# KEMB-8100 Series

## Standard / Extended Temperature Industrial-grade Motherboard in ATX Form Factor with 6th Generation Intel® Core™ i Processor and Intel® H110 / Q170 Chipset

# User's Guide

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# Safety Instructions

## ■ Before You Begin

Before handling the product, read the instructions and safety guidelines on the following pages to prevent damage to the product and to ensure your own personal safety. Refer to the “Advisories” section in the Preface for advisory conventions used in this user’s guide, including the distinction between Warnings, Cautions, Important Notes, and Notes.

- Always use caution when handling/operating a computer. Only qualified, experienced, authorized electronics service personnel should access the interior of a computer. The power supplies produce high voltages and energy hazards, which can cause bodily harm.
- Use extreme caution when installing or removing components. Refer to the installation instructions in this user’s guide for precautions and procedures. If you have any questions, please contact Quanmax Post-Sales Technical Support.

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**WARNING**

High voltages are present inside the chassis when the unit’s power cord is plugged into an electrical outlet. Turn off system power, turn off the power supply, and then disconnect the power cord from its source before removing the chassis cover. Turning off the system power switch does not remove power to components.

---

## ■ When Working Inside a Computer

Before taking covers off a computer, perform the following steps:

1. Turn off the computer and any peripherals.
2. Disconnect the computer and peripherals from their power sources or subsystems to prevent electric shock or system board damage. This does not apply when hot swapping parts.

3. Follow the guidelines provided in “Preventing Electrostatic Discharge” on the following page.
4. Disconnect any telephone or telecommunications lines from the computer.

In addition, take note of these safety guidelines when appropriate:

- To help avoid possible damage to system boards, wait five seconds after turning off the computer before removing a component, removing a system board, or disconnecting a peripheral device from the computer.
- When you disconnect a cable, pull on its connector or on its strain-relief loop, not on the cable itself. Some cables have a connector with locking tabs. If you are disconnecting this type of cable, press in on the locking tabs before disconnecting the cable. As you pull connectors apart, keep them evenly aligned to avoid bending any connector pins. Also, before connecting a cable, make sure both connectors are correctly oriented and aligned.

---

**CAUTION**

Do not attempt to service the system yourself except as explained in this user’s guide. Follow installation and troubleshooting instructions closely.

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## Preventing Electrostatic Discharge

Static electricity can harm system boards. Perform service at an ESD workstation and follow proper ESD procedure to reduce the risk of damage to components. Quanmax strongly encourages you to follow proper ESD procedure, which can include wrist straps and smocks, when servicing equipment.
You can also take the following steps to prevent damage from electrostatic discharge (ESD):

- When unpacking a static-sensitive component from its shipping carton, do not remove the component’s antistatic packing material until you are ready to install the component in a computer. Just before unwrapping the antistatic packaging, be sure you are at an ESD workstation or grounded. This will discharge any static electricity that may have built up in your body.

- When transporting a sensitive component, first place it in an antistatic container or packaging.
- Handle all sensitive components at an ESD workstation. If possible, use antistatic floor pads and workbench pads.
- Handle components and boards with care. Don’t touch the components or contacts on a board. Hold a board by its edges or by its metal mounting bracket.
- Do not handle or store system boards near strong electrostatic, electromagnetic, magnetic, or radioactive fields.

# Preface

## ■ How to Use This Guide

This guide is designed to be used as step-by-step instructions for installation, and as a reference for operation, troubleshooting, and upgrades.

**NOTE**

Driver downloads and additional information are available under Downloads on our web site: www.quanmax.com.

## ■ Unpacking

When unpacking, follow these steps:

1. After opening the box, save it and the packing material for possible future shipment.
2. Remove all items from the box. If any items listed on the purchase order are missing, notify Quanmax customer service immediately.
3. Inspect the product for damage. If there is damage, notify Quanmax customer service immediately. Refer to “Warranty Policy” for the return procedure.

## ■ Regulatory Compliance Statements

This section provides the FCC compliance statement for Class A devices.

### FCC Compliance Statement for Class A Devices

The product(s) described in this user’s guide 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 user’s guide, may cause harmful interference to radio communications. Operation of this equipment in a residential

area (domestic environment) is likely to cause harmful interference, in which case the user will be required to correct the interference (take adequate measures) at their own expense.
Changes or modifications not expressly approved by Quanmax could void the user's authority to operate the equipment.

**NOTE**

The assembler of a personal computer system may be required to test the system and/or make necessary modifications if a system is found to cause harmful interference or to be noncompliant with the appropriate standards for its intended use.

## ■ Warranty Policy

### Limited Warranty

Quanmax Inc.'s detailed Limited Warranty policy can be found under Support at www.quanmax.com. Please consult your distributor for warranty verification.
The limited warranty is void if the product has been subjected to alteration, neglect, misuse, or abuse; if any repairs have been attempted by anyone other than Quanmax or its authorized agent; or if the failure is caused by accident, acts of God, or other causes beyond the control of Quanmax or the manufacturer. Neglect, misuse, and abuse shall include any installation, operation, or maintenance of the product other than in accordance with the user's guide.
No agent, dealer, distributor, service company, or other party is authorized to change, modify, or extend the terms of this Limited Warranty in any manner whatsoever.
Quanmax reserves the right to make changes or improvements in any product without incurring any obligation to similarly alter products previously purchased.

### Return Procedure

For any Limited Warranty return, please contact Support at www.quanmax.com and login to obtain a Return Material Authorization (RMA) Number. If you do not have an account, send an email to support@quanmax.com to apply for one.
All product(s) returned to Quanmax for service or credit must be accompanied by a Return Material Authorization (RMA) Number. Freight on all returned items must be prepaid by the customer who is responsible for any loss or damage caused by common carrier in transit. Returns for Warranty must include a Failure Report for each unit, by serial number(s), as well as a copy of the original invoice showing the

date of purchase.
To reduce risk of damage, returns of product must be in a Quanmax shipping container. If the original container has been lost or damaged, new shipping containers may be obtained from Quanmax Customer Service at a nominal cost.
Quanmax owns all parts removed from repaired products. Quanmax uses new and reconditioned parts made by various manufacturers in performing warranty repairs and building replacement products. If Quanmax repairs or replaces a product, its warranty term is not extended.
Shipments not in compliance with this Limited Warranty Return Policy will not be accepted by Quanmax.

### Limitation of Liability

In no event shall Quanmax be liable for any defect in hardware, software, loss, or inadequacy of data of any kind, or for any direct, indirect, incidental, or consequential damages in connection with or arising out of the performance or use of any product furnished hereunder. Quanmax's liability shall in no event exceed the purchase price of the product purchased hereunder. The foregoing limitation of liability shall be equally applicable to any service provided by Quanmax or its authorized agent.

## ■ Maintaining Your Computer

### Environmental Factors

■ **Temperature**

The ambient temperature within an enclosure may be greater than room ambient temperature. Installation in an enclosure should be such that the amount of air flow required for safe operation is not compromised. Consideration should be given to the maximum rated ambient temperature. Overheating can cause a variety of problems, including premature aging and failure of chips or mechanical failure of devices.
If the system has been exposed to abnormally cold temperatures, allow a two-hour warm-up period to bring it up to normal operating temperature before turning it on. Failure to do so may cause damage to internal components, particularly the hard disk drive.

■ **Humidity**

High-humidity can cause moisture to enter and accumulate in the system. This moisture can cause corrosion of internal components and degrade such

properties as electrical resistance and thermal conductivity. Extreme moisture buildup inside the system can result in electrical shorts, which can cause serious damage to the system.
Buildings in which climate is controlled usually maintain an acceptable level of humidity for system equipment. However, if a system is located in an unusually humid location, a dehumidifier can be used to maintain the humidity within an acceptable range. Refer to the “Specifications” section of this user’s guide for the operating and storage humidity specifications.

- **Altitude**
  Operating a system at a high altitude (low pressure) reduces the efficiency of the cooling fans to cool the system. This can cause electrical problems related to arcing and corona effects. This condition can also cause sealed components with internal pressure, such as electrolytic capacitors, to fail or perform at reduced efficiency.

## Power Protection

The greatest threats to a system’s supply of power are power loss, power spikes, and power surges caused by electrical storms, which interrupt system operation and/or damage system components. To protect your system, always properly ground power cables and one of the following devices.

- **Surge Protector**
  Surge protectors are available in a variety of types and usually provide a level of protection proportional with the cost of the device. Surge protectors prevent voltage spikes from entering a system through the AC power cord. Surge protectors, however, do not offer protection against brownouts, which occur when the voltage drops more than 20 percent below the normal AC line voltage level.

- **Line Conditioner**
  Line conditioners go beyond the over voltage protection of surge protectors. Line conditioners keep a system’s AC power source voltage at a fairly constant level and, therefore, can handle brownouts. Because of this added protection, line conditioners cost more than surge protectors. However, line conditioners cannot protect against a complete loss of power.

## ■ Uninterruptible Power Supply

Uninterruptible power supply (UPS) systems offer the most complete protection against variations on power because they use battery power to keep the server running when AC power is lost. The battery is charged by the AC power while it is available, so when AC power is lost, the battery can provide power to the system for a limited amount of time, depending on the UPS system.

UPS systems range in price from a few hundred dollars to several thousand dollars, with the more expensive unit s allowing you to run larger systems for a longer period of time when AC power is lost. UPS systems that provide only 5 minutes of battery power let you conduct an orderly shutdown of the system, but are not intended to provide continued operation. Surge protectors should be used with all UPS systems, and the UPS system should be Underwriters Laboratories (UL) safety approved.

# Chapter 1

# Introduction

## ■ Overview

The KEMB-8100 Series is a standard / extended temperature ATX form factor industrial motherboard equipped with LGA1151 Socket 6th Generation Intel® Core™ i Processor and Intel® H110 / Q170 Express Chipset. It has a variety of I/O ports and expansion slots for peripheral applications and expansion, including 4x DDR4 UDIMM, 1x VGA, 1x DVI-D, 1x DP, 1x HDMI, 2x GbE, 4x SATA, 4/6x USB3.0, 4/6x USB2.0, 6x COM, 16-bit DIO, 2x PS/2, 4x PCI, 1x PCIex16, 2x PCIex1 or 2x PCIex4/PCIex2/PCIex1, 1x mPCIe or 2x mPCIe/mSATA and 1x SIM card holder.

### Checklist

- Driver/ Manual CD
- Quick Installation Guide
- KEMB-8000 Series main board
- Rear I/O Shield

### Features

- LGA1151 Socket 6th Generation Intel® Core™ i Processor
- Intel® H110 / Q170 Chipset
- 4x DDR3 UDIMM Socket up to 64GB
- 1x VGA, 1x DVI-D, 1x DP, 1x HDMI
- 2x GbE, 4/6x USB3.0, 4/6x USB2.0, 6x COM, 16-bit DIO, 2x PS/2
- 4x SATA
- 4x PCI, 1x PCIex16, 2x PCIex1 or 2x PCIex4/PCIex2/PCIex1
- 1x mPCIe or 2x mPCIe/mSATA, 1x SIM
- Watchdog Timer, Hardware Monitor
- Extended temperature model available: -20°C ~ 70°C

■

## ■ Product Specifications

| | |
|---|---|
| Model Name | ▪ KEMB-8100 Series |
| Form Factor | ▪ ATX |
| PCB Size | ▪ 304.8 x 244 mm / 12" x 9.6" |
| Processor /Chipset | ▪ LGA1151 socket 6th Generation Intel® Core™ i Processor<br>▪ Intel® H110 Express Chipset (KEMB-8100)<br>▪ Intel® Q170 Express Chipset (KEMB-8101/T) |
| Memory | ▪ 4x DDR4 UDIMM Socket support up to 64GB memory |
| Features | ▪ Display supported<br>● 1x DVI-D (on rear)<br>● 1x DP (on rear)<br>● 1x HDMI (on rear)<br>● 1x VGA<br>▪ Audio supported<br>● 1x Line-Out (on rear)<br>● 1x Mic-In (on rear)<br>● 1x header for front Audio<br>▪ LAN supported<br>● 2x GbE RJ-45 Connector (1x Intel® I219-LM & 1x Intel® I210-AT)<br>▪ USB supported<br>● 4x USB3.0 (KEMB-8100, Type-A on rear)<br>● 6x USB3.0 (KEMB-8101/T, 4x Type-A on rear)<br>● 4x USB2.0 (KEMB-8100, Type-A on rear)<br>● 6x USB2.0 (KEMB-8101/T, Type-A on rear)<br>▪ Storage supported<br>● 4x SATA Connector<br>● 2x mSATA Socket (mixed with mPCIe, KEMB-8101/T only)<br>▪ Extension supported<br>● 4x PCI, 32-bit/33MHz<br>● 1x PCIex16<br>● 2x PCIex1 (KEMB-8100)<br>● 2x PCIex4 / PCIex2 / PCIex1 (KEMB-8101/T)<br>● 1x mPCIe (KEMB-8100)<br>● 2x mPCIE/mSATA (KEMB-8101/T)<br>● 1x SIM card holder<br>▪ Super I/O supported<br>● 6x COM (COM1~2 with RS-232/422/485, COM1 on rear)<br>▪ TPM supported<br>● TPM support (KEMB-8101/T)<br>▪ Digital I/O supported<br>● 16-bit DIO |
| BIOS | ▪ AMI uEFI BIOS<br>▪ 1x 128Mb SPI flash memory onboard |
| Hardware Monitor | ▪ Input & Core Voltages monitoring<br>▪ CPU & System Temperatures monitoring |
| Watchdog | ▪ Programable WDT to generate System reset event |
| Real Time Clock | ▪ Chipset intergrated RTC |
| Power | ▪ One 2x12-pin, pitch 4.2mm Wafer ATX power DC input<br>▪ One 2x4-pin, pitch 4.2mm Wafer for CPU Core power supply |

| | |
|---|---|
| Operation Temp. | ▪ 0ºC ~ 60ºC / 32ºF ~ 140ºF (Standard)<br>▪ -20ºC ~ 70ºC / -4ºF ~ 158ºF (Standard) |
| Certifications | ▪ CE, FCC Class A |

Table 1 KEMB-8100 Series Specification

## ■ System Block Diagram

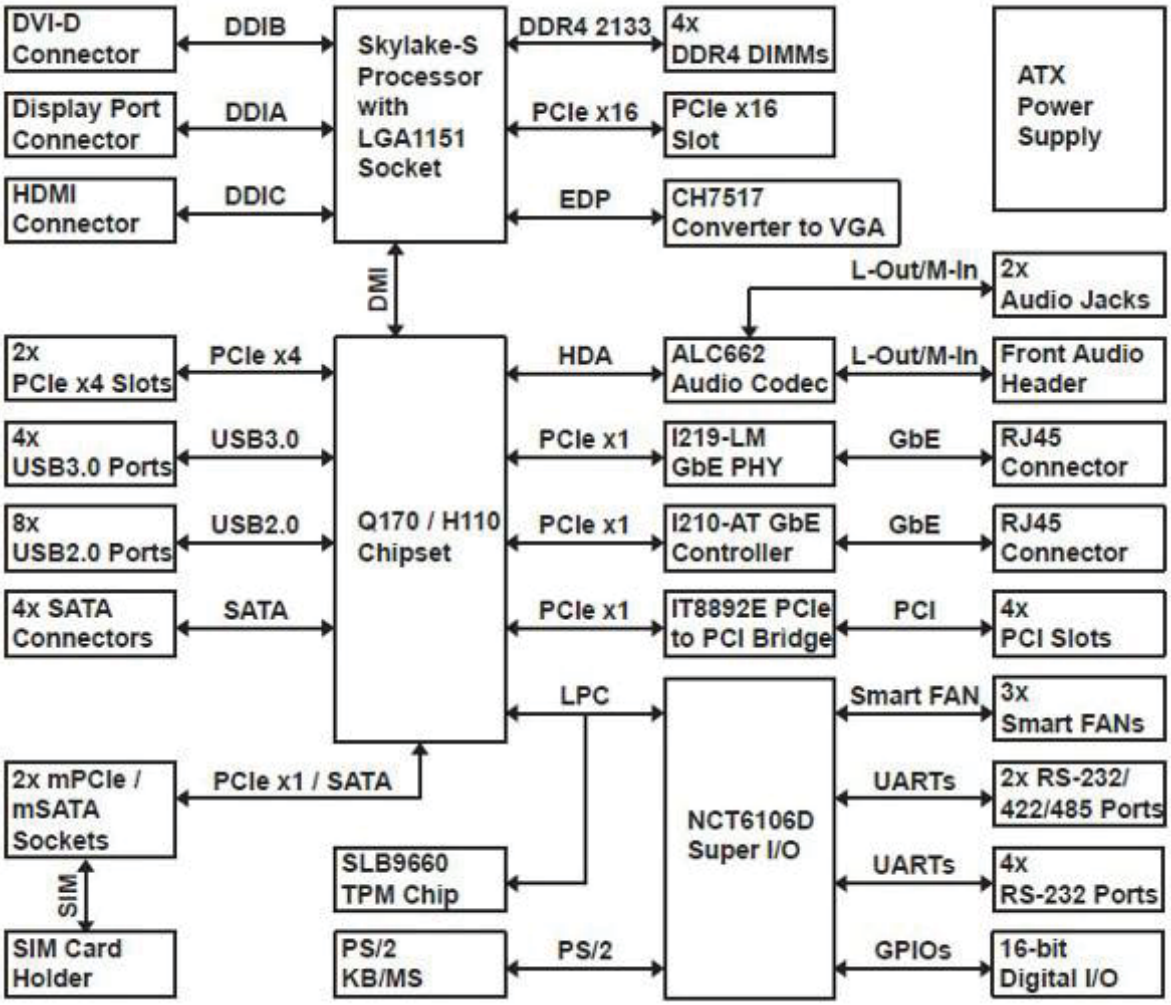



*Figure 1 Block Diagram*

## ■ Mechanical Dimensions

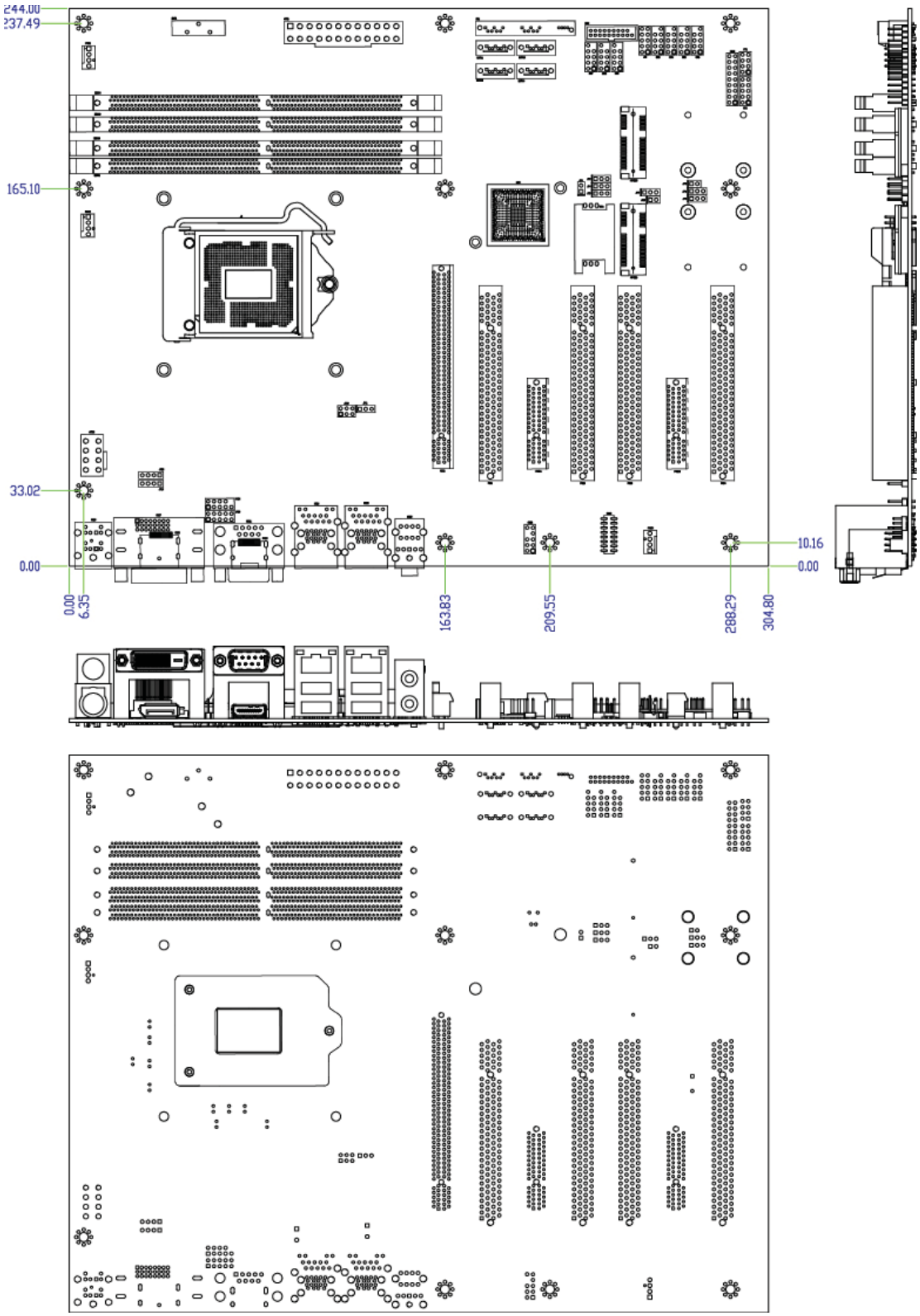



*Figure 2 Mechanical Dimensions*

# Chapter 2

# Hardware Settings

## ■ Overview

This chapter provides the definitions and locations of jumpers, headers, and connectors.

### Jumpers

The product has several jumpers which must be properly configured to ensure correct operation.

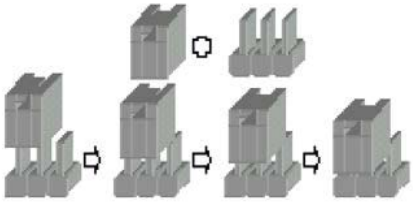


*Figure 3 Jumper Connector*

For a three-pin jumper (see *Figure 3*), the jumper setting is designated “1-2” when the jumper connects pins 1 and 2. The jumper setting is designated “2-3” when pins 2 and 3 are connected and so on. You will see that one of the lines surrounding a jumper pin is thick, which indicates pin No.1.
To move a jumper from one position to another, use needle-nose pliers or tweezers to pull the pin cap off the pins and move it to the desired position.

## ■ Jumper Settings and Pin Definitions

For jumper and connector locations, please refer to the diagrams below.

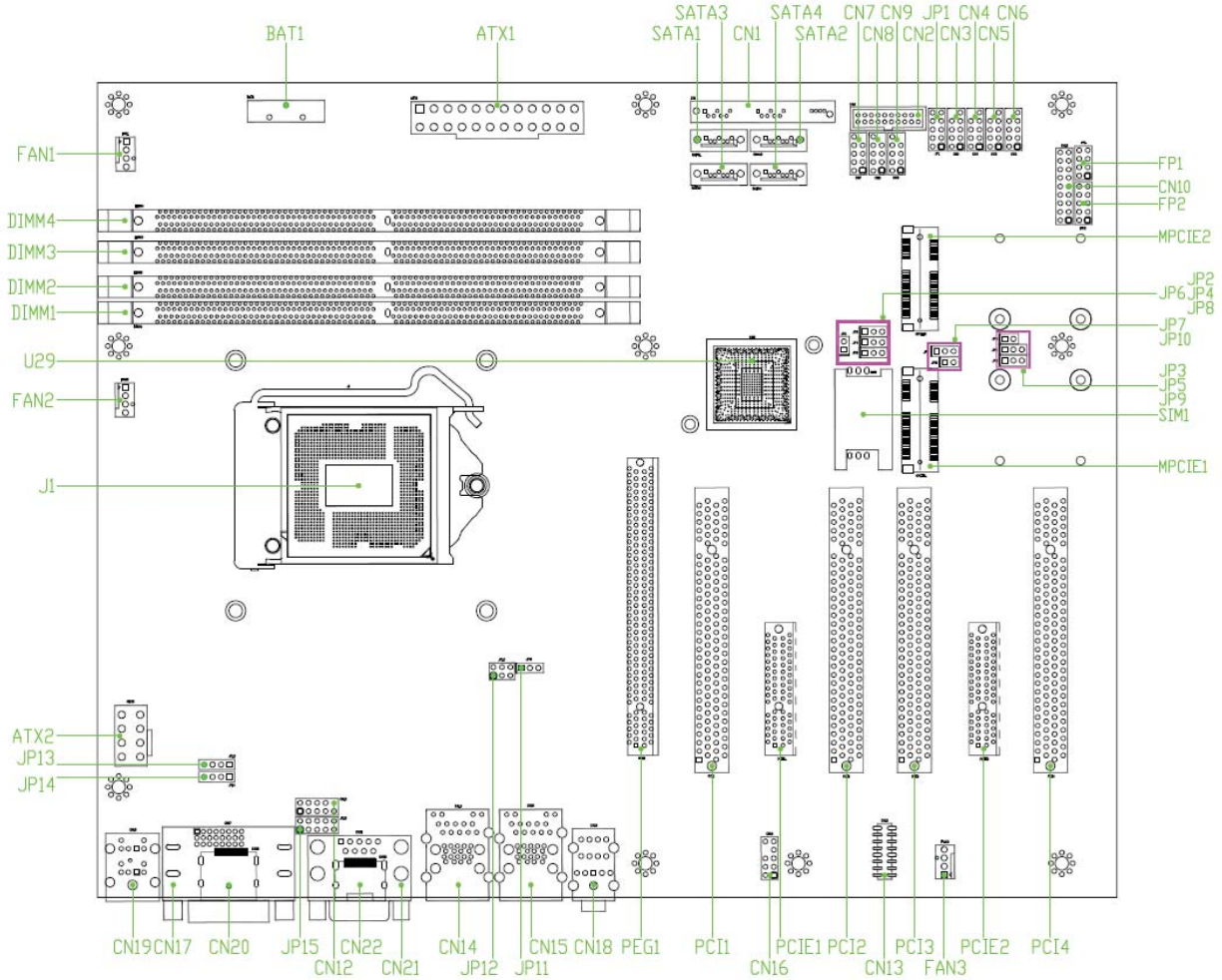



*Figure 4 Jumper and Connector Locations*

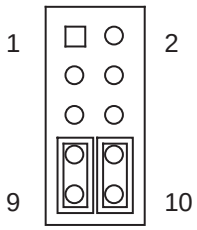
## Jumper Settings

To ensure correct system configuration, the following section describes how to set the jumpers to enable/disable or change functions. For jumper descriptions, please refer to the table below.

Table 2 Jumper List

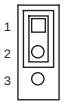
| Label | Function |
|---|---|
| JP1 | *Pin-9 Selection for COM3 & COM4* |
| JP2 | *Keyboard Lock Selection* |
| JP3 | *mPCIE LED Indicator Pin Header* |
| JP4 | *Protected RTC Selection* |
| JP5 | *mPCIE / mSATA Selection for MPCIE2 (KEMB-8101/T only)* |
| JP6 | *Flash Descriptor Security Override Selection* |
| JP7 | *AT / ATX Power Mode selection* |
| JP8 | *ME F/W selection* |
| JP9 | *mPCIE / mSATA Selection for MPCIE1 (KEMB-8101/T only)* |
| JP12 | *PCIE Configuration Setting for PEG1 (KEMB-8101/T only)* |
| JP13 | *Terminator Selection for COM1* |
| JP14 | *Terminator Selection for COM2* |
| JP15 | *Pin-9 Selection for COM1 & COM2* |

Table 3 JP1 Pin-9 Selection for COM3 & COM4



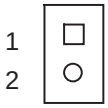

| Jumper | Setting | Description |
|---|---|---|
| 1 | 1-3 Short | COM3, Pin-9 = +12V |
| | 3-5 Short | COM3, Pin-9 = +5V |
| | 5-7 Short | COM3, Pin-9 = +5V |
| | 7-9 Short | COM3, Pin-9 = RI |
| 2 | 2-4 Short | COM4, Pin-9 = +12V |
| | 4-6 Short | COM4, Pin-9 = +5V |
| | 6-8 Short | COM4, Pin-9 = +5V |
| | 8-10 Short | COM4, Pin-9 = RI |
| Pitch:2.54mm | | |

Table 4 JP2 Keyboard Lock Selection



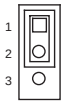

| Jumper | Description |
|---|---|
| 1-2 Short | Normal |
| 2-3 Short | Keyboard Locked |
| Pitch:2.54mm | |

Table 5 JP3 mPCIE LED Indicator Jumper



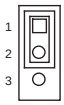

| Pin# | Description |
|---|---|
| 1 | LED+ |
| 2 | LED- |
| Pitch:2.54mm | |

Table 6 JP4 Protected RTC Selection



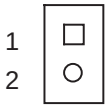

| Jumper | Description |
|---|---|
| 1-2 Short | Normal |
| 2-3 Short | Clear RTC_RST Register |
| Pitch:2.54mm | |

Table 7 JP5 mPCIE / mSATA Selection for MPCIE2 (KEMB-8101/T only)



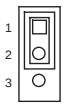

| Jumper | Description |
|---|---|
| 1-2 Short | mSATA |
| 2-3 Short | mPCIE |
| Pitch:2.54mm | |

Table 8 JP6 ME F/W Selection



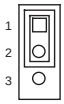

| Jumper | Description |
|---|---|
| 1-2 Open | Normal Operation |
| 1-2 Short | ME F/W disabled |
| Pitch:2.54mm | |

Table 9 JP7 AT / ATX Power Mode Selection



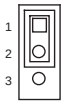

| Jumper | Description |
|---|---|
| 1-2 Short | ATX Mode |
| 2-3 Short | AT Mode |
| Pitch:2.54mm | |

Table 10 JP8 Clear ME Register



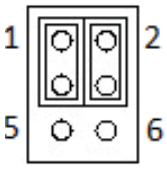

| Jumper | Description |
|---|---|
| 1-2 Short | Normal |
| 2-3 Short | Clear ME Register |
| Pitch:2.54mm | |

Table 11 JP9 mPCIE / mSATA Selection for MPCIE1 (KEMB-8101/T only)



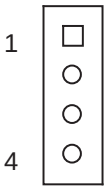

| Jumper | Description |
|---|---|
| 1-2 Short | mSATA |
| 2-3 Short | mPCIE |
| Pitch:2.54mm | |

Table 12 JP12 PCIE Configuration Setting for PEG1 (KEMB-8101/T only)



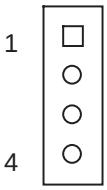

| Jumper 1 | Jumper 2 | Description |
|---|---|---|
| 1-3 Short | 2-4 Short | x16 |
| 1-3 Short | 4-6 Short | x8 x8 |
| 3-5 Short | 2-4 Short | x8 x4 |
| 3-5 Short | 4-6 Short | x8 x4 x4 |
| Pitch:2.54mm | | |

Table 13 JP13 Terminator Selection for COM1



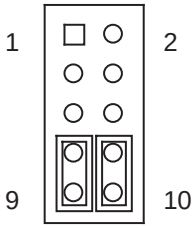

| Jumper | Description |
|---|---|
| 1-2 Short | Terminator is enabled between RX+ & RX- |
| 1-2 Open | Terminator is disabled |
| 3-4 Short | Terminator is enabled between TX+ & TX- |
| 3-4 Open | Terminator is disabled |
| Pitch:2.54mm | |

Table 14 JP14 Terminator Selection for COM2




| Jumper | Description |
|---|---|
| 1-2 Short | Terminator is enabled between RX+ & RX- |
| 1-2 Open | Terminator is disabled |
| 3-4 Short | Terminator is enabled between TX+ & TX- |
| 3-4 Open | Terminator is disabled |
| Pitch:2.54mm | |

Table 15 JP15 Pin-9 Selection for COM1 & COM2




| Jumper | Setting | Description |
|---|---|---|
| 1 | 1-3 Short | COM3, Pin-9 = +12V |
| | 3-5 Short | COM3, Pin-9 = +5V |
| | 5-7 Short | COM3, Pin-9 = +5V |
| | 7-9 Short | COM3, Pin-9 = RI |
| 2 | 2-4 Short | COM4, Pin-9 = +12V |
| | 4-6 Short | COM4, Pin-9 = +5V |
| | 6-8 Short | COM4, Pin-9 = +5V |
| | 8-10 Short | COM4, Pin-9 = RI |
| Pitch:2.54mm | | |

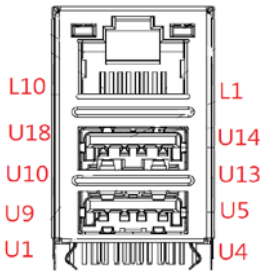
# Rear Panel Pin Assignments

*Figure 5 Front Panel IO*

Table 16 Front Panel Connector List

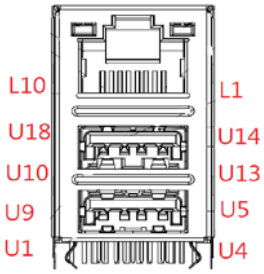
| Label | Function |
|---|---|
| CN14 | *GbE LAN1 & USB3.0 Port-3, 4* |
| CN15 | *GbE LAN2 & USB3.0 Port-1, 2* |
| CN17 | *DVI-D Connector* |
| CN18 | *Line-Out & MIC-In Audio Jacks* |
| CN19 | *PS/2 Keyboard & Mouse Mini-DIN Connector* |
| CN20 | *Display Port Connector* |
| CN21 | *RS-232/422/485 COM1 Connector* |
| CN22 | *HDMI Connector* |

Table 17 CN14 GbE LAN1 & USB3.0 Port-3, 4 Connector



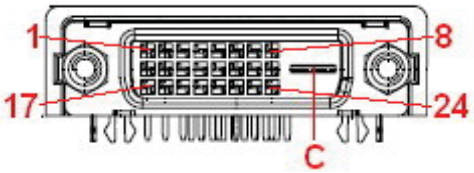

| Pin | Signal | Pin | Signal | Pin | Signal |
|---|---|---|---|---|---|
| L1 | VCT | U1 | +USBVCC | U10 | +USBVCC |
| L2 | MDI[0]+ | U2 | USB_A- | U11 | USB_A- |
| L3 | MDI[0]- | U3 | USB_A+ | U12 | USB_A+ |
| L4 | MDI[1]+ | U4 | GND | U13 | GND |
| L5 | MDI[1]- | U5 | USB3_SSRX- | U14 | USB3_SSRX- |
| L6 | MDI[2]+ | U6 | USB3_SSRX+ | U15 | USB3_SSRX+ |
| L7 | MDI[2]- | U7 | GND | U16 | GND |
| L8 | MDI[3]+ | U8 | USB3_SSTX- | U17 | USB3_SSTX- |
| L9 | MDI[3]- | U9 | USB3_SSTX+ | U18 | USB3_SSTX+ |
| L10 | GND | | | | |

Table 18 CN15 GbE LAN2 & USB3.0 Port-1, 2 Connector



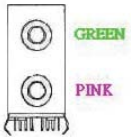

| Pin | Signal | Pin | Signal | Pin | Signal |
|---|---|---|---|---|---|
| L1 | VCT | U1 | +USBVCC | U10 | +USBVCC |
| L2 | MDI[0]+ | U2 | USB_A- | U11 | USB_A- |
| L3 | MDI[0]- | U3 | USB_A+ | U12 | USB_A+ |
| L4 | MDI[1]+ | U4 | GND | U13 | GND |
| L5 | MDI[1]- | U5 | USB3_SSRX- | U14 | USB3_SSRX- |
| L6 | MDI[2]+ | U6 | USB3_SSRX+ | U15 | USB3_SSRX+ |
| L7 | MDI[2]- | U7 | GND | U16 | GND |
| L8 | MDI[3]+ | U8 | USB3_SSTX- | U17 | USB3_SSTX- |
| L9 | MDI[3]- | U9 | USB3_SSTX+ | U18 | USB3_SSTX+ |
| L10 | GND | | | | |

Table 19 CN17 DVI-D Connector



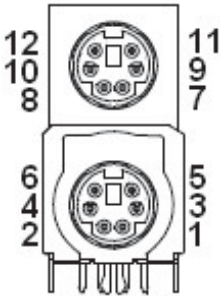

| Signal Name | Pin | Pin | Signal Name |
|---|---|---|---|
| TX2- | 1 | 2 | TX2+ |
| GND | 3 | 4 | NC |
| NC | 5 | 6 | DDC_CLK |
| DDC_DATA | 7 | 8 | NC |
| TX1- | 9 | 10 | TX1+ |
| GND | 11 | 12 | NC |
| NC | 13 | 14 | +5V |
| GND | 15 | 16 | HTPLG |
| TX0- | 17 | 18 | TX0+ |
| GND | 19 | 20 | NC |
| NC | 21 | 22 | GND |
| TXC+ | 23 | 24 | TXC- |
| GND | C | | |

Table 20 CN18 Line-Out & MIC-In Audio Jacks



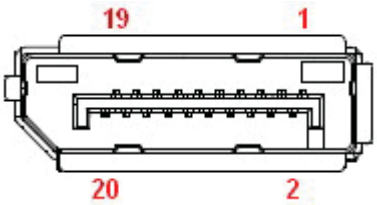

| | Signal Name |
|---|---|
| GREEN | LINE OUT |
| PINK | MIC IN |

Table 21 CN19 PS/2 Keyboard & Mouse Mini-DIN Connector



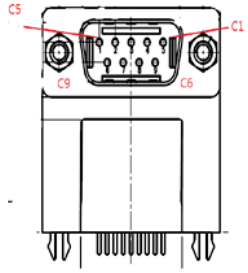

| Pin | Signal | Function |
|---|---|---|
| 1 | KBDAT | Keyboard Data |
| 2 | NC | No Connect |
| 3 | GND | Ground |
| 4 | KB5V | +5VSB Power Source |
| 5 | KBCLK | Keyboard Clock |
| 6 | NC | No Connect |
| 7 | MSDAT | Mouse Data |
| 8 | NC | No Connect |
| 9 | GND | Ground |
| 10 | KB5V | +5VSB Power Source |
| 11 | MSCLK | Mouse Clock |
| 12 | NC | No Connect |

Table 22 CN20 Display Port Connector



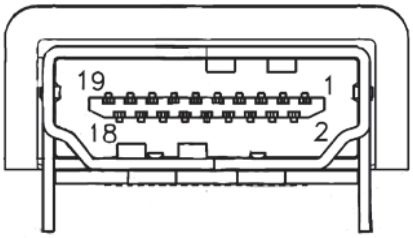

| Pin | Signal Name | Pin | Signal Name |
|---|---|---|---|
| 1 | TX0+ | 11 | GND |
| 2 | GND | 12 | TX3- |
| 3 | TX0- | 13 | GND |
| 4 | TX1+ | 14 | GND |
| 5 | GND | 15 | AUX+ |
| 6 | TX1- | 16 | GND |
| 7 | TX2+ | 17 | AUX- |
| 8 | GND | 18 | HPD |
| 9 | TX2- | 19 | GND |
| 10 | TX3+ | 20 | PWR |

Table 23 CN21 RS-232/422/485 COM1 Connector




| Pin | Signal Name | Pin | Signal Name |
|---|---|---|---|
| C1 | DCD | C2 | RXD |
| C3 | TXD | C4 | DTR |
| C5 | GND | C6 | DSR |
| C7 | RTS | C8 | CTS |
| C9 | RI | C10 | NC |

Table 24 CN22 HDMI Port Connector




| Pin | Signal | Pin | Signal |
|---|---|---|---|
| 1 | TMD_DATA2+ | 11 | GND |
| 2 | GND | 12 | TMD_CLK- |
| 3 | TMD_DATA2- | 13 | CEC |
| 4 | TMD_DATA1+ | 14 | RESERVED |
| 5 | GND | 15 | DDC_CLK |
| 6 | TMD_DATA1- | 16 | DDC_DATA |
| 7 | TMD_DATA0+ | 17 | GND |
| 8 | GND | 18 | 5V |
| 9 | TMD_DATA0- | 19 | HPET |
| 10 | TMD_CLK+ | | |

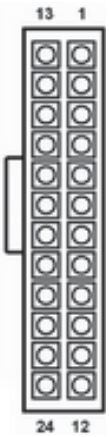
# Main Board Pin Assignments

Table 25 Internal Connector List

| Label | Function |
|---|---|
| ATX1 | 2x12-Pin ATX Power Supply Wafer |
| ATX2 | 2x4-Pin ATX Power Supply Wafer |
| BAT1 | CR2032 Battery Holder |
| BZ1 | Onboard Buzzer |
| CN1 | SATA Express connector |
| CN2 | USB3.0 Port-5, 6 Box Header (KEMB-8101/T only) |
| CN3 | RS-232 COM3 Pin Header |
| CN4 | RS-232 COM4 Pin Header |
| CN5 | RS-232 COM5 Pin Header |
| CN6 | RS-232 COM6 Pin Header |
| CN7 | USB2.0 Port-7, 8 Pin Header |
| CN8 | USB2.0 Port-11, 12 Pin Header (KEMB-8101/T only) |
| CN9 | USB2.0 Port-9, 10 Pin Header |
| CN10 | 16-bit Digital Input / Output Pin Header |
| CN12 | RS-232/422/485 COM2 Pin Header |
| CN13 | VGA Header |
| CN16 | Front Panel Audio Pin Header |
| DIMM1 | Channel-A, DIMM-0 DDR4 DIMM Slot |
| DIMM2 | Channel-A, DIMM-1 DDR4 DIMM Slot (KEMB-8101/T only) |
| DIMM3 | Channel-B, DIMM-0 DDR4 DIMM Slot |
| DIMM4 | Channel-B, DIMM-1 DDR4 DIMM Slot (KEMB-8101/T only) |
| FAN1 | System FAN Wafer |
| FAN2 | CPU FAN Wafer |
| FAN3 | AUX FAN Wafer |
| FP1 | Front Panel Pin Header 1 |
| FP2 | Front Panel Pin Header 2 |
| MPCIE1 | Full Size mPCIE / mSATA Socket |
| MPCIE2 | Half Size mPCIE / mSATA Socket (KEMB-8101/T only) |
| PCI1 | 32-bit, 33MHz PCI Slot 1 |
| PCI2 | 32-bit, 33MHz PCI Slot 2 |
| PCI3 | 32-bit, 33MHz PCI Slot 3 |
| PCI4 | 32-bit, 33MHz PCI Slot 4 |
| PCIE1 | PCIEx4 Slot 1 |
| PCIE2 | PCIEx4 Slot 2 |
| PEG1 | PCIEx16 Slot |
| SATA1 | Serial ATA Port-0 Connector (KEMB-8100 only) |
| SATA2 | Serial ATA Port-1 Connector (KEMB-8100 only) |
| SATA3 | Serial ATA Port-2 Connector |
| SATA4 | Serial ATA Port-3 Connector |
| SATA | Serial ATA Port-0,1 Connector (KEMB-8101/T only) |

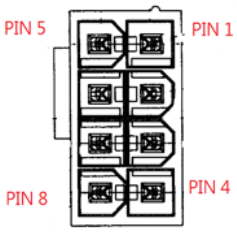
| Label | Function |
|---|---|
| EXPRESS | |
| SIM1 | SIM Card Holder for MPCIE1 |

Table 26 ATX1 2x12-Pin ATX Power Supply Wafer



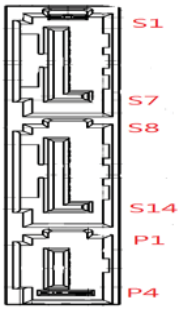

| Pin | Signal | Pin | Signal |
|---|---|---|---|
| 1 | +3.3V | 13 | +3.3V |
| 2 | +3.3V | 14 | -12V |
| 3 | GND | 15 | GND |
| 4 | +5V | 16 | PS_ON |
| 5 | GND | 17 | GND |
| 6 | +5V | 18 | GND |
| 7 | GND | 19 | GND |
| 8 | POWER OK | 20 | -5V |
| 9 | +5VSB | 21 | +5V |
| 10 | +12V | 22 | +5V |
| 11 | +12V | 23 | +5V |
| 12 | +3.3V | 24 | GND |
| Pitch:3.96mm | | | |

Table 27 ATX2 2x4-Pin ATX Power Supply Wafer



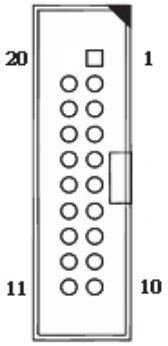

| Pin | Signal Name |
|---|---|
| 1 | GND |
| 2 | GND |
| 3 | GND |
| 4 | GND |
| 5 | +12V |
| 6 | +12V |
| 7 | +12V |
| 8 | +12V |
| Pitch:4.2mm | |

Table 28 CN1 Sata Express Header (KEMB-8101/T only)



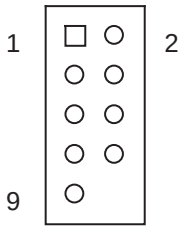

| Pin | Signal Name | Pin | Signal Name |
|---|---|---|---|
| S1 | GND | S8 | GND |
| S2 | PETP0 | S9 | PETP1 |
| S3 | PETN0 | S10 | PETN1 |
| S4 | GND | S11 | GND |
| S5 | PERN0 | S12 | PERN1 |
| S6 | PERP0 | S13 | PERP1 |
| S7 | GND | S14 | GND |
| P1 | RESERVED | P3 | DEVSLP/CLKREQ# |
| P2 | PERST# | P4 | IFDET |
| Pitch:2.0mm | | | |

Table 29 CN2 USB3.0 Port-5, 6 Box Header (KEMB-8101/T only)



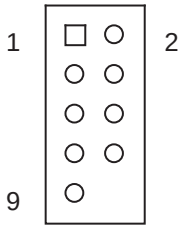

| Pin | Signal Name | Pin | Signal Name |
|---|---|---|---|
| 1 | USBA_VBUS | 20 | KEY |
| 2 | USBA_RX- | 19 | USBB_VBUS |
| 3 | USBA_RX+ | 18 | USBB_RX- |
| 4 | GND | 17 | USBB_RX+ |
| 5 | USBA_TX- | 16 | GND |
| 6 | USBA_TX+ | 15 | USBB_TX- |
| 7 | GND | 14 | USBB_TX+ |
| 8 | USBA_D- | 13 | GND |
| 9 | USBA_D+ | 12 | USBB_D- |
| 10 | NC | 11 | USBB_D+ |
| Pitch:2.0mm | | | |

Table 30 CN3 RS-232 COM3 Pin Header



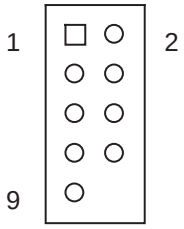

| Pin | Signal |
|---|---|
| 1 | DCD, Data carrier detect |
| 2 | RXD, Receive data |
| 3 | TXD, Transmit data |
| 4 | DTR, Data terminal ready |
| 5 | GND, ground |
| 6 | DSR, Data set ready |
| 7 | RTS, Request to send |
| 8 | CTS, Clear to send |
| 9 | RI, Ring indicator / +12V / +5V * |
| 10 | NC, Key |
| Pitch:2.54mm<br>* : Selected by JP1. | |

Table 31 CN4 RS-232 COM4 Pin Header



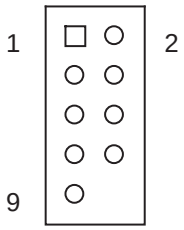

| Pin | Signal |
|---|---|
| 1 | DCD, Data carrier detect |
| 2 | RXD, Receive data |
| 3 | TXD, Transmit data |
| 4 | DTR, Data terminal ready |
| 5 | GND, ground |
| 6 | DSR, Data set ready |
| 7 | RTS, Request to send |
| 8 | CTS, Clear to send |
| 9 | RI, Ring indicator / +12V / +5V * |
| 10 | NC, Key |
| Pitch:2.54mm<br>* : Selected by JP1. | |

Table 32 CN5 RS-232 COM5 Pin Header



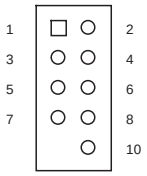

| Pin | Signal |
|---|---|
| 1 | DCD, Data carrier detect |
| 2 | RXD, Receive data |
| 3 | TXD, Transmit data |
| 4 | DTR, Data terminal ready |
| 5 | GND, ground |
| 6 | DSR, Data set ready |
| 7 | RTS, Request to send |
| 8 | CTS, Clear to send |
| 9 | RI, Ring indicator |
| 10 | NC, Key |
| Pitch:2.54mm | |

Table 33 CN6 RS-232 COM6 Pin Header



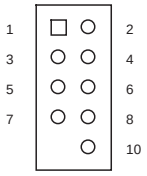

| Pin | Signal |
|---|---|
| 1 | DCD, Data carrier detect |
| 2 | RXD, Receive data |
| 3 | TXD, Transmit data |
| 4 | DTR, Data terminal ready |
| 5 | GND, ground |
| 6 | DSR, Data set ready |
| 7 | RTS, Request to send |
| 8 | CTS, Clear to send |
| 9 | RI, Ring indicator |
| 10 | NC, Key |
| Pitch:2.54mm | |

Table 34 CN7 USB2.0 Port-7, 8 Pin Header



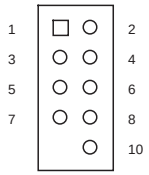

| Pin | Signal Name | Pin | Signal Name |
|---|---|---|---|
| 1 | +VBUS_A | 2 | +VBUS_B |
| 3 | USB_A- | 4 | USB_B- |
| 5 | USB_A+ | 6 | USB_B+ |
| 7 | GND_A | 8 | GND_B |
| 9 | KEY | 10 | GND |
| Pitch:2.54mm | | | |

Table 35 CN8 USB2.0 Port-11, 12 Pin Header (KEMB-8101 only)



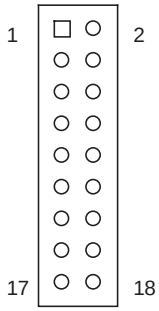

| Pin | Signal Name | Pin | Signal Name |
|---|---|---|---|
| 1 | +VBUS_A | 2 | +VBUS_B |
| 3 | USB_A- | 4 | USB_B- |
| 5 | USB_A+ | 6 | USB_B+ |
| 7 | GND_A | 8 | GND_B |
| 9 | KEY | 10 | GND |
| Pitch:2.54mm | | | |

Table 36 CN9 USB2.0 Port-9, 10 Pin Header



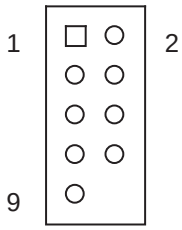

| Pin | Signal Name | Pin | Signal Name |
|---|---|---|---|
| 1 | +VBUS_A | 2 | +VBUS_B |
| 3 | USB_A- | 4 | USB_B- |
| 5 | USB_A+ | 6 | USB_B+ |
| 7 | GND_A | 8 | GND_B |
| 9 | KEY | 10 | GND |
| Pitch:2.54mm | | | |

Table 37 CN10 16-bit Digital Input / Output Pin Header



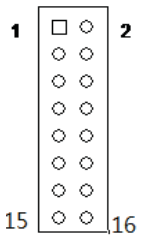

| Pin | Signal Name | Pin | Signal Name |
|---|---|---|---|
| 1 | DIO_0 | 2 | DIO_8 |
| 3 | DIO_1 | 4 | DIO_9 |
| 5 | DIO_2 | 6 | DIO_10 |
| 7 | DIO_3 | 8 | DIO_11 |
| 9 | DIO_4 | 10 | DIO_12 |
| 11 | DIO_5 | 12 | DIO_13 |
| 13 | DIO_6 | 14 | DIO_14 |
| 15 | DIO_7 | 16 | DIO_15 |
| 17 | +5V | 18 | GND |
| Pitch:2.54mm | | | |

Table 38 CN12 RS-232/422/485 COM2 Pin Header



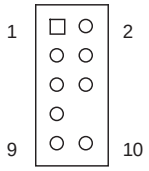

| Pin | RS-232 | RS-422 | Half Duplex RS-485 | Full Duplex RS-485 |
|---|---|---|---|---|
| 1 | DCD | TX- | DATA- | TX- |
| 2 | RXD | TX+ | DATA+ | TX+ |
| 3 | TXD | RX+ | N/A | RX+ |
| 4 | DTR | RX- | N/A | RX- |
| 5 | GND | GND | GND | GND |
| 6 | DSR | N/A | N/A | N/A |
| 7 | RTS | N/A | N/A | N/A |
| 8 | CTS | N/A | N/A | N/A |
| 9 | RI/+5V/+12V* | RI/+5V/+12V* | RI/+5V/+12V* | RI/+5V/+12V* |
| 10 | Key | Key | Key | Key |
| Pitch:2.54mm<br>*：Selected by JP14. | | | | |

Table 39 CN13 VGA Debug port



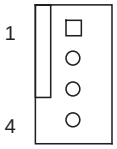

| Pin | Signal Name | Pin | Signal Name |
|---|---|---|---|
| 1 | Red | 2 | Green |
| 3 | Blue | 4 | NC |
| 5 | GND | 6 | GND |
| 7 | GND | 8 | GND |
| 9 | 5V | 10 | GND |
| 11 | NC | 12 | DDC_DATA |
| 13 | HSYNC | 14 | VSYNC |
| 15 | DDC_CLK | 16 | KEY |
| Pitch:2.54mm | | | |

Table 40 CN16 Front Panel Audio Pin Header



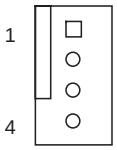

| Pin | Signal | Pin | Signal |
|---|---|---|---|
| 1 | MIC2-L | 2 | Audio GND |
| 3 | MIC2-R | 4 | Audio GND |
| 5 | Line2-R | 6 | MIC2_JD |
| 7 | Audio GND | 8 | Key |
| 9 | Line2-L | 10 | Line2_JD |
| Pitch:2.54mm | | | |

Table 41 FAN1 System FAN Wafer



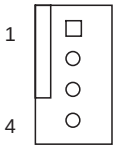

| Pin | Signal |
|---|---|
| 1 | GND |
| 2 | +12V |
| 3 | SENSE |
| 4 | PWM |
| Pitch:2.54mm | |

Table 42 FAN2 CPU FAN Wafer



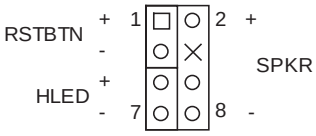

| Pin | Signal |
|---|---|
| 1 | GND |
| 2 | +12V |
| 3 | SENSE |
| 4 | PWM |
| Pitch:2.54mm | |

Table 43 FAN3 AUX FAN Wafer



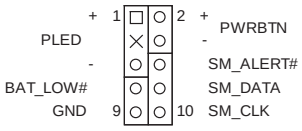

| Pin | Signal |
|---|---|
| 1 | GND |
| 2 | +12V |
| 3 | SENSE |
| 4 | PWM |
| Pitch:2.54mm | |

Table 44 FP1 Front Panel Pin Header 1



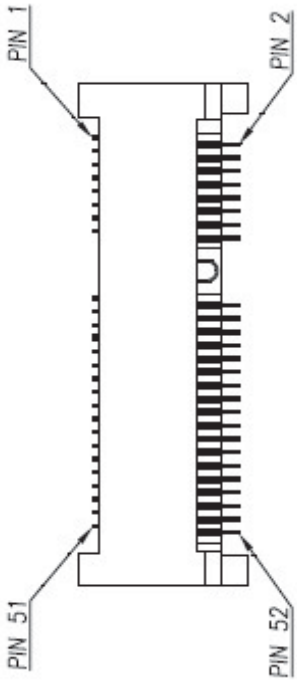

| Pin | Signal | Pin | Signal |
|---|---|---|---|
| 1 | Reset Button + | 2 | Speaker + |
| 3 | Reset Button - | 4 | NC |
| 5 | HDD LED + | 6 | Internal Speaker- |
| 7 | HDD LED - | 8 | Speaker - |
| Pitch:2.54mm<br>Note：Internal Buzzer is enabled when Pin6-8 is shorted. | | | |

Table 45 FP2 Front Panel Pin Header 2



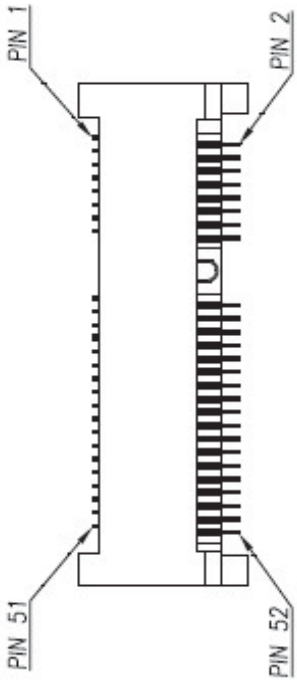

| Pin | Signal | Pin | Signal |
|---|---|---|---|
| 1 | Power LED + | 2 | Power Button + |
| 3 | NC | 4 | Power Button - |
| 5 | Power LED - | 6 | SM_ALERT# |
| 7 | BAT_LOW# | 8 | SMBus Data |
| 9 | GND | 10 | SMBus Clock |
| Pitch:2.54mm | | | |

Table 46 MPCIE1 Full Size mPCIE / mSATA Socket (KEMB-8100 only)



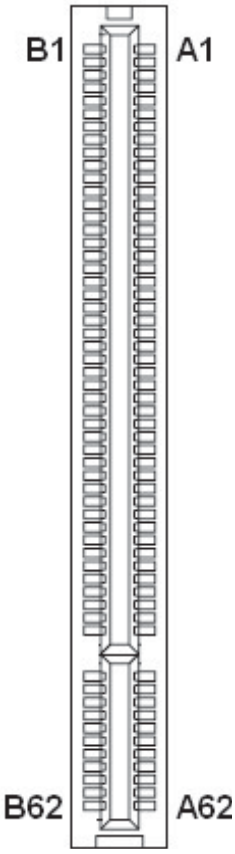

| Signal | Pin | Pin | Signal |
|---|---|---|---|
| WAKE# | 1 | 2 | +3.3VSB |
| Reserved | 3 | 4 | Ground |
| Reserved | 5 | 6 | +1.5V |
| CLKREQ# | 7 | 8 | UIM_PWR* |
| Ground | 9 | 10 | UIM_DATA* |
| REFCLK- | 11 | 12 | UIM_CLK* |
| REFCLK+ | 13 | 14 | UIM_RESET* |
| Ground | 15 | 16 | UIM_VPP* |
| Reserved | 17 | 18 | Ground |
| Reserved | 19 | 20 | W_Disable# |
| Ground | 21 | 22 | PERST# |
| PERn0 / SATA_RX+* | 23 | 24 | +3.3VSB |
| PERp0 / SATA_RX-* | 25 | 26 | Ground |
| Ground | 27 | 28 | +1.5V |
| Ground | 29 | 30 | SMB_CLK |
| PETn0 / SATA_TX-* | 31 | 32 | SMB_DATA |
| PETp0 / SATA_TX+* | 33 | 34 | Ground |
| Ground | 35 | 36 | USB_D- |
| Ground | 37 | 38 | USB_D+ |
| +3.3VSB | 39 | 40 | Ground |
| +3.3VSB | 41 | 42 | LED_WWAN# |
| Ground / NC* | 43 | 44 | LED_WLAN# |
| Reserved | 45 | 46 | LED_WPAN# |
| Reserved | 47 | 48 | +1.5V |
| Reserved | 49 | 50 | Ground |
| Reserved | 51 | 52 | +3.3VSB |
| Height:5.6mm<br>*：mPCIE / mSATA. | | | |

Table 47 MPCIE2 Half Size mPCIE / mSATA Socket (KEMB-8101/T only)




| Signal | Pin | Pin | Signal |
|---|---|---|---|
| WAKE# | 1 | 2 | +3.3VSB |
| Reserved | 3 | 4 | Ground |
| Reserved | 5 | 6 | +1.5V |
| CLKREQ# | 7 | 8 | Reserved |
| Ground | 9 | 10 | Reserved |
| REFCLK- | 11 | 12 | Reserved |
| REFCLK+ | 13 | 14 | Reserved |
| Ground | 15 | 16 | Reserved |
| Reserved | 17 | 18 | Ground |
| Reserved | 19 | 20 | W_Disable# |
| Ground | 21 | 22 | PERST# |
| PERn0 / SATA_RX+* | 23 | 24 | +3.3VSB |
| PERp0 / SATA_RX-* | 25 | 26 | Ground |
| Ground | 27 | 28 | +1.5V |
| Ground | 29 | 30 | SMB_CLK |
| PETn0 / SATA_TX-* | 31 | 32 | SMB_DATA |
| PETp0 / SATA_TX+* | 33 | 34 | Ground |
| Ground | 35 | 36 | USB_D- |
| Ground | 37 | 38 | USB_D+ |
| +3.3VSB | 39 | 40 | Ground |
| +3.3VSB | 41 | 42 | LED_WWAN# |
| Ground / NC* | 43 | 44 | LED_WLAN# |
| Reserved | 45 | 46 | LED_WPAN# |
| Reserved | 47 | 48 | +1.5V |
| Reserved | 49 | 50 | Ground |
| Reserved | 51 | 52 | +3.3VSB |
| Height:5.6mm<br>*：mPCIE / mSATA. | | | |

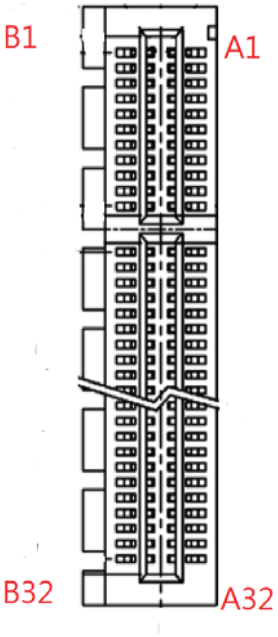
Table 48 PCI1,2,3,4 32-bit, 33MHz PCI Slot 1,2,3,4




| Pin | Side B | Side A |
|---|---|---|
| 1 | -12V | Reserved |
| 2 | Reserved | +12V |
| 3 | Ground | Reserved |
| 4 | Reserved | Reserved |
| 5 | +5V | +5V |
| 6 | +5V | INTA# |
| 7 | INTB# | INTC# |
| 8 | INTD# | +5V |
| 9 | Reserved | Reserved |
| 10 | Reserved | +5V |
| 11 | Reserved | Reserved |
| 12 | Ground | Ground |
| 13 | Ground | Ground |
| 14 | Reserved | +3.3VAUX |
| 15 | Ground | RST# |
| 16 | CLK | +5V |
| 17 | Ground | GNT# |
| 18 | REQ# | Ground |
| 19 | +5V | PME# |
| 20 | AD[31] | AD[30] |
| 21 | AD[29] | +3.3V |
| 22 | Ground | AD[28] |
| 23 | AD[27] | AD[26] |
| 24 | AD[25] | Ground |
| 25 | +3.3V | AD[24] |
| 26 | C/BE[3]# | IDSEL0 |
| 27 | AD[23] | +3.3V |
| 28 | Ground | AD[22] |
| 29 | AD[21] | AD[20] |
| 30 | AD[19] | Ground |
| 31 | +3.3V | AD[18] |
| 32 | AD[17] | AD[16] |
| 33 | C/BE[2]# | +3.3V |
| 34 | Ground | FRAME# |
| 35 | IRDY# | Ground |
| 36 | +3.3V | TRDY# |
| 37 | DEVSEL# | Ground |
| 38 | Ground | STOP# |
| 39 | LOCK# | +3.3V |
| 40 | PERR# | SMB_CLK |
| 41 | +3.3V | SMB_DAT |
| 42 | SERR# | Ground |
| 43 | +3.3V | PAR |
| 44 | C/BE[1]# | AD[15] |
| 45 | AD[14] | +3.3V |
| 46 | Ground | AD[13] |
| 47 | AD[12] | AD[11] |
| 48 | AD[10] | Ground |
| 49 | Ground | AD[09] |
| 50 | Key | |
| 51 | | |
| 52 | AD[08] | C/BE[0]# |
| 53 | AD[07] | +3.3V |
| 54 | +3.3V | AD[06] |
| 55 | AD[05] | AD[04] |

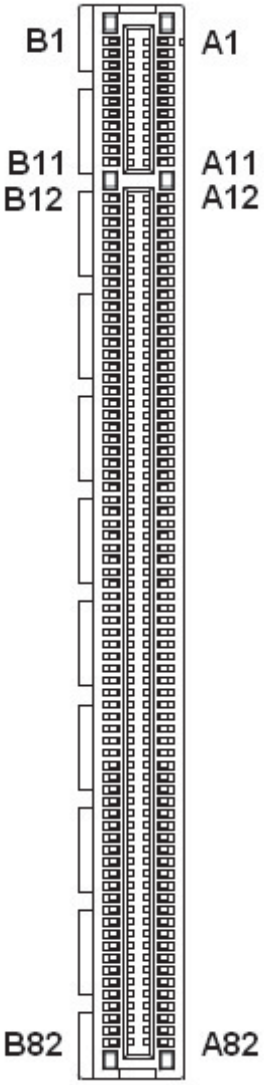
| Pin | Side B | Side A |
|---|---|---|
| 56 | AD[03] | Ground |
| 57 | Ground | AD[02] |
| 58 | AD[01] | AD[00] |
| 59 | +5V | +5V |
| 60 | Reserved | Reserved |
| 61 | +5V | +5V |
| 62 | +5V | +5V |

Table 49 PCIE1,2 PCIEx4 Slot 1,2




| Pin | Side B | Side A |
|---|---|---|
| 1 | +12V | PRSNT1# |
| 2 | +12V | +12V |
| 3 | NC | +12V |
| 4 | Ground | Ground |
| 5 | SMB_CLK | NC |
| 6 | SMB_DAT | NC |
| 7 | Ground | NC |
| 8 | +3.3V | NC |
| 9 | NC | +3.3V |
| 10 | +3.3VSB | +3.3V |
| 11 | WAKE# | RST# |
| 12 | NC | Ground |
| 13 | Ground | REFCLK+ |
| 14 | PETX0+ | REFCLK- |
| 15 | PETX0- | Ground |
| 16 | Ground | PERX0+ |
| 17 | PRSNT2#1 | PERX0- |
| 18 | Ground | Ground |
| 19 | PETX1+ | NC |
| 20 | PETX1- | Ground |
| 21 | Ground | PERX1+ |
| 22 | Ground | PERX1- |
| 23 | PETX2+ | Ground |
| 24 | PETX2- | Ground |
| 25 | Ground | PERX2+ |
| 26 | Ground | PERX2- |
| 27 | PETX3+ | Ground |
| 28 | PETX3- | Ground |
| 29 | Ground | PERX3+ |
| 30 | NC | PERX3- |
| 31 | NC | Ground |
| 32 | Ground | NC |

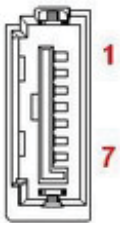
Table 50 PEG1 PCIE Express x16 Slot




| Pin | Side B | Side A |
|---|---|---|
| 1 | +12V | PRSNT1# |
| 2 | +12V | +12V |
| 3 | Reserved | +12V |
| 4 | Ground | Ground |
| 5 | SMCLK | Reserved |
| 6 | SMDAT | Reserved |
| 7 | Ground | Reserved |
| 8 | +3.3V | Reserved |
| 9 | Reserved | +3.3V |
| 10 | +3.3VSB | +3.3V |
| 11 | WAKE# | PERST# |
| 12 | Reserved | Ground |
| 13 | Ground | REFCLK+ |
| 14 | HSOP0 | REFCLK- |
| 15 | HSON0 | Ground |
| 16 | Ground | HSIP0 |
| 17 | PRSNT2# | HSIN0 |
| 18 | Ground | Ground |
| 19 | HSOP1 | Reserved |
| 20 | HSON1 | Ground |
| 21 | Ground | HSIP1 |
| 22 | Ground | HSIN1 |
| 23 | HSOP2 | Ground |
| 24 | HSON2 | Ground |
| 25 | Ground | HSIP2 |
| 26 | Ground | HSIN2 |
| 27 | HSOP3 | Ground |
| 28 | HSON3 | Ground |
| 29 | Ground | HSIP3 |
| 30 | Reserved | HSIN3 |
| 31 | PRSNT2# | Ground |
| 32 | Ground | Reserved |
| 33 | HSOP4 | Reserved |
| 34 | HSON4 | Ground |
| 35 | Ground | HSIP4 |
| 36 | Ground | HSIN4 |
| 37 | HSOP5 | Ground |
| 38 | HSON5 | Ground |
| 39 | Ground | HSIP5 |
| 40 | Ground | HSIN5 |
| 41 | HSOP6 | Ground |
| 42 | HSON6 | Ground |
| 43 | Ground | HSIP6 |
| 44 | Ground | HSIN6 |
| 45 | HSOP7 | Ground |
| 46 | HSON7 | Ground |
| 47 | Ground | HSIP7 |
| 48 | PRSNT2# | HSIN7 |
| 49 | Ground | Ground |
| 50 | HSOP8 | Reserved |
| 51 | HSON8 | Ground |
| 52 | Ground | HSIP8 |
| 53 | Ground | HSIN8 |
| 54 | HSOP9 | Ground |
| 55 | HSON9 | Ground |

| Pin | Side B | Side A |
|---|---|---|
| 56 | Ground | HSIP9 |
| 57 | Ground | HSIN9 |
| 58 | HSOP10 | Ground |
| 59 | HSON10 | Ground |
| 60 | Ground | HSIP10 |
| 61 | Ground | HSIN10 |
| 62 | HSOP11 | Ground |
| 63 | HSON11 | Ground |
| 64 | Ground | HSIP11 |
| 65 | Ground | HSIN11 |
| 66 | HSOP12 | Ground |
| 67 | HSON12 | Ground |
| 68 | Ground | HSIP12 |
| 69 | Ground | HSIN12 |
| 70 | HSOP13 | Ground |
| 71 | HSON13 | Ground |
| 72 | Ground | HSIP13 |
| 73 | Ground | HSIN13 |
| 74 | HSOP14 | Ground |
| 75 | HSON14 | Ground |
| 76 | Ground | HSIP14 |
| 77 | Ground | HSIN14 |
| 78 | HSOP15 | Ground |
| 79 | HSON15 | Ground |
| 80 | Ground | HSIP15 |
| 81 | PRSNT2# | HSIN15 |
| 82 | Reserved | Ground |

Table 51 SATA1,2,3,4 Serial ATA Port-1,2,3,4 Connector




| Pin | Signal Name |
|---|---|
| 1 | GND |
| 2 | TX+ |
| 3 | TX- |
| 4 | GND |
| 5 | RX- |
| 6 | RX+ |
| 7 | GND |
| DIP SATA-7P 180D CONN. BLUE/double row pin/parallel positioning peg [WIN WIN WATM-07ABN4A2B8UW4] (SATA1,2,3,4) | |

Table 52 SIM1 SIM Card Holder for MPCIE1

| Pin | Signal Name |
|---|---|
| 1 | UIM_PWR |
| 2 | UIM_RST |
| 3 | UIM_CLK |
| 4 | GND |
| 5 | UIM_VPP |
| 6 | UIM_DATA |

# Chapter 3

# System Installation

## Expansion Interfaces

- 4x PCI slot, 1x PCIex16 slot, 2x PCIex1 (KEMB-8100) or 2 PCIex4/PCIex2/PCIex1 (KEMB-8101/T)
- 1x mPCIe socket (KEMB-8100) / 2x mPCIe/mSATA socket (KEMB-8101/T)
- 1x SIM card holder

**NOTE**

When adding or removing expansion cards, make sure that you unplug the power supply first. Meanwhile, read the documentation for the expansion card to configure any necessary hardware or software settings for the expansion card, such as jumpers, switches or BIOS configuration.

## Memory Module Installation

### Carefully follow the steps below in order to install the DIMMs:

1. To avoid generating static electricity and damaging the DIMM, ground yourself by touching a grounded metal surface or use a ground strap before you touch the DIMM.
2. Do not touch the connectors of the DIMM. Dirt or other residue may cause a malfunction.
3. Spread apart the ejector tabs on each end of the DIMM socket.
4. Hold the DIMM with its notch aligned with the onboard socket and insert it straight down into the socket.
5. Fully insert the module into the socket until the ejector tabs pop up and a “click” is heard.

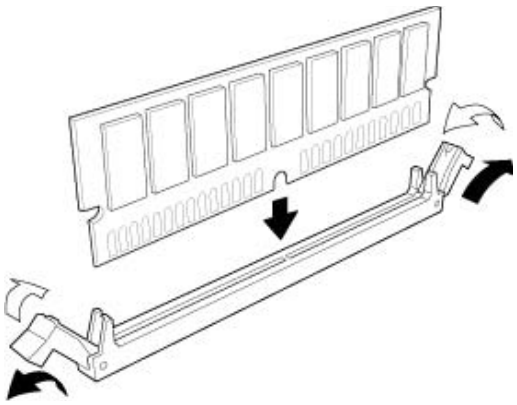


*Figure 6 Spread apart the ejector tabs, align the DIMM with the socket and push it straight down until the tabs pop up*

6. Check to see if the DIMM is correctly seated and tight.

## Removing a DIMM:

To remove the DIMM, use your fingers to carefully spread apart the tabs that secure either side of the DIMM. Lift it out of the socket.

Make sure you store the DIMM in an anti-static bag. The socket must be populated with memory modules of the same size and manufacturer.

# Chapter 4

# AMI BIOS Setup

## ■ Overview

This chapter provides a description of the AMI BIOS. The BIOS setup menus and available selections may vary from those of your product. For specific information on the BIOS for your product, please contact Quanmax.

**NOTE:** The BIOS menus and selections for your product may vary from those in this chapter. For the BIOS manual specific to your product, please contact Quanmax

AMI's ROM BIOS provides a built-in Setup program, which allows the user to modify the basic system configuration and hardware parameters. The modified data will be stored in a battery-backed CMOS, so that data will be retained even when the power is turned off. In general, the information saved in the CMOS RAM will not need to be changed unless there is a configuration change in the system, such as a hard drive replacement or when a device is added.

It is possible for the CMOS battery to fail, which will cause data loss in the CMOS only. If this happens you will need to reconfigure your BIOS settings.

# ■ Main Menu

The BIOS Setup is accessed by pressing the DEL key after the Power-On Self-Test (POST) memory test begins and before the operating system boot begins. Once you enter the BIOS Setup Utility, the Main Menu will appear on the screen. The Main Menu provides System Overview information and allows you to set the System Time and Date. Use the “<” and “>” cursor keys to navigate between menu screens.

Table 53 BIOS Main Menu

| BIOS SETUP UTILITY | | | | | |
|---|---|---|---|---|---|
| **Main** | Advanced | Power | Security | Boot | Save & Exit |

| | | |
|---|---|---|
| Product Information | | → ←: Select Screen |
| Product Name | KEMB-8101 | ↑↓: Select Item |
| BIOS Version | R0.06 (x64) | Enter: Select |
| BIOS Build Date | 01/15/2016 | +-: Change Opt. |
| ME FW Version | 11.0.0.1178 | F1: General Help |
| | | F2: Previous Values |
| CPU Information | | F3: Optimized Defaults |
| Intel® Core™ i7-6700TE CPU @ 2.40GHz | | F4: Save & Reset |
| Microcode Revision | 39 | ESC: Exit |
| Processor Cores | 4 | |
| | | |
| Memory Information | | |
| Total Size | 4096 MB | |
| Frequency | 2133 MHz | |
| | | |
| System Date | [Mon 01/25/2016] | |
| System Time | [13:48:23] | |
| | | |
| Access Level | Administrator | |

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# ■ Advanced Menu

Table 54 Advanced Menu

| BIOS SETUP UTILITY | | |
|---|---|---|
| Main **Advanced** Power Security Boot Save & Exit | | |
| Onboard LAN1 Controller | [Enabled] | → ←: Select Screen |
| Onboard LAN1 Boot | [Disabled] | ↑↓: Select Item |
| Onboard LAN2 Controller | [Enabled] | Enter: Select |
| Onboard LAN2 Boot | [Disabled] | +-: Change Opt. |
| Audio Controller | [Enabled] | F1: General Help |
| | | F2: Previous Values |
| > Display Configuration | | F3: Optimized Defaults |
| > Super IO Configuration | | F4: Save & Reset |
| > CPU Chipset Configuration | | ESC: Exit |
| > SATA Configuration | | |
| > USB Configuration | | |
| > AMT Configuration | | |
| > TPM Configuration | | |
| > DIO Configuration | | |
| > H/W Monitor | | |
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**Onboard LAN 1 Controller**

Options: Disabled, Enabled

**Onboard LAN 1 Boot**

Options: Disabled, Enabled

**Onboard LAN 2 Controller**

Options: Disabled, Enabled

**Onboard LAN 2 Boot**

Options: Disabled, Enabled

**Audio Controller**

Options: Disabled, Enabled

Table 55 Advanced Menu – Display Configuration

| BIOS SETUP UTILITY | | | | | |
|---|---|---|---|---|---|
| Main | **Advanced** | Power | Security | Boot | Save & Exit |

| | | |
|---|---|---|
| Display Configuration | | → ←: Select Screen<br>↑↓: Select Item<br>Enter: Select<br>+-: Change Opt.<br>F1: General Help<br>F2: Previous Values<br>F3: Optimized Defaults<br>F4: Save & Reset<br>ESC: Exit |
| Primary Display | [Auto] | |
| UMA Frame Buffer Size | [256 MB] | |
| DVMT Pre-Allocated | [64M] | |
| DVMT Total Gfx Mem | [256 M] | |
| Primary IGFX Boot Display | [VBIOS Default] | |

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**Primary Display**

Options: Auto, IGFX, PEG, PCIE

**UMA Frame Buffer Size**

Options: 128MB, 256MB, 512MB

**DVMT Pre-Allocated**

Options: 32M, 64M, 96M, 128M, 160M, 192M, 224M, 256M, 288M, 320M, 352M, 384M, 416M, 448M, 480M, 512M, 1024M

**DVMT Total Gfx Mem**

Options: 128M, 256M, MAX

**Primary IGFX Boot Display**

Options: VBIOS Default, CRT, DP, DVI, HDMI

Table 56 Advanced Menu – Super IO Configuration

| BIOS SETUP UTILITY | | | | | |
|---|---|---|---|---|---|
| Main | **Advanced** | Power | Security | Boot | Save & Exit |
| Super IO Chip Parameters.<br><br>>Serial Port 1 Configuration<br>>Serial Port 2 Configuration<br>>Serial Port 3 Configuration<br>>Serial Port 4 Configuration<br>>Serial Port 5 Configuration<br>>Serial Port 6 Configuration | | | | | →←: Select Screen<br>↑↓: Select Item<br>Enter: Select<br>+-: Change Opt.<br>F1: General Help<br>F2: Previous Values<br>F3: Optimized Defaults<br>F4: Save & Reset<br>ESC: Exit |
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Table 57 Advanced Menu –Super IO Configuration – Serial Port 1 Configuration

| BIOS SETUP UTILITY | | | | | |
|---|---|---|---|---|---|
| Main | **Advanced** | Power | Security | Boot | Save & Exit |
| Serial Port 1 Configuration<br><br>Serial Port<br>Device Settings<br><br>Change Settings<br>Serial Port 1 Type | | | [Enabled]<br>IO=3F8h; IRQ=4;<br><br>[Auto]<br>[RS232] | | →←: Select Screen<br>↑↓: Select Item<br>Enter: Select<br>+-: Change Opt.<br>F1: General Help<br>F2: Previous Values<br>F3: Optimized Defaults<br>F4: Save & Reset<br>ESC: Exit |
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**Serial Port**

Options: Disabled, Enabled

**Change Settings**

Options: Auto;

IO=3F8h; IRQ=4;

IO=3F8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;

IO=2F8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;

IO=3E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;

IO=2E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;

**Serial Port Type**

Options: RS232, RS422, RS485

Table 58 Advanced Menu –Super IO Configuration – Serial Port 2 Configuration

| BIOS SETUP UTILITY | | | | | |
|---|---|---|---|---|---|
| Main | **Advanced** | Power | Security | Boot | Save & Exit |
| Serial Port 2 Configuration | | | | | → ←: Select Screen<br>↑↓: Select Item<br>Enter: Select<br>+-: Change Opt.<br>F1: General Help<br>F2: Previous Values<br>F3: Optimized Defaults<br>F4: Save & Reset<br>ESC: Exit |
| Serial Port | | | [Enabled] | | |
| Device Settings | | | IO=2F8h; IRQ=3; | | |
| Change Settings | | | [Auto] | | |
| Serial Port 2 Type | | | [RS232] | | |
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**Serial Port**

Options: Disabled, Enabled

**Change Settings**

Options: Auto;

IO=2F8h; IRQ=3;

IO=3F8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;

IO=2F8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;

IO=3E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;

IO=2E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;

**Serial Port Type**

Options: RS232, RS422, RS485

Table 59 Advanced Menu –Super IO Configuration – Serial Port 3 Configuration

| BIOS SETUP UTILITY | | | | | |
|---|---|---|---|---|---|
| Main | **Advanced** | Power | Security | Boot | Save & Exit |
| Serial Port 3 Configuration | | | | | → ←: Select Screen<br>↑↓: Select Item<br>Enter: Select<br>+-: Change Opt.<br>F1: General Help<br>F2: Previous Values<br>F3: Optimized Defaults<br>F4: Save & Reset<br>ESC: Exit |
| Serial Port | | | [Enabled] | | |
| Device Settings | | | IO=3E8h; IRQ=5; | | |
| Change Settings | | | [Auto] | | |
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**Serial Port**

Options: Disabled, Enabled

**Change Settings**

Options: Auto;

IO=3E8h; IRQ=7;

IO=3E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;

IO=2E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;

IO=2F0h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;

IO=2E0h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;

Table 60 Advanced Menu –Super IO Configuration – Serial Port 4 Configuration

| BIOS SETUP UTILITY | | | | | |
|---|---|---|---|---|---|
| Main | **Advanced** | Power | Security | Boot | Save & Exit |
| Serial Port 4 Configuration | | | | | → ←: Select Screen<br>↑↓: Select Item<br>Enter: Select<br>+-: Change Opt.<br>F1: General Help<br>F2: Previous Values<br>F3: Optimized Defaults<br>F4: Save & Reset<br>ESC: Exit |
| Serial Port | | | [Enabled] | | |
| Device Settings | | | IO=2E8h; IRQ=5; | | |
| Change Settings | | | [Auto] | | |
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**Serial Port**

Options: Disabled, Enabled

**Change Settings**

Options: Auto;

IO=2E8h; IRQ=7;

IO=3E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;

IO=2E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;

IO=2F0h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;

IO=2E0h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;

Table 61 Advanced Menu –Super IO Configuration – Serial Port 5 Configuration

| BIOS SETUP UTILITY | | | | | |
|---|---|---|---|---|---|
| Main | **Advanced** | Power | Security | Boot | Save & Exit |
| Serial Port 5 Configuration | | | | | → ←: Select Screen<br>↑↓: Select Item<br>Enter: Select<br>+-: Change Opt.<br>F1: General Help<br>F2: Previous Values<br>F3: Optimized Defaults<br>F4: Save & Reset<br>ESC: Exit |
| Serial Port | | | [Enabled] | | |
| Device Settings | | | IO=2F0h; IRQ=5; | | |
| Change Settings | | | [Auto] | | |
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**Serial Port**

Options: Disabled, Enabled

**Change Settings**

Options: Auto;

IO=2F0h; IRQ=7;

IO=3E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;

IO=2E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;

IO=2F0h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;

IO=2E0h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;

Table 62 Advanced Menu –Super IO Configuration – Serial Port 6 Configuration

| BIOS SETUP UTILITY | | | | | |
|---|---|---|---|---|---|
| Main | **Advanced** | Power | Security | Boot | Save & Exit |
| Serial Port 6 Configuration | | | | | → ←: Select Screen<br>↑↓: Select Item<br>Enter: Select<br>+-: Change Opt.<br>F1: General Help<br>F2: Previous Values<br>F3: Optimized Defaults<br>F4: Save & Reset<br>ESC: Exit |
| Serial Port | | | [Enabled] | | |
| Device Settings | | | IO=2E0h; IRQ=5; | | |
| Change Settings | | | [Auto] | | |
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**Serial Port**

Options: Disabled, Enabled

**Change Settings**

Options: Auto;

IO=2E0h; IRQ=7;

IO=3E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;

IO=2E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;

IO=2F0h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;

IO=2E0h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;

Table 63 Advanced Menu –CPU Chipset Configuration

| BIOS SETUP UTILITY | | | | | |
|---|---|---|---|---|---|
| Main | **Advanced** | Power | Security | Boot | Save & Exit |

| | | |
|---|---|---|
| CPU Chipset Configuration | | → ←: Select Screen<br>↑↓: Select Item<br>Enter: Select<br>+-: Change Opt.<br>F1: General Help<br>F2: Previous Values<br>F3: Optimized Defaults<br>F4: Save & Reset<br>ESC: Exit |
| EIST | [Enabled] | |
| Turbo Mode | [Enabled] | |
| Hyper-threading | [Enabled] | |
| VT-d | [Enabled] | |
| Active Processor Cores | [All] | |
| Limit CPUID Maximum | [Disabled] | |
| Execute Disable Bit | [Enabled] | |
| Intel® Virtualization Technology | [Disabled] | |
| Intel® TXT(LT) Support | [Disabled] | |

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**EIST**

Options: Disabled, Enabled

**Turbo Mode**

Options: Disabled, Enabled

**Hyper-threading**

Options: Disabled, Enabled

**VT-d**

Options: Disabled, Enabled

**Active Processor Cores**

Options: All, 1, 2, 3

**Limit CPUID Maximum**

Options: Disabled, Enabled

**Execute Disable Bit**

Options: Disabled, Enabled

**Intel® Virtualization Technology**

Options: Disabled, Enabled

**Intel® TXT(LT) Support**

Options: Disabled, Enabled

Table 64 Advanced Menu – SATA Configuration

| BIOS SETUP UTILITY | | | | | |
|---|---|---|---|---|---|
| Main | **Advanced** | Power | Security | Boot | Save & Exit |

| | | |
|---|---|---|
| SATA Configuration | | → ←: Select Screen<br>↑↓: Select Item<br>Enter: Select<br>+-: Change Opt.<br>F1: General Help<br>F2: Previous Values<br>F3: Optimized Defaults<br>F4: Save & Reset<br>ESC: Exit |
| SATA Controller(s) | [Enabled] | |
| SATA Mode Selection | [AHCI] | |
| Serial ATA Port 1 | Empty | |
| Port 1 | [Enabled] | |
| Serial ATA Port 2 | Empty | |
| Port 2 | [Enabled] | |
| Serial ATA Port 3 | Empty | |
| Port 3 | [Enabled] | |
| Serial ATA Port 4 | Empty | |
| Port 4 | [Enabled] | |
| mSATA Port 1 | Empty | |
| Port 1 | [Enabled] | |
| mSATA Port 2 | Empty | |
| Port 2 | [Enabled] | |

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**SATA Controller(s)**

Options: Enabled, Disabled

**SATA Mode Selection**

Options: AHCI, RAID

**Serial ATA Port 1**

**Port 1**

Options: Disabled, Enabled

**Serial ATA Port 2**

**Port 2**

Options: Disabled, Enabled

**Serial ATA Port 3**

**Port 3**

Options: Disabled, Enabled

**Serial ATA Port 4**

**Port 4**

Options: Disabled, Enabled

**mSATA Port 1**

**Port 1**

Options: Disabled, Enabled

**mSATA Port 2**

**Port 2**

Options: Disabled, Enabled

Table 65 Advanced Menu – USB Configuration

| BIOS SETUP UTILITY | | | | | |
|---|---|---|---|---|---|
| Main | **Advanced** | Power | Security | Boot | Save & Exit |
| USB Configuration | | | | → ←: Select Screen<br>↑↓: Select Item<br>Enter: Select<br>+-: Change Opt.<br>F1: General Help<br>F2: Previous Values<br>F3: Optimized Defaults<br>F4: Save & Reset<br>ESC: Exit | |
| USB Devices:<br>None | | | | | |
| Legacy USB Support | | | [Enabled] | | |
| XHCI hand-off | | | [Disabled] | | |
| USB Mass Storage Driver Support | | | [Enabled] | | |
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**Legacy USB Support**

Options: Enabled, Disabled

**XHCI hand-off**

Options: Enabled, Disabled

**USB Mass Storage Driver Support**

Options: Disabled, Enabled

Table 66 Advanced Menu – AMT Configuration (KEMB-8101/T only)

| BIOS SETUP UTILITY | | | | | |
|---|---|---|---|---|---|
| Main | **Advanced** | Power | Security | Boot | Save & Exit |
| AMT Configuration | | | | → ←: Select Screen<br>↑↓: Select Item<br>Enter: Select<br>+-: Change Opt.<br>F1: General Help<br>F2: Previous Values<br>F3: Optimized Defaults<br>F4: Save & Reset<br>ESC: Exit | |
| Intel AMT | | | [Enabled] | | |
| Un-Configure ME | | | [Disabled] | | |
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**Intel AMT**

Options: Disabled, Enabled

**Un-Configure ME**

Options: Disabled, Enabled

Table 67 Advanced Menu – TPM Configuration (KEMB-8101/T only)

| BIOS SETUP UTILITY | | | | | |
|---|---|---|---|---|---|
| Main | **Advanced** | Power | Security | Boot | Save & Exit |
| TPM Configuration<br>Security Device Support [Disabled]<br><br>Current Status Information | | | | → ←: Select Screen<br>↑↓: Select Item<br>Enter: Select<br>+-: Change Opt.<br>F1: General Help<br>F2: Previous Values<br>F3: Optimized Defaults<br>F4: Save & Reset<br>ESC: Exit | |
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## Security Device Support

Options: Disabled, Enabled

Table 68 Advanced Menu – DIO Configuration

| BIOS SETUP UTILITY | | | | | |
|---|---|---|---|---|---|
| Main | **Advanced** | Power | Security | Boot | Save & Exit |

| | | |
|---|---|---|
| DIO Configuration | | → ←: Select Screen<br>↑↓: Select Item<br>Enter: Select<br>+-: Change Opt.<br>F1: General Help<br>F2: Previous Values<br>F3: Optimized Defaults<br>F4: Save & Reset<br>ESC: Exit |
| User Configuration | [Disabled] | |
| DIO_0 Value | 1 | |
| DIO_1 Value | 1 | |
| DIO_2 Value | 1 | |
| DIO_3 Value | 1 | |
| DIO_4 Value | 1 | |
| DIO_5 Value | 1 | |
| DIO_6 Value | 1 | |
| DIO_7 Value | 1 | |
| DIO_8 Value | 1 | |
| DIO_9 Value | 1 | |
| DIO_10 Value | 1 | |
| DIO_11 Value | 1 | |
| DIO_12 Value | 1 | |
| DIO_13 Value | 1 | |
| DIO_14 Value | 1 | |
| DIO_15 Value | 1 | |

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### User Configuration

Options: Enabled, Disabled

Table 69 Advanced Menu – H/W Monitor

| BIOS SETUP UTILITY | | | | | |
|---|---|---|---|---|---|
| Main | **Advanced** | Power | Security | Boot | Save & Exit |

| | | |
|---|---|---|
| PC Health Status | | → ←: Select Screen<br>↑↓: Select Item<br>Enter: Select<br>+-: Change Opt.<br>F1: General Help<br>F2: Previous Values<br>F3: Optimized Defaults<br>F4: Save & Reset<br>ESC: Exit |
| CPU Warning Temperature | [Disabled] | |
| >Smart FAN Configuration | | |
| CPU Temperature | : +19 C | |
| System Temperature | : +22 C | |
| CPU Fan Speed | : 4326 RPM | |
| SYS Fan Speed | : N/A | |
| AUX Fan Speed | : N/A | |
| +VCORE | : +0.997 V | |
| +12V | : +12.164 V | |
| +5V | : +4.986 V | |
| +VMEM | : +1.221 V | |
| +3.3VSB | : +3.296V | |
| +3.3V | : +3.376 V | |
| +VRTC | : +3.280 V | |
| +1.05V | : +1.080 V | |

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**CPU Warning Temperature**

Options: Disabled, 80 C, 85 C, 90 C, 95 C

**Smart FAN Configuration**

**CPU FAN Setting [Manual]**

Options: Manual, Smart

**System FAN Setting [Manual]**

Options: Manual, Smart

**Aux FAN Setting [Manual]**

Options: Manual, Smart

# ■ Power Menu

Table 70 Power Menu

| BIOS SETUP UTILITY | | |
|---|---|---|
| Main Advanced **Power** Security Boot Save & Exit | | |
| Power Configuration | | → ←: Select Screen |
| ACPI Sleep State | [S3 (Suspend to RAM)] | ↑↓: Select Item |
| Restore AC Power Loss | [Power Off] | Enter: Select |
| Power Saving Mode | [Disabled] | +-: Change Opt. |
| | | F1: General Help |
| Resume Event Control | | F2: Previous Values |
| Resume from S3 By PS/2 Keyboard | [Disabled] | F3: Optimized Defaults |
| Resume from S3 By PS/2 Mouse | [Disabled] | F4: Save & Reset |
| Resume By LAN Device | [Disabled] | ESC: Exit |
| Resume By PCI Device(PME#) | [Disabled] | |
| Resume By PCI-E Device | [Disabled] | |
| Resume By Ring Device | [Disabled] | |
| Resume By RTC Alarm | [Disabled] | |
| >WatchDog Timer Configuration | | |
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**ACPI Sleep State**

Options: Suspend Disabled, S3 (Suspend to RAM)

**Restore AC Power Loss**

Options: Power Off, Power On, Last State

**Power Saving Mode**

Options: Disabled, EUP Enabled, DeepSx Enabled

**Resume from S3 By PS/2 Keyboard**

Options: Disabled, Enabled

**Resume from S3 By PS/2 Mouse**

Options: Disabled, Enabled

**Resume By LAN Device**

Options: Disabled, Enabled

**Resume By PCI Device(PME#)**

Options: Disabled, Enabled

**Resume By PCI-E Device**

Options: Disabled, Enabled

**Resume By Ring Device**

Options: Disabled, Enabled

**Resume By RTC Alarm**

Options: Disabled, Enabled

**Watchdog Timer Configuration**

**WDT Function**

Options: Disabled, Enabled

# ■ Security Menu

Table 71 Security Menu

| BIOS SETUP UTILITY | |
|---|---|
| Main Advanced Power **Security** Boot Save & Exit | |
| Password Description<br><br>If ONLY the Administrator's password is set, then this only limits access to Setup and is only asked for when entering Setup<br>If ONLY the User's password is set, then this is a power on password and must be entered to boot or enter Setup. In Setup the User will have Administrator rights<br>The password length must be in the following range:<br>Minimum Length 3<br>Maximum length 20<br><br>Administrator Password<br>User Password | → ←: Select Screen<br>↑↓: Select Item<br>Enter: Select<br>+-: Change Opt.<br>F1: General Help<br>F2: Previous Values<br>F3: Optimized Defaults<br>F4: Save & Reset<br>ESC: Exit |
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# ■ Boot Menu

Table 72 Boot Menu

| BIOS SETUP UTILITY | | |
|---|---|---|
| Main Advanced Power Security **Boot** Save & Exit | | |
| Boot Configuration | | → ←: Select Screen |
| Full Screen LOGO Display | [Disabled] | ↑↓: Select Item |
| Setup Prompt Timeout | 1 | Enter: Select |
| Bootup NumLock State | [On] | +-: Change Opt. |
| | | F1: General Help |
| CSM Support | [Enabled] | F2: Previous Values |
| Boot Option Filter | [Legacy only] | F3: Optimized Defaults |
| | | F4: Save & Reset |
| Boot Option Priorities | | ESC: Exit |
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**Full Screen LOGO Display**

Options: Disabled, Enabled

**Bootup Numlock State**

Options: On, Off

**CSM Support**

Options: Enabled, Disabled

**Boot Option Filter**

Options: UEFI and Legacy, Legacy only, UEFI only

# ■ Save & Exit Menu

Table 73 Save & Exit Menu

| BIOS SETUP UTILITY | |
|---|---|
| Main Advanced Power Security Boot **Save & Exit** | |
| Save Changes and Reset<br>Discard Changes and Reset<br><br>Save Options<br>Save Changes<br>Discard Changes<br><br>Restore Defaults | → ←: Select Screen<br>↑↓: Select Item<br>Enter: Select<br>+-: Change Opt.<br>F1: General Help<br>F2: Previous Values<br>F3: Optimized Defaults<br>F4: Save & Reset<br>ESC: Exit |
| Version 2.17.1254. Copyright (C) 2016, American Megatrends, Inc. | |

**Save Changes and Exit**

Exit system setup after saving the changes. Once you are finished making your selections, choose this option from the Exit menu to ensure the values you selected are saved to the CMOS RAM. The CMOS RAM is sustained by an onboard backup battery and stays on even when the PC is turned off. When you select this option, a confirmation window appears. Select [Yes] to save changes and exit.

**Discard Changes and Exit**

Exit system setup without saving any changes. Select this option only if you do not want to save the changes that you made to the Setup program. If you made changes to fields other than system date, system time, and password, the BIOS asks for a confirmation before exiting.

**Discard Changes**

Discards changes done so far to any of the setup values. This option allows you to discard the selections you made and restore the previously saved values. After selecting this option, a confirmation appears. Select [Yes] to discard any changes and load the previously saved values.

**Load Optimal Defaults**

Load Optimal Default values for all the setup values. This option allows you to load optimal default values for each of the parameters on the Setup menus, which will provide the best performance settings for your system. The F9 key can be used for this operation.

**Load Failsafe Defaults**

Load Optimal Default values for all the setup values. This option allows you to load failsafe default values for each of the parameters on the Setup menus, which will provide the most stable performance settings. The F8 key can be used for this operation.

# Chapter 5

# Driver Installation

If your KEMB-8100 Series does not come with an operating system pre-installed, you will need to install an operating system and the necessary drivers to operate it. After you have finished assembling your system and connected the appropriate power source, power it up using the power supply and install the desired operating system.

You can download the drivers for the KEMB-8100 Series from the Quanmax website at www.quanmax.com and install as instructed there. For other operating systems, please contact Quanmax.

**NOTE**

When the system reboots without connecting the CRT, there might be no image on screen when you insert the CRT/VGA cable. Please pressing <**Ctrl>+<Alt>+<F1>** simultaneously to show the image on screen.

# Appendix A

# DIO (Digital I/O) Sample Code

```
//*************************************************************//
//DIO sample code for KEMB-8100                                 //
//Please compile with Turbo C 3.0 to utilized the program      //
//                                                             //
//DIO GPIO pin define from NCT6106D                             //
// DIO_0 : GP30                DIO_8   : GP40                   //
// DIO_1 : GP31                DIO_9   : GP41                   //
// DIO_2 : GP32                DIO_10 : GP42                    //
// DIO_3 : GP33                DIO_11 : GP43                    //
// DIO_4 : GP34                DIO_12 : GP44                    //
// DIO_5 : GP35                DIO_13 : GP45                    //
// DIO_6 : GP36                DIO_14 : GP46                    //
// DIO_7 : GP37                DIO_15 : GP47                    //
//*************************************************************//
#include<stdio.h>

#define INDEX_PORT 0x2E
#define DATA_PORT   INDEX_PORT+1

void Set_SIO_Reg( int REG, int DATA)
{
    outportb(INDEX_PORT, REG);
    outportb(DATA_PORT, DATA);
}

int Get_SIO_Reg(int REG)
{
    int Result;
    outportb(INDEX_PORT, REG);
    Result = inportb(DATA_PORT);
```

```
    return Result;
}

int main()
{
    int RetVal;
    int i;
    int Temp;

//Set Unlock SIO
    outportb(INDEX_PORT, 0x87);
    outportb(INDEX_PORT, 0x87);

//Set GPIO LDN7
    Set_SIO_Reg(0x07, 0x07);

//Set DIO_0~15 as Input
    Set_SIO_Reg(0xEC, 0xFF);
    Set_SIO_Reg(0xF0, 0xFF);

//Read DIO_0~15 value
    RetVal = Get_SIO_Reg(0xED);
    printf("Read DIO_0~15 value\n");

    for (i=0; i<8; i++)
    {
        Temp = (RetVal>>i) & 0x01;
        printf("DIO_%d = %d\n",i ,Temp);
    }

    RetVal = Get_SIO_Reg(0xF1);
    for (i=0; i<8; i++)
    {
        Temp = (RetVal>>i) & 0x01;
        printf("DIO_%d = %d\n",8+i ,Temp);
    }
```

```
    system("pause");

//Set DIO_0~15 as Output
    Set_SIO_Reg(0xEC, 0x00);
    Set_SIO_Reg(0xF0, 0x00);

//set DIO_0~7 to High
    printf("Set DIO_0~15 to High\n");
    Set_SIO_Reg(0xED, 0xFF);
    Set_SIO_Reg(0xF1, 0xFF);

    system("pause");

//set DIO_0~7 to Low
    printf("Set DIO_0~15 to Low\n");
    Set_SIO_Reg(0xED, 0x00);
    Set_SIO_Reg(0xF1, 0x00);
    system("pause");

    return 0;
}
```

# Appendix B

# WatchDog Timer Sample Code

```
//==========================================================
==========//
//KEMB-8100 DOS Watchdog sample program                    //
//Please compile with Turbo C 3.0 to utilized the program  //
//==========================================================
==========//

#include<stdio.h>

#define SIO_CONFIG_INDEX   0x2e
#define SIO_CONFIG_DATA    SIO_CONFIG_INDEX+1


void UnlockSIO()
{
   outp(SIO_CONFIG_INDEX,0x87);
   outp(SIO_CONFIG_INDEX,0x87);
}

void LockSIO()
{
   outp(SIO_CONFIG_INDEX,0xAA);
}

void SetLDN(int LDN)
{
     outp(SIO_CONFIG_INDEX, 0x07);
     outp(SIO_CONFIG_DATA,   LDN);
}

void main()
{
     int value = 0;

     UnlockSIO();
     SetLDN(0x08);

     //Enable WDT
     outp(SIO_CONFIG_INDEX,0x30);
```

```
    outp(SIO_CONFIG_DATA,0x01);

    //Set Timer unit(0xF0 bit3(0: 1sec, 1: 60 sec) of watchdog timer by setting
this bit)
    outp(SIO_CONFIG_INDEX,0xF0);
    value=inp(SIO_CONFIG_DATA);
    outp(SIO_CONFIG_DATA,(value & 0xF7));//set unit sec.

    //Set Timer Value(0xF1 Time of watchdog timer)
    outp(SIO_CONFIG_INDEX,0xF1);
    outp(SIO_CONFIG_DATA,0x14);//set to 20 sec (0x14)

    LockSIO();
}
```