源	请检查电源和电源线/连接器
	设备运行不符合指定的环境条件	1、检查环境条件 2、在开启冷天运输的设备之前请等待大约 12 小时
外接显示器不亮	显示器未打开	打开显示器
	显示器处于“节电”模式	按键盘上的任意键
	亮度控件被设置为黑暗状态	通过亮度控件提高亮度。 有关详细信息，可参考显示器操作说明
	未连接电源线或显示器电缆	1、检查电源线是否正确地连接到显示器和系统单元或接地出口 2、检查显示器电缆是否正确地连接到系统单元和显示器 3、如果执行这些检查后显示器屏幕仍不亮，请与技术支持联系
设备上的时间或日期不正确	BIOS 设置不正确	根据开机画面提示的按键，打开 BIOS Setup，在 BIOS Setup 中调整时间和日期

BIOS 设置正确，时间和日期不对	备用电池电量不足	更换电池
USB 设备不响应	在 BIOS 中已禁用 USB 端口	使用不同的 USB 端口或启用该端口
	连接了 USB 2.0 设备，但禁用了 USB 2.0	启用 USB 2.0
	操作系统不支持 USB 端口	1、为鼠标和键盘启用 USB Legacy Support（支持传统 USB） 2、对其它设备，需要有适合操作系统的 USB 驱动程序
计算机未启动或显示 Boot device not found	在 BIOS 设置的启动优先级中，该启动设备不是第一优先级，或者未包括在启动设备中	在 BIOS 设置的“启动”(Boot) 菜单中更改该启动设备的启动优先级，或将该启动设备包括在启动优先级中
开机提示找不到系统盘	硬盘电源线或数据线未接好	检查硬盘（硬盘必须是已经装好系统可引导的）的电源线、数据线是否插好
	硬盘系统文件损坏	用可引导的光盘进入系统（常用 winpe 系统），检查硬盘系统是否已损坏，有必要时最好重新安装系统

即插即用I/O卡设备，再次使用时检测不到或不能正常使用	插槽接触不良	一般是由于PCI或ISA卡频繁的拔插、固定不稳、防尘措施不好等造成插槽接触不良所致，可反复拔插几次或者换个槽插

9.2 常见报警信息分析与解决

报警信息	含义及解决措施
EFI BIOS产品开机屏幕显示黄色报警信息“Warning system time is invalid, please set it to right”	主板CMOS时间设置错误，需要纠正
主板开机后屏幕显示“Reboot and Select proper Boot device or Insert Boot Media in selected Boot device and press a key”	当前磁盘无法引导，需要重新检查系统硬盘连接线缆是否正常，或使用光驱进行操作系统重新安装
Award BIOS主板，开机POST阶段，屏幕显示错误信息“Keboard error or no keyboard present”	主板或整机未连接PS/2或USB键盘，需要正确接入键盘
EFI BIOS主板开机POST阶段，听到“滴-滴-滴-滴”5声滴的响声	主板或整机未连接PS/2或USB键盘，需要正确接入键盘
整机搭配冗余电源，当开机后，整机电源位置发出刺耳的报警声	冗余电源没有同时接入2个AC插头，需要关机重新接入2个AC插头

9.3 ESD 准则

ESD的定义

所有电子模块都配备了大规模集成化的 IC 或组件。 由于其自身设计原因，这

些电子元件对过电压极其敏感，因此对任何静电放电都极为敏感。

静电敏感组件/模块通常被称为 ESD设备。 这也是此类设备的国际通用缩略语。

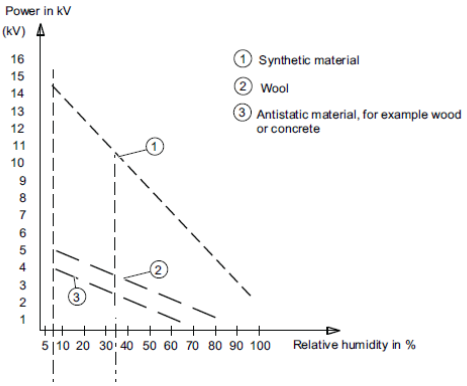
可通过以下符号来识别 ESD 模块：

小心
ESD 设备可被远低于人类能感知阈值的电压所损坏。如果您接触设备的元件或电气连接时未释放身体中存在的静电电荷，将产生静电电压。 静电放电电流可能会导致模块出现潜在问题，损坏或许不会在当时表现得很严重，但运行中可能导致故障。

静电充电

未与周围电位相连的人体中会发生静电充电现象。

以下数据显示了人体与指定材料接触时可能产生的最大静电电压。 这些值符合 IEC 801-2规范。



操作员身上的静电电压

防止静电放电的基本保护措施

- 确保良好的等电位连接：

拿握静电敏感设备时，确保您的身体、工作区域和包装均已接地。 这样做可防止静电电荷。

- 避免直接接触：

通常只有在无法避免的情况下（例如在维修过程中）才接触静电敏感设备。 拿握模块时不接触任何芯片引脚或 PCB 电路。 这样，释放的电能将不会影响敏感设备。

处理模块之前，先释放身体中的电荷。可通过接触接地的金属部件进行放电。务必使用接地的测量仪器。

9.4 缩略语列表

缩略语	术语	含义
AC	交流	交流
ACPI	高级组态与电源接口	
PLC	可编程控制器	
AGP	加速图形端口	高速总线系统
AHCI	高级主机控制器接口	SATA设备的标准控制器接口。Microsoft Windows XP（高于 SP1 版本）和 IAA 驱动程序支持该接口
APIC	高级可编程中断控制器	扩展的可编程中断控制器
APM	高级电源管理	用于监视和降低设备功耗的工具
AS	自动化系统	
ASIS	售后信息系统	
AT	高级技术	
ATA	高级技术附件	
ATX	扩展的 AT 总线	
AWG	美国线缆规格	区分电缆直径的美国标准
BIOS	基本输入输出系统	基本输入输出系统
CAN	控制器局域网络	
CD-ROM	光盘 – 只读存储器	用于存储大量数据的可移动存储介质
CD-RW	光盘 – 可重写	可重写 CD

CE	欧洲共同体（CE 符号）	产品符合所有适用的 EC 指令
CF	CF 卡	
CGA	彩色图形适配器	标准监视器接口
CLK	时钟脉冲	用于控制器的时钟信号
CMOS	互补金属氧化物半导体	互补金属氧化物半导体
COA	真品证书	Microsoft Windows 产品密钥
COL	许可证书	许可证授权
COM	通信端口	串行接口的术语
CP	通信处理器	通信计算机
CPU	中央处理单元	CPU
CRT	阴极射线管	
CSA	加拿大标准协会	按照本国或两国标准（使用 UL/USA）进行测试和认证的加拿大组织
CTS	清除发送	清除发送
DRAM	动态随机存取存储器	
DC	直流	直流
DCD	数据载波检测	数据载波信号检测
DMA	直接存储器存取	直接存储器存取
DOS	磁盘操作系统	无 GUI 的操作系统
DP	分布式 I/O	
DQS	德国质量与环境管理体系认证机构	
DDRAM	双数据随机存取存储器	带有高速接口的存储器芯片
DSR	数据设置就绪	操作就绪
DTR	数据终端就绪	数据终端就绪
DVD	数字多功能光盘	数字多功能光盘
DVI	数字视频接口	数字显示器接口
DVI-I	数字视频接口	具有数字和 VGA 信号的数字显示接口

ECC	错误修正代码	错误修正代码
ECP	扩展的功能端口	扩展的并行端口
EGA	增强型图形适配器	设备与监视器的接口
ESD	静电荷敏感组件	
DM	电子手册	
EIDE	增强型电子集成驱动器	IDE 标准的增强
EISA	扩展工业标准体系结构	扩展的 ISA 标准
EMM	扩展内存管理器	管理内存扩展
EM64T	64 位内存扩展技术	
EN	欧洲标准	
EPROM/EEPROM	可擦写可编程只读存储器/电子可擦写可编程只读存储器	使用 EPROM/EEPROM 芯片的插件子模块
EPP	增强型并行端口	双向 Centronics 接口
ESC	退出字符	控制字符
EWF	增强型写入过滤	
FAQ	常见问题解答	FAQ
FAT 32	32 位文件分配表	32 位文件分配表
FBWF	基于文件的写入过滤器	
FD	软盘	磁盘驱动器，3.5″
FSB	前端总线	
GND	接地	机壳接地
HD	硬盘	硬盘
HDA	高保真音频	
HDD	硬盘驱动器	HDD
HU	高度单位	
HMI	人机界面	用户界面
HORM	一次休眠多次快速启动	
HT	超线程	
HTML	超文本标记语言	用于创建 Internet 页面的脚本语言

HTTP	超文本传输协议	Internet 上的数据传输协议
硬件	硬件	
I/O	输入/输出	计算机的数据输入/输出
IAA	Intel 应用程序加速器	
IDE	集成设备电子部件	
IEC	国际电工委员会	
IGD	集成的图形设备	
IP	入口保护	防护等级
IR	红外	红外
IRDA	红外数据协会	用于通过 IR 模块传输数据的标准
IRQ	中断请求	中断请求
ISA	工业标准体系结构	用于扩展模块的总线
ITE	信息技术设备	
L2C	二级缓存	
LAN	局域网	局限于本地区域的计算机网络
LCD	液晶显示器	液晶显示器
LED	发光二极管	发光二极管
LPT	行式打印机	打印机端口
LVDS	低电压差分信号	
LW	驱动器	
MAC	介质访问控制	介质访问控制
MC	存储卡	信用卡格式的存储卡
MLFB	机器可读的产品标识	
MMC	微型存储卡	32 x 24.5 mm 格式的存储卡
MPI	用于编程设备的多点接口	
MS-DOS	Microsoft 磁盘操作系统	
MTBF	故障平均间隔时间	
MUI	多语言用户界面	Windows 的语言本地化
NA	不适用	

NAMUR	Normenarbeitsgemeinschaft for Mess- und Regelungstechnik in der chemischen Industrie（化工行业测量和控制技术标准协会）	
NC	未连接	未连接
NCQ	原生命令队列	自动将文件和磁盘存取重新排序，以提高性能
NEMA	美国国家电气制造商协会	美国电子部件制造商联合组织
NMI	不可屏蔽中断	无法拒绝中断处理器
NTFS	新技术文件系统	Windows 版本（2000、XP、Vista）的安全文件系统
ODD	光盘驱动器	
OPC	过程控制 OLE	工业过程的标准化接口
PATA	并行 ATA	
PC	个人计算机	
PCI	外围设备组件互连	高速扩展总线
PCIe	Peripheral Component Interconnect express	具有高数据传输速率的高速串行、差分全双工 PtP 接口。
PCMCIA	个人计算机存储卡国际协会	
PI	保护性接地	保护导体
PEG	PCI Express 图形	
PG	编程PC	
PIC	可编程中断控制器	可编程中断控制器
POST	开机检测	
PXE	预引导执行环境	用于通过网络运行没有硬盘数据的新设备的软件
RAID	独立磁盘冗余阵列	冗余硬盘阵列
RAL	受限的访问位置	在受限制访问的操作设施（例

		如，上锁的控制柜）中安装设备
RAM	随机存取存储器	
RI	振铃输入	呼入
ROM	只读存储器	
RS 485	协调子层 485	设计用于多达 32 个节点的双向总线系统
RTC	实时时钟	实时时钟
RTS	可靠传输服务	请求发送
RxD	接收数据	数据传送信号
SATA	串行高级技术附件	
SCSI	小型计算机系统接口	
SDRAM	同步 DRAM	
SELV	安全超低电压	安全超低电压
SLC	二级缓存	
SMART	自我监视、分析和报告技术	硬盘错误诊断程序
SMS	短消息服务	通过电信网络传输短消息
SNMP	简单网络管理协议	网络协议
SO-DIMM	小型双内联内存模块	
SOM	主板上的安全卡(SOM)	
SPP	标准并行端口	并行端口的同义词
SRAM	静态随机存取存储器	静态 RAM
SSD	固态驱动器	
SVGA	超级视频图形阵列	使用了至少 256 种颜色的增强型 VGA 标准
SVP	设备的序列号	
SW	软件	
TCO	Total Cost of Ownership（总体拥有成本）	
TFT	薄膜晶体管	LCD 平面屏幕类型

TTY	电传	异步数据传送
TxD	发送数据	数据传送信号
TWD	看门狗时间	看门狗监视时间
UL	美国安全检测实验室公司	按照本国或两国标准（使用 CSA/Canada）进行测试和认证的美国组织
UMA	统一内存体系结构	视频存储器
URL	统一资源定位符	Internet 页面的完整地址标识
USB	通用串行总线	
UXGA	极速扩展图形阵列	图形标准，旳大分辨率为 1600×1200 像素。
V.24		通过串行端口传输数据的 ITU-T 标准化建议
VCC		集成电路的正极电源电压
VDE	Verein deutscher Elektrotechniker（德国电气工程师协会）	
VGA	视频图形阵列	满足工业标准的视频适配器
VRM	电压调整模块	
VT	虚拟化技术	通过 Intel 技术可以使用模拟封闭环境。
VT-D	直接 I/O 的虚拟化技术	启用将设备（例如，网络适配器）直接分配给虚拟设备这一功能。
W2k	Windows 2000	
WAV	波长编码	用于音频数据的免丢失文件格式
WD	看门狗	采用错误检测和报警的监视程序

WLAN	无线 LAN	无线局域网
WoL	局域网唤醒	
WWW	环球信息网	
XGA	扩展图形阵列	图形标准，旳大分辨率为 1024×768 像素。

9.5 词汇表

AHCI 模式

AHCI 是对 SATA 控制器进行寻址的标准方法。AHCI 描述了 RAM 中的结构，其中包含用于控制和状态的常规区域以及一个命令列表。

APIC 模式

高级外围设备中断控制器。共有 24 条中断线。

ATAPI CD-ROM 驱动器

AT 总线附件包接口（连接到 AT 总线）CD-ROM 驱动器。

CE 标志

Communauté Européene CE 符号确认产品符合相应 EC 说明，例如 EMC 说明。

CF 卡

CF 卡是一种卡片形式的数字存储介质，没有移动部件。 CF 卡包含非易失性内存和控制器。 CF 卡的接口符合 IDE 接口。 可通过插头和插座适配器操作 CF 卡，而无需PCMCIA 上的其它电子元件或 IDE 硬盘控制器。有两种设计规格：

CF-I (42.6×36.4×3.3 mm) 和 CF-II (42.8×36.4×5 mm)。

COM 接口

COM 接口是串行 V.24 接口。 该接口适用于异步数据传输。

EMC 说明

关于 Electromagnetic Compatibility(电磁兼容)的说明。符合标准由 CE 符号和 EC 一致性证书确认。

ESD 说明

使用静电敏感组件的说明。

Intel VT

英特尔虚拟化技术 (IVT, Intel Virtualization Technology) 为应用程序创建一个安全封闭的环境。使用此功能需要专用（虚拟化）软件和具有 VT 功能的处理器。

LAN

Local Area Network（局域网）： LAN 是本地网络，它包含跨越相对有限的范围分布并使用通信电缆链接的一组计算机和其它设备。连接到 LAN 的设备称为节点。 网络的用途共用文件、打印机或其它资源。

LAN 唤醒 (WoL)

局域网唤醒。该功能允许通过 LAN 接口启动设备。

LPT 接口

LPT 接口（Centronics 接口）是可用于连接打印机的并行接口。

PATA

用于硬盘驱动器和光驱的接口，并行数据传输速率高达 100 Mbps。

PC 卡

个人计算机存储卡国际协会（PCMCIA）的商标。 符合 PCMCIA 规范的辅助卡的标识。与信用卡大小大致相同的PC卡可插入 PCMCIA 插槽。 版本 1 指定厚度为 3.3 毫米、主要用作外部存储器的 I 型卡。 PCMCIA 规范的版本 2 也定义了厚度为 5 毫米的 II 型卡和厚度为 10.5 毫米的 III 型卡。II 型卡可以实现例如调制解调器、传真卡和网络接口卡等设备。III 型卡配备有需要更多空间的设备（例如，无线通信模块）或旋转存储介质（例如，硬盘）。

PC/104 / PC/104-Plus

目前在业界特别流行两种总线体系结构。 PC/104 和 PC/104-Plus 。 两者都是设备类单板机的标准。 这两种总线系统的电气和逻辑布局与 ISA（PC/104）和 PCI（PC/104-Plus）相同。 软件通常不能检测出它们与常规桌面总线系统之间的差别。 它们的优点是紧凑的设计和由此带来的空间上的节省。

PCMCIA

该协会由大约 450 个计算机行业的公司会员组成，关注焦点是为设备扩展卡的小型化和灵活使用提供国际标准，以便为市场提供基本的技术。

PEG 接口

用于图形的 PCI Express。具有 16 个 PCIe 通道的图形接口，用于扩展图形模块。

PIC 模式

外围设备中断控制器。共有 15 条中断线。

POST

打开计算机后 BIOS 执行的自检。例如,执行 RAM 测试和图形控制器测试。如果 BIOS检测到任何错误，则系统会输出音频信号（蜂鸣声代码）；在屏幕上会输出指示错误原因的相关消息。

PROFIBUS/MPI

Process Field Bus（过程现场总线）（过程应用程序的标准总线系统）。

PROFINET

PROFINET 是由 PROFIBUS 用户组织开发并维护的工业以太网的标准名称。PROFINET统一了工业以太网的协议和规范，以满足工业自动化技术的要求。

RAID

Redundant Array of Independent Disks（独立磁盘的冗余阵列）： 数据存储系统,一般至少在两个硬盘卷上存储数据及相应错误修正代码(例如奇偶位)以提高可靠性和性能。硬盘阵列由管理程序和用于错误修正的硬盘控制器控制。RAID 系统通常在网络服务器中实现。

ROM

Read-Only Memory（ROM）是只读存储器，可以单独寻址其中的每个存储地址。 程序或数据永久存储，电源故障时不会丢失。

S.M.A.R.T

自监视、分析和报表技术（SMART 或 S.M.A.R.T.）是集成在存储介质中的工业标准。通过该技术可持续监视重要参数并在早期检测到即将发生的问题。

SATA

硬盘驱动器和光驱的串行 ATA 接口，串行数据的传输速率高达 300 Mbps。

SCSI 接口

用于连接 SCSI设备（例如硬盘驱动器或光驱）的小型计算机系统接口。

SETUP（BIOS 设置）

在其中定义关于设备配置(即 PC/PG 上硬件的配置)信息的程序。PC/PG 的设备组态预设为默认值。 因此，如果在硬件配置中添加了内存扩展、新模块或新驱动器，则必须在 SETUP 中输入更改。

SSD（固态驱动器）

固态驱动器的安装方式与任何其它驱动器类似，它仅使用容量接近的半导体存储芯片，因此不包含旋转磁盘或其它运动组件。这种设计使得 SSD 更为坚固耐用，同时可以缩短存取时间并降低能耗。

WLAN

Wireless LAN（无线 LAN）是本地网络，它通过无线电波、红外线或其它无线技术传输数据。 无线 LAN 主要应用于办公室或工厂环境中的便携式计算机。

备份

程序、数据介质或数据库的副本，用于归档或用于保护关键、不可替换的数据，防止工作副本损坏时数据丢失。 某些应用程序自动生成数据文件的备份副本，并管理硬盘上的当前和先前的版本。

波特

信号传输中步进速度的物理单位。 定义每秒钟传送的信号状态的数目。 只有两种状态时，一波特等于 1 bps 的传输率。

操作系统

描述与硬件协作控制并监视用户程序执行、用户程序和操作模式中系统资源分配的所有功能的通称（例如 Windows XP Professional）。

超线程

HT 技术（多线程）允许并行计算多个进程。 仅当支持所有相关的系统组件（例如处理器、操作系统和应用程序）时，HT 才有效。

传统 USB 支持 (Legacy USB support)

不使用驱动程序支持 USB 端口上的 USB设备（例如鼠标、键盘）。

传统的启动设备

传统的驱动器可用作 USB设备。

存储卡

信用卡格式的存储卡。 存储用户程序和参数（例如可编程模块和 CP）的存储器。

复位

硬件复位： 使用按钮/开关复位/重启设备。

格式化

将磁性数据介质上的存储空间初级划分为磁道和扇区。格式化操作将删除数据介质上的所有数据。所有的数据介质在首次使用前，必须进行格式化。

常见故障

错误原因、原因分析、补救措施。

缓存

用于所请求数据的中间存储（缓冲）的高速访问缓冲区。

即插即用

通常指计算机自动组态系统以便与外围设备（例如监视器、调制解调器或打印机）通信的能力。用户可以插入一个外围设备并可立即“使用”而无需手动组态系统。 即插即用设备需要支持即插即用的 BIOS 和即插即用扩展卡。

集线器

网络技术中的一个术语。 网络中的一个设备，它在一个中央位置连接多个通信线路，为网络上的所有设备提供公共连接。

可扩展的固件接口 (EFI)

指的是固件与计算机的各个组件以及操作系统间的中央接口。EFI 在逻辑上位于操作系统之下，是设备BIOS 的继任规范，主要面向 64 位系统。

控制器

控制某些内部或外围设备的功能的集成硬件和软件控制器（例如键盘控制器）。

冷启动

一个启动序列，当打开计算机时进行启动。 在冷启动序列内，系统通常执行一些基本硬件检查，然后将操作系统从硬盘加载到工作内存 -> 引导。

模块

模块是 PLC、编程设备或设备的插件单元。这些模块可以是本地模块、扩展模块、接口或海量存储器（海量存储模块）。

模块固定架

模块固定架用于固定模块并确保安全接触和运输。 撞击和振动特别影响大而重的模块。因此建议对这种类型的模块使用模块固定架。 市场上也有短、轻、紧凑的模块。 模块固定架不是为这些模块而设计，因为对它们而言，标准的固

定措施已足够。

暖启动

中止程序后重启计算机。 加载并再次重启操作系统。 可使用热键 CTRL+ ALT+ DEL 执行暖启动。

驱动程序

操作系统的程序部分。 它们按 I/O设备（例如硬盘、打印机和监视器）需要的特定格式修改用户程序数据。

热插拔

SATA 接口为设备的硬盘驱动器系统提供了热插拔功能。该组态的前提条件是一个带有SATA RAID 控制器（板载或插槽模块）的 RAID1 系统以及至少两个 SATA 拆卸式托架。热插拔的优势在于无需重新启动计算机就可更换有故障的硬盘。

双核 CPU

与上一代使用超线程技术的单核处理器相比，双核处理器显著提高了计算和程序执行的速度。

像素

PixElement（像素）（画面点）。 像素表示可在屏幕或打印机上复制的最小元素。

芯片组

位于主板上，将处理器与 RAM、图形控制器、设备I 总线和外部接口连接在一起。

以太网

局域网络内（总线结构）进行文本和数据通信时的传输率为 10/100/1000 Mbps。

引导盘

引导盘即为具有“引导”扇区的引导程序盘。 它可用于从磁盘装载操作系统。

映像

指硬盘分区的映像，例如，保存到一个文件中以便在必要时进行恢复。

重启

不关闭电源暖启动计算机 (Ctrl + Alt + Del)

主板

主板是计算机的核心部分。 在主板处理和存储数据并控制和管理接口和设备I/O。

Legal Information

Warnings

Please pay attention to the tips within the manual so as to avoid personal injury or property losses. The tips for personal injury are indicated in warning triangles while the tips only related to property losses have no warning triangles. The warning tips are listed as follows with the hazardous scale from severe to slight.

⚠ **Danger**
If handled carelessly, death or severe human injury will occur.

⚠ **Warning**
If handled carelessly, death or severe human injury might occur.

⚠ **Caution**
Warning triangle indicates that slight human injury might occur if handled carelessly.

Note
Unexpected result or status might occur, if not handled according to the tips.

Professional Personnel

The product/system covered by the manual can only be handled by qualified and professional personnel. During operation, please follow the respective instructive manuals, especially the safety warnings. The professional personnel have been trained and possess relevant experiences; therefore, he/she could be aware of the risks of the product/system and avoid possible damages.

EVOC Product

Please pay attention to the following instructions:

⚠ **Warning**
EVOC product can only be used according to the descriptions within the manual, including the contents and the relevant technical documents. If the products or components from other companies are required, please get the recommendation and grant from EVOC first. Proper transportation, storage, assembly, installation, debugging, operation and maintenance are prerequisite to ensure product safety and normal operation; therefore, please ensure permitted environment conditions and pay attention to the tips within the manual.

Copyright Notice

Information offered in this manual is believed to be correct at the time of printing, and is subject to change without prior notice in order to improve reliability, design and function and does not represent a commitment on the part of the manufacturer. In no event will the manufacturer be liable for direct, indirect, special, incidental, or consequential damages arising out of improper installation and/or use, or inability to use the product or documentation.

Trademarks

Warranty Terms:

The warranty on the product lasts for two year. If the user has additional requirements, the contract signed between the two sides shall prevail.

Please visit our website: http://www.evoc.com for more information,
or send an email to the Technical Support Mailbox support@evoc.com (International) or support@evoc.cn (Domestic) for consultation.

Hotline: 4008809666

About this manual

Scope of the Manual

The manual is appropriate for EVOC IPC-860.

Convention

The term “the PC” or “the Product” within the manual usually stands for EVOC IPC-860.

Instructions

Safety instructions

To avoid property losses or individual injury, please pay attention to the safety instructions within the manual. The warnings within the manual are marked with warning triangle ⚠, whose existence is dependent upon the scale of the potential hazard.

History

The version of this manual:

Version	Time
B00	2015.4
C00	2015.7
C01	2015.9
C02	2015.9

Safety Instructions

General Safety Instructions

⚠Caution
Before you have read related safety instructions, please do not expand your device.

This device is compliant with related safety requirements. If you have any doubt about the effectiveness of installation in the planned environment, please contact your service representative.

Repair

The PC can only be repaired by authorized personnel.

⚠Warning
Unauthorized opening of the PC and improper repair may cause serious damage to the PC or endanger users' personal safety.

System Expansion

Only system expansion devices designed for this PC can be installed. Installing other expansion devices may damage the system and violate regulations on radio interference suppression. To know the system expansion devices that can be installed, please contact technical support team or local distributor.

⚠Caution!
If the PC is damaged due to improper installation or replacement of system expansion devices, the warranty for the product will become invalid.

Battery

The battery can only be replaced by qualified personnel.

⚠Caution!
If the battery is not replaced according to the instructions, it may have the danger of explosion. It can only be replaced by the same type of battery or batteries recommended by the manufacturer. The used battery must be disposed according to local laws and regulations.

⚠Warning!
Danger of explosion or release of hazardous substances may exist! Therefore, please do not put the Li-ion battery into fire, weld it onto cell body, open, short-circuit or reverse polarity of the battery, and do not heat it up to above 100 ℃. Dispose the battery according to the rules, and avoid direct sunlight, moisture and condensation.

ESD Instructions

The following label can be used to identify the modules that contain electrostatic sensitive devices:

When operating the modules that contain electrostatic sensitive devices, please follow the instructions below:

- When operating the modules that contain electrostatic sensitive devices, make sure to release static electricity on your body (for example, by touching a grounded object).
- All the devices and tools should not contain ESD.
- Before installing or removing modules that contain ESD, make sure to pull out the power plug and remove the battery.
- When assembling modules that contain ESD, always handle them by their edge.
- Please do not touch any connector pin or conductive part on the modules that contain ESD.

Contents

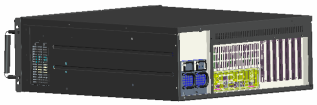
1. Product Introduction

1.1 Overview

IPC-860 is a 19-inch 4U rack mount industrial-grade chassis.

The front panel of the PC has an innovative cool and elegant design. With such high-end appearance, combined with rugged design and anti-vibration performance, the product looks very valuable. Made of high-quality steel sheet, the chassis has excellent strength and stiffness. Inside the chassis, large-power-consumption fan is used to dissipate heat for the system, so the product has excellent heat dissipation performance. It supports up to four 3.5″ drawable HDD module (supports 2 shock-absorption HDD modules), and can be used together with industrial redundant power supply or industrial PS2 ATX single power, which ensures the stable operation of the complete PC system. The PC supports EPE industrial full-size cards, ATX industrial motherboards and EATX server motherboards. It not only meets the system requirement of industrial fields for high memory capacity, but also meets the requirements of certain applications for high performance processing, in addition, it also can meet the requirements for multiple expansions. Inside the door cover, there is a user interaction LCD module (LCM) with touch screen and fashionable UI interface. With Power-off, Information Display, Status Monitoring, Process Management, Log Management and other functions, the module realizes an interaction design in real sense. After the chassis door cover is closed, the LED status and Interaction Module status can still be observed through windows on the door cover.

The product can be widely used in bank security monitoring system, Intelligent Building Management System (IBMS), Integrated Security Management System (ISMS), Integrated Traffic Management System (ITMS), machine vision, as well as recording monitoring systems in work station, insurance, securities and other fields.



1.2 Specifications

Item		Definition
Main Function Indices	Expansion performance	➢ Motherboards that can be installed: EPE standard full-size cards, EC0 standard single boards, EATX server motherboards Power supplies that can be installed: Standard 2U industrial redundant power supply, standard PS2 ATX single power supply.
	Storage function	➢ When anti-vibration HDD module is used, only two 3.5″ drawable HDDs are supported. ➢ When non-anti-vibration HDD module is used, only four 3.5″ drawable HDDs are supported.
	Ports and buttons on the chassis	➢ 2 x USB2.0 port at front ➢ ATX power switch, reset switch, power LED, HDD LED, AC220V LED
Main Performance Indices	Dimensions (excluding mounting ear)	440mm (W) x 177mm(H) x 552mm(D)
	Net weight	About 20Kg (excluding package and accessories)
	Color	Color of the PC: PF-diamond black
	Temperature	➢ Operating temperature When SVE-2901 server motherboard is used, operating temperature：0℃～40℃ When EC0 single board or EPE full-size card is used, operating temperature：0℃～50℃ ➢ Storage temperature: -20℃～60℃
	Humidity	5%～90% (Non-condensing)
	EMC	➢ Radiation disturbance: GB 9254-2008 Class A ➢ Conduction disturbance: GB 9254-2008 Class A ➢ GB/T 17626.2.2006 Electrostatic Discharge Level(2) ➢ GB/T 17626.4-2006 Pulse Group Immunity Level(2) ➢ GB/T 17626.5-2008 Surge (Impact) Immunity Level(2)

	Performance	➢ MTBF≥5000h ➢ MTTR≤20Min
	Safety	Meets basic requirements of GB4943
	Mechanical and environmental adaptability	➢ Anti-vibration: When SVE-2901 server motherboard is used: 5-17Hz/1mm; amplitude, 17-200Hz/1.0g acceleration (power-off status) When EC0 single board or EPE full-size card is used: 5-17Hz/1mm amplitude, 17-200Hz/1.0g acceleration (Power-on status) ➢ Anti-shock: 10g acceleration, 11ms duration ➢ Noise: When SVE-2901 server motherboard is used, noise≤70dB When EC0 single board or EPE full-size card is used, noise ≤50dB
	Power feature	➢ Input voltage/Frequency: 220VAC/50Hz ➢ Power consumption of the PC: 49.5W (standby status); Power consumption of the PC: 149.6W (operating MaxPower 100%)

Note:

Because large capacity HDD (such as HDDs with 4TB or above capacity) needs a relatively longer detection time, when a large capacity HDD is used, if the default HDD detection time in the motherboard BIOS is short, sometimes HDD may fail to be detected. If such failure occurs, the HDD detection time in the motherboard BIOS needs to be adjusted longer.

When the PC is used with SVE-2901 motherboard, Memory Installation Methods (For reference only; for detailed configuration, please refer to the Motherboard Manual):

Configuration		Installation method	
CPU Qty.	**Memory Qty.**	**Position for memory installation**	**Position for CPU installation**
1	**1-4**	P1-DIMMA1, P1-DIMMB1,P1-DIMMC1 or P1-DIMMD1	CPU1
	5-8	P1-DIMMA1, P1-DIMMB1, P1-DIMMC1 or P1-DIMMD1; additional ones can be inserted in P1-DIMMA2、P1-DIMMB2、P1-DIMMC2 or P1-DIMMD2	
2	**2**	P1-DIMMA1, P2-DIMME1	CPU1 & CPU2
	4	P1-DIMMA1, P1-DIMMB1, P2-DIMME1, P2-DIMMF1	
	6	P1-DIMMA1, P1-DIMMB1, P1-DIMMC1, P1-DIMMD1, P2-DIMME1, P2-DIMMF1	
	8	P1-DIMMA1, P1-DIMMB1, P1-DIMMC1, P1-DIMMD1, P2-DIMME1, P2-DIMMF1, P2-DIMMG1, P2-DIMMH1	
	10-16	P1-DIMMA1, P1-DIMMB1, P1-DIMMC1, P1-DIMMD1, P2-DIMME1, P2-DIMMF1, P2-DIMMG1, P2-DIMMH1；additional ones can be inserted in unused slots.	

Notes:

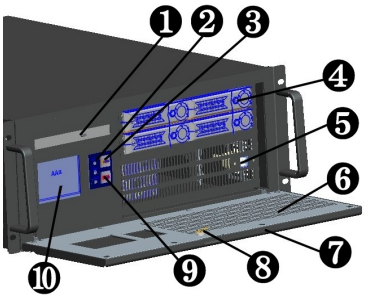
1. ECC memory and non-ECC memory cannot be used on a same motherboard;

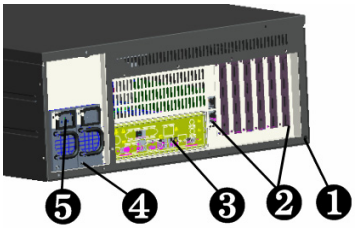
2. UDIMM and RDIMM cannot be used on a same motherboard;

3. LRDIMM and other types of DIMM cannot be used on a same motherboard;

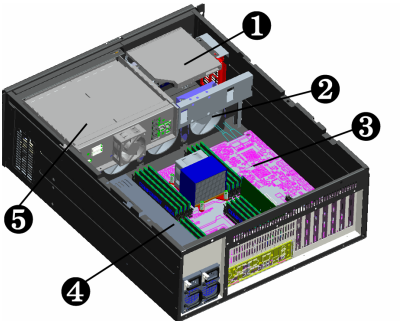
1.3 Operating Instructions

1.3.1 External Function

Front View	Location	Description
	1	Ultra-slim optical drive
	2	Status indication
	3	Switch button
	4	Drawable HDD case (on the upper layer from left to right are SATA1 and SATA2; on the upper layer from left to right are SATA3 and SATA4)
	5	2×USB port
	6	Sponge filter (located at the back of the front door). Please check regularly whether the filter has got dirty, and replace it if necessary
	7	The front door which can be locked, to avoid safety problems caused by direct contact. This door has magnetic sucking function, so after the door is unlocked, it needs to be opened manually.
	8	Door latch
	9	Reset button
	10	LCM display module

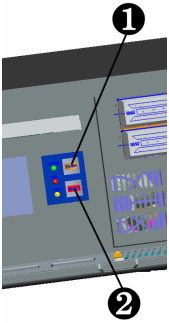
Rear View	Location	Description
	1	Ground screw
	2	Expansion slot
	3	I/O port
	4	Redundant power supply module (optional)
	5	Power connector of redundant power module

1.3.2 Internal Layout

Internal Layout of the PC	Location	Description
	1	Optical drive
	2	Fan module
	3	Motherboard
	4	Power supply
	5	HDD module

1.3.3 Operating Control

⚠Caution!
When executing hardware reset, data may be lost.

Control Button	Location	Description
	1	ATX power switch On/Off button used to switch on/off the PC.
	2	Reset button The button signal will trigger hardware reset

1.4 Status LED

Display	Meaning	LED	Description
POWER	PC status indication	Off	The PC stops operating
		Green	The PC is operating
HDD	Indicating access to hard drive	Off	Not being accessed
		Yellow	Being accessed
AC 220V	Status indication	Off	AC 220V disconnected
		Red	AC 220V connected

2. Application Scheme

2.1 Transportation

Well-packaged products are suited for transportation by all kinds of vehicles. During transportation, products should not be put in open cabin or carriage. During transshipping, products should not be stored in open air without protection from the atmospheric conditions. Products should not be transported together with inflammable, explosive and corrosive substances and are not allowed to be exposed to rain, snow and liquid substances and mechanical force.

2.2 Storage

Products should be stored in package box when it is not used. And warehouse temperature should be 0°C ~ 40°C, and relative humidity should be 20% ~ 85%. In the warehouse, there should be no harmful gas, inflammable, explosive products, and corrosive chemical products, and strong mechanical vibration, shock and strong magnetic field interference. The package box should be at least 10cm above ground, and 50cm away from wall, thermal source, window and air inlet.

Caution
Risk of destroying the device! **When shipping the PC in cold weather, please pay attention to the extreme temperature variation. Under this circumstance, please make sure no water drop (condensation) is formed on the surface or interior of the device. If condensation is formed on the device, please wait for over twelve hours before connecting the device.**

2.3 Opening the Box and Initial Examination

2.3.1 Opening the Box to Examine the PC

Please pay attention to the following issues when opening the box:

- Do not discard the original packing material. Please keep the original packing material for re-transportation.
- Please keep the documentation at a safe place. The documentation, which is a part of the device, is required for initial device debugging.
- When doing the initial examination, please check whether there are distinct damages to the device caused during the transport.
- Please check whether the delivery contains the intact device and all of the independently ordered accessories. Please contact the customer service when any unconformity or transportation damages occur.

2.3.2 Data to Identify the PC

Note
During maintenance or after the product is stolen, this code can be used to identify the PC. Please do not rip it off.

Serial No.: Located on the chassis body (as shown below)

2.4 External Environment Conditions

When planning a project, the following conditions should be considered:

- Please observe the weather and mechanical environment condition specified in the operating instructions.

- Please avoid extreme environment conditions, and keep the PC away from dust, moisture and heat.
- Please avoid direct sunlight on the PC.
- Please make sure other assemblies or the side of cabinet is 50mm and 100mm respectively away from the upper/lower side of the PC.
- Please do not cover the ventilation hole of the PC.
- The installation location requirement allowed for the PC should always be observed.
- The I/O connected or installed should not generate reverse voltage of larger than 0.5V in the PC.

3. Installing the Product

3.1 Installation Information

Before installing the PC, please read the following installation instructions:

Note
When installing the product in the switch cabinet, please observe the assembly guidance, related DIN/VDE requirements and specific regulations of the country/region.

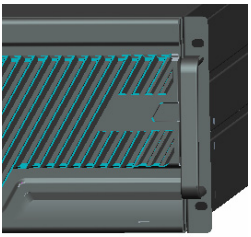
3.2 Mounting Method

■19″ Rack Mount □Desktop □Embedded Panel

□Wall Mount □VESA Standard Arm □Portable

□Others_____

3.2.1 19″ Rack Mount Installation

	Step: As shown in the left picture, use screws to fasten the PC onto the cabinet.
	Note: The PC must be placed on the support board or guide rail. Do not fasten the PC only by front panel screws.

4. PC Connection

4.1 Things to Know before Connection

⚠ Warning
The connected or built-in peripherals with opposite polarities are not allowed.

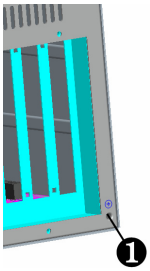
⚠ Warning
The device only operates when connecting with grounded power. No operation is allowed when the device power is ungrounded or only impedance is grounded.

⚠ Warning
Rated voltage of the device in use shall be in accord with power feature of the product.

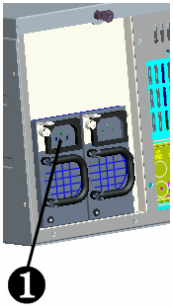
Note:
Only the peripheral devices approved for industrial application can be used. When operating the PC, hot swappable IO modules (USB) can be used. The IO devices without hot swap function can only be connected when the PC is powered off.

4.2 Product Grounding

Low impedance ground connection is more helpful to release the interference produced by the external cables, the signal cables or the cables connecting the IO module to the grounding system.

Ground Terminals	
The ground terminal ① (large surface and large area contact) shall be connected with the cabinet installed with the PC or the central grounding busbar on the device. The minimum cross section area of the cable shall be no less than 2.5mm^2, and the grounding resistance shall be no more than 0.1Ω.	

4.3 Connecting the PC to Power

Steps to connect the device to power:	
Insert the power cable into the socket ①. Please make sure the input voltage is consistent with the power feature of this product before insertion.	

⚠**Danger**
Disconnect the power source and data cable during a lightning storm.

Attention
The PC is completely isolated from the power supply only by disconnecting the power connector.

5. Software Introduction

Software name	Description	Supported range
BPI	BIOS Programming Interface, providing a unified interface for software to access hardware.	All the X86 motherboards/ complete PCs of our company (Products launched after October 2011)
eManager	The platform management application software developed based on BPI. It makes it convenient for users to check the status of their embedded PC products, carry out logging, and basic common functions of embedded PC (WDT, GPIO, boot order), etc.	All the motherboards/complete PCs supporting BPI can operate eManager. The sub-function depends on the specific motherboard. For those not supporting BPI, customization service can be provided (please consult customer service for specific cost)
eDisk	A virtual floppy disk in the BIOS Flash, to provide drivers of Linux and Windows, to facilitate access under the system.	It depends on the specific product. If it is supported by the product by default, it is provided for free; (If it is not supported by default, customization service can be provided, the charge standard depends on the purchase amount, and hardware modification may be involved.)
eCon-XPE	Standard XPE experience system	The trial version is provided for free. For the legal version, a License from Microsoft should be purchased. If there is special requirement, customization and development fee will be charged. (please consult customer service for specific fee)

5.1 BPI Overview

EVOC BPI (BIOS Programming Interface) is a cross-platform, easy-to-maintain software interface specification, which supports access to hardware under the Protected Mode of the 32-bit operating system. BPI is a link between hardware and application software, its purpose is to provide a platform-irrelevant standard interface of operating hardware for the application layer (in the form of library function, a library function similar to standard C). Application software engineers do not need to worry about specific hardware solution of motherboard. Users can rapidly develop their own software product using BPI library. When the hardware of the motherboard is upgraded, there is no need to modify the application software or driver and the former software can operate on the new platform normally. It has greatly sped up the product development and reduced the maintenance cost. The BPI structure is shown in the Figure1 below:

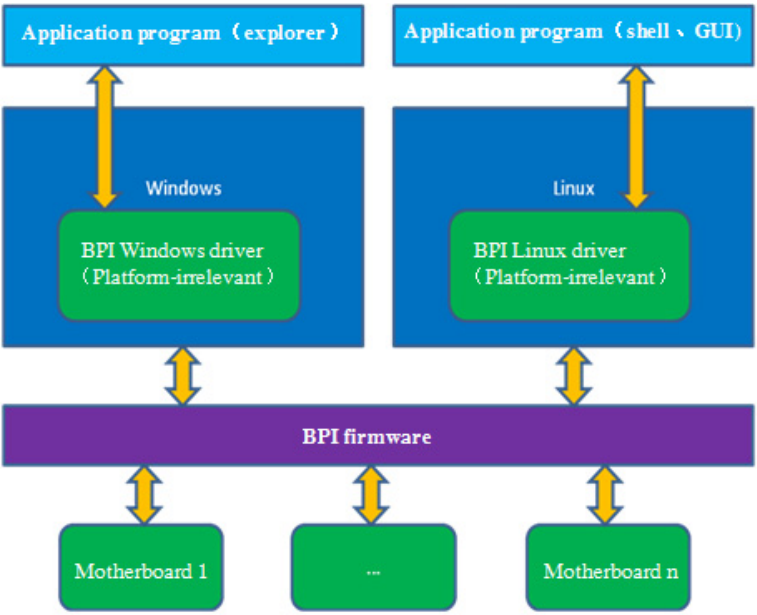


Figure 1 BPI Structure

1. Functions supported by BPI

1) Watchdog

Supports Watchdog Startup, Stop and feed Watchdog functions.

2) GPIO

Supports GPIO input/output programming.

3) Hardware monitoring

Supports detection of motherboard CPU temperature, system temperature, fan rotation speed and motherboard core voltage, for example CPU Core voltage, V12.0, battery voltage, and etc.

4) Flash programming

The motherboard provides an OEM Flash space by default, which is used to store users' private data, such as secret key, product serial number. The size of the space can be acquired by BPI library function.

Users can carry out second development using BPI library according to the application need, for example:

1) By detecting CPU temperature: if the temperature is too high, the buzzer is trigger to send an alarm.

2) To control peripheral device by GPIO programming, etc.

2. Advantages of the BPI:

1) Platform Irrelevant

The interface provided by BPI to the application layer, i.e. the BPI library function is platform-irrelevant, therefore, the software developed by BPI function library can operate on a new platform, supporting BPI function, normally without making any modification.

2) Security and High Reliability

The BPI function library accessing the hardware is programmed by the motherboard developer and is strictly tested; therefore, it can avoid system malfunction caused by improper operation of the system hardware.

3) Easy Maintenance

Traditional WDT and GPIO programming are closely related to the hardware with complicated test and debug process and software of different platforms; however, the software developed by BPI only requires one set of the maintenance software.

4) Low Cost

Developing the applications by BPI will not result in additional hardware and software cost. Application software engineers can carry out second development conveniently by using BPI library, without having to care about access details of specific hardware, which can greatly reduce the development difficulty, development cycle and time-to-market for the system integrator.

5.2 FMI Overview

FMI(Firmware Management Interface) is a management software developed based on BPI specifications. Currently, FMI supports eLog, eDisk, eLogo, eOrder and product SN management functions. As for its test procedure, please refer to eManager software in the user manual CD.

1) eLog

It keeps detailed records of the operation of PC, for example, the time of first bootup, completion time of test, time of leaving factory, time of each power-on/off, total bootup times of the system, illegal power-off times, total online time length of the PC, total heart beat times of CPU. The log management

information can provide valuable reference information for failure analysis and product upgrade.

2) eDisk

eDisk is a virtual onboard disk device. By factory default, it is a floppy drive device which can be booted into DOS system, and used for system maintenance. Users can change the purpose of eDisk based on actual needs, for example, storing users' private data or EVOC's One-Button-Recovery system eBack software.

3) eLogo

It provides an effective, simple, safe and reliable method for users to replace OEM LOGO of the PC, without having to customize BIOS. Users only need to place the OEM LOGO into eDisk. In the next bootup or reboot, BIOS will update OEM Logo for users automatically.

4) eOrder

It meets the requirements of users of embedded PCs for special boot order of the PC. It allows users to set special boot order of the PC in BIOS Setup or under operating system.

5) Product SN management

BPI library address: seen "Software\Chinese\BPI" in the enclosed CD

or "Software\English\BPI"

User manual of BPI library function

After "BPI X Setup.exe" is installed, the BPI library function user manual will be generated automatically by default, and can be found in "Start"→"Procedure"→"EVOC" →"evoc_bpi_x".

5.3 eManager Management Software Introduction

eManager is a device management platform software independently researched and developed by EVOC. eManager software can be used for abnormality monitoring of system operation, setup of GPIO input/output mode and electrical level, real-time monitoring of temperature, fan and voltage status, modification of boot order under OS system, prediction of HDD life, and other functions. The software can help users effectively use and manage the PC. The software has the following functions:

- Watchdog (WDT)
- GPIO
- Hardware detection
- Flash read/write
- Guide device update
- HDD SMART information

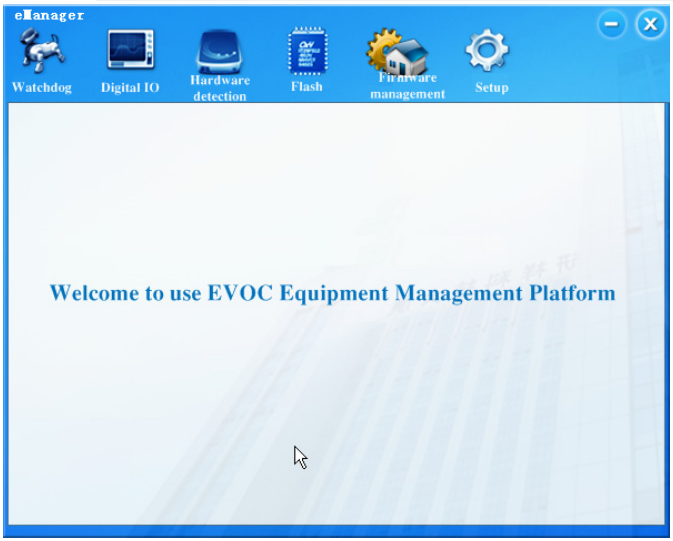
5.3.1 Operating Environment

The files needed for software operation are EVOC_BPI_DLL.dll, ImagedataDll.dll, BPIIo.sys, and DiskSMARTInfo.dll, and .net Framework environment is needed. Windows2000 and above version 32-bit systems are supported.

5.3.2 Function

1. Welcome Interface

After the software is opened, a welcome interface will appear, as shown below:



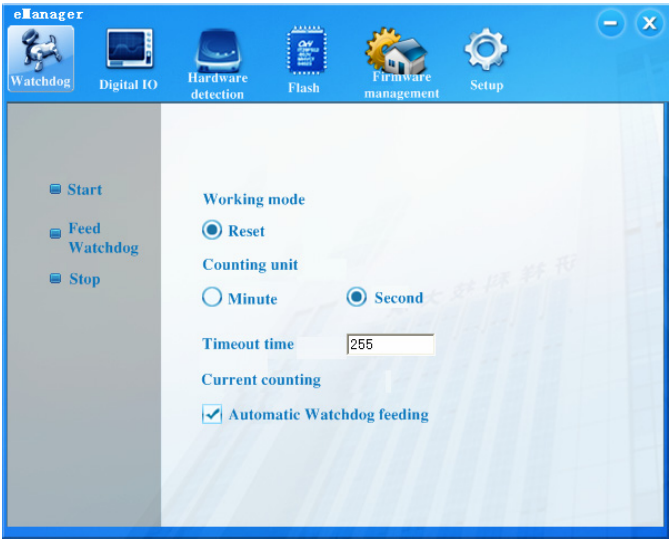
2. Watchdog (WDT)

The effect of Watchdog is shown in the picture below:

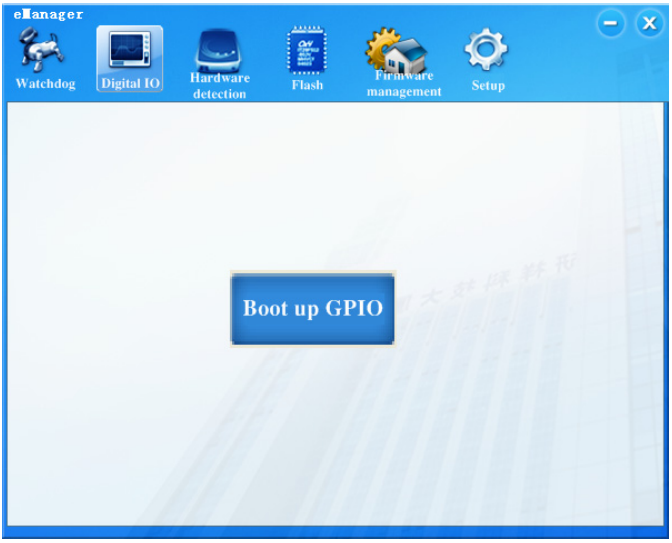
Using method: First, carry out configuration: the mode is reset mode; the counting time unit can be minute or second, and the timeout time range can be any number within 1-255. After the configuration is finished, press “Start” button on the left, the Watchdog will start countdown. When countdown value is indicated at “Current Counting”, countdown in reset mode means the PC reboots at 0. And during the countdown, “Feed Watchdog” button can be pressed to restart countdown from configured timeout time; Pressing “Stop” button means to stop Watchdog. Exiting the program when the Watchdog is counting down will also stop the Watchdog. When “Automatically Feed Watchdog” checkbox is selected, watchdog will be automatically fed when counting time is less than 3 seconds during countdown.

Function: It can monitor whether the system is operating normally, and carry out reset for abnormality. When an abnormality occurs to the system, the Watchdog cannot feed

dog automatically, the system will reboot after countdown is finished, and recover from the system error.



3. GPIO

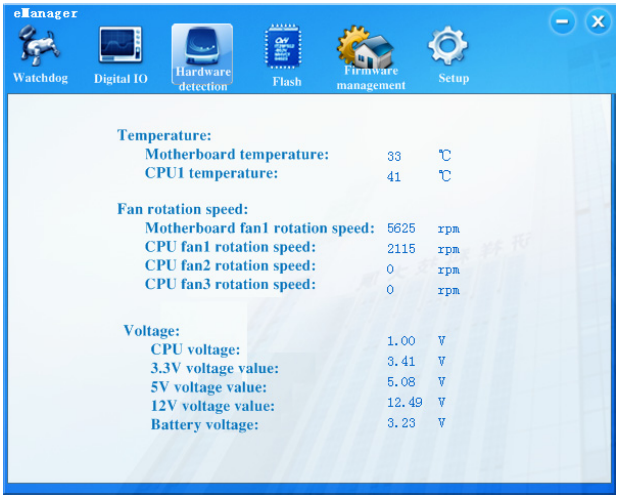


The effect of GPIO is shown in the above picture.

Using method: GPIO is disabled by default, to avoid conflict when GPIO setup also exists in user program. GPIO supports up to 64Pin display. When it is above 8Pin on the interface, it is shown in the form of rolling bar. GPIO input/output mode can be set up in the corresponding single-option checkbox. High/low status of electrical level is indicated by green LED: On means high level; Off means low level. When GPIO is output mode, the electrical level status can be switched by pressing corresponding "Setup" button on the right. If it is a network model motherboard, the specific LED of the motherboard will be indicated, and can be set up.

Function: Setup of GPIO and network LED

4. Hardware Detection

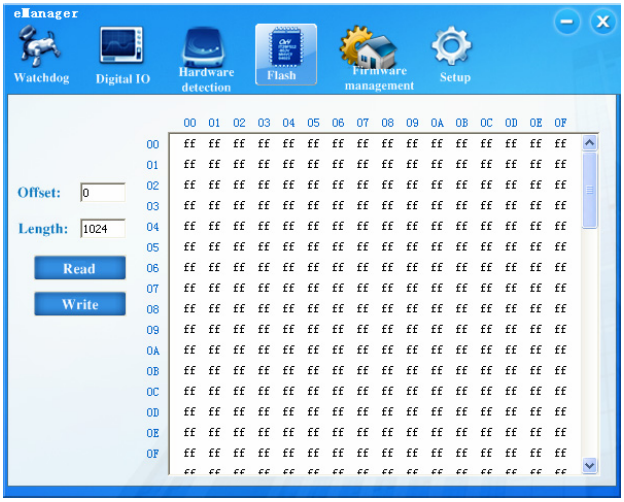


The effect of hardware detection is shown in the above picture.

Using method: After the software is switched to hardware detection interface, the parameter information including temperature, fan rotation speed and voltage can be acquired automatically. The information is refreshed at 2S interval.

Function: Acquiring hardware working status in real-time.

5. Flash Read/Write



The effect of Flash Read/Write is shown in the above picture.

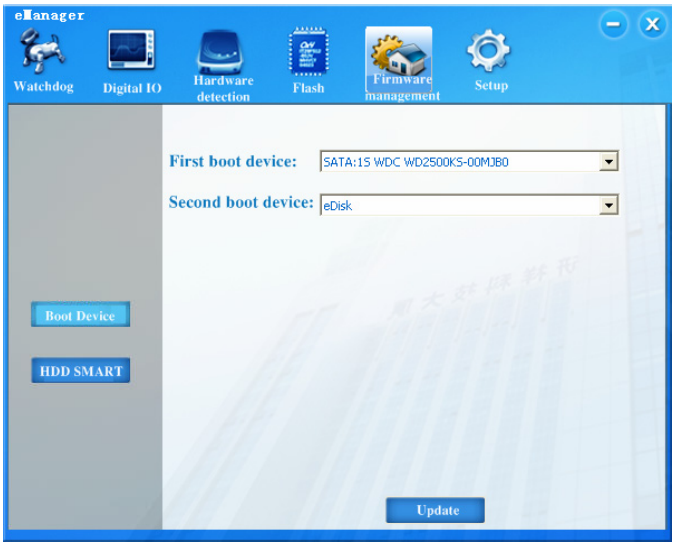
Using method: Flash read/write can be carried out by setting offset and length. Keep alignment when changing data in the edit box.

Function: Write encrypted data into Flash, and user software can be bound by using Flash read/write. The written data will not be lost due to power failure and HDD replacement.

Note: The theoretical write times of Flash chip are 100,000. To ensure normal use of the chip, avoid frequent Flash read/write operation as much as possible. When writing data, keep the power supply stable and avoid data loss caused by power failure.

5.3.3 Firmware Management

1. Boot Device



The effect of Boot Device is shown in the above picture.

Using method: Change the boot order in the dropdown list on the picture, click "Update" to make it effective, then the product will enter into the system by the set boot order at the next boot.

Function: To realize change of boot order under the operating system.

2. HDD SMART

The effect of HDD SMART is shown in the above picture.

Using method: Select the HDD in the dropdown list, then the list block will indicate SMART information related to HDD performance.

Function: To check SMART information related to HDD performance, help predict using life of HDD and avoid data loss caused by HDD damage.

3. User Programming

User can directly use eManager software for device management. If users need to write software by themselves, please refer to complete routine of VB, VC, C++Builder and Delphi, as well as BPI Programming Interface User Manual in the enclosed CD.

5.4 eDisk Introduction

eDisk is a flash storage space integrated on the motherboard. By the eDisk driver program attached on the motherboard, users can store files on the eDisk just as they access common disks. Because there is no mechanical part in the eDisk, its anti-shock performance and security level is higher than mechanical hard disks. However, eDisk has relatively small capacity (eDisks on different motherboards may vary, usually within 512Kbytes～5Mbytes), which can only store limited amount of key data for users.

5.4.1 Driver Programs

eDisk includes two driver programs: Windows and Linux. The operating system versions supported by eDisk drivers are listed below:

- Windows XP (32-bit)
- Windows 7 (32-bit)
- Fedora 10 (32-bit)
- Fedora 14 (32-bit)

Note: eDisk Linux driver usually supports 32-bit Linux systems with kernel versions higher than 2.6.24. And it is passed by verification under Fedora 10 (32-bit), Fedora 14 (32-bit).

eDisk driver program only supports FAT file system.

5.4.2 Installation/Uninstallation Method of eDisk Driver Program under Windows

Under Windows, eDisk driver program is Setup installation mode. After installing Windows system on the target platform (motherboard or complete PC), users can directly run the Setup.exe program under eDisk driver program, and carry out installation following the installation guide. When the installation is finished, reboot the system.

If users need to uninstall eDisk driver program, please open "Control Panel" in Windows, enter into "Add/Delete Program" and find eDisk driver program, click "Uninstall Program" button, and uninstall the eDisk driver program following the uninstallation guide. After the uninstallation is finished, reboot the system.

5.4.3 Using Method of eDisk under Windows

After eDisk driver program is installed and the system is rebooted, a disk called "Local Disk (Z:)" in "My Computer" can be seen. This disk is eDisk. Users can "Formatize" (only supports FAT file system) this partition as they operate common hard disk partitions, and carry out "Copy", "Paste", "Delete" for the files.

5.4.4 The Using Method of eDisk under Linux

Because different systems have different kernel versions, three steps are needed to use eDisk driver under the Linux system:

1. Compile driver:

   make clean

   make

2. Mount the driver:

   insmod oem_driver.ko

3. Mount device:

   mount /dev/ramdisk /mnt

Afterwards, read/write can be carried out fo /mnt menu.

If formatization is needed before Step 3, the following commands can be executed:

mkfs.vfat /dev/ramdisk

4. After it has been used, unmount the driver

   umount /mnt

   rmmod oem_driver.ko

5.5 eCon-XPE System Introduction

eCon-XPE is an embedded operating system developed based on Windows Embedded Standard 2009 development tools. It has the same core with Windows XP Professional. It not only has the common functions and properties of Windows XP professional version, as well as application software compatibility, but also has functions that Windows XP system does not have, such as EWF (Enhanced Write Filter). Meanwhile,

eCon-XPE operating system also integrates EVOC BPI and system logo self-definition software.

5.5.1 Enhanced Write Filter (EWF)

1. Purpose and Function

EWF (Enhanced Write Filter) is a function which can only be used on Windows Embedded operating system. It provides write protection which can be configured by users.

Enhanced Write Filter can be used to load Windows Embedded Standard 2009 from write protection media (such as CD-ROM), carry out write protection setup for various partitions, and adjust the performance of file system (for example, when CF card is used) based on actual needs.

Using EWF can minimize the times of write access to CF card. This is very important, because the write cycle of CF card is limited due to technical reasons. Therefore, it is recommended to enable EWF when CF card is used.

Caution
Each partition only activates one write filter – otherwise data may be lost. EWF is pre-installed in the SIMATIC IPC image. Make sure only one write filter is used on one partition, otherwise data may be lost.

Note:
By default, Windows Embedded Standard 2009 disables EWF. After setup for the operating system, data should be backed up before enabling EWF.

2. Set up EWF

EWFMGR.EXE program can be used to install, enable or disable EWF. Command prompts can be used to call the program. The following functions are provided:

Function	Command
Write protection driver C: Enable	ewfmgr c:-enable
Write protection driver C: Disable (revised file accepted)	ewfmgr c:-commitanddisable
Acceptance of revised files on driver C:	ewfmgr c:-commit
Indicating information about EWF driver program	ewfmgr c:
Indicating help	ewfmgr c:/h

Note:
EWF command which affects write protection becomes effective after next boot process.

Features of Enhanced Write Filter (EWF):

- When power failure occurs, if EWF is enabled, the changes made to Driver C: after the boot order will be lost.

To prevent data loss caused by power failure, it is recommended to use USV.

- Before shutting down the PC, the files in the writable EWF RAM can be saved in the CF card or HDD. To execute this operation, please enter the following command in the command prompt:

ewfmgr c:-commitanddisable

Then reboot the system.

ewfmgr c:-enable

Then reboot the system.

Note:

If the system has been set to Automatic Daylight Saving Time, each time the system is booted, the system without Central Time Management but with EWF activated will put forward/backward the clock for one hour in summer time/standard time.

The reason to explain this is that Windows Embedded Standard 2009 has a Registry entry, which detects whether the clock will be adjusted for summer time. Because this file also prevents EWF from being changed, the sign will be lost during boot order process, and will be adjusted again. Therefore, it is recommended to disable automatic adjustment and adjust the clock manually.

Steps:

1. Disable EWF filter (ewfmgr c: -commitanddisable) and reboot the system.

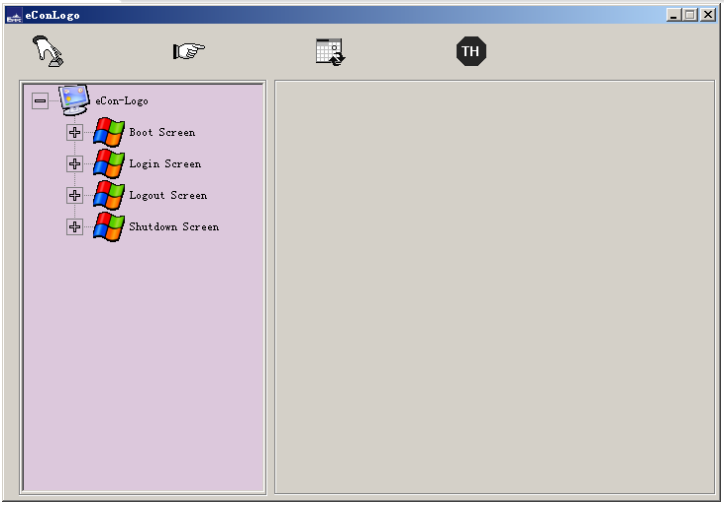
2. Disable automatic adjustment in the “Control Panel”. Open “Time Zone” option by menu command “Start > Control Panel > Date and Time”, and delete the checkmark in the checkbox of “Automatically adjust clock for daylight saving changes”.

3. Enable EWF (ewfmgr c: -enable) again and reboot the system.

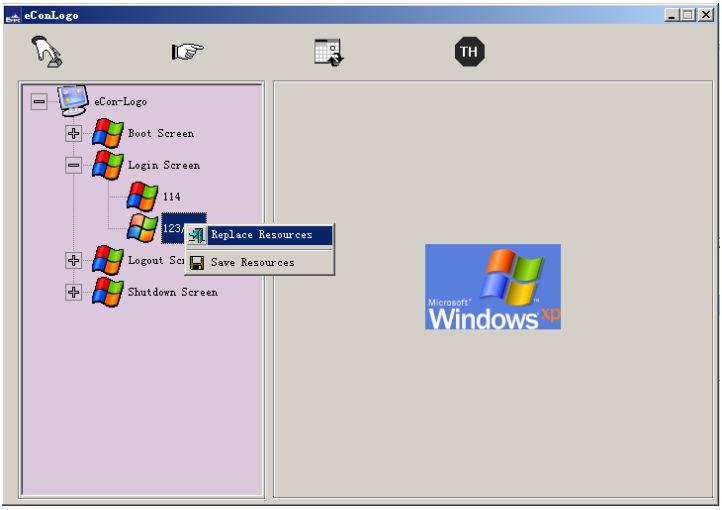
5.5.2 Logo Self-definition Software

Logo Self-definition Software is a tool software used to change operating system. It realizes the replacement of boot logo, login logo, logout logo and shutdown logo of operating system. Its using method is shown below:

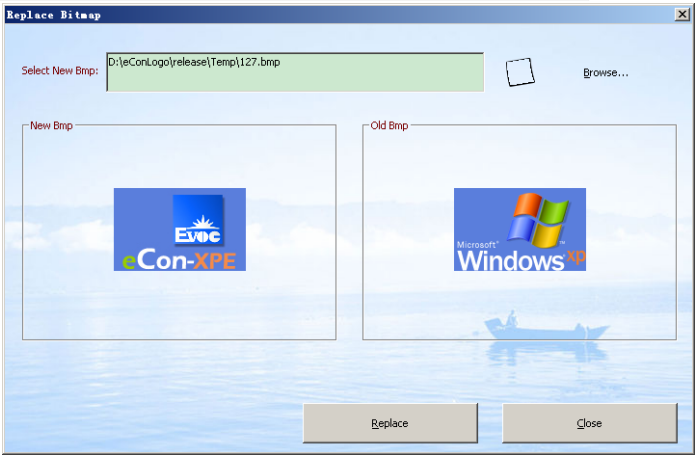
Start menu->Program->EVOC->eConLogo, operating Logo self-definition software, as shown in the picture below:



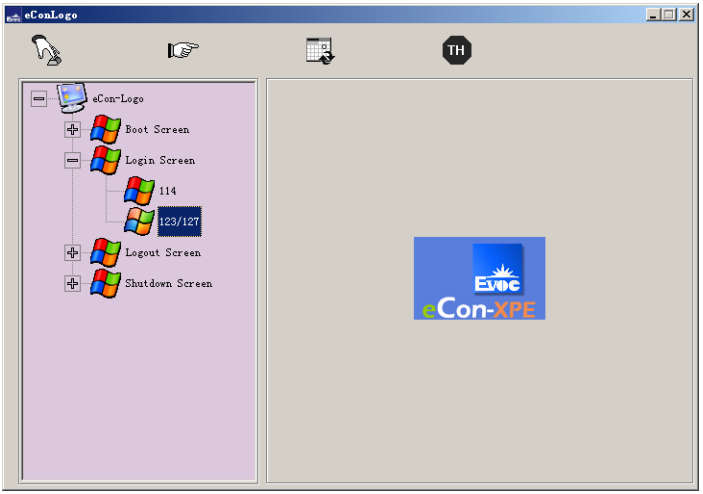
Select Login Screen and start to replace Login Logo:



Click Replace Resource to shift to the replacement interface, select the new Bmp:



Click Replace to finish replacement.



Click Change Login Screen Logo to finish replacement, and reboot the computer to see the effect. By the same way, the boot logo can be replaced.

Caution
If the software is used under the current system, a prompt will appear asking whether to enter DOS system or WinPE system to replace the file for logout logo and shutdown logo replacement. If the software is operated under WinPE, the replacement can be carried out directly.

5.6 LCM Software Operating Instructions and Configuration File Programming and Calibration Method

5.6.1 LCM Software Operating Instructions

I. Software Overview

1. Software Function

It is an industrial control software developed by EVOC Intelligent Technology Co., Ltd based on touch control LCM screen. By a low cost LCM screen, it can help users operate and maintain their embedded computers, and at same time meet the requirements of embedded PC users for convenient operation, health status monitoring and cost control. With touch screen function and fashionable user interface design, the LCM lattice touch screen can realize true interactive design in the embedded PC field and bring unprecedented experience and value to users.

It mainly contains the following four modules:

a. System information module (Info)

It acquires basic configuration information of the system, including names of the complete PC and motherboard, CPU model, memory model, capacity, hard drive model and capacity.

b. Status information module (Status)

This model monitors health status of the system, including CPU occupancy rate, memory occupancy rate, Lan upstream/downstream traffic, CPU fan rotation speed, system fan rotation speed, CPU temperature, system temperature, hard disk drive temperature, and motherboard core voltage.

c. System configuration module (Config)

The function of this module is to realize configuration of the PC, including system time setup, login password setup, alarm threshold value setup (such as CPU/SYS high temperature alarm, HDD remaining capacity too low, and etc.), process management (start/stop/reboot certain system process or user program), shutdown function (including immediate shutdown, shutdown after certain seconds, automatic shutdown at certain time everyday) and automatic start at certain time.

d. Log module

The function of the module is to monitor system log, software log, device enumeration and board log. The board log keeps detailed records of each power-on/shutdown time of the board, total operation time of the system, total bootup times, times of illegal shutdowns (i.e. times of illegal power-off onsite) and other information. These information provides valuable information for users' product updating and analysis of certain faults, for example, predict product updating time according to the total operation time of the system, and judge whether frequent illegal power disconnections exists at the industrial site according to the times of illegal power-off.

2. Software Operation Configuration

LCM screen and Host communicate by COM ports. An embedded PC usually has multiple COM ports. This software uses COM2 as default. Although users can also change the LCM configuration file lcmd.conf to select the COM port for communication between LCM and motherboard according to actual needs, it is recommended to use the default settings.

II. Operating Environment

1. Hardware

Because LCM screen uses COM ports to communicate with the Host, the embedded PC must have at least one RS232 COM port. This software has no special requirements in other aspects for the system.

2. Software Environment

Windows operating environment

Name	Description
Software environment	Windows XP, Win7, Windows Server2003/2008/2012 32bit and 64bit systems supported
Programming language	Visual Studio2008 C++

Linux Operating Environment

Name	Description
Software environment	Redhat/CenOS 32bit amd 64bit system supported
Programming language	C language + Shell script

Note: LCM module display content can be customized under Linux system.

III. Detailed Operating Instructions

1. Software Installation

This software supports Windows and Linux operating system. Next, we are going to introduce the installation of LCMD software under Windows and Linux operating system respectively.

1.1 Installation of LCMD software under Windows system

Under the Windows system, LCMD is an executable application program. It can be directly operated without installation.

1.2 Installation of LCMD software under Linux system

a. Unzip the software kit

```
# tar -xvf LCM_for_IPC-860_A00.tar.gz
```

b. Enter into lmcd software menu

```
# cd LCM_for_IPC-860_A00
```

c. Execute the installation script install.sh, to automatically finish installation of lcmd program and configuration of operating environment.

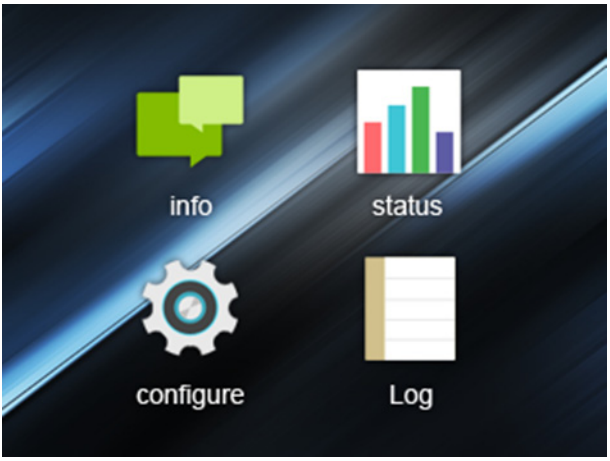
```
# ./install.sh
```

2. Power-on LOGO

After the LCM screen is powered on, there will be a power-on LOGO with cartoon effect. Its main interface is shown in Picture1 below:

Picture 1 LCM screen LOGO

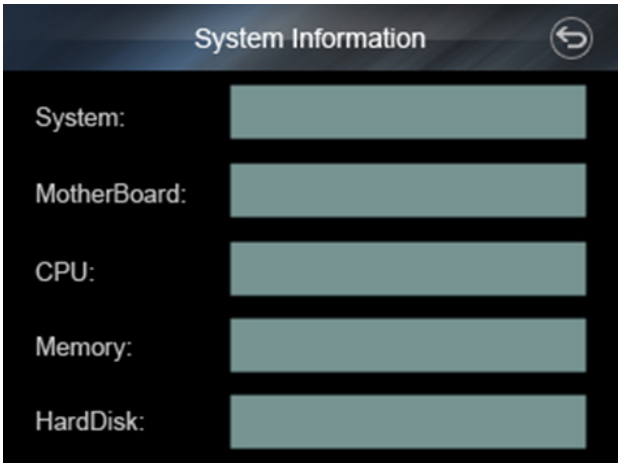
Touch any position on the LOGO, LCM screen will switch to main interface of the software, as shown in the Picture 2:



Picture 2 Main Interface of lcmd Software

3. System Information

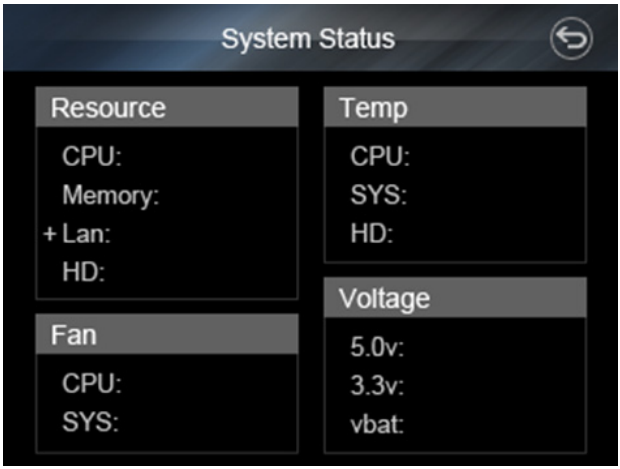
Lcmd software will read basic hardware configuration information of the system, including names of the complete PC and motherboard, CPU model, memory model, capacity, hard drive model and capacity, as shown in the Picture 3 below:



Picture 3 System Hardware Configuration Information

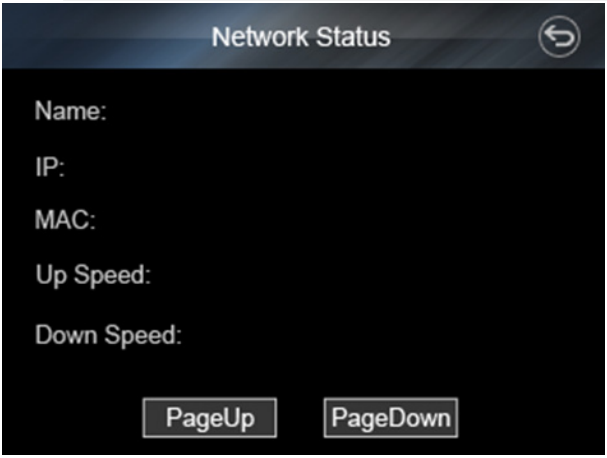
4. System Health Status Monitoring

LCMD software can monitor the health status of the system in real time, including CPU occupancy rate, memory occupancy rate, Lan upstream/downstream traffic, CPU fan rotation speed, system fan rotation speed, CPU temperature, system temperature, HDD temperature, motherboard core voltage, as shown in the Picture 4 below:



Picture 4 System Status Monitoring

Among them, the ”+” before Lan in the Resource module means that there are multiple Lan ports in the system, and users can touch the line where Lan is located to check detailed information about all Lan ports in the system, including name of Lan port device, IP address, MAC address, Up Speed and Down Speed, as shown in the Picture 5:



Picture 5 Check Network Information

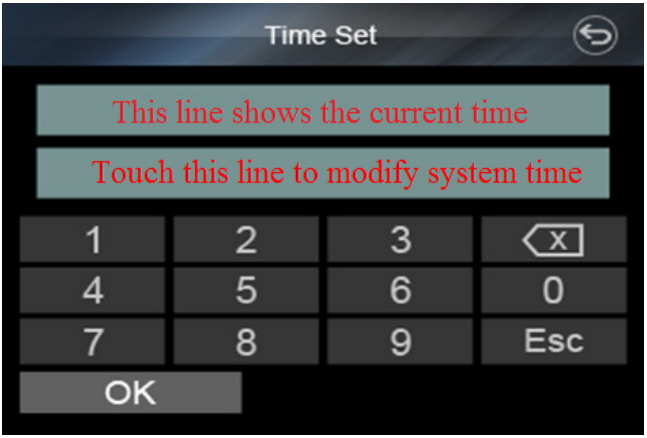
5. System Configuration

The function of system configuration is to help user manage the PC, including system time setup, login password setup, alarm threshold value setup (such as CPU/SYS high temperature alarm, remaining HDD capacity too low, and etc.), process management (start/stop/reboot certain system process or user program), shutdown function (including immediate shutdown, shutdown after certain seconds, automatic shutdown at certain time everyday) and automatic start at certain time. The system configuration main interface is shown in the Picture 6:

Picture 6 System Configuration Interface

5.1 System Time Set

Users can set up system time by system Time Set module, as shown in the Picture 7 below:



Picture 7 System Time Set

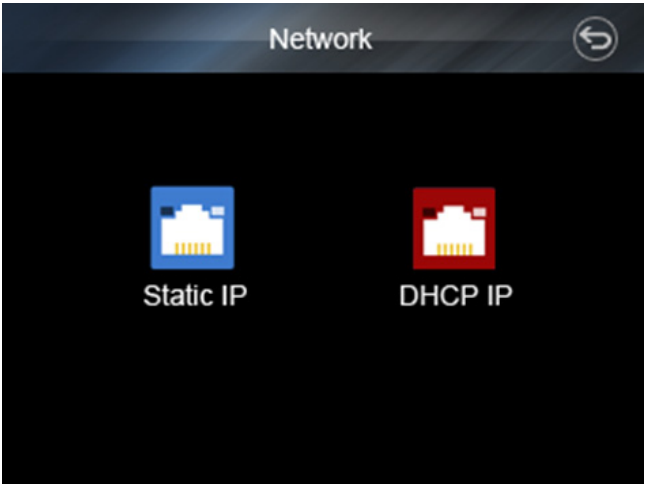
5.2 Password Setup for the Embedded PC

The Password Setup module is used to set up or cancel login password. Using this function, users can set up login password, forbid operation of unauthorized users. The BIOD module of this software will check whether the user has set up login password during BIOS POST of the embedded PC, and prohibit forbid operation of unauthorized users. The user can enter password either by LCM screen or by keyboard. The login password in this software solution has high level of safety. The login password of LCM is saved in the Flash of LCM screen, and will not be lost due to damage caused by power loss of BIOS CMOS or operating system. Please see the Picture 8 below:

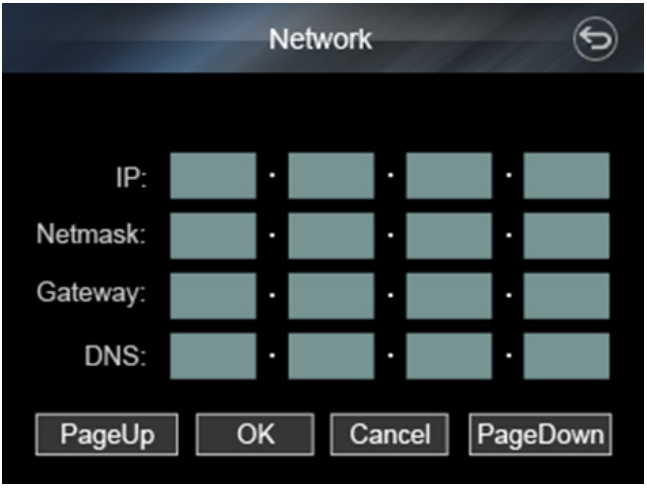
Picture 8 Password Setup

5.3 Network Configuration

Users can set up the static IP addresses, subnet mask, network gateway and DNS of various LAN ports in the system by the Network configuration module. Users can also press ”DHCP IP” button, and LCMD software will dynamically assign IP addresses by DHCP service. Please see the Picture 9 and Picture 10:



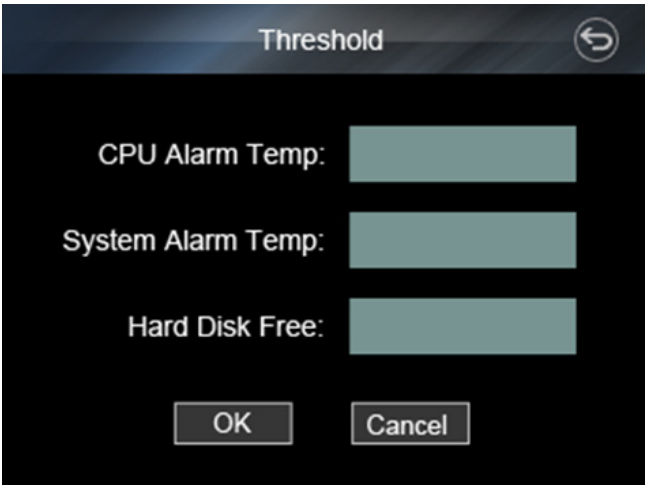
Picture 9 Select Lan IP configuration method



Picture 10 Manual Setup of IP Address

5.4 Alarm Threshold Setup

Users can set up threshold values for CPU/SYS temperature alarm and hard disk remaining capacity by this module, as shown in the Picture 11 below:



Picture 11 Alarm Threshold Setup

If entering 0 means to cancel the alarm, other numbers mean that the set alarm thresholds are effective. For example, if the threshold value for CPU Alarm Temp is 75, it means when the CPU temperature is higher than 75 degrees, the system will give alarm. If the value for Hard Disk Free is 0, it means the user does not need to monitor HDD remaining capacity.

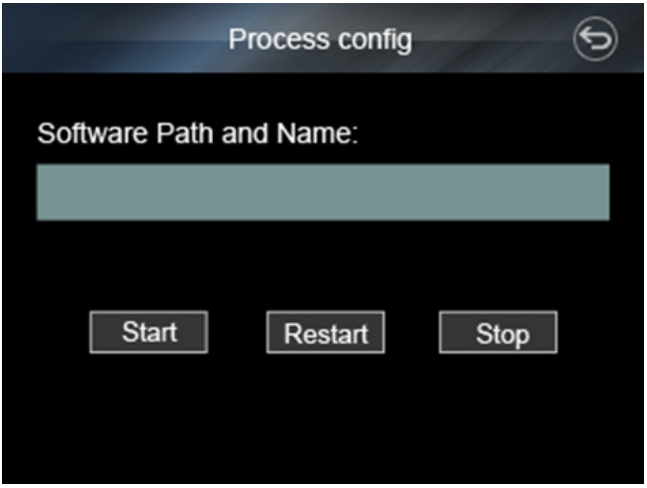
5.5 Process Management

By process management module, users can execute or stop the application program of applications written by themselves, boot up, stop or reboot certain services in the system, such as http service, ftp service, and etc.

LCM screen software provides two methods to manage users or system program. The detailed description is as below:

a. User can use soft keyboard of LCM screen to manually enter program to be executed or stopped as shown in the Picture 12: At this time, the user will be

asked to enter complete path and parameters of the program, otherwise lcmd software does not know where the program is located.



Picture 12 Process Management

b. By configuration file conf/process.conf, the program to be managed can be set by specified format, as shown in the Picture 13:

```
#process name                    type
/root/test,                      USER
#service iptables,               SYSTEM_SERVICE
```

Picture 13 Process Management Configuration File

The configuration file format is described as below:

1)‘#’ means annotation

2) Type of process

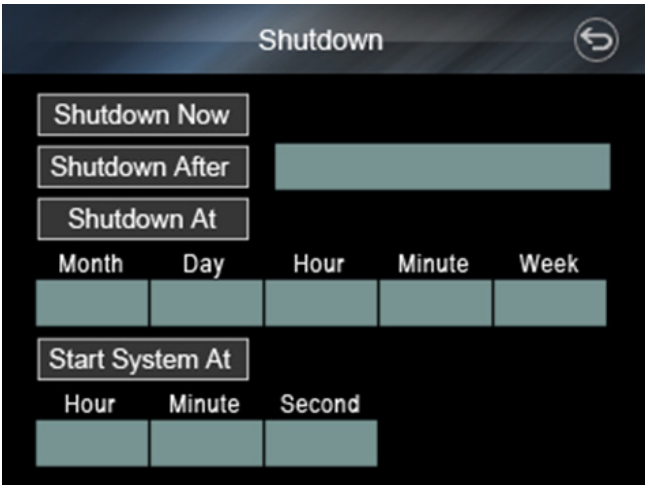
A. USER means user program, which needs complete program path and parameters;

B. SYSTEM_SERVICE means system service.

3) The process name and process type should be separated by a comma.

5.6 Shutdown Setup

Users can use this module to carry out regular maintenance for the embedded PC. The shutdown interface is shown in the Picture 14 below:



Picture 14 Shutdown Interface

Users can carry out the following functions by this module:

a. Shutdown Now

After clicking this button, the system will execute shutdown immediately.

b. Shutdown After

Automatic shutdown at certain time point. The system will be shut down after the time period (unit: second) set by the user. If this item is set to 0, it means to disable the automatic shutdown.

c. (Shutdown At)

This function helps users to set certain time point for shutdown. The meanings of its parameters are described below:

1） Month

It means the month for automatic shutdown, and the value can be 0～12. 0 means the shutdown operation is to be executed at any month.

2） Date

It means the date for automatic shutdown, and the value can be 0～31. 0 means the shutdown operation is to be executed at any date.

3） Hour

It means the hour for automatic shutdown, and the value can be 0～23. 0 means the shutdown operation is to be executed at any hour.

4） Minute

It means the minute for automatic shutdown, and the value can be 0～59. 0 means the shutdown operation is to be executed at any minute.

5） Week

It means the day in a week for automatic shutdown, and the value can be 0～7. 0 means any day in a week, 1～6 refers to Monday to Saturday respectively, 7 means Sunday.

6） If the values for “Month-Date-Hour-Minute-Day in a Week” are all 0, it means the function is disabled.

Application cases:

A. Automatic shutdown at 23：30 each Saturday

Month-Date-Hour-Minute-Day in a Week: 0 0 23 30 6

B. Automatic shutdown at 11：11 on November 11

Month-Date-Hour-Minute-Day in a Week: 11 11 11 11 0

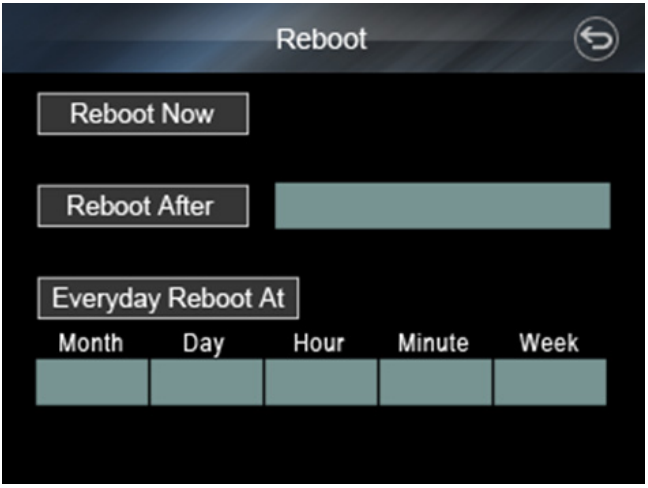
d. Start System At

Users can use this function to set automatic start of the system each day (the condition is that the AC power of the embedded PC is connected). The meanings of its parameters are the same with those for shutdown. For example, the system is to be started at 8:30:30 each day.

Note:The funtion of start system at have to customize BIOS in Windows.

5.7 Reboot Setup

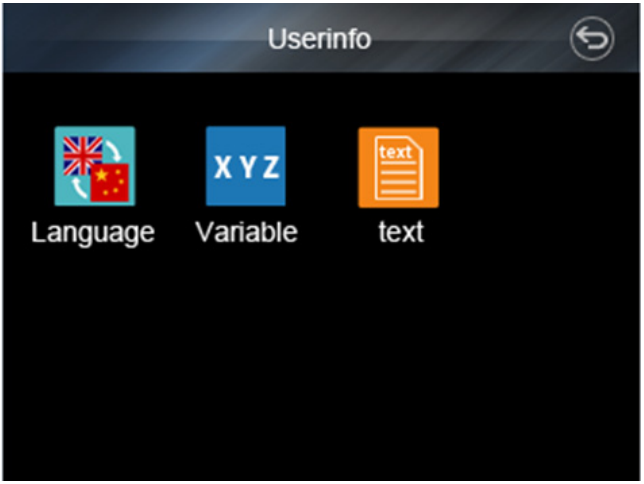
Users can reboot the embedded PC using this module, including immediate reboot, reboot after certain seconds, automatic reboot at certain time. The meanings of its parameters are the same with those for shutdown setup. Its interface is shown in the Picture 15 below:



Picture 15 Reboot Setup

5.8 User Information Setup

User information setup, including language selection (supporting English and Chinese); variable information setup, which provides a control interface for second-development of users, and add a control method for user development; text information, where users can control sending and display of their text information. Its interface is shown in the Picture 16 below:



Picture 16 User Information

Note: Variable and Text functions, have not been developed by Linux for the moment.

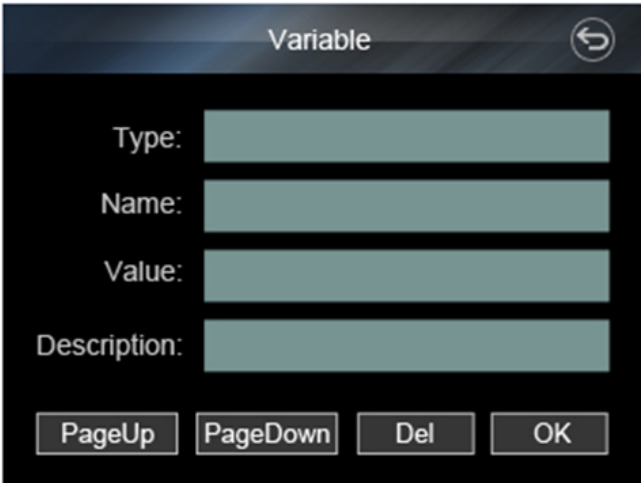
a. Language Selection

This software supports Chinese and English. Users can carry out language selection by Language menu, as shown in the Picture 17 below:

Picture 17 Language Selection

b. Variable Setup

This function is used to set up variable information. The variable setup covers types, names, parameters and descriptions. The types support character string and positive integer, and users can carry out corresponding switch according to their own requirements. Currently, 30 variable storage spaces are open and available. Information can be entered on the screen and accessed in the program, namely, users can enter self-defined variable information, which will be saved in the flash. By using the port function we provide, access to variable information can be realized. In this way, users can realize function of their own programs, and the second development will be more flexible and convenient. As for the variable setup, please see the Picture 18 below:



Picture 18 Variable Setup

c. Text Display

This function is used to display text information. Users can display some user information, such as function introduction, product information, and etc. Please see the Picture 19 below:

Picture 19 User Information

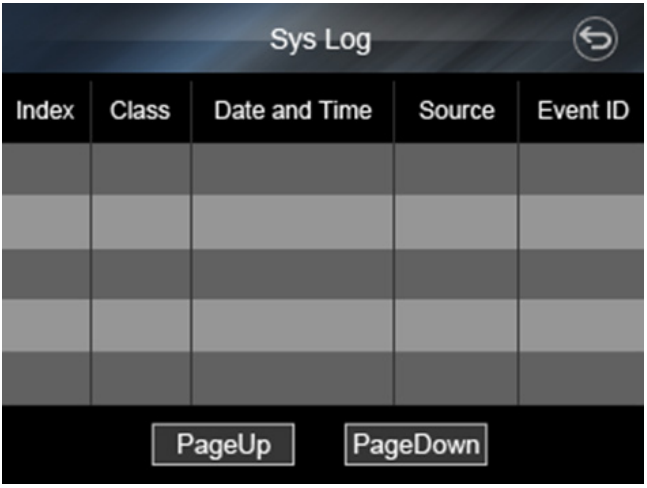
6. Log Management

It monitors System Log, User Software Log, Alarm Log, Board Log and PCI Device Enum. Due to limited resources of LCM screen, each type of log displays only the latest 100 items. The main interface of Log Management is shown in the Picture 20 as below:

Picture 20 Log Management

6.1 System Log

The function of this module is mainly to help user check alarm information in the operating system, and to provide valuable information for users to maintain their embedded PCs, such as system alarm, error, FAIL, and other alarm logs. The System Log interface is shown in the Picture 21 below:



Picture 21 System Log Interface

6.2 Software Log

The function of Software Log is to help users monitor and display logs of application program developed by themselves. Users only need to save the log of software developed by themselves in specific format under the log menu, and use the file name sw.log, then lcmd will display the user software onto the LCM screen automatically, in the same display interface format as Picture 18.

The log file format is as shown in the Picture 22. It comprises five sections, separated by semicolons, corresponding to the five sections shown in the Picture 21 respectively.

```
1;Warning;Oct 21 11:32:49;hdd temp alarm; 123
2;Warning;Oct 21 11:32:50;cpu temp alarm; 125
3;Warning;Oct 21 11:33:36;hdd free space alarm; 127
4;Warning;Oct 21 11:33:39;cpu temp alarm; 128
5;Warning;Oct 21 11:33:42;hdd temp alarm; 129
```

Picture 22 Software Log File Format

6.3 Alarm Log

The function of the Alarm Log: according to the alarm threshold value set in the system configuration module by the user, LCMD software will access CPU temperature, system temperature and HDD remaining capacity at an interval of 10 minutes ("Once every 10 minutes" is selected here because high frequency may affect system performance and lead to rapid expansion of the log). If the current value reaches the alarm threshold value set by the user, LCMD software will record the alarm event in the Alarm Log, and the user can check detailed information about the alarm event by Alarm Log menu.

6.4 Board Log

Board Log monitors status of embedded motherboards. If the motherboard supports EVOC Firmware Management Technology (FMI), the Board Log keeps detailed records of each power-on/shutdown time of the board, total operation time of the system, total bootup times, times of illegal shutdowns (i.e. times of illegal power-off onsite) and other information. These information provides valuable information for users' product updating and analysis of certain faults, for example, predict product updating time according to the total operation time of the system, and judge whether frequent illegal power disconnections exists at the industrial site according to the times of illegal power-off. The log file of FMI log management is shown in Picture23. "Abnormal PowerOff" means the user does not shut down the PC by normal procedure, and directly pulls out the power cable for the embedded PC, which is a bad habit, and may cause damage to the embedded PC and its peripheral devices, shorten its service life, or even lead to data loss or damage.

```
BIOS Name:C9140054 Ver:C00
BPI Version     : 2.0
FMI Version     : 1.0
eLog Function   : Enabled
eDisk Function  : Enabled
eOrder Function: Disabled
Power On Hours: 16
Boot Times      : 1035
Abnormal PowerOff Times: 13
First Boot Time    : 2014-11-14 17:32:43
PowerOn Time : 2014-11-18 13:53:04
PowerOff Time: Abnormal PowerOff
PowerOn Time : 2014-11-18 13:51:52
PowerOff Time: Abnormal PowerOff
PowerOn Time : 2014-11-18 13:30:15
PowerOff Time: Abnormal PowerOff
PowerOn Time : 2014-11-18 11:41:30
PowerOff Time: Abnormal PowerOff
```

Picture 23 Board Log

6.5 Log Export

The function of this module is to export system log, software log, alarm log and board log to a file named lcm.log, and generate a complete log report.

6.6 Device Enumeration

This function is to enumerate all the PCI devices in the system. 100 items of devices are displayed by default. If users want to check for more logs, you can check the pci_devices.log file under the log menu, as shown in the Picture 24 below:

```
00:00.0 Host bridge: Intel Corporation 2nd Generation Core Processor Family DRAM Controller (rev 09)
00:01.0 PCI bridge: Intel Corporation Xeon E3-1200/2nd Generation Core Processor Family PCI Express Root Port (rev 09)
00:02.0 VGA compatible controller: Intel Corporation 2nd Generation Core Processor Family Integrated Graphics Controller (rev 09)
00:16.0 Communication controller: Intel Corporation 6 Series/C200 Series Chipset Family MEI Controller #1 (rev 04)
00:1a.0 USB controller: Intel Corporation 6 Series/C200 Series Chipset Family USB Enhanced Host Controller #2 (rev 05)
00:1c.0 PCI bridge: Intel Corporation 6 Series/C200 Series Chipset Family PCI Express Root Port 1 (rev b5)
00:1c.1 PCI bridge: Intel Corporation 6 Series/C200 Series Chipset Family PCI Express Root Port 2 (rev b5)
00:1c.2 PCI bridge: Intel Corporation 6 Series/C200 Series Chipset Family PCI Express Root Port 3 (rev b5)
00:1c.3 PCI bridge: Intel Corporation 6 Series/C200 Series Chipset Family PCI Express Root Port 4 (rev b5)
00:1c.4 PCI bridge: Intel Corporation 6 Series/C200 Series Chipset Family PCI Express Root Port 5 (rev b5)
00:1c.5 PCI bridge: Intel Corporation 6 Series/C200 Series Chipset Family PCI Express Root Port 6 (rev b5)
00:1d.0 USB controller: Intel Corporation 6 Series/C200 Series Chipset Family USB Enhanced Host Controller #1 (rev 05)
00:1f.0 ISA bridge: Intel Corporation H61 Express Chipset Family LPC Controller (rev 05)
00:1f.2 SATA controller: Intel Corporation 6 Series/C200 Series Chipset Family SATA AHCI Controller (rev 05)
00:1f.3 SMBus: Intel Corporation 6 Series/C200 Series Chipset Family SMBus Controller (rev 05)
02:00.0 Ethernet controller: Intel Corporation 82583V Gigabit Network Connection
03:00.0 Ethernet controller: Intel Corporation 82583V Gigabit Network Connection
04:00.0 Ethernet controller: Intel Corporation 82583V Gigabit Network Connection
05:00.0 Ethernet controller: Intel Corporation 82583V Gigabit Network Connection
06:00.0 Ethernet controller: Intel Corporation 82583V Gigabit Network Connection
07:00.0 Ethernet controller: Intel Corporation 82583V Gigabit Network Connection
```

Picture 24 PCI Device Enumeration

5.6.2 LCM Configuration File Programming and Calibration Method

I. Overview

LCM module configuration file and image data

1. Programming method

2. Calibration steps

Preparing data (place the DWIN_SET folder in the zip file into the SD card root menu)

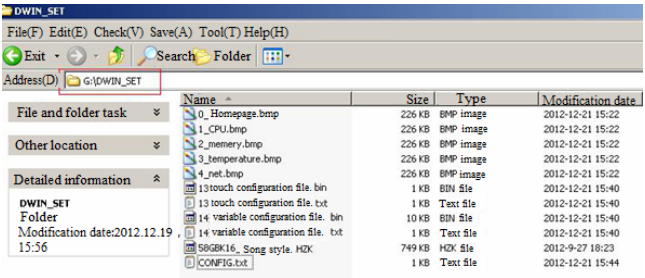
1. Prepare one empty Micro SD card;

2. Formatize the SD card to FAT32;

3. Place the DWIN_SET folder in the zip file into the SD card root menu;

4. As shown in the picture below, the disk G is the SD card, and place the DWIN_SET folder into the disk G.

Then open the disk G, you will see a folder named DWIN_SET, click open the DWIN_SET file, and the files will be shown as the Picture 1 below.



Picture 1 LCM Programming Code

II. Programming LCM Module Configuration File

Programming method: SD card online programming

1、 Disconnect the PC from power;

2、 Insert the SD card containing DWIN_SET folder into the SD card slot of the LCM module;

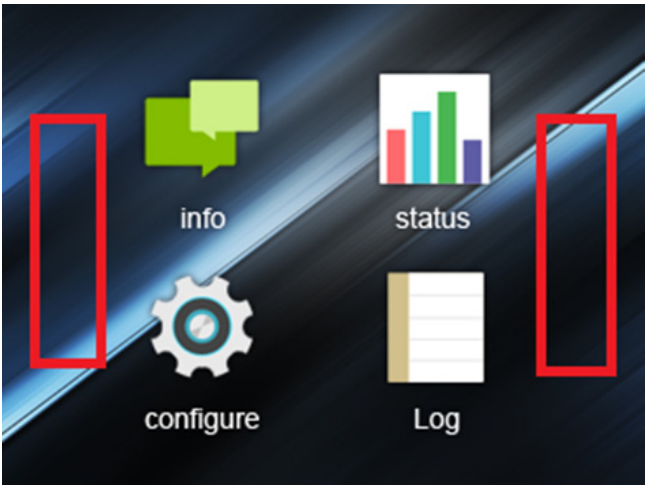
3、 Power on the PC;

4、 After power-on, blue screen flashing will occur to the LCM module, which means it is being updated. After the updating is finished, a bootup interface will appear as shown in the Picture 2. This means the programming is finished. After the programming is finished, calibration steps must be executed. Please refer to the description of calibration.

Picture 2 LCM Main Interface

III. Calibrating LCM Touch Screen

1. Click the main interface and switch to the interface shown in Picture 3, then click the non-touch area of LCM module quickly (within 4s) for more than 20 times (click any area in red blocks shown in the Picture 3.).

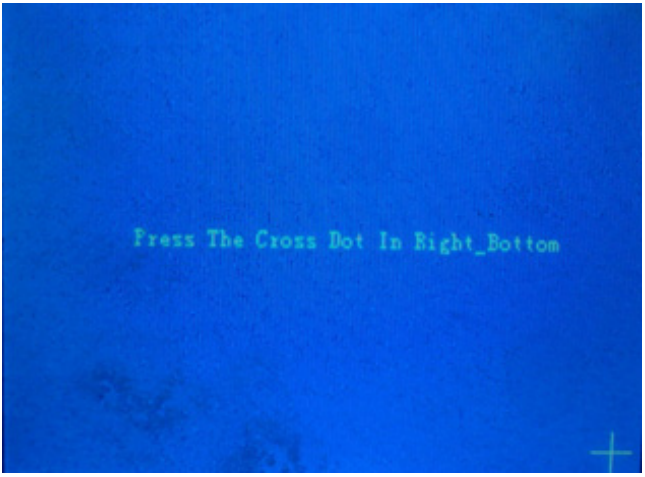


Picture 3

2. Calibration process. Click Picture 4, Picture 5 and crossed dots on Picture 6 one after another.

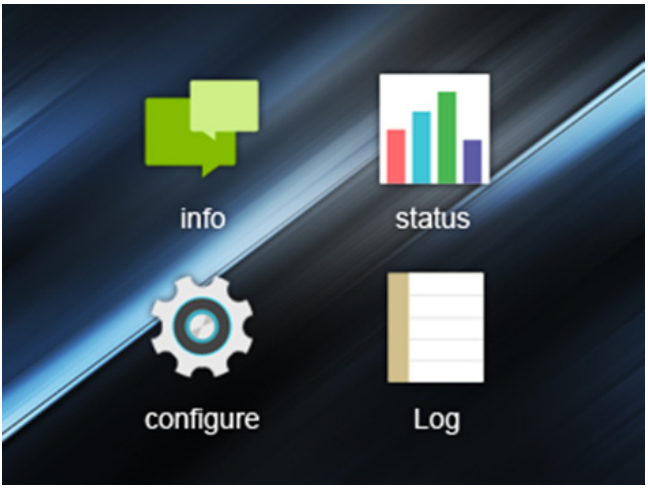
Picture 4

Picture 5



Picture 6

3. Click the all “Crossed Dots”, and return to the interface shown in Picture 7.



Picture 7

4. After programming is finished, pull out the SD card, and carry out LCM module programming for next PC.

Notes:

1. All devices can share one SD card containing programming configuration file;

2. After programming and calibration are finished, make sure to pull out the SD card;

3. The programming method is online programming;

4. SanDisk is recommended for SD card.

6. Expansion Installation

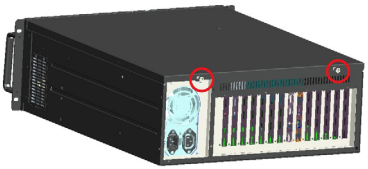
6.1 Opening the PC

⚠Caution
Only authorized and qualified personnel are allowed to open the PC. Within warranty period, users can only install expansion memory and expansion card module.

⚠Caution
The electronic components contained in the PC may be damaged by static charge. Therefore, preventative measures must be taken before opening the PC. Please refer to “ESD Guideline” concerning operation of ESD-sensitive components.

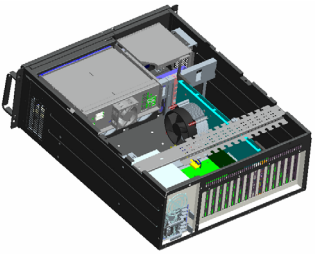
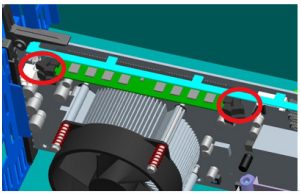
Work Preparation

Isolate the PC from power supply.

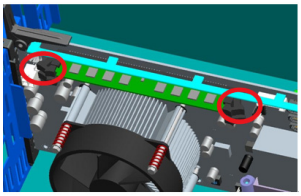
Steps to open the PC		
1	Loosen the two captive screws shown in the picture.	
2	When removing the chassis cover, first pull the chassis cover toward the direction of rear I/O, then lift the cover upward to remove it.	

6.2 Memory Expansion

Removing the Memory Module

Steps to remove memory module		
1	Open the PC	
2	Loosen the two screws on the binding strips, and remove the binding strips	
3	Open the memory fastening clamp	
4	Pull up the memory module carefully.	

Installing the Memory Module

The steps to install the memory module		
1	Place the memory in the slot on the motherboard	
2	Insert the memory into the slot carefully, until the memory fully meets the clamps.	

Display the current memory configuration

When the PC is booted, the system can automatically detect the new memory.

6.3 Optical Drive and HDD Expansion

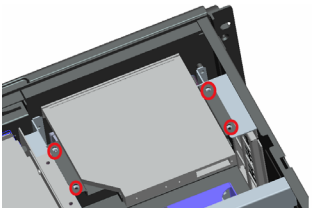
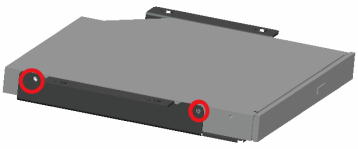
⚠Caution
Replacement of driver can only be carried out by authorized personnel.

Preparatory work

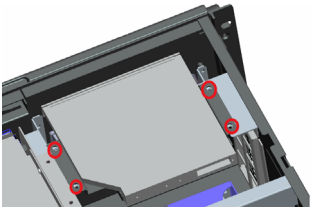
Isolate the PC from the power supply.

6.3.1 Optical Drive Expansion

Removing the Optical Drive

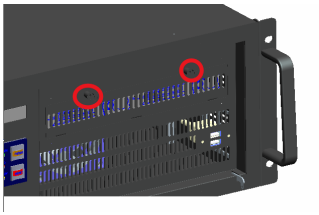
Steps to remove the optical drive		
1	Open the PC	
2	Remove the four screws on the optical drive bracket and the cables.	
3	Remove the optical drive bracket	
4	Loosen the four screws on the optical drive (two on the left and two on the right)	
5	Gently remove the optical drive	

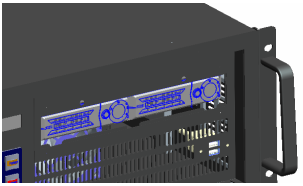
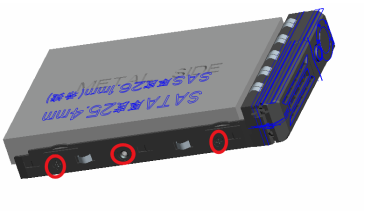
Installing Optical Drive

Steps to install optical drive		
1	Install the optical drive on the optical drive bracket	
2	Align it with the mounting holes on the bracket and tighten the four screws.	
3	Close the PC.	

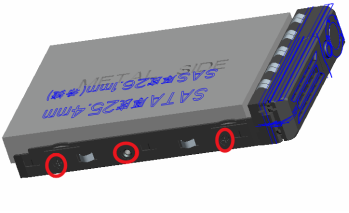
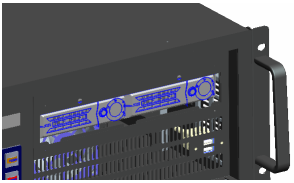
6.3.2 HDD Expansion

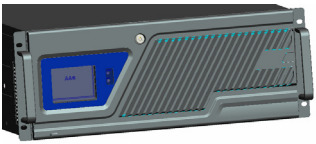
Removing HDD

Steps to remove HDD		
1	Open the latch and open the door	
2	Loosen the two captive screws on the HDD bracket, and remove the bracket.	

3	Press the button on the HDD case, and pull out the HDD case.	
4	Loosen the screws on the HDD case, and remove the HDD.	

Installing HDD

Steps to install HDD		
1	Tighten the screws fastening the HDD, and install the HDD.	
2	Insert the HDD case into the HDD module, and use the HDD case spanner to fasten it.	

3	Install the HDD bracket on the inner panel, and tighten the two captive screws.	
4	Close the front door panel and lock the door.	

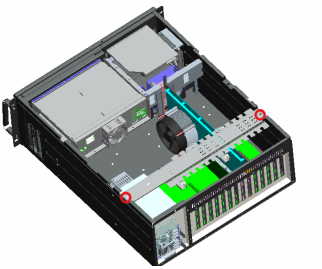
6.4 Installing/Uninstalling Pluggable Expansion Card

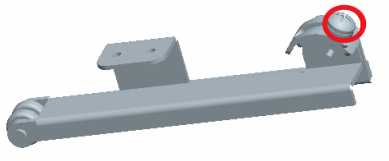
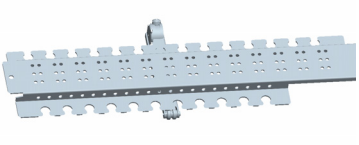
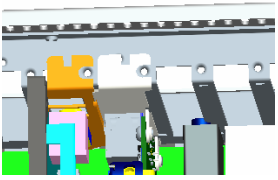
Work Preparation

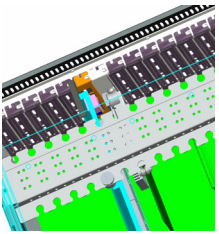
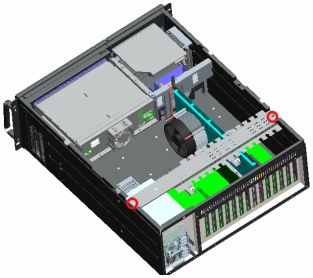
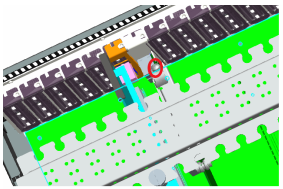
Isolate the PC from power supply.

Caution
The electronic components contained in the PC may be damaged by static charge. Therefore, preventative measures must be taken before opening the PC. Please refer to “ESD Guideline” concerning operation of ESD-sensitive components.

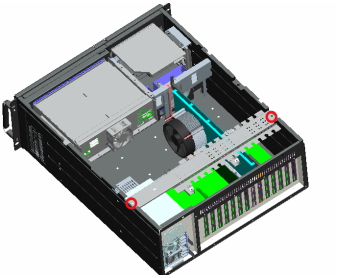
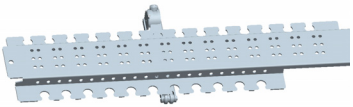
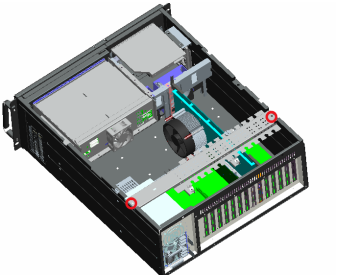
Installing expansion card

Steps to install expansion card		
1	Open the PC.	
2	Loosen the two screws on the binding strips, and remove the binding strips.	

3	Tighten the screw on the adjustable bracket.	
4	Install the adjustable bracket on the slot for expansion on the binding strip.	
5	Loosen the screws on the empty bracket of corresponding slot for expansion, and remove the bracket.	
6	Carefully insert the expansion card into corresponding slot, and tighten the screws on the bracket.	

7	Install the binding strip with adjustable bracket onto the chassis body. Insert the board or card into the slot of rubber pad of adjustable bracket, and click it into place.	
8	Tighten the two screws on the binding strips.	
9	Press the rubber pad of the adjustable bracket firmly against the expansion card, then tight the screws on the adjustable bracket.	
10	Close the PC.	

Removing Expansion Card

Steps to remove expansion card		
1	Open the PC.	
2	Loosen the two screws on the binding strips, and remove the binding strips.	
3	Remove the adjustable bracket, and place it into accessories box for later use.	
4	Install the bracket.	
5	Tighten the two screws on the binding strips.	
6	Close the PC.	

7. PC Maintenance

7.1 Removing/Installing Hardware Assemblies

7.1.1 Repair

The PC can only be repaired by authorized personnel.

⚠Warning
Unauthorized opening of the PC or improper repair of the PC may cause severe damage to the PC or endanger users' safety.

Always disconnect the PC from power supply before opening the PC.

- Only system expansion devices designed for this PC can be installed. If other expansion devices are installed, the PC may be damaged, or it may run counter to the safety requirements and regulations related to radio frequency suppression. Please technical support team or place of purchase, to know the system expansion devices that can be safely installed.
- If the PC is damaged due to installation or replacement of system expansion device, the warranty will become invalid.

Responsibility Range

Our company shall not be held responsible for the function damage caused by using a third-party device or assembly.

7.1.2 Preventative Maintenance

To maintain relatively high system availability, we recommend preventative replacement of wear parts. The following table gives the time interval for replacement:

Assembly	Interval for replacement
HDD	3 years
CMOS backup battery	5 years

7.1.3 Replacing Backup Battery

Things to know before replacing battery:

⚠Caution
A risk of damage exists! Always use same type of Li-ion battery or that recommended by the manufacturer for replacement.

Disposal

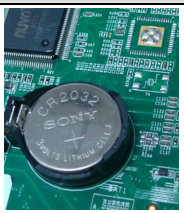
⚠Caution
The discarded battery should be disposed according to local laws and regulations.

Work Preparation

Note:
1. Keep down the current settings of BIOS Setup or save the settings in the user configuration file in the BIOS Setup “Exit” menu; 2. A list is provided in the BIOS manual, and information can be stored there; 3. Disconnect the PC from the power supply.

Replacing Battery

Steps to replace battery		
1	Open the PC.	
2	Remove the motherboard. Note: place the motherboard on a table with ESD protection.	
3	Press the clamp fastening the battery, and remove the battery.	

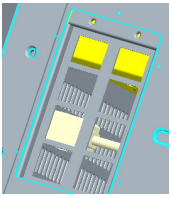
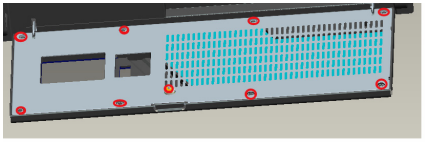
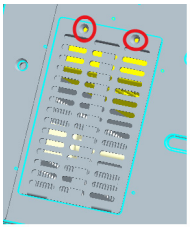
4	Place the new battery into the battery case and fasten it.	
5	Install the motherboard.	
6	Close the PC.	

Reconfigure BIOS Setup

If the battery replacement time is above 30 seconds, the configuration data of the PC will be lost. In this situation, reconfiguration of BIOS Setup is needed.

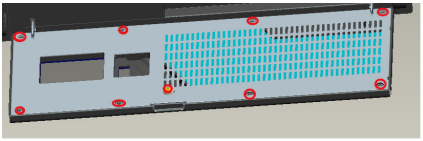
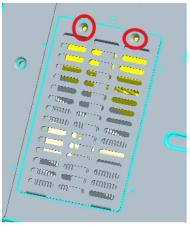
7.1.4 Installation/Removal and Maintenance of Dust Filter

7.1.4.1 Installing the Dust Filter

1	Place the dust filter into the slot.	 
2	Close the dust filter cover, and use the screws to tighten the cover. Note: After the dust filter behind the door is locked, install the spring bolt and tighten it with screw.	 

Note:
To ensure excellent system heat dissipation and ventilation, and avoid blocking of the dust filter, the dust filter should be cleaned regularly. It is recommended to clean it at least once every three months, or more frequently for environment with more dust. Usually, the dust filter should be replaced each year.

7.1.4.2 Removing the Dust Filter

1	Loosen the screws on the dust filter cover and remove the cover. Note: After the dust filter behind the door is locked, install the spring bolt and tighten it with screw.	 
2	Remove the dust filter.	

7.2 Installing the Drivers

Regarding the installation of the driver program and the detailed information of the motherboard, please refer to the enclosed CD of the PC.

8. Dimensions Drawing

8.1 Dimensions Drawing Overview

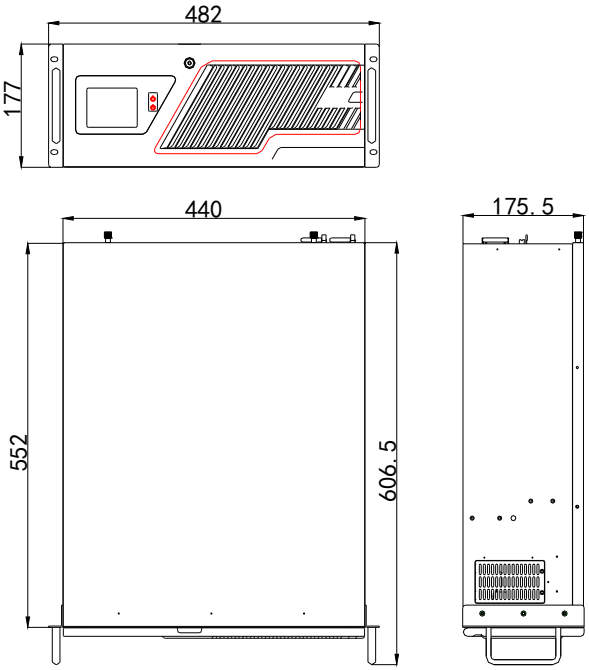
This section includes the following dimensions drawings:

Product Outline Dimensions Drawing

Product Installation Dimensions Drawing

> Note:
>
> The unit used in the dimensions drawings is usually millimeter.

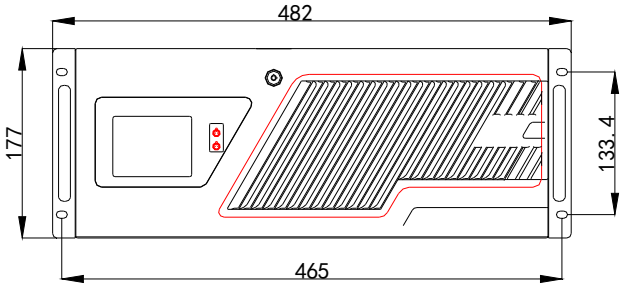
8.2 Product Outline Dimensions Drawing



Unit: mm

8.3 Installation Dimensions Drawing

8.3.1 Product Installation Dimensions Drawing



Unit: mm

9. Appendix

9.1 Troubleshooting and Solutions

Common Malfunctions	Reasons	Troubleshooting and Solution
The device is not operating	No power supply	Please check the power supply and the power cable/connector.
	Improper device operating environment	1. Check with the environment conditions; 2. Please wait for twelve hours before powering on the device shipped in cold weather.
The external display is black	The display has not been turned on	Turn on the display
	The display is under "power saving" mode	Press any key on the keyboard.
	The luminance control is set to "Black".	Increase the screen luminance by luminance control. Please refer to the instructions of the display for detailed information.
	Power cable or display cable is not connected	1. Please check whether the power cable is correctly connected with the display, the system unit or the ground port. 2. Please check whether the display cable is correctly connected with the display and the system unit. 3. Contact Technique Support if the screen remains black after implementing the above measures.
Incorrect time or date on PC	Incorrect BIOS setting	Follow the power-on prompt and press the key to enter the BIOS Setup; adjust the time and date in

		BIOS Setup.
BIOS setting is correct while the time and date are incorrect.	Insufficient backup battery capacity	Replace the battery
USB device has no response	USB port is disabled in BIOS	Use other USB ports or enable that port.
	USB 2.0 device is connected; however, USB 2.0 is disabled.	Enable USB 2.0.
	USB port is not supported by the operating system.	1. Enable USB Legacy Support for the mouse and keyboard (Legacy USB is supported); 2. For other devices, appropriate USB drivers are required.
The computer is not booted or displays "Boot device not found"	In booting priority of the BIOS setting, the device is not the first priority or the device is not included in the booting device.	Modify the booting priority of the device in the Boot menu of BIOS setting or include that device into the boot priority.
No system disk can be found when powering on	The HDD power cable or data cable is not connected well.	Check whether the power cable and the data cable of the hard disk (the hard disk shall be installed with operating system and is bootable) are well connected.

	System files on the hard disk are damaged.	Enter the system (usually WinPE system) with a bootable disk; check whether the system in the hard disk is damaged. Reinstall the system if necessary.
Plug and play I/O card, no IO card is detected or no IO card can be used when used again.	Poor contact of the slot.	Poor contact is usually caused by frequent installation/ uninstallation of the PCI or ISA card, unstable fixing or improper dust-proof measures; please remove and install the card for a few times or use another slot.

9.2 Common Alarm Information Analysis and Solution

Alarm Information	Meaning and Solution
EFI BIOS product bootup screen indicates yellow alarm information: “Warning system time is invalid，please set it to right”	Motherboard CMOS time setup error needs to be corrected.
After the motherboard is booted up, the screen indicates: “Reboot and Select proper Boot device or Insert Boot Media in selected Boot device and press a key”	Current disk cannot boot, recheck the system HDD connection cables, or use optical drive for reinstallation of operating system.
Award BIOS motherboard, during bootup POST, the screen indicates error information “Keyboard error or no keyboard present”	The motherboard or complete PC is not connected to PS/2 or USB keyboard, and the keyboard needs to be correctly connected.
During EFI BIOS motherboard bootup POST, “Beep, beep, beep, beep, beep” 5	The motherboard or complete PC is not connected to PS/2 or USB keyboard, and

beeping sounds can be heard.	the keyboard needs to be correctly connected.
The complete PC is equipped with redundant power supply. After it is booted, the PC power supply gives a piercing alarm sound.	The redundant power supply is not connected with two AC plugs. Power off the PC and connect the two AC plugs.

9.3 ESD Guideline

Definition of ESD:

All the electronic modules are equipped with large-scale integrated ICs or assemblies. Due to their own design, these electronic components are extremely sensitive to over-voltage, therefore, they are extremely sensitive to any electrostatic discharge. ESD-sensitive assemblies/modules are usually called ESD devices. This is also the internationally universal abbreviation for these devices.

The following sign can be used to identify ESD modules:

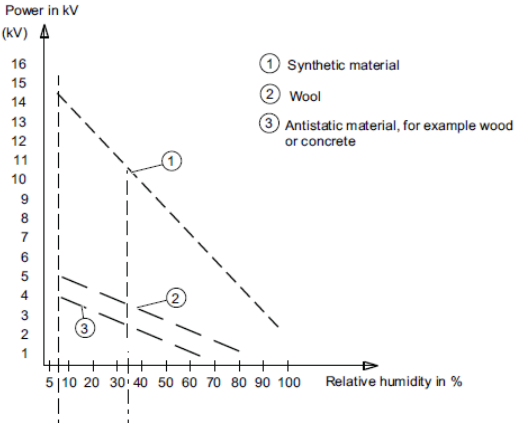
Caution
ESD devices can be damaged by any voltage far lower than that can be felt by human. If you do not release electrostatic charges on your body when you contact a component of the device or carry out electrical connection for the device, electrostatic voltage will be generated. The current of electrostatic discharge may cause potential problem to the module. The damage may not seem serious for the moment, but may lead to malfunction during later operation.

Electrostatic charging

Human body not connected to surrounding electrical level may have electrostatic charging.

The following data indicates the maximum electrostatic voltages generated when

human bodies contact specific materials. These values are compliant with IEC 801-2 specifications.



Electrostatic voltage on the operator

Basic protection measures to prevent electrostatic discharge:

- Ensure excellent equipotential connection:

When holding an ESD-sensitive device, make sure your body, working area and package are all grounded. This can prevent electrostatic charges.

- Avoid direct contact:

Contact ESD-sensitive devices only when it is unavoidable (for example during repair). Do not touch any chip pin or PCB circuit when holding a module. In this way, the released electric energy will not affect the ESD-sensitive device.

Before handling the module, release charges on your body. They can be released by touching a grounded metal component. Make sure a grounded measuring instrument is used.

9.4 Abbreviations

Abbreviations	Terminology	Meaning
AC	Alternate current	Alternate current
ACPI	Advanced Configuration and Power Interface	

PLC	Programmable logic controller	
AGP	Accelerate Graphical Port	High speed bus system
AHCI	Advanced Host Controller Interface	Serial ATA Advanced Host Controller Interface. Microsoft Windows XP (above SP1 version) and IAA driver program support the port.
APIC	Advanced Programmable Interrupt Controller	Extended programmable interrupt controller
APM	Advanced Power Management	A tool used to monitor and reduce power consumption of the PC.
AS	Automation System	
ASIS	After-sales Information System	
AT	Advanced Technology	
ATA	Advanced Technology Attachment	
ATX	Advanced Technology Extended	
AWG	American wire gauge	An American standard to differentiate wire diameter
BIOS	Basic Input/Output System	BIOS code
CAN	Controller Area Network	
CD-ROM	Compact Disc Read-only Memory	Large data storage read-only disc
CD-RW	CD - ReWritable	Rewritable CD
CE	Communate Europpene (European Conformity) (CE	Unified certificate mark of European Union products

	Certificate Mark)	
CF	CF card	
CGA	Color Graphic Adapter	Standard monitor interface
CLK	Clock Pulse	Clock signal used for controller
CMOS	Complementary Metal-oxide Semi-conductor	Complementary Metal-oxide Semi-conductor
COA	Certificate Of Authenticity	Microsoft Windows product key
COL	Certificate of License	License authorization
COM	Serial Communication Port	Serial Port
CP	Communications Processor	Communication PC
CPU	Central Processing Unit	CPU
CRT	Cathode Ray Tube	
CSA	Canada Standard Association	A Canada organization which carries out test and certification by the standard of Canada or the two countries (using UL/USA)
CTS	Clear to Send	Clear to Send
DRAM	Dynamic Random Access Memory	
DC	Direct Current	Direct Current
DCD	Data Carrier Detect	Data carrier signal detect
DMA	Direct Memory Access	Direct memory access
DOS	Disk Operating System	Operating system without graphic interface
DP	Distributed I/O	
DQS	German Certification body for Quality and Environment Management Systems	
DDRAM	Double Data Random Access Memory	Memory chip with high speed interface

DSR	Data set ready	Operation is ready
DTR	Data Terminal Ready	Data Terminal Ready
DVD	Digital versatile disc	Digital versatile disc
DVI	Digital Visual Interface	Digital display port
DVI-I	Digital Visual Interface-Integrated	Digital display port with digital and VGA signals
ECC	Error correction Coding	Error correction Coding
ECP	Enhanced Capability Port	Extended parallel port
EGA	Enhanced Graphics Adapter	Connector between PC and monitor
ESD	Electrostatic Discharge	
DM	Design Manual	
EIDE	Enhanced IDE	Enhanced electronic integrated drive
EISA	Extended Industry Standard Architecture	Extended ISA standard
EMM	Expanded Memory Manager	To manage memory expansion
EM64T	64-bit memory expansion technology	
EN	European Standards	
EPROM/EEPROM	Erasable Programmable Read-Only Memory/ Electrically Erasable Programmable Read-Only Memory	Plug-in sub-module using EPROM/EEPROM chip
EPP	Enhanced Parallel Port	Dual-way Centronics port
ESC	Character for exit	Control character
EWF	Enhanced Write Filter	
FAQ	Frequently Asked Question	FAQ
FAT 32	32-bit File Allocation Table	32-bit File Allocation Table
FBWF	File Based Write Filter	

FD	Floppy disk	Disk drive, 3.5"
FSB	Front Side Bus	
GND	Grounding	Chassis grounded
HD	Hard drive	Hard drive
HDA	High-definition audio	
HDD	Hard Disk Drive	HDD
HU	Height Unit	
HMI	Human Machine Interface	User interface
HORM	Hibernate Once Resume Many	
HT	Hyper Threading	
HTML	Hyper Text Markup Language	Used to create script language of Internet page
HTTP	Hyper Text Transfer Protocol	Data transfer protocol on the Internet
Hardware	Hardware	
I/O	Input/Output	Data input/out of the computer
IAA	Intel(R) Application Accelerator	
IDE	Integrated Drive Electronics	
IEC	International Electrotechnical Commission	
IGD	Integrated Graphic Device	
IP	Ingress Protection	Protection grade
IR	Infrared	Infrared
IRDA	Infrared Data Association	Used for the standard of data transmitted by IR module
IRQ	Interrupt Request	Interrupt Request
ISA	Industrial Standard Architecture	Used for bus of extended module

ITE	Information Technology Equipment	
L2C	Level-2 Cache	
LAN	Local Area Network	Computer network confined to local area
LCD	Liquid Crystal Display	Liquid Crystal Display
LED	Light Emitting Diode	Light Emitting Diode
LPT	Line Print Terminal	Printer port
LVDS	Low-Voltage Differential Signaling	
LW	Driver	
MAC	Media Access Control	Media Access Control
MC	Memory card	Memory card of credit card size
MLFB	Machine-readable product designation	
MMC	Micro memory card	Memory card of 32 x 24.5 mm format
MPI	Multi Point Interface for programming device	
MS-DOS	Microsoft Disk Operating System	
MTBF	Mean Time Between Failure	
MUI	Multilingual User Interface	Language localization of Windows
NA	Not Available	
NAMUR	Normenarbeitsgemeinschaft for Mess- und Regelungstechnik in der chemischen Industrie (Standardization association	

	for measurement and control in chemical industries)	
NC	Not Connected	Not Connected
NCQ	Native Command Queuing	Automatically rearrange the files and disc access, to improve performance
NEMA	National Electrical Manufactures Association	An organization of U.S. electronic component manufacturers
NMI	Non Maskable Interrupt	Interrupt processor cannot be refused
NTFS	New Technology File System	Windows version (2000, XP, Vista) security file system
ODD	Optical Disc Drive	
OPC	OLE for Process Control	Standard interface of industrial process
PATA	Parallel ATA	
PC	Personal Computer	
PCI	Peripheral Component Interconnect	High speed expansion bus
PCIe	Peripheral Component Interconnect express	High speed serial/differential full duplex interface with high data transmission rate
PCMCIA	Personal Computer Memory Card International Association	
PI	Protective grounding	Protective conductor
PEG	PCI Express Graphics	
PG	Programming PC	
PIC	Programmable interrupt controller	Programmable interrupt controller
POST	Power-on Self Test	
PXE	Preboot execute environment	Software used to operate new

		device without hard disk data by network
RAID	Redundancy Array of Independent	Redundant hard disk array
RAL	Restricted access location	Install devices in operating equipment with restricted access (for example, locked cabinet)
RAM	Random Access Memory	
RI	Ring input	Ring in
ROM	Read-only Memory	
RS 485	Reconciliation Sublayer 485	Designed to be used for dual-way bus system with up to 32 nodes
RTC	Real Time Clock	Real time clock
RTS	Reliable Transmission Service	Apply for transmission
RxD	Receive Data	Data transmission signal
SATA	Serial Advanced Technology Attachment	
SCSI	Small Computer System Interface	
SDRAM	Synchronous Dynamic Random Access Memory	
SELV	safety extra-low voltage circuit	Safety extra-low voltage circuit
SLC	Second Level Cache	
SMART	Self-Monitoring, Analysis and Reporting Technology	Hard disk drive error detection program
SMS	Short message service	Transmitting short messages by telecommunication network

SNMP	Simple Network Management Protocol	Network protocol
SO-DIMM	Small Outline Dual In-line Memory Module	
SOM	Safety card on motherboard	
SPP	Standard Parallel Port	Synonym of parallel port
SRAM	Static Random Access Memory	Static RAM
SSD	Solid State Drive	
SVGA	Super Video Graphics Array	Enhanced VGA standard which uses at least 256 colors
SVP	Serial number of the device	
SW	Software	
TCO	Total Cost of Ownership	
TFT	Thin Film Transistor	Screen type of LCD
TTY	Teletype	Asynchronous data transmission
TxD	Transmit Data	Data transmission signal
TWD	Watchdog time	Monitoring time of Watchdog
UL	Underwriters Laboratories	An American safety consulting and certification company based on standards of American or two countries (using CSA/Canada）
UMA	Unified Memory Architecture	Video memory
URL	Unified Resource Locator	Complete address mark of Internet page
USB	'Universal Serial Bus	
UXGA	Ultra eXtended Graphics Array	Graphics standard, with maximum resolution of

		1600x1200 pixel.
V.24		ITU-T standardization advice of using serial port to transmit data
VCC		Positive pole power supply voltage of integrated circuit
VDE	Verein deutscher Elektrotechniker (German Electrical Engineer Association)	
VGA	Video Graphics Array	Video adapter which meets industrial standard
VRM	Voltage Regulator Module	
VT	Virtualization Technology	By Intel technology, simulated closed environment can be used
VT-D	Virtualization Technology for Directed I/O	To enable the function that directly assigns the device (e.g. network adapter) to virtual device.
W2k	Windows 2000	
WAV	Wavelength Code	Loss-free file format used for audio data
WD	Watchdog	Monitoring program using error detection and alarm
WLAN	Wireless LAN	Wireless local area network
WoL	Wake-On-LAN	
WWW	World Wide Web	
XGA	Extended Graphics Array	Graphics standard, with maximum resolution of 1024x768 pixel

9.5 Glossary

AHCI mode

AHCI is the standard method for addressing of SATA controller. AHCI describes the structure in RAM, including regular area used for control and status, as well as a command list.

APIC mode

Advanced Peripheral Interrupt Controller, with 24 interrupt lines.

ATAPI CD-ROM drive

AT Attachment Packet Interface (connected to AT bus) CD-ROM drive.

CE mark

Communauté Européene CE mark confirms that the product is compliant with corresponding EC instructions, e.g. EMC instructions.

CF Card

CF card is a card-shaped digital storage media, without any mobile part. The CF card includes non-volatile memory and controller. The socket of CF card is compliant with IDE interface. Plug and socket adapter can be used to operate CF card, and there is no need to use other electronic components on PCMCIA or IDE hard disk controller. There are two design specifications: CF-I (42.6 x 36.4 x3.3 mm) and CF-II (42.8 x 36.4 x 5 mm).

COM port

COM port is serial V.24 port, which is suitable for asynchronous data transmission.

EMC Instructions

The instructions about Electromagnetic Compatibility. The compliance standard is confirmed by CE make and EC Conformity Certificate.

ESD Instructions

Instructions about use of ESD-sensitive assemblies.

Intel VT

IVT (Intel Virtualization Technology) creates a safe and closed environment for application program. To use this function, specialized (virtualized) software and processors with VT function are needed.

LAN

Local Area Network: LAN is a local network, which includes a group of computers and other devices distributed across a relatively limited range and linked by communication cables. The device connected to LAN is called node. The purpose of the network is to share files, printers and other resources.

Wake-On-LAN (WoL)

Local Area Network wakeup. This function supports bootup of device by LAN port.

LPT port

LPT port (Centronics port) is a parallel port used to connect printer.

PATA

An interface used for hard disk drive and optical drive, with a parallel data transmission rate up to 100 Mbps.

PC card

The trademark of Personal Computer Memory Card International Association

(PCMCIA), a mark of auxiliary card which is compliant with PCMCIA specifications. PC cards of same size with credit card can be inserted into PCMCIA slot. Version 1 defines 3.3mm thick Type I card, which is used as external memory. Version 2 of PCMCIA specifications defines 5mm thick Type II card and 10.5mm thick Type III card. Type II card can realize modem, facsimile card, network port card and other devices. Type III card supports devices that need more space (for example, wireless communication module) or spin storage media (disks, such as hard disk).

PC/104 / PC/104-Plus

Currently, two bus system structures are especially popular in the industry: PC/104 and PC/104-Plus. Both of them are standards of device type single board computers. The electrical and logic layout of these two bus systems are the same with those of ISA (PC/104) and PCI (PC/104-Plus). Software usually cannot detect the difference between them and regular desktop bus system. Their advantages are compact design and space economy.

PCMCIA

The association consists of about 450 company members in the computer industry. The association focuses on providing international standards for miniaturization and flexible use of device expansion cards, and providing basic technology for the market.

PEG port

Used for PCI Express for graphics. A graphics port with 16 PCIe channels, used to expand graphics module.

PIC mode

Peripheral interrupt controller, with 15 interrupt lines in total.

POST

The self test executed by BIOS after the PC is booted up. For example, RAM test and graphics controller test. If any error is detected by BIOS, the system will give audio signals (buzzer code), and the screen will show information related to the reason of error.

PROFIBUS/MPI

Process Field Bus (standard bus system of process application program).

PROFINET

PROFINET is the standard name of industrial Ethernet developed and maintained by PROFIBUS users. PROFINET unifies the protocol and specifications of industrial Ethernet, to meet the requirements of industrial automation technology.

RAID

Redundant Array of Independent Disks: data storage system usually store data and corresponding Error Correction Code (such as parity) on at least two hard disk volumes, so as to improve reliability and performance. Hard disk array is controlled by management program and HDD controller used for error correction. RAID system is usually realized in the network server.

ROM

Read-Only Memory (ROM) can independently search each of the memory addresses. The program or data can be stored permanently, and will not be lost when power failure occurs.

S.M.A.R.T

Self-Monitoring, Analysis and Reporting Technology (SMART or S.M.A.R.T.) is an industrial standard integrated in storage media. By this technology, key parameters

can be monitored continuously, and upcoming problems can be detected beforehand.

SATA

Serial ATA interface of hard disk drive and optical drive, with a serial data transmission rate up to 300 Mbps.

SCSI port

A small computer system port used to connect SCSI devices (e.g. hard disk drive or optical drive).

SETUP (BIOS Setup)

The program which defines device configuration (i.e. configuration of hardware on PC/PG) information. The device configuration of PC/PG is preset with default value. Therefore, if memory expansion, new module or new drive is added to hardware configuration, changes must be entered into SETUP.

SSD (Solid State Drive)

The installation method of solid state drive is similar to any other drives. It only uses semi-conductor memory chip with similar capacity, so it does not include spin disk or other mobile components. This design makes SSD even more rugged and endurable, and at the same time shortens access time and lowers the power consumption.

WLAN

Wireless LAN is local network, which transmits data by radio wave, infrared or other wireless technology. Wireless LAN is mainly used for portable computer in offices or factory environment.

Backup

It refers to copies of program, data media or data base, used for records keeping or used to protect key and irreplaceable data, and prevent data loss when the working

copy is damaged. Some application programs automatically generate backup copies of data files, and manage the current and previous versions on the hard disk drive.

Baud

A physical unit of the stepping speed in signal transmission. It defines the quantity of signal status sent each second. When there are only two status, one baud is equal to 1bps transmission rate.

Operating system

It is a general term to describe all the functions to control and monitor user program execution, user program and system resource assignment in operating mode while cooperating with hardware. (e.g. Windows XP Professional).

Hyper threading

HT technology (multi-threading) supports parallel computing of multiple processes. HT is effective only when all the related system assemblies (such as CPU, operating system and application program) are supported.

Legacy USB support

Supports USB devices on USB ports (e.g. mouse, keyboard) without using driver program. Driver program is not used to support USB devices on the USB port (such as mouse and keyboard).

Legacy boot device

The legacy drive can be used as USB device.

Memory card

Memory card of credit card size. Memory to store user programs and parameters (such as programmable module and CP).

Reset

Hardware reset: use button/switch reset/reboot the PC.

Formatization

The storage space on the magnetic data media can be divided into track and sector. Formatization operation will delete all the data on the data media. Before first time use, all the data media must be formatized.

Common malfunctions

Reasons of error, reason analysis, corrective measures.

Cache

The high-speed access buffer area of intermediate storage used for data request.

Plug-and-play

It usually refers to the capability of automatic system configuration of PC to communicate with peripheral devices (such as monitor, modem or printer). Users can insert a peripheral device and immediately use it without manual system configuration. Plug-and-Play dev ices need to support Plug-and-Play BIOS and Plug-and-Play expansion card.

Concentrator

A jargon in the network technology. It refers to a device in the network, located in the central position and connected to multiple communication cables, to provide public connection for all the devices on the network.

Extensible Firmware Interface (EFI)

EFI refers to the central interface between firmware and various assemblies and operating system of PC. Logically, EFI is located under the operating system. It is the

successive specifications of device BIOS, and mainly targets 64-bit system.

Controller

The integrated hardware and software controller to control functions of certain internal or peripheral devices (such as keyboard controller).

Cold boot

A boot order, boot up the PC when it is powered on. In cold boot order, the system usually executes some basic hardware examinations, and loads the operating system from hard disk drive to Working Memory -> Boot.

Module

A module is a PLC, programming device or plug-in unit of device. These modules can be local module, expansion module, interface or mass memory (mass memory module).

Module fastening bracket

Module fastening bracket is used to fasten modules and ensure safe contact and transportation. Vibration and impact especially affects large and heavy modules. So it is recommended to use module fastening bracket for these modules. Module fastening bracket is not designed for the short, light and compact modules on the market, because standard fixing measures are sufficient for them.

Warm boot

Load and reboot the computer after the program is suspended. The hot key CTRL+ ALT+ DEL can be used to execute warm boot.

Driver program

The program part of operating system. They amend the user program data by specific format required by I/O devices (such as hard disk drive, printer, and monitor).

Hot swap

SATA interface provides hot swap function for the HDD system of the PC. The prerequisite of this configuration is a RAID1 system with SATA RAID controller (onboard or slot module) and at least two SATA detachable brackets. The advantage of hot swap is that the faulty hard disk drive can be replaced without having to reboot the computer.

Dual-core CPU

Compared with the last-generation single-core CPU using hyper threading technology, the dual-core CPU remarkably improves the speed of computing and program execution.

Pixel

PixElement (pixel) (image point). Pixel means the smallest element which can be copied on the screen or printer.

Chipset

Located on the motherboard, a chipset connects CPU with RAM, graphics controller, device 1 bus and external ports.

Ethernet

In the local area network (bus architecture), the transmission rate for file or data communication is 10/100/1000 Mbps.

Boot disk

Boot disk is the boot order disk with “boot” sector. It can be used to load operating system from disks.

Image

It refers to the image of hard disk drive partition, for example, save it to a file for recovery when it is necessary.

Reboot

Warm boot the computer without disconnecting it from power source (Ctrl + Alt + Del)

Motherboard

Motherboard is the core part of a computer. Data are processed and stored on the motherboard. Ports and device I/O are controlled and managed on the motherboard.