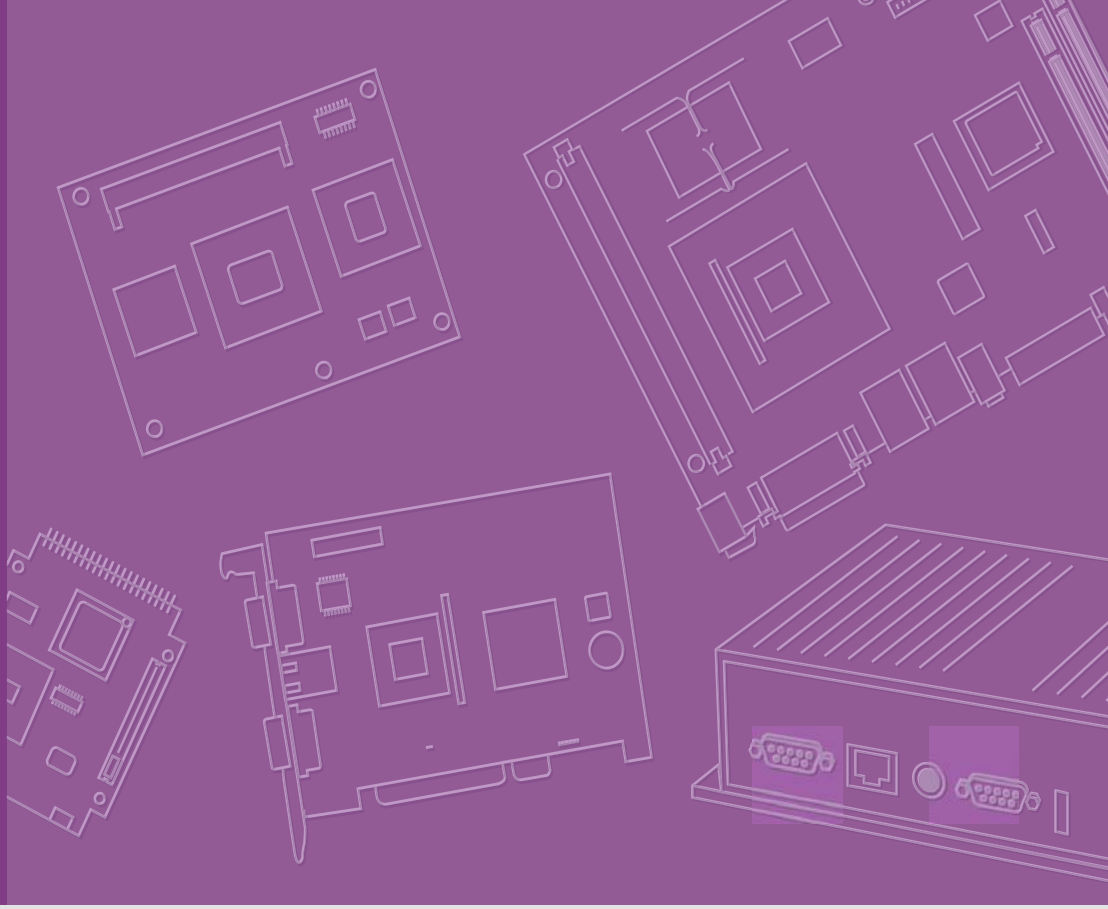

User Manual

SOM-5786

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http://www.emacinc.com/support

This manual is for the SOM-5786.

Part No. 2006578600 Edition 1

Printed in China July 2008

Declaration of Conformity

CE

This product has passed the CE test for environmental specifications. Test conditions for passing included the equipment being operated within an industrial enclosure. In order to protect the product from being damaged by ESD (Electrostatic Discharge) and EMI leakage, we strongly recommend the use of CE-compliant industrial enclosure products.

FCC Class A

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

Caution! *There is a danger of a new battery exploding if it is incorrectly installed. Do not attempt to recharge, force open, or heat the battery. Replace the battery only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.*

Technical Support and Assistance

1. Visit the EMAC, inc website at www.emacinc.com/support where you can find the latest information about the product.
2. Contact your distributor, sales representative, or our customer service center for technical support if you need additional assistance. Please have the following information ready before you call:
   - Product name and serial number
   - Description of your peripheral attachments
   - Description of your software (operating system, version, application software, etc.)
   - A complete description of the problem
   - The exact wording of any error messages

Document Feedback

To assist us in making improvements to this manual, we would welcome comments and constructive criticism. Please send all such - in writing to:

support@emacinc.com

Packing List

Before setting up the system, check that the items listed below are included and in good condition. If any item does not accord with the table, please contact your dealer immediately.

- Before you begin installing your card, please make sure that the following materials have been shipped:
- SOM-5786 System On Module CPU module
- CD-ROM or Disks for utility, drivers, and manual (in PDF format)
- Heatspreader

Safety Instructions

1. Read these safety instructions carefully.
2. Keep this User Manual for later reference.
3. Disconnect this equipment from any AC outlet before cleaning. Use a damp cloth. Do not use liquid or spray detergents for cleaning.
4. For plug-in equipment, the power outlet socket must be located near the equipment and must be easily accessible.
5. Keep this equipment away from humidity.
6. Put this equipment on a reliable surface during installation. Dropping it or letting it fall may cause damage.
7. The openings on the enclosure are for air convection. Protect the equipment from overheating. DO NOT COVER THE OPENINGS.
8. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
9. Position the power cord so that people cannot step on it. Do not place anything over the power cord.
10. All cautions and warnings on the equipment should be noted.
11. If the equipment is not used for a long time, disconnect it from the power source to avoid damage by transient overvoltage.
12. Never pour any liquid into an opening. This may cause fire or electrical shock.
13. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
14. If one of the following situations arises, get the equipment checked by service personnel:
    - The power cord or plug is damaged.
    - Liquid has penetrated into the equipment.
    - The equipment has been exposed to moisture.
    - The equipment does not work well, or you cannot get it to work according to the user's manual.
    - The equipment has been dropped and damaged.
    - The equipment has obvious signs of breakage.

Safety Precaution - Static Electricity

Follow these simple precautions to protect yourself from harm and the products from damage.

- To avoid electrical shock, always disconnect the power from your PC chassis before you work on it. Don't touch any components on the CPU card or other cards while the PC is on.
- Disconnect power before making any configuration changes. The sudden rush of power as you connect a jumper or install a card may damage sensitive electronic components.

Contents

Chapter 1

General Information

This chapter gives background information on the SOM-5786 CPU System on Module.

Sections include:

- Introduction
- Specification

1.1 Introduction

SOM-5786 is an embedded COM Express Type 2 CPU module that fully complies with the PCI Industrial Computer Manufactures PICMG COM Express standard. The new CPU module supports Intel Core Duo / Solo processor by Intel GME965/ICH8-M chipset which supports faster integrated graphic engine, PCI Express and SATA interfaces. In a basic form factor of 95 mm x 125 mm, the SOM-5786 provides a scalable high performance and easy to integrate solution for customers' applications by utilizing a plug-in CPU module on an application-specific customer solution board. The SOM-5786 with advanced I/O capacity incorporates serial differential signaling technologies such as PCI Express, Serial ATA, USB 2.0, LVDS, HD Audio and Serial DVO interfaces. SOM-5786 offers design partners more choices for their own applications needing higher computing speeds while maintaining a compact form factor.

SOM-5786 complies with the "Green Function" standard and supports Doze, Standby and Suspend modes. The small size (95 mm x 125 mm) and use of two high capacity connectors based on the proven SOM-Express form factor, allow the SOM-Express modules to be easily and securely mounted onto a customized solution board or our standard SOM-DB5700 development board.

The SOM-5786 is a highly integrated multimedia SOM that combines audio, video, and network functions. It provides excellent calculated ability by Intel latest dual core process, high quality TV out, dual channel LVDS interface for large size TFT LCD display, DDR2 memory up to 4 GB, high definition audio interface (AC97/Azalia), 25 to 112 MHz. Major on-board devices adopt PCI technology, to achieve outstanding computing performance when customer adopts SOM-5786 to establish their own application.

1.2 Specifications

1.2.1 Standard System On Module functions

- **CPU:**
  - Support socket type Intel® Core™ 2 Duo processor or Intel® Celeron® M Processor
  - On board Inte® Core 2 Duo processor LV or Intel® Celeron® M processor ULV

  (Detail CPU support information please contact your sales representative)
- **BIOS:**
  Award 4 Mb Flash BIOS
- **Chipset:**
  Intel® GME965 GMCH/ICH8-M Chipset 533/800 MHz FSB
- **Cache memory:**
  Intel® processor integrated L2 cache
- **System memory:**
  2 x 200 pin SODIMM sockets, Double Data Rate 2 (DDR2) 128 MB to 4 GB, DDR2 533/667 MHz
- **Power management:**
  Supports power saving modes including Normal / Standby / Suspend modes. ACPI 2.0 compliant
- **Enhanced IDE interface:**
  1 EIDE channel for two devices. BIOS auto-detect up to UDMA -100
- **SATA interface:**
  3 SATA-150 Channels for two SATA devices
- **Watchdog timer:**
  256 levels timer interval, from 0 to 255 sec or min setup by software, jumper less selection, generates system reset
- **USB interface:**
  Support 8 USB 2.0 ports
- **Expansion Interface:**
  Supports PCIe by 16, PCIe by 1 x 4 channels, PCI, LPC interface

1.2.2 VGA/flat panel Interface

- **Chipset:**
  Intel GME965 integrated 2D/3D graphic controller
- **Frame buffer:**
  Intel DVMT supported up to 384 MB system memory
- **Display type:**
  - Simultaneously supports CRT / LCD, LCD / TV, CRT / TV displays
  - Dual-view supports CRT / LCD displays
  - Supports 18-bit dual channel LVDS interface
- **Display mode:**
  - CRT Mode: Support up to 2048 x 1536
  - LCD Mode: Support up to 1600 x 1200
  - TV Mode: Support up to 1024 x 768

1.2.3 Audio function

- **Audio interface:**
  AC97, Intel high definition audio interface

1.2.4 Ethernet

- **Chipset:**
  – 1000 Mbps: Intel 82566DM Controller. Base on IEEE 10BASE-T, 100BASE-TX and 1000BASE-T standard.

1.2.5 Mechanical and environmental

- **Dimensions:**
  SOM-Express form-factor, 125 mm x 95 mm (4.92" x 3.74")
- **Power supply voltage:**
  +12 V power only
  (+5 VSB is need for ACPI and ATX power)
- **Power requirement:**
  – Typical: (1 GB DDRII 667)
  +12 V @ 2.56 A (Intel® Core™ 2 Duo T7000)
- **Operating temperature:**
  0 ~ 60° C (32 ~ 140° F)
- **Operating humidity:**
  0% ~ 90% relative humidity, non-condensing
- **Weight:**
  0.103 Kg (weight of total package)

Chapter 2

Mechanical Information

This chapter gives mechanical and connector information on the SOM-5786 CPU System on Module.

Sections include:

- Connector Information
- Mechanical Drawing

2.1 Board Connector

There are two connectors at the rear side of SOM-5786 for connecting to carrier board.

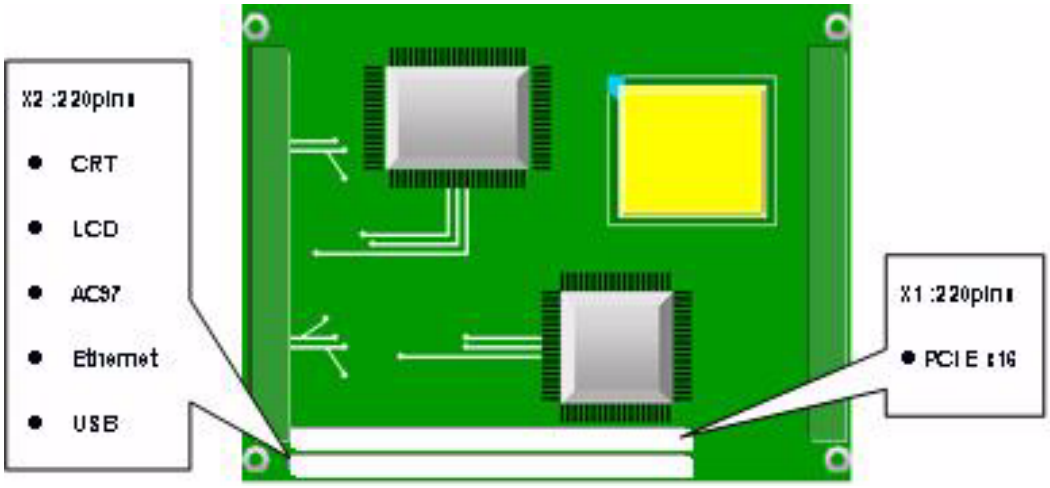

Figure 2.1 SOM-5786 Locating Connectors

Pin Assignments for X1/2 connectors

Please refer to SOM-Express Design and Specification Guide, Chapter 2.

2.2 Board Mechanical Drawing

2.2.1 Front Side

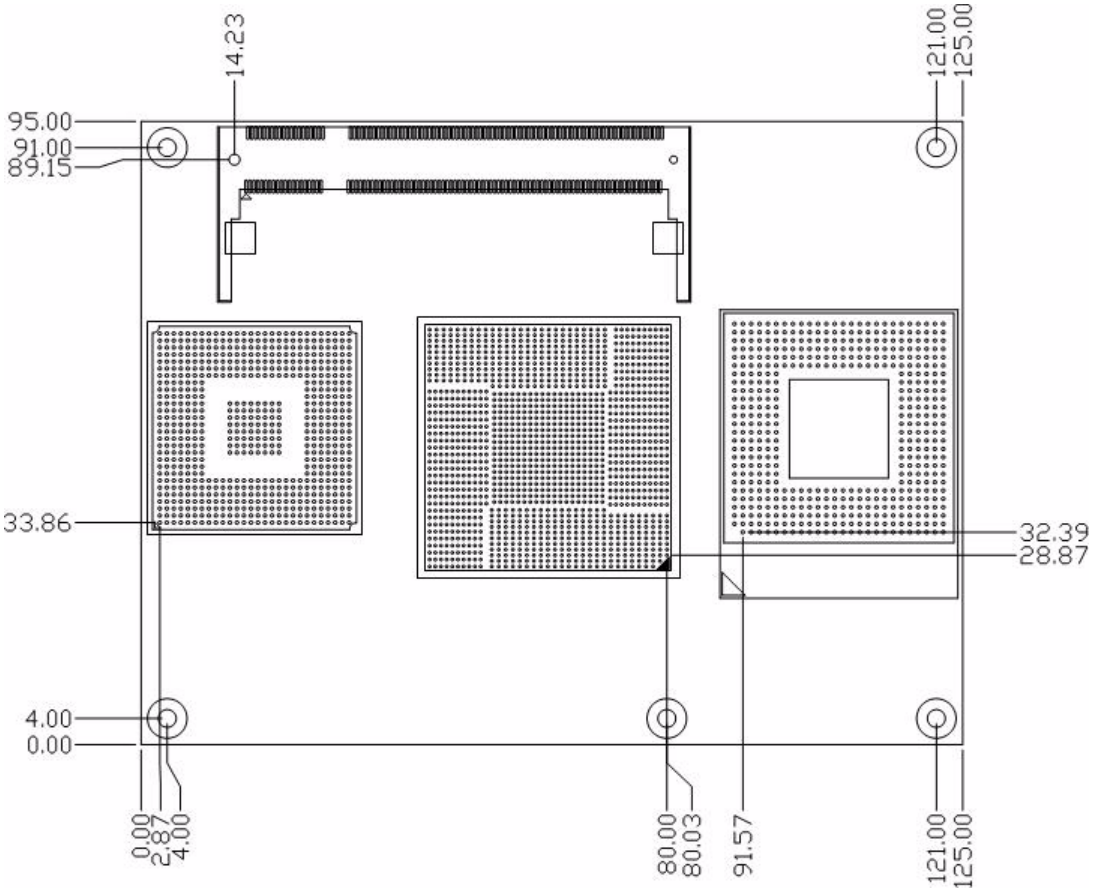

Figure 2.2 SOM-5786 Front Side Drawing

2.2.2 Rear Side

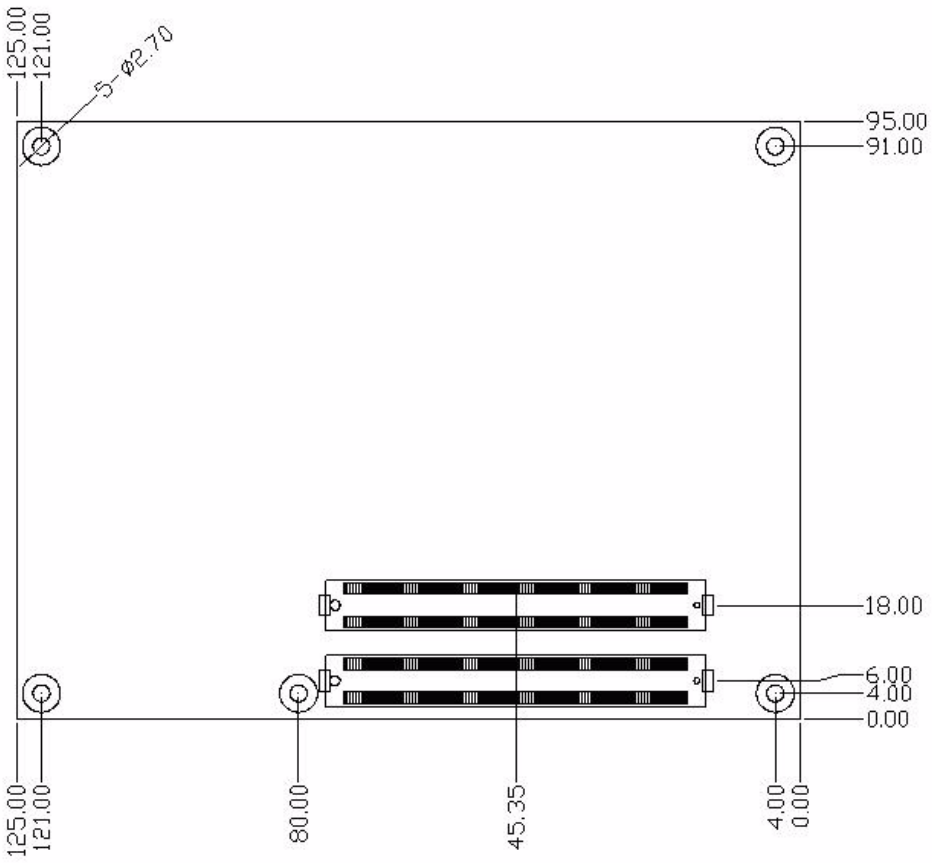

Figure 2.3 SOM-5786 Rear Side Drawing

2.3 Heatspreader Mechanical Drawing

2.3.1 Drawing of Heatspreader for BGA type CPU

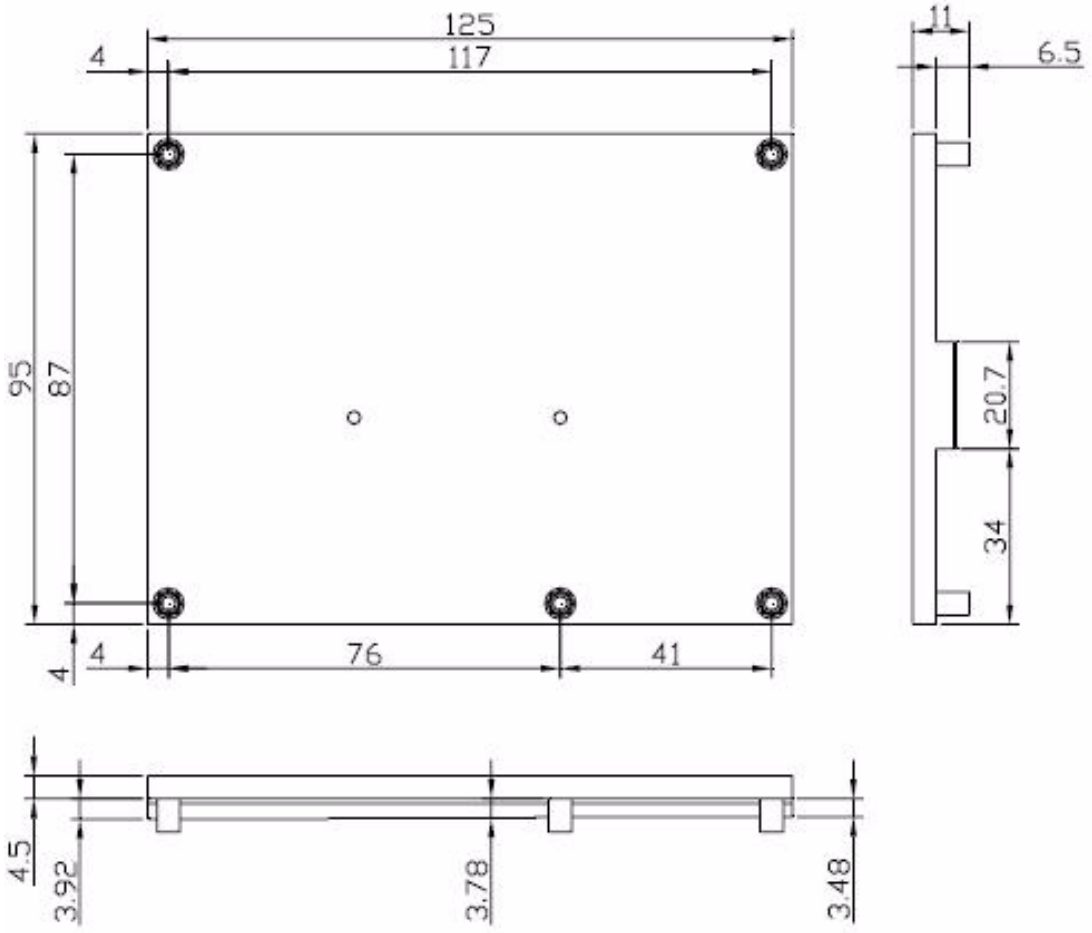

Figure 2.4 Heatspreader Drawing of BGA Type CPU

2.3.2 Drawing of Heatspreader for Socket type CPU

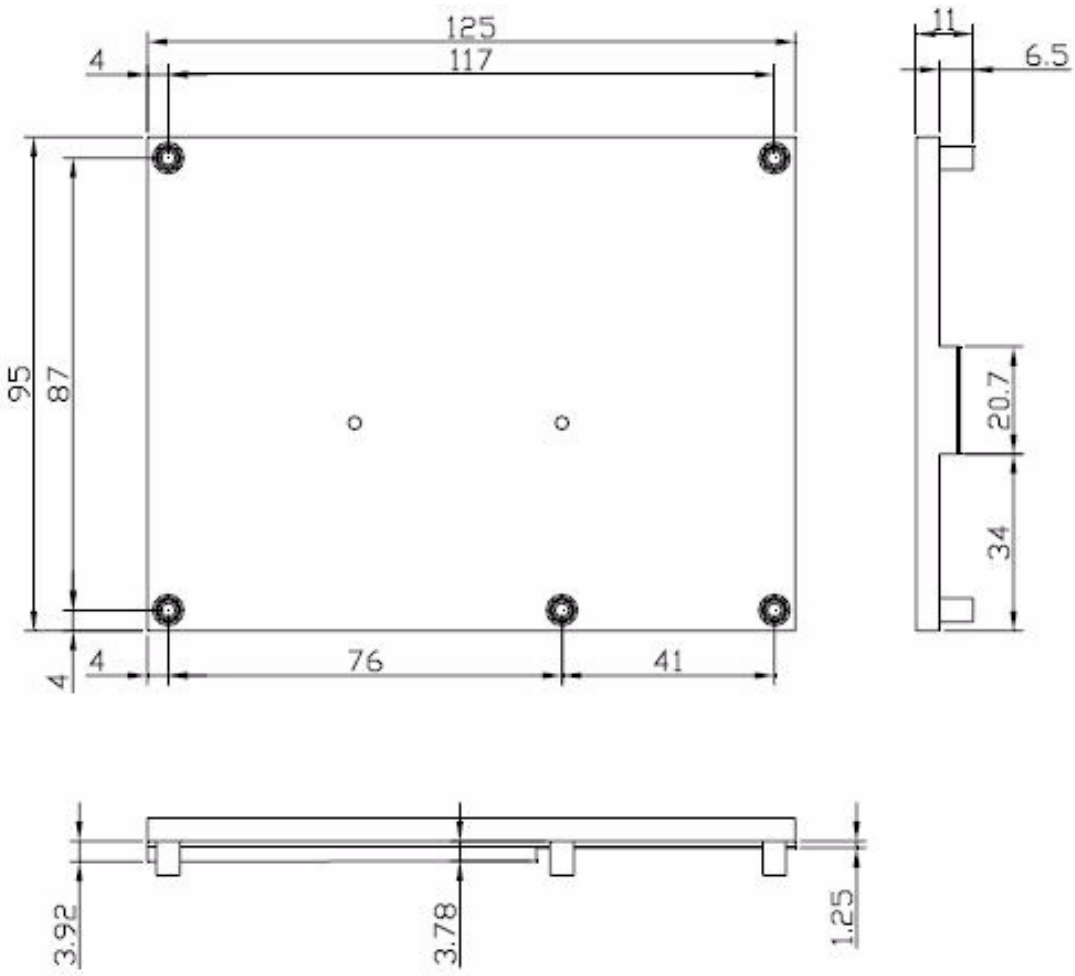

Figure 2.5 Heatspreader Drawing of Socket Type CPU

Chapter 3

BIOS Operation

Sections include:

- **BIOS Introduction**
- **BIOS Setup**

3.1 BIOS Introduction

We provide full-featured AwardBIOS 6.0 and delivers the superior performance, compatibility and functionality that manufactures of Industry PC and Embedded boards, it's many options and extensions let you customize your products to a widerange of designs and target markets.

The modular, adaptable AwardBIOS 6.0 supports the broadest range of third-party peripherals and all popular chipsets, plus Intel, AMD, nVidia, VIA, and compatible CPUs from 386 through Pentium and AMD Geode, K7 and K8 (including multiple processor platforms), and VIA Eden C3 and C7 CPU.

You can use our utilities to select and install features to suit your designs for your customers need.

3.2 BIOS Setup

The SOM-5786 system has build-in AwardBIOS with a CMOS SETUP utility which allows user to configure required settings or to activate certain system features.

The CMOS SETUP saves the configuration in the CMOS RAM of the motherboard. When the power is turned off, the battery on the board supplies the necessary power to the CMOS RAM.

When the power is turned on, press the <Del> button during the BIOS POST (Power-On Self Test) will take you to the CMOS SETUP screen.

CONTROL KEYS	
< ↑ >< ↓ >< ← >< → >	Move to select item
<Enter>	Select Item
<Esc>	Main Menu - Quit and not save changes into CMOS
	Sub Menu - Exit current page and return to Main Menu
<Page Up/+>	Increase the numeric value or make changes
<Page Down/->	Decrease the numeric value or make changes
<F1>	General help, for Setup Sub Menu
<F2>	Item Help
<F5>	Load Previous Values
<F7>	Load Optimized Default
<F10>	Save all CMOS changes

Technical Support and Assistance

1. Visit the EMAC, inc website at www.emacinc.com/support where you can find the latest information about the product.
2. Contact your distributor, sales representative, or our customer service center for technical support if you need additional assistance. Please have the following information ready before you call:
   - Product name and serial number
   - Description of your peripheral attachments
   - Description of your software (operating system, version, application software, etc.)
   - A complete description of the problem
   - The exact wording of any error messages

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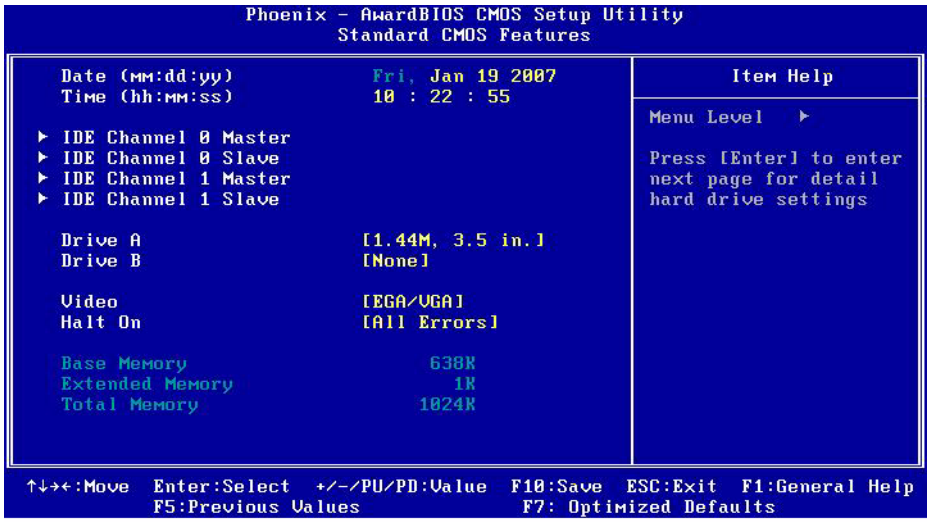
- Heatspreader

3.2.2 Standard CMOS Features



- Date

  The date format is <week>, <month>, <day>, <year>.

Week	From Sun to Sat, determined and display by BIOS only.
Month	From Jan to Dec.
Day	From 1 to 31 .
Year	From 1999 through 2098.

- Time

  The times format in <hour> <minute> <second>, base on the 24-hour time.

- IDE Channel 0 Master/Slave

  IDE HDD Auto-Detection Press "Enter" for automatic device detection.

- IDE Channel 1 Master/Slave

  IDE HDD Auto-Detection Press "Enter" for automatic device detection.

- Drive A / Drive B

  The Item identifies the types of floppy disk drive A or drive B

None	No floppy drive installed.
360 K, 5.25"	5.25 inch PC-type standard drive; 360 K byte capacity.
1.2 M, 5.25"	5.25 inch AT-type high-density drive; 1.2 M byte capacity.
720 K, 3.5"	3.5 inch double-sided drive; 720 K byte capacity.
1.44 M, 3.5"	3.5 inch double-sided drive; 1.44 M byte capacity.
2.88 M, 3.5"	3.5 inch double-sided drive; 2.88 M byte capacity.

- Halt on

  The item determines whether the computer will stop if an error is detected during power up.

No Errors	The system boot will not stop for any error.
All Errors	Whenever the BIOS detects a non-fatal error the system will be stopped.
All, But Keyboard	The system boot will not stop for a keyboard error; it will stop for all other errors (Default value).
All, But Diskette	The system boot will not stop for a disk error; it will stop for all other errors.

All, But Disk/Key The system boot will not stop for a keyboard or disk error; it will stop for al other errors.

- Base Memory

  The POST of the BIOS will determine the amount of base (or conventional) memory installed in the system.

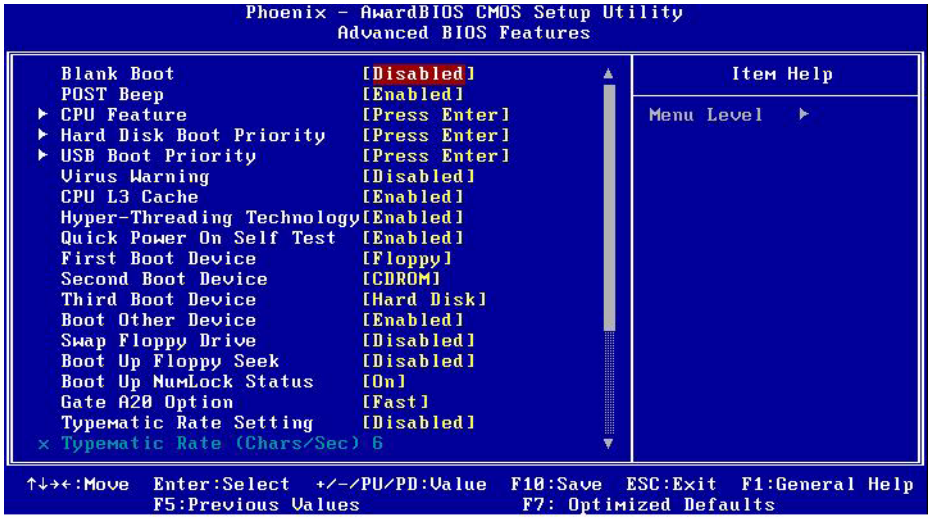
- Extended Memory

  The POST of the BIOS will determine the amount of extended memory (above 1MB in CPU's memory address map) installed in the system.

- Total Memory

  This item displays the total system memory size.

3.2.3 Advanced BIOS Features



- Blank Boot [Disabled]

  This item allows user to enable/disable BIOS POST screen output.

- POST Beep [Enabled]

  This item allows user to enable/disable POST beep sound.

- CPU Feature

  This item allows user to adjust CPU features, CPU ratio, VID and Thermal and special feature like XD flag.

- Hard Disk Boot Priority

  This item allows user to select boot sequence for system device HDD, SCSI, RAID.

- USB Boot Priority

  This item allows user to select boot sequence for USB devices.

- Virus Warning [Disabled]

  This item allows user to choose the VIRUS Warning feature for IDE Hard Disk boot sector protection.

- CPU L3 Cache [Enabled]

  This item allows user to enable CPU L3 cache.

- Hyper-Threading Technology [Enabled]

  This item allows user to enable supported on the Intel® Pentium® 4 Processor with HT Technology.

- Quick Power On Self Test [Enabled]

  This field speeds up the Power-On Self Test (POST) routine by skipping retesting a second, third and forth time. Setup setting default is enabled.

- First / Second / Third / Other Boot Drive

Floppy	Select boot device priority by Floppy.
LS120	Select boot device priority by LS120.
Hard Disk	Select boot device priority by Hard Disk.
CDROM	Select boot device priority by CDROM.
ZIP	Select boot device priority by ZIP.
USB-FDD	Select boot device priority by USB-FDD.
USB-ZIP	Select boot device priority by USB-ZIP.
USB-CDROM	Select boot device priority by USB-CDROM.
USB Device	Select boot device priority by USB Device.
LAN	Select boot device priority by LAN.
Disabled	Disable this boot function.

- Swap Floppy Drive [Disabled]

  This item enables users to swap floppy “A” and “B” identified without change hardware cable connection.

- Boot Up Floppy Seek [Disabled]

  When enabled, the BIOS will seek the floppy “A” drive one time

- Boot Up NumLock Status [Enabled]

  This item enables users to activate the Number Lock function upon system boot

- Gate A20 Option [Fast]

  This item enables users to switch A20 control by port 92 or not.

- Typematic Rate Setting

  This item enables users to set the two typematic controls items.

  This field controls the speed at

  – Typematic Rate (Chars/Sec)

    This item controls the speed at system registers repeated keystrokes.

    Eight settings are 6, 8, 10, 12, 15, 20, 24 and 30.

  – Typematic Delay (Msec)

    This item sets the time interval for displaying the first and second characters.

    Four delay rate options are 250, 500, 750 and 1000.

- Security Option [Setup]

System	System can not boot and can not access to Setup page if the correct password is not entered at the prompt.
Setup	System will boot, but access to Setup if the correct password is not entered at the prompt (Default value).

- APIC Mode [Enabled]

  This item allows user to enabled of disabled “Advanced Programmable Interrupt Controller”. APIC is implemented in the motherboard and must be supported by the operating system, and it extends the number of IRQ's available.

- MPS Version Control for OS [1.4]

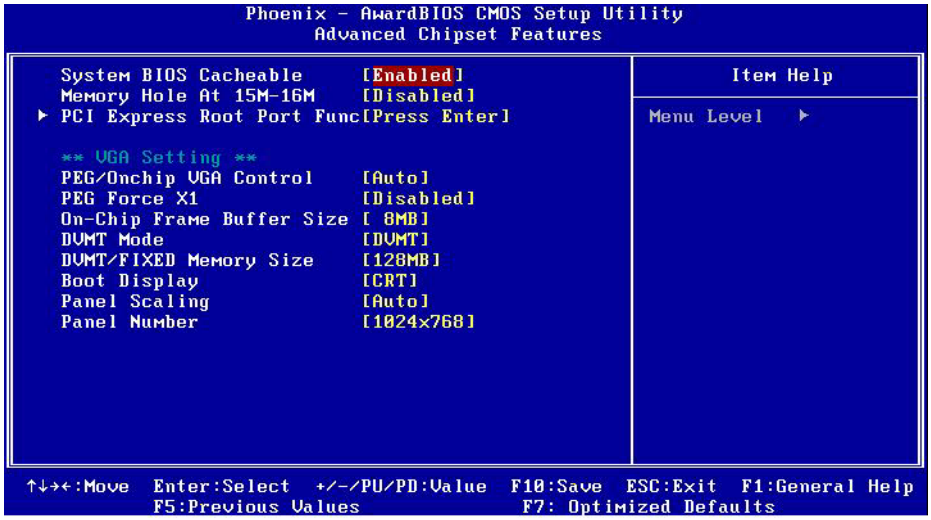
  This item sets the operating system multiprocessor support version.

- OS Select For DRAM > 64 M [Non-OS2]

  Select OS2 only if system is running OS/2 operation system with greater than 64 MB of RAM on the system.

- Full Screen LOGO Show [Enabled]
  This item allows user to set if the BIOS should show the full screen logo or not.
- Small Logo (EPA) Show [Disabled]
  Show EPA logo during system post stage.
- Summary Screen Show [Enabled]
  This item allows user to set if the BIOS should show the summary screen or not.

3.2.4 Advanced Chipset Features

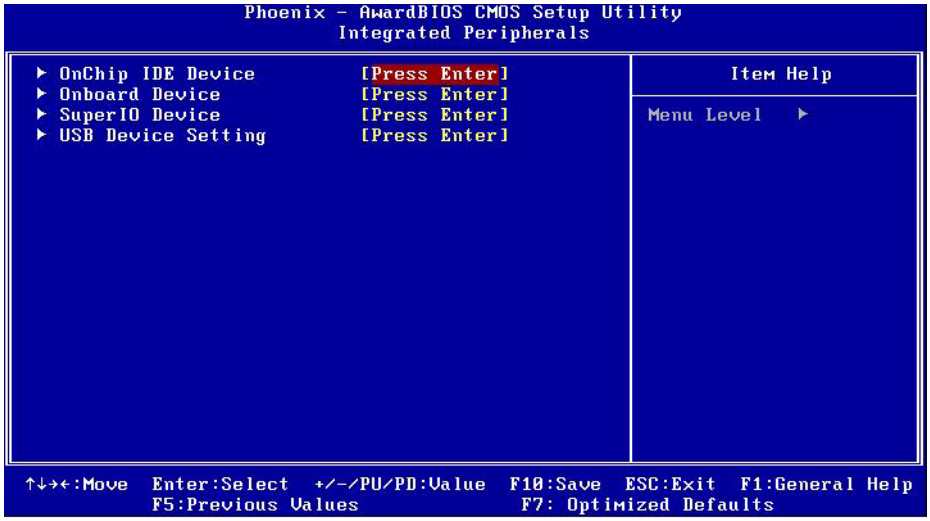


Note! *This "Advanced Chipset Features" option controls the configuration of the board's chipset, this page is developed by Chipset independent, for control chipset register setting and fine tune system performance. It is strongly recommended only technical users make changes to the default settings.*

- System BIOS Cacheable [Enabled]
  This item allows the system BIOS to be cached to allow faster execution and better performance.
- Memory Hole At 15 M-16 M [Disabled]
  This item reserves 15 MB-16 MB memory address space to ISA expansion cards that specifically require the setting. Memory from 15 MB-16 MB will be unavailable to the system because of the expansion cards can only access memory at this area.
- PCI Express Root port Func [Press Enter]
  This item allows the user to adjust PCIE port on,off or auto.
- PEG/Onboard VGA Control [Auto]
  This item allows the user to select whether onboard graphics processor or the PCI Express card.
- PEG Force X1 [Disabled]
  This item allows the user to covert a PCI Express X16 slot to PCI Express X1 slot.
- On-Chip Frame Buffer Size [8 MB]
  This item allows the user to adjust on-chip graphics of memory buffer.

- DVMT Mode [DVMT]
  This item allows the user to adjust Intel's Dynamic Video Memory Technology (DVMT). Bios provide three option to choose(DVMT,FIXED and Both).
- DVMT/FIXED Memory Size [128 MB]
  This item allows the user to adjust DVMT/FIXED graphics memory size.
- Boot Display [CRT]
  This item allows the user to decide that display mode.
- Panel Scaling [Auto]
  This item allows the user to control panel scaling feature.
- Panel Number [1024 x 768]
  This item allows the user to adjust panel resolution.

3.2.5 Integrated Peripherals



Note! *This "Integrated Peripherals" option controls the configuration of the board's chipset, includes IDE, ATA, SATA, USB, AC97, MC97 and Super IO and Sensor devices, this page is developed by Chipset independent.*

- OnChip IDE Device
  This item enables users to set the OnChip IDE device status, includes enable IDE devices and setting PIO and DMA access mode, and some of new chipset also support for SATA device (Serial-ATA).
- Onboard Device
  This item enables users to set the Onboard device status, includes enable USB, AC97, MC97 and LAN devices.
- Super IO Device
  This item enables users to set the Super IO device status, includes enable Floppy, COM, LPT, IR and control GPIO and Power fail status.
- Onboard Serial port 1 [3F8/IRQ4]
  This item allows user to adjust serial port 1 of address and irq.
- Onboard Serial port 2 [2F8/IRQ3]
  This item allows user to adjust serial port 2 of address and irq.

- UART Mode Select [Normal]

  This item allows user to adjust UART mode. Bios provide three item for choose(Normal, IrDA and ASKIR).

- RxD , TxD Active [Hi,Lo]

  This item allows user to adjust infrared ray transition of polarity.

- IR Transmission Delay [Enabled]

  This item allows user to adjust infrared ray transmission delay function.

- UR2 Duplex mode [Half]

  This item allows user to adjust infrared ray duplex function. Two options provided.(half, Full).

  Full-duplex mode permits simultaneous two-direction transmission. Half-duplex mode permits transmission in only one direction at a time.

- Use IR Pins [IR-Rx2Tx2]

  This item allows user to adjust infrared ray pins of options(IR-Rx2Tx2, RxD2 TxD2).

- Onboard Parallel Port [378/IRQ7]

  This item allows user to adjust parallel port of address and irq.

- Parallel Port Mode [SPP]

  This item allows user to adjust parallel port mode.

- EPP Mode Select [EPP1.7]

  This item allows user to adjust EPP standard.

- ECP Mode Use DMA [3]

  This item allows user to adjust ECP DMA resource.

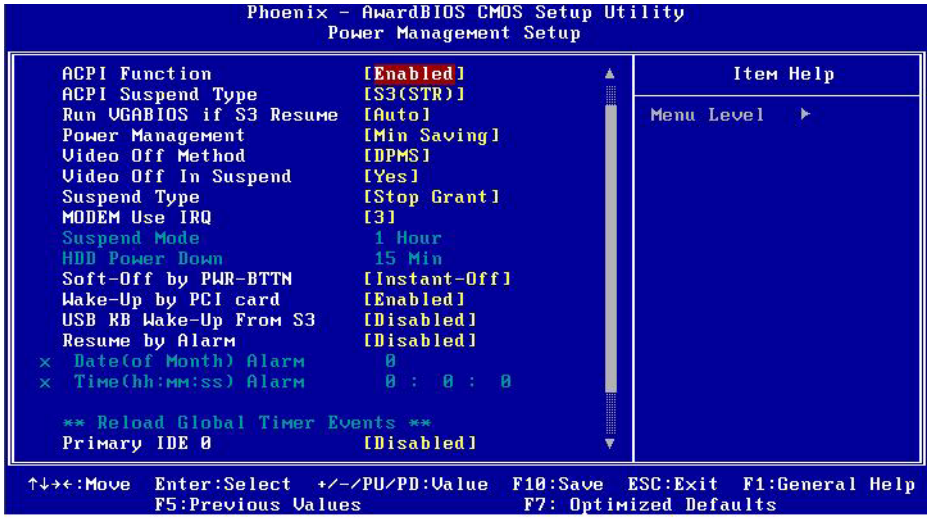
- PWRON After PWR-Fail [Off]

  This item allows user to select system power status after power loss.

- USB Device Setting

  This item enables users to set the OnChip USB functions, includes enable USB1.1/2.0 controller and operation mode, and USB keyboard/mouse/storage functions.

3.2.6 Power Management Setup



Note! *This "Power management Setup" option configure system to most effectively saving energy while operating in a manner consistent with your computer use style.*

- ACPI Function [Enabled]

  This item defines the ACPI (Advanced Configuration and Power Management) feature that makes hardware status information available to the operating system, and communicate PC and system devices for improving the power management.

- ACPI Suspend Type [S3 (STR)]

  This item allows user to select sleep state when suspend.

S1(POS)	The suspend mode is equivalent to a software power down;
S3(STR)	The system shuts down with the exception of a refresh current to the system memory.

- Run VGA BIOS if S3 Resume [Auto]

  This item allows system to reinitialize VGA BIOS after system resume from ACPI S3 mode.

- Power Management [Min Saving]

  This item allows user to select system power saving mode.

Min Saving	Minimum power management. Suspend Mode=1 hr.
Max Saving	Maximum power management. Suspend Mode=1 min.
User Define	Allows user to set each mode individually. Suspend Mode= Disabled or 1 min ~1 hr.

- Video Off Method [DPMS]

  This item allows user to determine the manner is which the monitor is blanked.

V/H SYNC+Blank	This option will cause system to turn off vertical and horizontal synchronization ports and write blanks to the video buffer.
Blank Screen	This option only writes blanks to the video buffer.
DPMS	Initial display power management signaling.

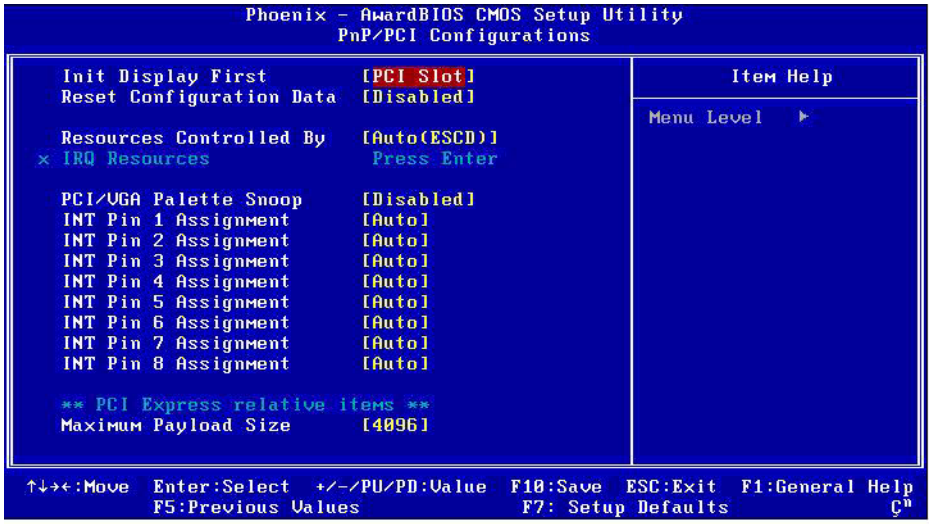
- Video Off In Suspend [Yes]
  This item allows user to turn off Video during system enter suspend mode.
- Suspend Type [Stop Grant]
  This item allows user to determine the suspend type.
- Modem use IRQ [3]
  This item allows user to determine the IRQ which the MODEM can use.
- Suspend Mode [1 Hour]
  This item allows user to determine the time of system inactivity, all devices except the CPU will be shut off.
- HDD Power Down Mode [15 Min]
  This item allows user to determine the time of system inactivity, the hard disk drive will be powered down.
- Soft-Off by PWR-BTTN [Enabled]
  This item allows user to define function of power button.

Instant-Off	Press power button then Power off instantly.
Delay 4 Sec	Press power button 4 sec. to Power off.

- Wake-Up by PCI card [Enabled]
  This item allows user to defines PCI cards to wake up the system from the suspend mode.
- USB KB Wake-Up From S3 [Enabled]
  This item allows user to enable using a USB keyboard, and allow a keystroke to wake up the system from power saving mode.
- Resume by Alarm [Disabled]
  This item allows user to enable and key in Date/time to power on system

Disabled	Disable this function.
Enabled	Enable alarm function to power on system.
Data (of month)	Alarm 1-31
Time (HH:MM:SS)	Alarm (0-23) : (0-59) : 0-59)

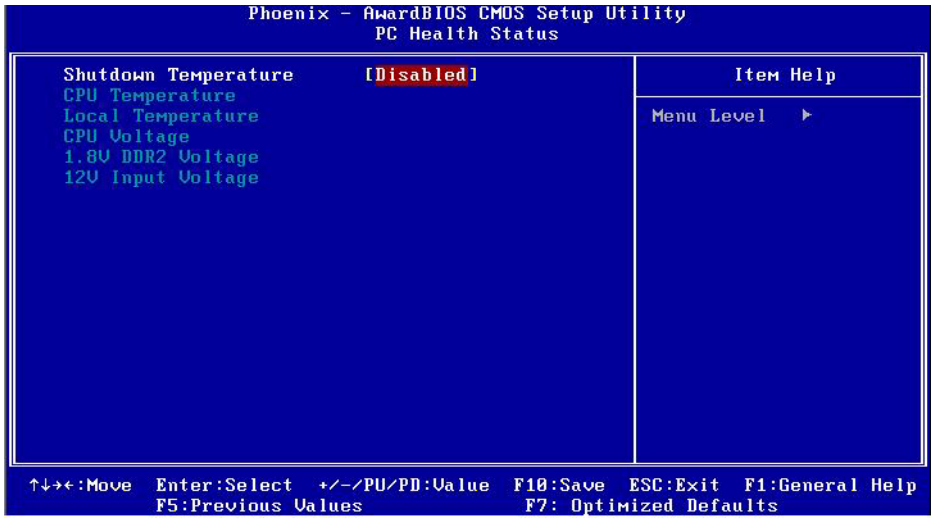
3.2.7 PnP/PCI Configurations



Note! *This "PnP/PCI Configurations" option is setting up the IRQ and DMA (both PnP and PCI bus assignments.*

- Init Display First [PCI Slot]
  This item is setting for start up Video output from PCI or Onboard device.
- Reset Configuration Data [Disabled]
  This item allow user to clear any PnP configuration data stored in the BIOS.
- Resources Controlled By [Auto (ESCD)]
  - IRQ Resources
    This item allows you respectively assign an interruptive type for IRQ-3, 4, 5, 7, 9, 10, 11, 12, 14, and 15.
  - DMA Resources
    This item allows you respectively assign an interruptive type for DMA, 0, 1, 2, 3, 4, 5, 6, and 7.
- PCI VGA Palette Snoop [Disabled]
  The item is designed to solve problems caused by some non-standard VGA cards. A built-in VGA system does not need this function.
- INT Pin 1~8 Assignment [Auto]
  The interrupt request (IRQ) line assigned to a device connected to the PCI interface on your system.
- Maximum payload Size [4096]
  The item allows user to adjust maximum TLP (Transaction Layer Packet) payload size.

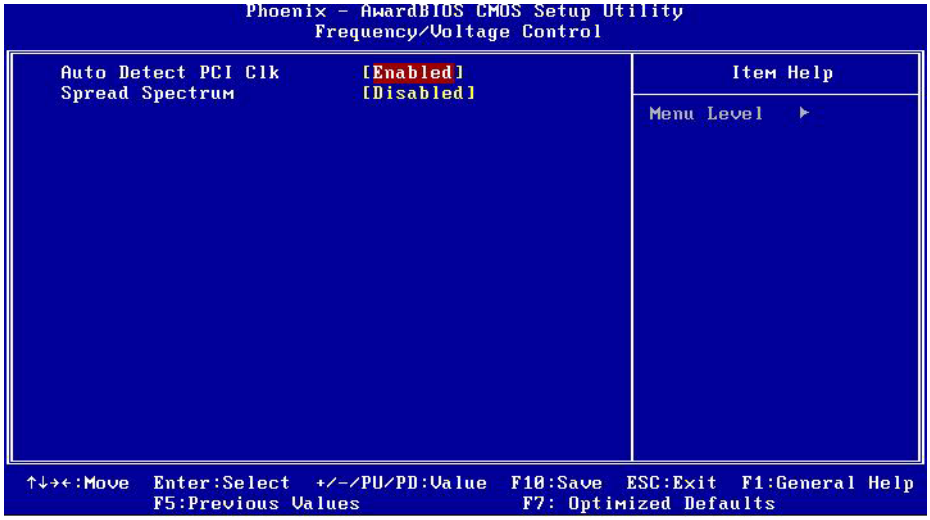
3.2.8 PC Health Status



Note! *This "PC Health Status" option controls the Thermal, FAN and Voltage status of the board. this page is developed by Chipset independent.*

- Shutdown Temperature [Disabled]
  This item allow user to set the temperature to notify the ACPI OS to shutdown the system.
- CPU Temperature [Show Only]
  This item displays current CPU temperature.
- Local Temperature [Show Only]
  This item displays current system temperature.
- CPU/ 1.8 V DDR2/12 V Input Voltage [Show Only]
  This item displays current CPU and system Voltage.

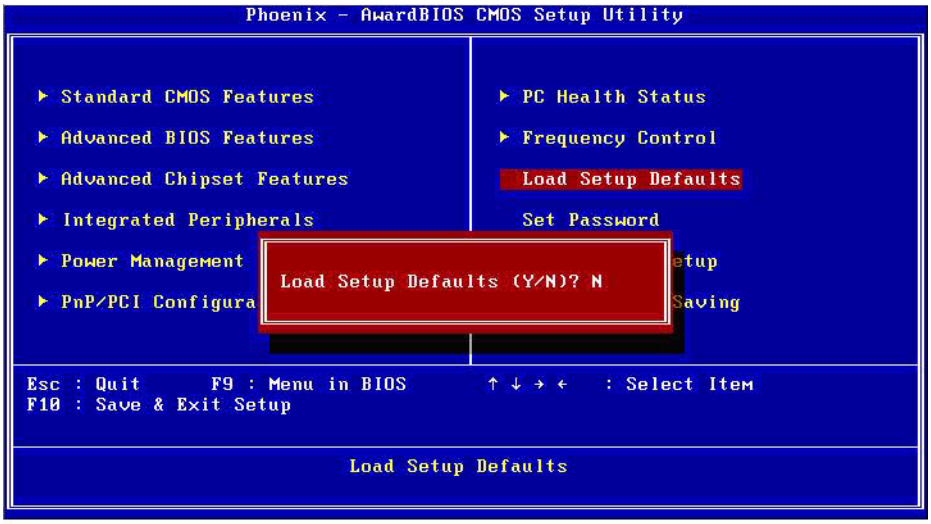
3.2.9 Frequency/voltage Control



Note! *This "Frequency/Voltage Control" option controls the CPU Host and PCI frequency, this page is developed by CPU and Chipset independent, some items will show up when you install a processor which supports this function.*

- Auto Detect PCI Clk [Enabled]
  This item enables users to set the PCI Clk by system automatic detection or by manual.
- Spread Spectrum [Disabled]
  This item enables users to set the spread spectrum modulation.

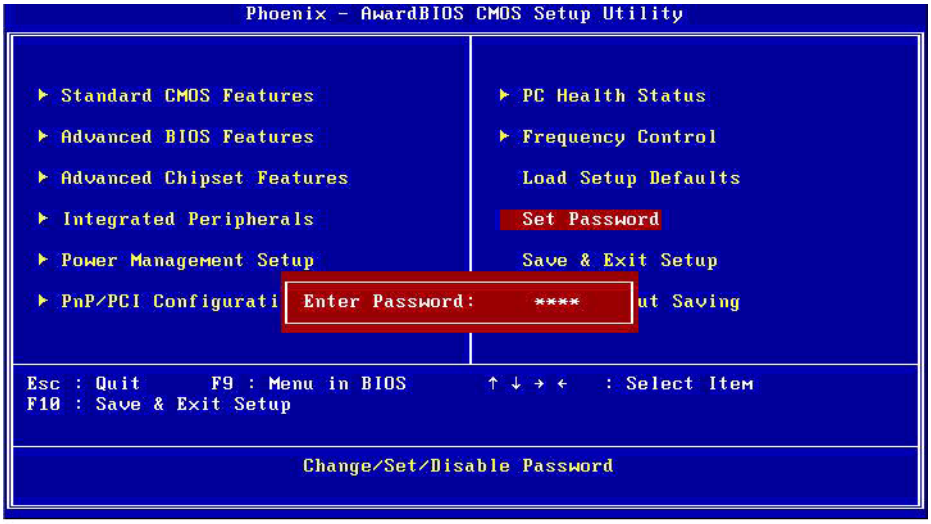
3.2.10 Load Optimized Defaults



Note! *Load Optimized Defaults loads the default system values directly from ROM. If the stored record created by the Setup program should ever become corrupted (and therefore unusable).*

These defaults will load automatically when you turn SOM-5786 system on.

3.2.11 Set Password



Note! *To enable this feature, you should first go to the Advanced BIOS Features menu, choose the Security Option, and select either Setup or System, depending on which aspect you want password protected. Setup requires a password only to enter Setup. System requires the password either to enter Setup or to boot the system. A password may be at most 8 characters long.*

To Establish Password

1. Choose the Set Password option from the CMOS Setup Utility main menu and press <Enter>.
2. When you see “Enter Password”, enter the desired password and press <Enter>.
3. At the “Confirm Password” prompt, retype the desired password, then press <Enter>.
4. Select Save to CMOS and EXIT, type <Y>, then <Enter>.

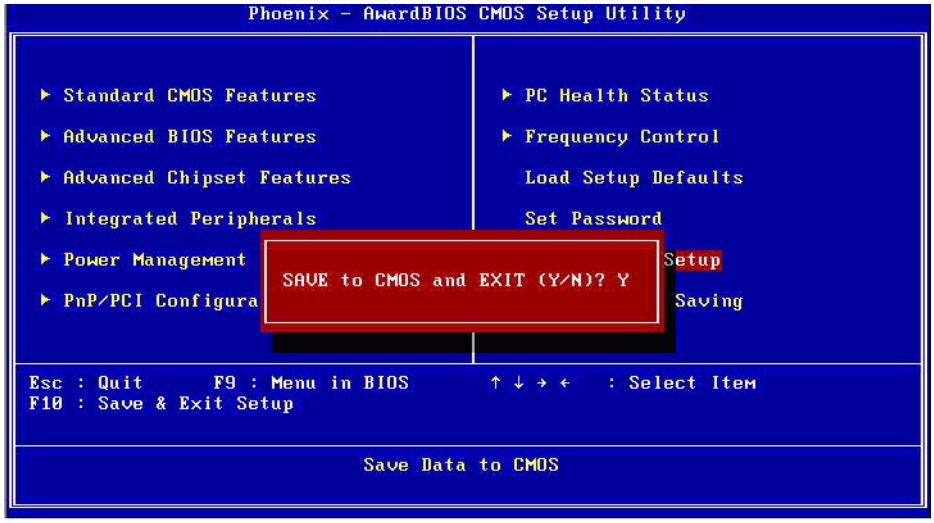
To Change Password

1. Choose the Set Password option from the CMOS Setup Utility main menu and press <Enter>.
2. When you see “Enter Password”, enter the existing password and press <Enter>.
3. You will see “Confirm Password”. Type it again, and press <Enter>.
4. Select Set Password again, and at the “Enter Password” prompt, enter the new password and press <Enter>.
5. At the “Confirm Password” prompt, retype the new password, and press <Enter>.
6. Select Save to CMOS and EXIT, type <Y>, then <Enter>.

To Disable Password

1. Choose the Set Password option from the CMOS Setup Utility main menu and press <Enter>.
2. When you see “Enter Password”, enter the existing password and press <Enter>.
3. You will see “Confirm Password”. Type it again, and press <Enter>.
4. Select Set Password again, and at the “Enter Password” prompt, please don’t enter anything; just press <Enter>.
5. At the “Confirm Password” prompt, again, don’t type in anything; just press <Enter>.
6. *Sele*ct Save to CMOS and EXIT, type <Y>, then <Enter>.

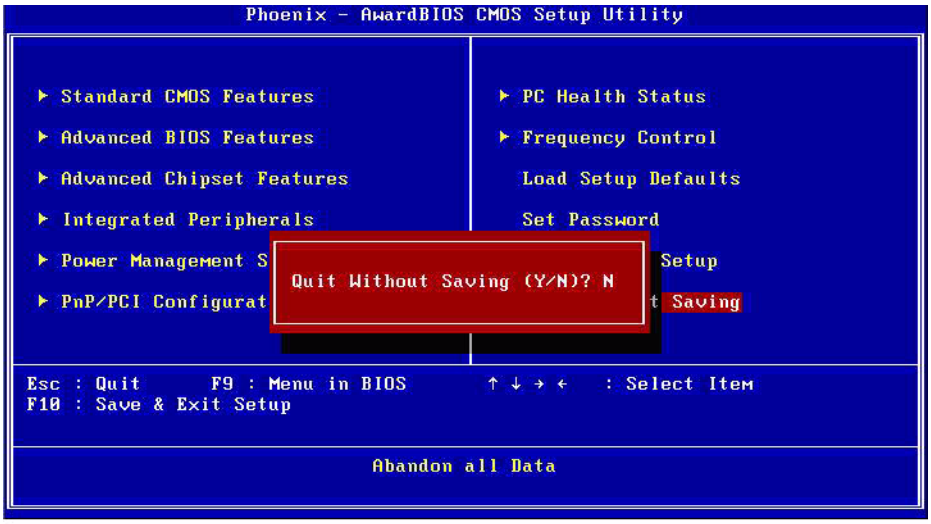
3.2.12 Save & Exit Setup



Note! *Type "Y" will quit the BIOS Setup Utility and save user setup value to CMOS.*

Type "N" will return to BIOS Setup Utility.

3.2.13 Quit Without Saving



Note! *Type "Y" will quit the BIOS Setup Utility without saving to CMOS.*

Type "N" will return to BIOS Setup Utility.

Chapter 4

Driver Installation

This chapter gives you the driver installation information on the SOM-5786 CPU System on Module.

Sections include:

- **Driver Information**
- **Driver Installation**

4.1 Driver Introduction

The CD shipped with SOM-5786 should contain below drivers, please follow below sequence to complete the driver installation.

Step 1- Install Intel RAID Disk Driver for Windows XP/2000.
(This Step is required to be done before installing Microsoft Windows)

Step 2- Install Intel INF Update Driver for Windows XP/2000.

Step 3- Install Intel Graphic Driver for Windows XP/2000.

Step 4- Install Audio Driver for Windows XP/2000.

Step 5- Install Intel Ethernet Driver for Windows XP/2000.

Step 6- Install IT8888 PCI to ISA Inf for Windows 2000.

Note! *For Windows XP Embedded, Windows CE 5.0 and Linux support, please contact sales representative or technical person.*

Note! *Downloading the update for Windows XP or Windows 2000 may be required for enabling USB 2.0 function. Details information please refers to below web link.*

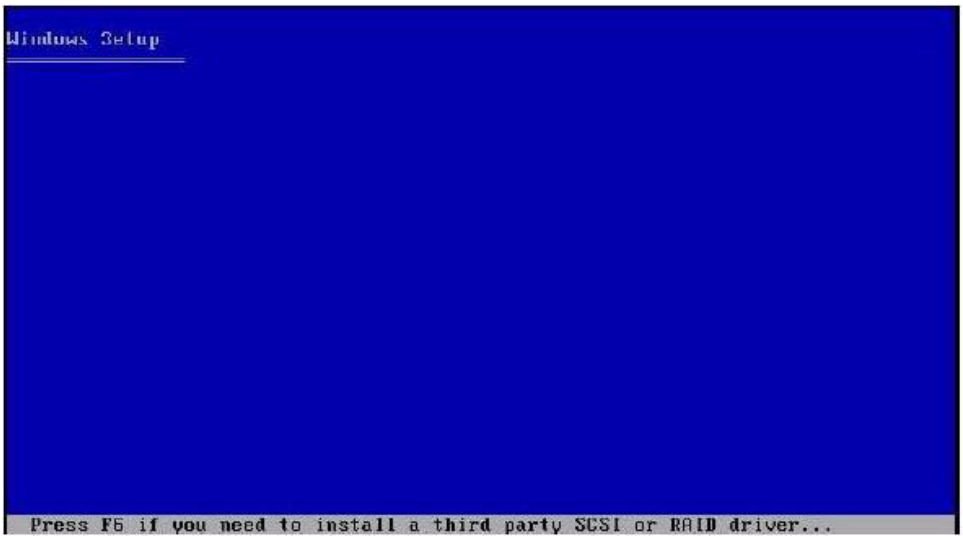
http://www.microsoft.com/whdc/system/bus/USB/USB2support.mspx

4.2 Driver Installation

Insert the SOM-5786 CD into the CD-ROM device, and follow below installation process from Step 1 to Step 5 or 6.

4.2.1 Step 1- Install Intel RAID Disk Driver for Windows XP/2000

1. To install Intel RAID Disk Driver, you need to make a utility floppy disk before installing Microsoft Windows on SOM-5786, please makes this floppy disk on your another Windows base PC.
2. Click on the “Storage” folder and double click the ”F6flpy32.exe” file and system will ask for a floppy to be inserted for making the utility floppy disk. Follow the instruction till the disk is done.
3. Insert the floppy utility disk and start to install Microsoft Windows on SOM-5780 then press “F6” to install Intel RAID Disk Driver.



4. At the prompt, press “S” to select the RAID driver.
5. Follow the instruction and complete RAID driver installation.

4.2.2 Step 2- Install Intel INF Update Driver for Windows XP/2000

1. Click on the “Chipset” folder and double click the “*.exe” file.
2. Follow the instructions that the driver installation wizard shows.
3. The system will help you to complete the driver installation.

4.2.3 Step 3- Install Intel Graphic Driver for Windows XP/2000

1. Click on the “VGA” folder and double click the “*.exe” file.
2. Follow the instructions that the driver installation wizard shows.
3. The system will help you to complete the driver installation.

Note! There are several hot key to allow you to switch between different displays.

Mode	Key 1	Key 2	Key 3
CRT	CTRL	ALT	F1
LCD	CTRL	ALT	F3
Graphic Control Panel	CTRL	ALT	F12

Press Key1+Key2+Key3 at the same time to change the display mode.

4.2.4 Step 4- Install Audio Driver for Windows XP/2000

1. Click on the “Audio” folder and double click the “*.exe” file.
2. Follow the instructions that the driver installation wizard shows.
3. The system will help you to complete the driver installation.

4.2.5 Step 5- Install Intel Ethernet Driver for Windows XP/2000

1. Click on the “LAN” folder and double click the “*.exe” file.
2. Follow the instructions that the driver installation wizard shows.
3. The system will help you to complete the driver installation.

4.2.6 Step 6- Install IT8888 PCI to ISA Inf for Windows 2000

1. Click “Start” button and choose the “Control Panel”, Click the “System” Icon.
2. Click the exclamation mark of PCI device.
3. Install the inf file in “Chipset/IT8888” folder.
4. Follow the instructions that the driver installation wizard shows. Then the inf file is installed.

Appendix A

System Assignments

This appendix gives you the information about the watchdog timer programming on the SOM-5786 CPU System on Module.

Sections include:

- **Watchdog Timer Programming**

A.1 Programming the Watchdog Timer

1. SMBus Address: Pin 3 internal pull up 100K = 0X9C, External pull up 4.7K = 0X6E2.
2. Enable WDT function: Configuration and function select register Index-03h3.

Table A.1: Index-03h

Bit	Name	P/W	PWR	Description
1-0	PIN10_MODE	R/W	VSB3V	00:GPI010 01: LED10 IN this mode can use REG Ox06(bit1,0) to select LED frequency. 10,11 :WD_OUT

3. Watchdog Control: Watchdog Timer Control Register - Index 36h
   Power-on default [7:0] =0000_0000b

Table A.2: Watchdog Timer Index 36h

Bit	Name	P/W	PWR	Description
7	Reserved	RO	VSB3V	Reserved. Read will return 0.
6	STS WD TMOUT	R/W	VSB3V	Watchdog is timeout. When the watchdog is timeout, this bit will be set to one. If set to 1, write 1 will clear this bit. Write 0, no effect.
5	WD ENABLE	R/W	VSB3V	Enable watchdog timer.
4	WD PULSE	R/W	VSB3V	Watchdog output level or pulse. If set 0 (default), the pin of watchdog is level output, if write 1, the pin will output with a pulse.
3	WD UNIT	R/W	VSB3V	Watchdog unit select. Default 0 is select second. Write 1 to select minute.
2	WD HAC-TIVE	RW	VSB3V	Program WD2 output level. If set to 1 and watchdog asserted, the pin will be high. If set to 0 and watchdog asserted, this pin will drive low (default).
1-0	WD_PS WIDTH	RW	VSB3V	Watchdog pulse width selection. If the pin output is selected to pulse mode. The pulse width can be choice. 00b- 1m second. 01b- 20m second. 10b -100m second. 11b- 4 second.

4. Watchdog reset timing control: Watchdog Timer Range Register - Index 37h
   Power-on default [7:0] =0000_0000b

Table A.3: Watchdog Timer Range - Index 37h

Bit	Name	P/W	PWR	Description
7-0	WD_TIME	RW	VSB3V	Watchdog timing range from 0 - 255. The unit is either second or minute programmed by the watchdog timer control register bits.

Appendix B

Programming GPIO

This Appendix gives the illustration of the General Purpose Input and Output pin set-ting.

Sections include:

- **System I/O ports**

B.1 GPIO Register

1. Configuration and function select Register - Index 03h.

Table B.1: Index 03h

Bit	Name	P/W	PWR	Description
4-3	PIN12_MODE	RW	VSB3V	00: GPIO12 01: LED12 IN tills mode can use REG Ox06(bit5,4) to select LED frequency. 10: IRQ 11:WDTOUT11#:
2	PIN11_MODE	RW	VSB3V	0: GPI011 1: LED11 IN this mode can use REG Ox06(brt3,2) to select LED frequency.

2. Configuration and function select Register - Index 04h.

Table B.2: Index 04h

Bit	Name	P/W	PWR	Description
1	PIN5_MODE	RW	VSB3V	0: GPI0171: LED17 IN this mode can use REG Ox07(bit7, 6) to select LED frequency.
0	PIN4_MODE	RW	VSB3V	0: GPIO161: LED16 IN this mode can use REG Ox07(bit5, 4) to select LED frequency.

3. Configuration and function select Register - Index 05h.

Table B.3: Index 05h

Bit	Name	P/W	PWR	Description
2	PIN23_MODE	RW	VSB3V	0: GPIO241: LED24 IN this mode can use REG 0x09 (bit 1, 0) to select LED frequency.
1	PIN22_MODE	RW	VSB3V	0: GPI0251: LED25 IN this mode can use REG 0x09 (bit 3, 2) to select LED frequency.
0	PIN21_MODE	RW	VSB3V	0: GPIO261: LED26 IN this mode can use REG 0x09 (bit5, 4) to select LED frequency.

4. GPIOIx Output Control Register - Index 10h.

Table B.4: Index 10h

Bit	Name	P/W	PWR	Description
7	GP17JX CTRL	RW	VSB3V	GPIO 17 output control. Set to 1 for output function. Set to 0 for input function (default).
6	GP16_O CTRL	RW	VSB3V	GPIO 16 output control. Set to 1 for output function. Set to 0 for input function (default).
2	GP12JD CTRL	RW	VSB3V	GPIO 12 output control. If this pin serves as IRQ/SMI#. this bit has no effect. Set to 1 for output function. Set to 0 for input function (default).
1	GP11_O CTRL	RW	VSB3V	GPIO 11 output control. Set to 1 for output function. Set to 0 for input function (default).mode can use REG 0x09 (bit5, 4) to select LED frequency.

5. GPIO2x Output Control Register - Index 20h.

Table B.5: Index 20h

Bit	Name	P/W	PWR	Description
7	GP27_O CTRL	RW	VSB3V	GPIO 27 output control. Set to 1 for output function. Set to 0 for input function (default).
6	GP26_O CTRL	RW	VSB3V	GPIO 26 output control. Set to 1 for output function. Set to 0 for input function (default).
5	GP25_O CTRL	RW	VSB3V	GPIO 25 output control. Set to 1 for output function. Set to 0 for input function (default).
4	GP24_O CTRL	RW	VSB3V	GPIO 24 output control. Set to 1 for output function. Set to 0 for input function (default).
3	GP23_O CTRL	RW	VSB3V	GPIO 23 output control. Set to 1 for output function. Set to 0 for input function (default).
2	GP22_O CTRL	RW	VSB3V	GPIO 22 output control. Set to 1 for output function. Set to 0 for input function (default).
1	GP21_O CTRL	RW	VSB3V	GPIO 21 output control. Set to 1 for output function. Set to 0 for input function (default).
0	GP20_O CTRL	RW	VSB3V	GPIO 20 output control. Set to 1 for output function. Set to 0 for input function (default).

6. GPIOIx Output Data Register - Index 11h.

Table B.6: Index 11h

Bit	Name	P/W	PWR	Description
7	GP17JD DATA	RW	VSB3V	GPIO 17 output data.
6	GP16_O DATA	RW	VSB3V	GPIO 16 output data.
5	GP15JD DATA	RW	VSB3V	GPIO 15 output data.
4	GP14JD DATA	RW	VSB3V	GPIO 14 output data.
3	GP13JD DATA	RW	VSB3V	GPIO 13 output data.
2	GP12_O DATA	RW	VSB3V	GPIO 12 output data. If this pin serves as IRQ/ SMI*, this bit has no effect.
1	GP11_O DATA	RW	VSB3V	GPIO 11 output data.
0	GP10JD DATA	RW	VSB3V	GPIO 10 output data.

7. GPIOIx Input Status Register - Index 12h.

Table B.7: Index 12h

Bit	Name	P/W	PWR	Description
7	GP17_P STS	RO	VSB3V	Read the GPIO17 data on the pin.
6	GP16_P STS	RO	VSB3V	Read the GPIO16 data on the pin.
5	GP15_P STS	RO	VSB3V	Read the GPIO15 data on the pin.
4	GP14_P STS	RO	VSB3V	Read the GPIO14 data on the pin..
3	GP13_P STS	RO	VSB3V	Read the GPIO13 data on the pin.
2	GP12_P STS	RO	VSB3V	Read the GPIO12 data on the pin.
1	GP11_P STS	RW	VSB3V	Read the GPIO11 data on the pin.
0	GP10_P STS	RW	VSB3V	Read the GPIO10 data on the pin.

Appendix C

System Assignments

This appendix gives you the information about the system resource allocation on the SOM-5786 CPU System on Module.

Sections include:

- **System I/O ports**
- **DMA Channel Assignments**
- **Interrupt Assignments**
- **1st MB Memory Map**

C.1 System I/O Ports

Table C.1: System I/O ports

Addr. range (Hex)	**Device**
0000 - 0CF7	PCI bus
0000 - 000F	Direct memory access controller
0010 - 001F	Motherboard resources
0020 - 0021	Programmable interrupt controller
0022 - 003F	Motherboard resources
0040 - 0043	System timer
0044 - 005F	Motherboard resources
0060 - 0060	Standard 101/102-Key or Microsoft Natural PS/2 Keyboard
0061 - 0061	System speaker
0062 - 0063	Motherboard resources
0064 - 0064	Standard 101/102-Key or Microsoft Natural PS/2 Keyboard
0065 - 006F	Motherboard resources
0070 - 0073	System CMOS/real time clock
0074 - 007F	Motherboard resources
0080 - 0090	Direct memory access controller
0091 - 0093	Motherboard resources
0094 - 009F	Direct memory access controller
00A0 - 00A1	Programmable interrupt controller
00A2 - 00BF	Motherboard resources
00C0 - 00DF	Direct memory access controller
00E0 - 00EF	Motherboard resources
00F0 - 00FF	Numeric data processor
01F0 - 01F7	Primary IDE Channel
0274 - 0277	ISAPNP Read Data Port
0279 - 0279	ISAPNP Read Data Port
02F8 - 02FF	Communications Port (COM2)
0378 - 037F	Printer Port (LPT1)
03B0 - 03BB	Mobile Intel(R) 965 Express Chipset Family
03C0 - 03DF	Mobile Intel(R) 965 Express Chipset Family
03F0 - 03F5	Standard floppy disk controller
03F6 - 03F6	Primary IDE Channel
03F7 - 03F7	Standard floppy disk controller
03F8 - 03FF	Communications Port (COM1)
0400 - 04BF	Motherboard resources
04D0 - 04D1	Motherboard resources
0500 - 051F	Intel(R) ICH8 Family SMBus Controller - 283E
0778 - 077B	Printer Port (LPT1)
0880 - 088F	Motherboard resources
0A78 - 0A7B	Motherboard resources
0B78 - 0B7B	Motherboard resources
0BBC - 0BBF	Motherboard resources
0D00 - FFFF	PCI bus
0E78 - 0E7B	Motherboard resources

Table C.1: System I/O ports	
0F78 - 0F7B	Motherboard resources
0FBC - 0FBF	Motherboard resources
F200 - F20F	Intel(R) ICH8M 3 port Serial ATA Storage Controller - 2828
F300 - F30F	Intel(R) ICH8M 3 port Serial ATA Storage Controller - 2828
F400 - F403	Intel(R) ICH8M 3 port Serial ATA Storage Controller - 2828
F500 - F507	Intel(R) ICH8M 3 port Serial ATA Storage Controller - 2828
F600 - F603	Intel(R) ICH8M 3 port Serial ATA Storage Controller - 2828
F700 - F707	Intel(R) ICH8M 3 port Serial ATA Storage Controller - 2828
F800 - F80F	Intel(R) ICH8M Ultra ATA Storage Controllers - 2850
F900 - F91F	Intel(R) ICH8 Family USB Universal Host Controller - 2832
FA00 - FA1F	Intel(R) ICH8 Family USB Universal Host Controller - 2831
FB00 - FB1F	Intel(R) ICH8 Family USB Universal Host Controller - 2830
FC00 - FC1F	Intel(R) ICH8 Family USB Universal Host Controller - 2835
FD00 - FD1F	Intel(R) ICH8 Family USB Universal Host Controller - 2834
FE00 - FE1F	Intel(R) 82566MM Gigabit Network Connection
FF00 - FF07	Mobile Intel(R) 965 Express Chipset Family

C.2 DMA Channel Assignments

Table C.2: DMA channel assignments	
Channel	**Function**
0	Available
1	Available
2	Standard floppy disk controller
3	Available
4	Direct memory access controller
5	Available
6	Available
7	Available

C.3 Interrupt Assignments

Table C.3: Interrupt assignments

Interrupt#	Interrupt source
NMI	Parity error detected
IRQ 0	System timer
IRQ 1	Standard 101/102-Key or Microsoft Natural PS/2 Keyboard
IRQ 2	Available
IRQ 3	Communications Port (COM2)
IRQ 4	Communications Port (COM1)
IRQ 5	Available
IRQ 6	Standard floppy disk controller
IRQ 7	Available
IRQ 8	System CMOS/real time clock
IRQ 9	Microsoft ACPI-Compliant System
IRQ 10	Available
IRQ 11	Available
IRQ 12	PS/2 Compatible Mouse
IRQ 13	Numeric data processor
IRQ 14	Primary IDE Channel
IRQ 15	ntel(R) ICH8 Family SMBus Controller - 283E
IRQ 16	Mobile Intel(R) 965 Express Chipset Family Intel(R) ICH8 Family USB Universal Host Controller - 2834
IRQ 18	Intel(R) ICH8 Family USB2 Enhanced Host Controller - 283A Intel(R) ICH8 Family USB Universal Host Controller - 2832
IRQ 19	Intel(R) ICH8 Family USB Universal Host Controller ®C 2831 Intel(R) ICH8M 3 port Serial ATA Storage Controller - 2828
IRQ 20	Intel(R) 82566MM Gigabit Network Connection
IRQ 21	Intel(R) ICH8 Family USB Universal Host Controller - 2835
IRQ 22	Microsoft UAA Bus Driver for High Definition Audio
IRQ 23	Intel(R) ICH8 Family USB Universal Host Controller ®C 2830 Intel(R) ICH8 Family USB2 Enhanced Host Controller - 2836 USB and Ethernet IRQ is automatically set by the system

C.4 1st MB Memory Map

Table C.4: 1st MB memory map

Addr. range (Hex)	Device
00000000 - 0009FFFF	System board
000A0000 - 000BFFFF	PCI bus
000A0000 - 000BFFFF	Mobile Intel(R) 965 Express Chipset Family
000C0000 - 000DFFFF	PCI bus
000E0000 - 000EFFFF	System board
000F0000 - 000FFFFF	System board
00100000 - 7F6DFFFF	System board
7F6E0000 - 7F6FFFFF	System board
7F700000 - FEBFFFFF	PCI bus
7F700000 - 7F7FFFFF	System board
D0000000 - DFFFFFFF	Mobile Intel(R) 965 Express Chipset Family
E0000000 - EFFFFFFF	Motherboard resources
FDB00000 - FDBFFFFF	Mobile Intel(R) 965 Express Chipset Family
FDE00000 - FDEFFFFF	Mobile Intel(R) 965 Express Chipset Family
FDFC0000 - FDFDFFFF	Intel(R) 82566MM Gigabit Network Connection
FDFF4000 - FDFF7FFF	Microsoft UAA Bus Driver for High Definition Audio
FDFFC000 - FDFFC0FF	Intel(R) ICH8 Family SMBus Controller - 283E
FDFFD000 - FDFFD3FF	Intel(R) ICH8 Family USB2 Enhanced Host Controller - 2836
FDFFE000 - FDFFE3FF	Intel(R) ICH8 Family USB2 Enhanced Host Controller - 283A
FDFFF000 - FDFFFFFF	Intel(R) 82566MM Gigabit Network Connection
FEC00000 - FEC00FFF	System board
FED14000 - FED1DFFF	System board
FED20000 - FED9FFFF	System board
FEE00000 - FEE00FFF	System board
FFB00000 - FFB7FFFF	System board
FFB80000 - FFBFFFFF	Intel(R) 82802 Firmware Hub Device
FFF00000 - FFFFFFFF	System board

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