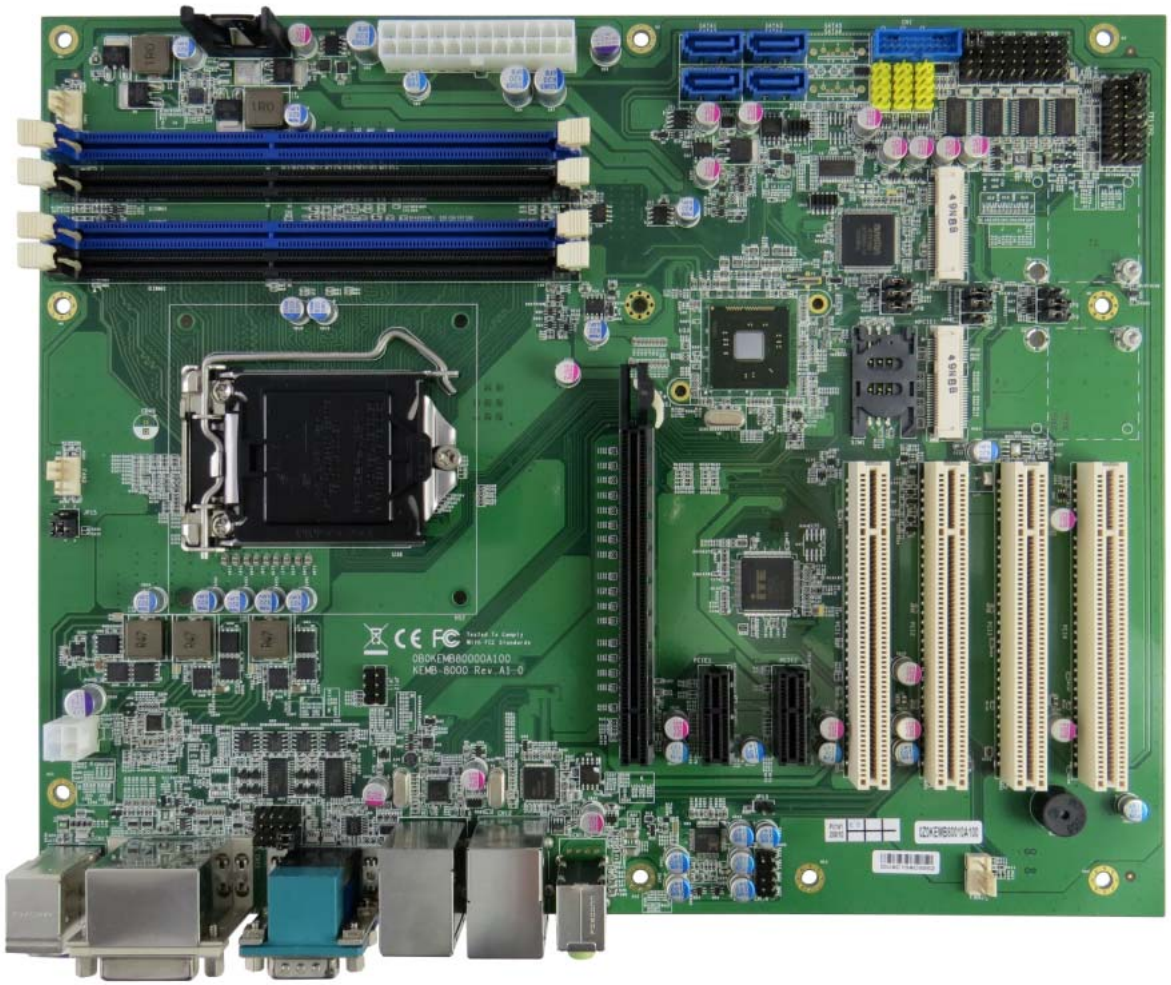
KEMB-8000 Series

Standard / Extended Temperature Industrial-grade Motherboard in ATX Form Factor with 4th Generation Intel® Core™ Processor and Intel® H81 / Q87 Chipset

User's Guide



Contact Info: **Quanmax Inc.**
4F, No. 415, Ti-Ding Blvd. Sec. 2 NeiHu District,
Taipei 114Taiwan
Tel: +886-2-2799-2789
Fax: +886-2-2799-7399

Visit our site at: **www.quanmax.com**

The information in this user's guide is provided for reference only. Quanmax does not assume any liability arising out of the application or use of the information or products described herein. This user's guide may contain or reference information and products protected by copyrights or patents and does not convey any license under the patent rights of Quanmax, nor the rights of others.

Quanmax is a registered trademark of Quanmax. All trademarks, registered trademarks, and trade names used in this user's guide are the property of their respective owners. All rights reserved. This user's guide contains information proprietary to Quanmax. Customers may reprint and use this user's guide in other publications. Customers may alter this user's guide and publish it only after they remove the Quanmax name, cover, and logo.

Quanmax reserves the right to make changes without notice in product or component design as warranted by evolution in user needs or progress in engineering or manufacturing technology. Changes which affect the operation of the unit will be documented in the next revision of this user's guide.

Content

Figures

Tables

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.

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.

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 units 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-8000 Series is a ATX form factor industrial motherboard equipped with LGA1150 Socket 4th Generation Intel® Core™ i Processor and Intel® H81 / Q87 Express Chipset. It has a variety of I/O ports and expansion slots for peripheral applications and expansion, including 2/4x DDR3 DIMM, 1x VGA, 1x DVI-D, 1x DP, 2x GbE, 4x SATA, 2/4x USB3.0, 6/8x USB2.0, 6x COM, 16-bit DIO, 2x PS/2, 4x PCI, 1x PCIe x16, 2x PCIe x1, 1x mPCIe or 2x mPCIe/mSATA and 1x SIM card holder. In addition, an extended temperature model is offered for this series and allows operation under extreme high, low or radically fluctuating temperatures, which is common in industrial environments.

Checklist

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

Features

- LGA1150 Socket 4th Generation Intel® Core™ i Processor
- Intel® H81 / Q87 Chipset
- 2/4x DDR3 DIMM Socket up to 16/32GB
- 1x VGA, 1x DVI-D, 1x DP
- 2x GbE, 2/4x USB3.0, 6/8x USB2.0, 6x COM, 2x PS/2
- 4x PCI, 1x PCIe x16, 2x PCIe x1, 1x mPCIe or 2x mPCIe/mSATA, 1x SIM
- 16-bit Digital I/O supported
- Extended temperature model available: -20ºC ~ 70ºC / -4ºF ~ 158ºF
- Watchdog Timer, Hardware Monitor

■ Product Specifications

Model Name	▪ KEMB-8000 Series
Form Factor	▪ ATX
PCB Size	▪ 304.8 x 244 mm / 12" x 9.6"
Processor /Chipset	▪ LGA1150 socket 4th Generation Intel® Core™ i Processor ▪ Intel® H81 Express Chipset (KEMB-8000) ▪ Intel® Q87 Express Chipset (KEMB-8001/8001T)
Memory	▪ 2x DDR3 DIMM Socket support up to 16GB memory (KEMB-8000) ▪ 4x DDR3 DIMM Socket support up to 32GB memory (KEMB-8001/8001T)
Features	▪ Display supported ● 1x DVI-D ● 1x VGA ● 1x DP ▪ Audio supported ● 2x header for rear Line-Out and Mic-In ● 1x header for front Audio ▪ LAN supported ● 2x GbE RJ-45 Connector (1x Intel® I217-LM & 1x Intel® I210-AT) ▪ USB supported ● 2x USB3.0 (KEMB-8000) / 4x USB3.0 (KEMB-8001/8001T) ● 6x USB2.0 (KEMB-8000) / 8x USB2.0 (KEMB-8001/8001T) ▪ Storage supported ● 4x SATA Connector ● 2x mSATA Socket (mixed with mPCIe, KEMB-8001/8001T only) ▪ Extension supported ● 4x PCI, 32-bit/33MHz ● 1x PCIe x16 ● 2x PCIe x1 ● 1x mPCIe (KEMB-8000) / 2x mPCIE/mSATA (KEMB-8001/8001T) ● 1x SIM card holder ▪ Super I/O supported ● 6x COM (COM1~2 with RS-232/422/485) ▪ TPM supported ● TPM support (KEMB-8001/8001T) ▪ Digital I/O supported ● 1x 16-bit DIO
BIOS	▪ AMI uEFI BIOS ▪ 1x 128Mb SPI flash memory onboard
Hardware Monitor	▪ Input & Core Voltages monitoring ▪ CPU & System Temperatures monitoring
Watchdog	▪ Programable WDT to generate System reset event
Real Time Clock	▪ Chipset intergrated RTC
Power	▪ One 2x12-pin, pitch 3.96mm Wafer ATX power DC input ▪ One 2x2-pin, pitch 3.96mm Wafer for CPU Core power supply
Operation Temp.	▪ 0°C ~ 60°C / 32°F ~ 140°F (KEMB-8000/8001) ▪ -20°C ~ 70°C / -4°F ~ 158°F (KEMB-8001T)
Certifications	▪ CE, FCC Class A

Table 1 KEMB-8000 Series Specification

■ System Block Diagram

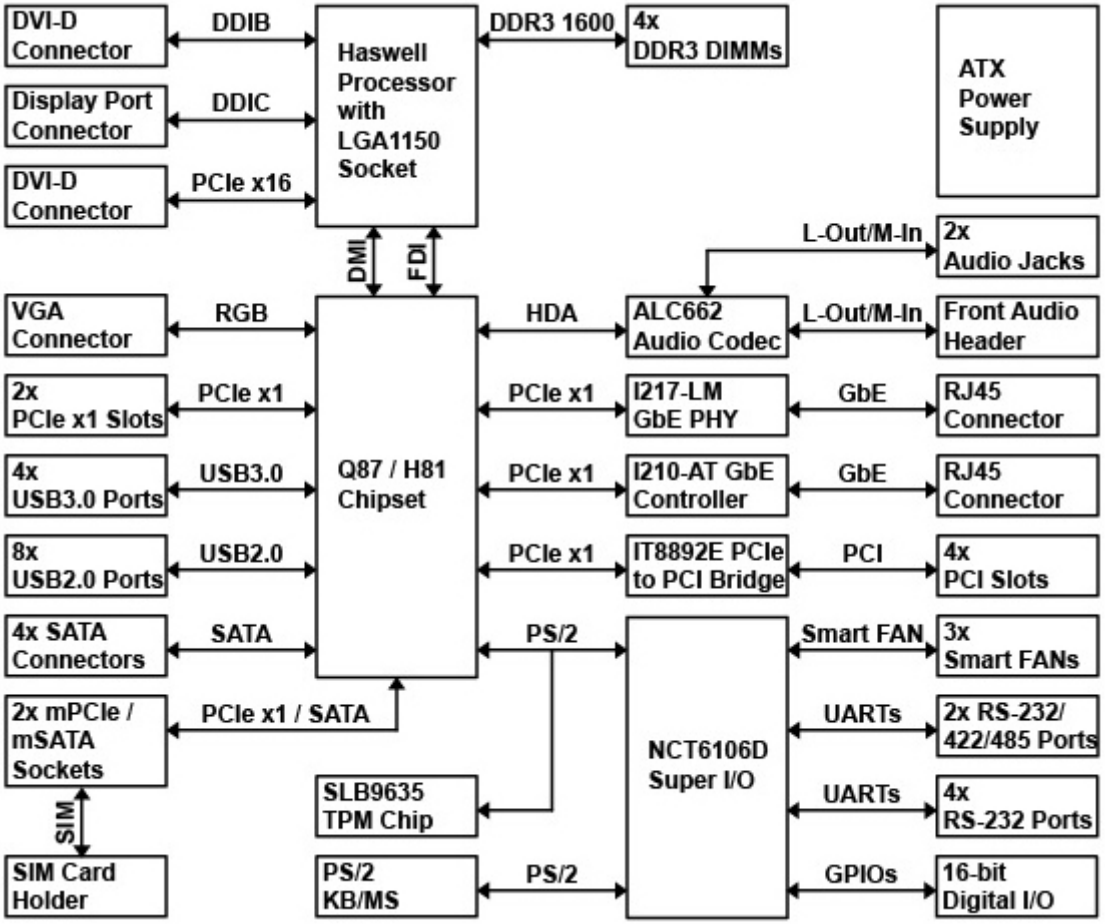


Figure 1 Block Diagram

■ Mechanical Dimensions

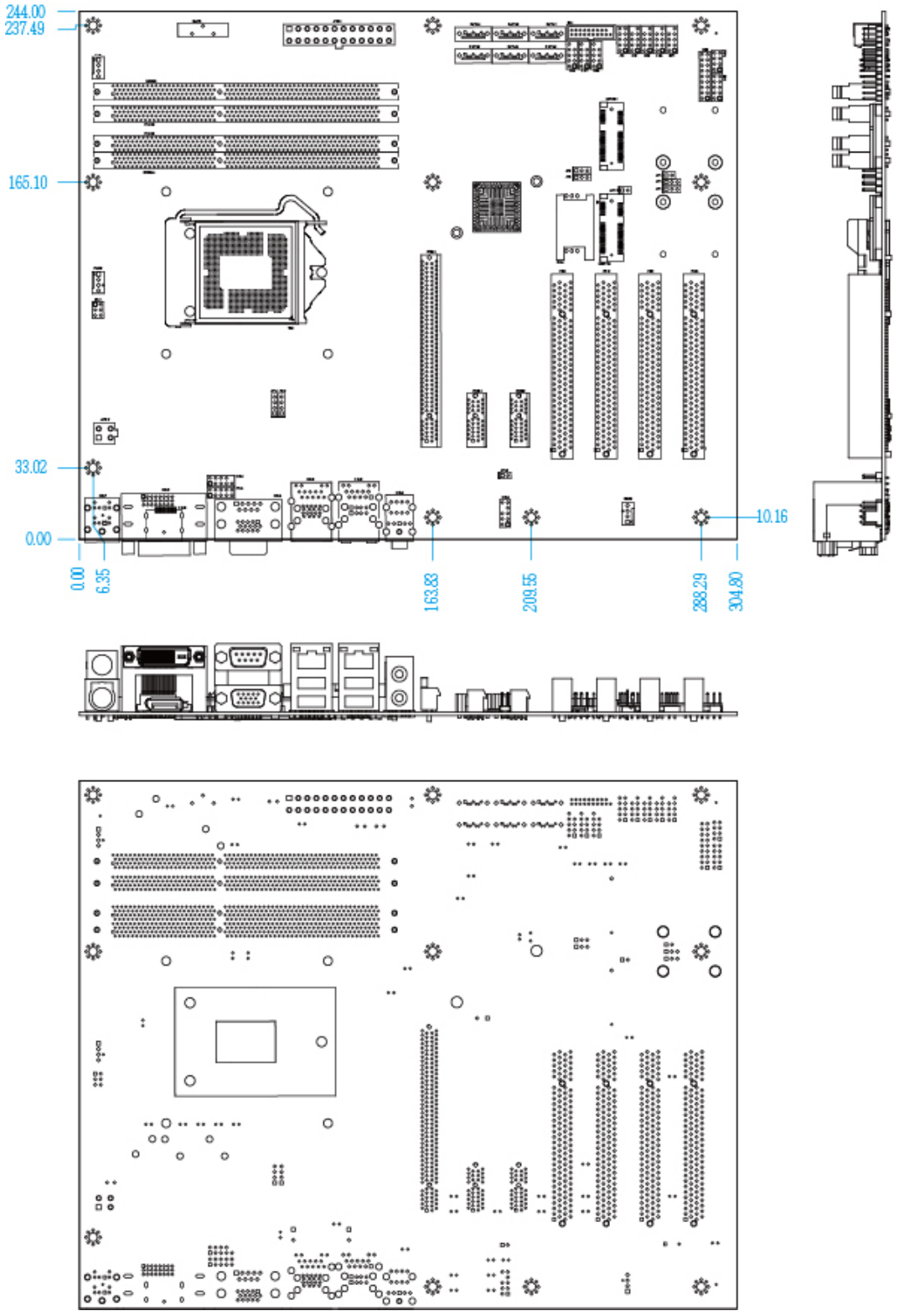


Figure 2 Mechanical Dimensions

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.

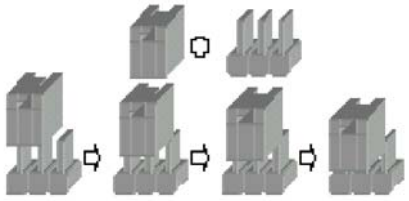


Figure 3 Jumper Connector

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.

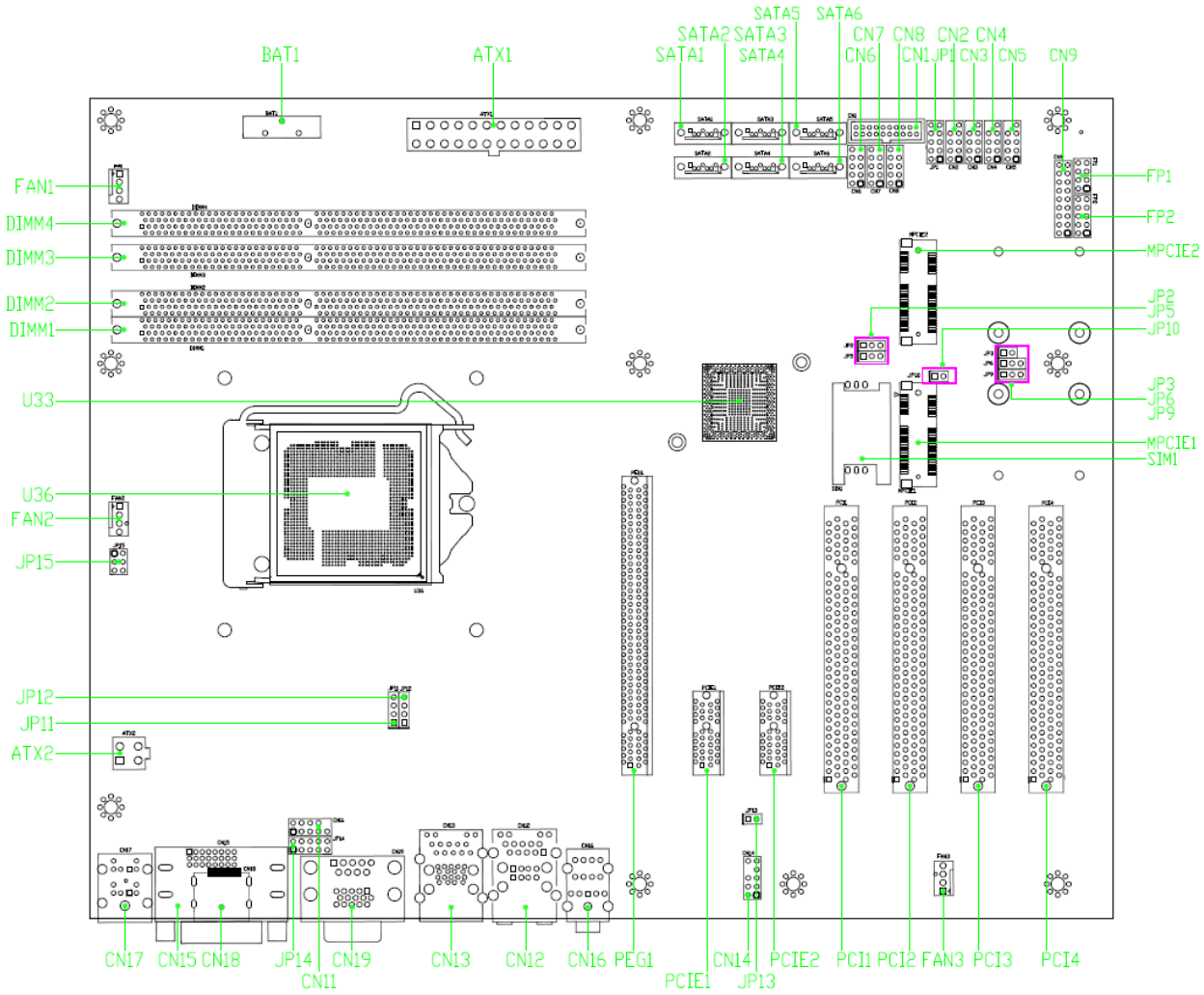


Figure 4 Jumper and Connector Locations

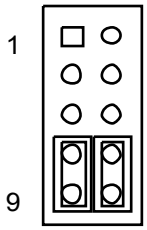
Jumper Settings

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

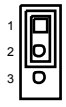
Label	Function
JP1	*Pin-9 Selection for COM3 & COM4*
JP2	*Keyboard Lock Selection*
JP3	*mPCIE LED Indicator Jumper*
JP5	*Protected RTC Selection*
JP6	*mPCIE / mSATA Selection for MPCIE2*
JP9	*mPCIE / mSATA Selection for MPCIE1*
JP10	*Case Open Detection*
JP11	*Terminator Selection for COM1*
JP12	*Terminator Selection for COM2*
JP13	*Flash Descriptor Security Override Selection*
JP14	*Pin-9 Selection for COM1 & COM2*
JP15	*PCIE Configuration Setting for PEG1*

Table 3 JP1 Pin-9 Selection for COM3 & COM4



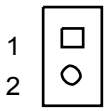
Jumper	Setting	Description
1	1-3 Short	COM3, Pin-9 = +12V
	3-5 Short	COM3, Pin-9 = +5V
	5-7 Short	COM3, Pin-9 = +5V
	7-9 Short	COM3, Pin-9 = RI
2	2-4 Short	COM4, Pin-9 = +12V
	4-6 Short	COM4, Pin-9 = +5V
	6-8 Short	COM4, Pin-9 = +5V
	8-10 Short	COM4, Pin-9 = RI
Pitch:2.54mm		

Table 4 JP2 Keyboard Lock Selection



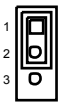
Jumper	Description
1-2 Short	Normal
2-3 Short	Keyboard Locked
Pitch:2.54mm	

Table 5 JP3 mPCIE LED Indicator Jumper



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

Table 6 JP5 Protected RTC Selection



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

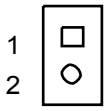
Table 7 JP6 mPCIE / mSATA Selection for MPCIE2 (KEMB-8001/T only)

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

Table 8 JP9 mPCIE / mSATA Selection for MPCIE1 (KEMB-8001/T only)

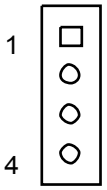
Jumper	Description
1-2 Short	mSATA
2-3 Short	mPCIE
Pitch:2.54mm	

Table 9 JP10 Case Open Detection



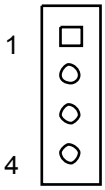
Jumper	Description
Open	Case is Closed
Short	Case is Opened
Pitch:2.54mm	

Table 10 JP11 Terminator Selection for COM1



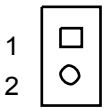
Jumper	Description
1-2 Short	Terminator is enabled between RX+ & RX-.
1-2 Open	Terminator is disabled.
3-4 Short	Terminator is enabled between TX+ & TX-
3-4 Open	Terminator is disabled.
Pitch:2.54mm	

Table 11 JP12 Terminator Selection for COM2



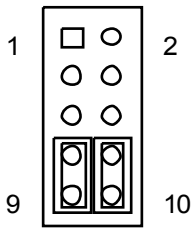
Jumper	Description
1-2 Short	Terminator is enabled between RX+ & RX-.
1-2 Open	Terminator is disabled.
3-4 Short	Terminator is enabled between TX+ & TX-
3-4 Open	Terminator is disabled.
Pitch:2.54mm	

Table 12 JP13 Flash Descriptor Security Override Selection



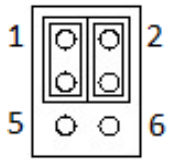
Jumper	Description
1-2 Open	Security Measures Defined are Set
1-2 Short	Security Measures Defined by BIOS are Over-Written
Pitch:2.54mm	

Table 13 JP14 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		

Table 14 JP15 PCIE Configuration Setting for PEG1



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		

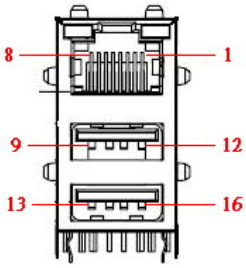
Rear Panel Pin Assignments

Figure 5 Front Panel IO

Table 15 Front Panel Connector List

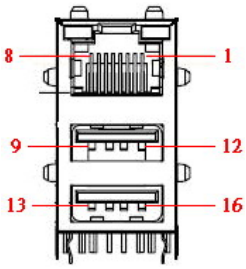
Label	Function
CN12	*GbE LAN2 & USB2.0 Port-8, 9 Connector*
CN13	*GbE LAN1 & USB3.0 Port-0, 1 Connector*
CN15	*DVI-D Connector*
CN16	*Line-Out & MIC-In Audio Jacks*
CN17	*PS/2 Keyboard & Mouse Mini-DIN Connector*
CN18	*Display Port Connector*
CN19	*VGA & RS-232/422/485 COM1 Connector*

Table 16 CN12 GbE LAN2 & USB2.0 Port-8, 9 Connector



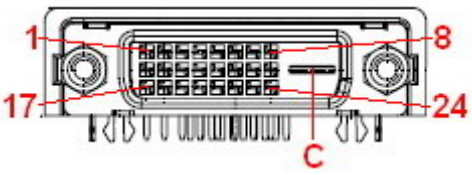
Pin	Signal Name	Pin	Signal Name
1	MDI[0]+	9	+USBVCC
2	MDI[0]-	10	USB_A-
3	MDI[1]+	11	USB_A+
4	MDI[1]-	12	GND
5	MDI[2]+	13	+USBVCC
6	MDI[2]-	14	USB_B-
7	MDI[3]+	15	USB_B+
8	MDI[3]-	16	GND

Table 17 CN13 GbE LAN1 & USB3.0 Port-0, 1 Connector



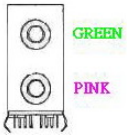
Pin	Signal Name	Pin	Signal Name
1	MDI[0]+	9	+USBVCC
2	MDI[0]-	10	USB_A-
3	MDI[1]+	11	USB_A+
4	MDI[1]-	12	GND
5	MDI[2]+	13	+USBVCC
6	MDI[2]-	14	USB_B-
7	MDI[3]+	15	USB_B+
8	MDI[3]-	16	GND

Table 18 CN15 DVI-D Connector



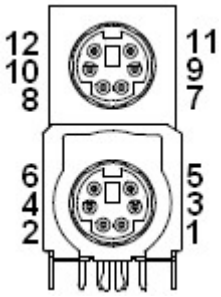
Pin	Signal Name	Pin	Signal Name
1	TX2-	2	TX2+
3	GND	4	NC
5	NC	6	DDC_CLK
7	DDC_DATA	8	NC
9	TX1-	10	TX1+
11	GND	12	NC
13	NC	14	+5V
15	GND	16	HTPLG
17	TX0-	18	TX0+
19	GND	20	NC
21	NC	22	GND
23	TXC+	24	TXC-
C	GND		

Table 19 CN16 Line-Out & MIC-In Audio Jacks



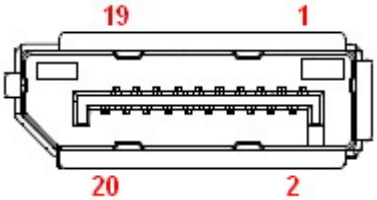
	Signal Name
GREEN	LINE OUT
PINK	MIC IN

Table 20 CN17 PS/2 Keyboard & Mouse Mini-DIN Connector



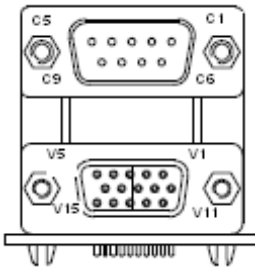
Pin	Signal	Function
1	KBDAT	Keyboard Data
2	NC	No Connect
3	GND	Ground
4	KB5V	+5VSB Power Source
5	KBCLK	Keyboard Clock
6	NC	No Connect
7	MSDAT	Mouse Data
8	NC	No Connect
9	GND	Ground
10	KB5V	+5VSB Power Source
11	MSCLK	Mouse Clock
12	NC	No Connect

Table 21 CN18 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 22 CN19 VGA & RS-232/422/485 COM1 Connector



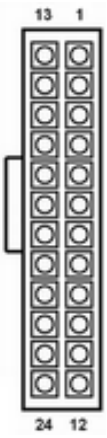
Pin	Signal Name	Pin	Signal Name
V1	Red	V2	Green
V3	Blue	V4	NC
V5	GND	V6	GND
V7	GND	V8	GND
V9	+5V	V10	GND
V11	NC	V12	DDC data
V13	HSYNC	V14	VSYNC
V15	DDC clock		
C1	DCD	C2	RXD
C3	TXD	C4	DTR
C5	GND	C6	DSR
C7	RTS	C8	CTS
C9	RI	C10	NC

Main Board Pin Assignments

Table 23 Internal Connector List

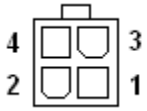
Label	Function
ATX1	*2x12-Pin ATX Power Supply Wafer*
ATX2	*2x2-Pin ATX Power Supply Wafer*
BAT1	*CR2032 Battery Holder*
BZ1	*Onboard Buzzer*
CN1	*USB3.0 Port-5, 6 Box Header (KEMB-8001/T only)*
CN2	*RS-232 COM3 Pin Header*
CN3	*RS-232 COM4 Pin Header*
CN4	*RS-232 COM5 Pin Header*
CN5	*RS-232 COM6 Pin Header*
CN6	*USB2.0 Port-2, 3 Pin Header*
CN7	*USB2.0 Port-6, 7 Pin Header (KEMB-8001/T only)*
CN8	*USB2.0 Port-10, 11 Pin Header*
CN9	*16-bit Digital Input / Output Pin Header*
CN11	*RS-232/422/485 COM2 Pin Header*
CN14	*Front Panel Audio Pin Header*
DIMM1	*Channel-A, DIMM-0 DDR3 DIMM Slot*
DIMM2	*Channel-A, DIMM-1 DDR3 DIMM Slot (KEMB-8001/T only)*
DIMM3	*Channel-B, DIMM-0 DDR3 DIMM Slot*
DIMM4	*Channel-B, DIMM-1 DDR3 DIMM Slot (KEMB-8001/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	*Full Size mPCIE / mSATA Socket (KEMB-8001/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	*PCIEx1 Slot 1*
PCIE2	*PCIEx1 Slot 2*
PEG1	*PCIEx16 Slot*
SATA1	*Serial ATA Port-0 Connector*
SATA2	*Serial ATA Port-1 Connector*
SATA3	*Serial ATA Port-2 Connector (KEMB-8001/T only)*
SATA4	*Serial ATA Port-3 Connector (KEMB-8001/T only)*
SATA5	*Serial ATA Port-4 Connector (KEMB-8000 only)*
SATA6	*Serial ATA Port-5 Connector (KEMB-8000 only)*
SIM1	*SIM Card Holder for MPCIE1*

Table 24 ATX1 2x12-Pin ATX Power Supply Wafer



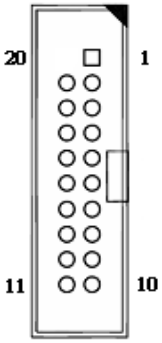
Pin	Signal	Pin	Signal
1	+3.3V	13	+3.3V
2	+3.3V	14	-12V
3	GND	15	GND
4	+5V	16	PS_ON
5	GND	17	GND
6	+5V	18	GND
7	GND	19	GND
8	POWER OK	20	-5V
9	+5VSB	21	+5V
10	+12V	22	+5V
11	+12V	23	+5V
12	+3.3V	24	GND
Pitch:3.96mm			

Table 25 ATX2 2x2-Pin ATX Power Supply Wafer



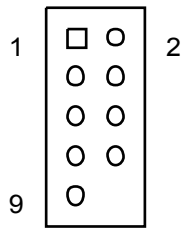
Pin	Signal Name
1	GND
2	GND
3	+12V
4	+12V
Pitch:4.2mm	

Table 26 CN1 USB3.0 Port-5, 6 Box Header (KEMB-8001/T only)



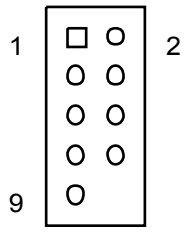
Pin	Signal Name	Pin	Signal Name
1	USBA_VBUS	20	KEY
2	USBA_RX-	19	USBB_VBUS
3	USBA_RX+	18	USBB_RX-
4	GND	17	USBB_RX+
5	USBA_TX-	16	GND
6	USBA_TX+	15	USBB_TX-
7	GND	14	USBB_TX+
8	USBA_D-	13	GND
9	USBA_D+	12	USBB_D-
10	NC	11	USBB_D+
Pitch:2.0mm			

Table 27 CN2 RS-232 COM3 Pin Header



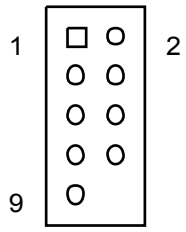
Pin	Signal
1	DCD, Data carrier detect
2	RXD, Receive data
3	TXD, Transmit data
4	DTR, Data terminal ready
5	GND, ground
6	DSR, Data set ready
7	RTS, Request to send
8	CTS, Clear to send
9	RI, Ring indicator / +12V / +5V *
10	NC, Key
Pitch:2.54mm * : Selected by JP1.	

Table 28 CN3 RS-232 COM4 Pin Header



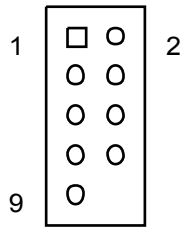
Pin	Signal
1	DCD, Data carrier detect
2	RXD, Receive data
3	TXD, Transmit data
4	DTR, Data terminal ready
5	GND, ground
6	DSR, Data set ready
7	RTS, Request to send
8	CTS, Clear to send
9	RI, Ring indicator / +12V / +5V *
10	NC, Key
Pitch:2.54mm * : Selected by JP1.	

Table 29 CN4 RS-232 COM5 Pin Header



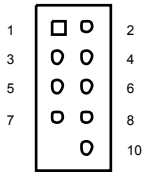
Pin	Signal
1	DCD, Data carrier detect
2	RXD, Receive data
3	TXD, Transmit data
4	DTR, Data terminal ready
5	GND, ground
6	DSR, Data set ready
7	RTS, Request to send
8	CTS, Clear to send
9	RI, Ring indicator
10	NC, Key
Pitch:2.54mm	

Table 30 CN5 RS-232 COM6 Pin Header



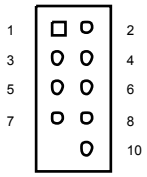
Pin	Signal
1	DCD, Data carrier detect
2	RXD, Receive data
3	TXD, Transmit data
4	DTR, Data terminal ready
5	GND, ground
6	DSR, Data set ready
7	RTS, Request to send
8	CTS, Clear to send
9	RI, Ring indicator
10	NC, Key
Pitch:2.54mm	

Table 31 CN6 USB2.0 Port-2, 3 Pin Header



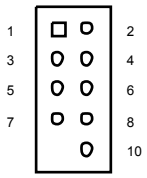
Pin	Signal Name	Pin	Signal Name
1	+VBUS_A	2	+VBUS_B
3	USB_A-	4	USB_B-
5	USB_A+	6	USB_B+
7	GND_A	8	GND_B
9	KEY	10	GND
Pitch:2.54mm			

Table 32 CN7 USB2.0 Port-6, 7 Pin Header (KEMB-8001/T only)



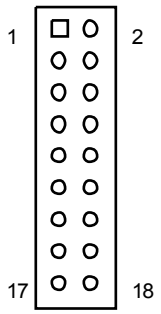
Pin	Signal Name	Pin	Signal Name
1	+VBUS_A	2	+VBUS_B
3	USB_A-	4	USB_B-
5	USB_A+	6	USB_B+
7	GND_A	8	GND_B
9	KEY	10	GND
Pitch:2.54mm			

Table 33 CN8 USB2.0 Port-10, 11 Pin Header



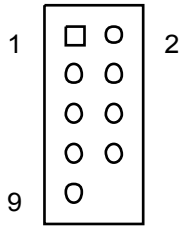
Pin	Signal Name	Pin	Signal Name
1	+VBUS_A	2	+VBUS_B
3	USB_A-	4	USB_B-
5	USB_A+	6	USB_B+
7	GND_A	8	GND_B
9	KEY	10	GND
Pitch:2.54mm			

Table 34 CN9 16-bit Digital Input / Output Pin Header



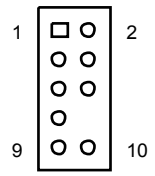
Pin	Signal Name	Pin	Signal Name
1	DIO_0	2	DIO_8
3	DIO_1	4	DIO_9
5	DIO_2	6	DIO_10
7	DIO_3	8	DIO_11
9	DIO_4	10	DIO_12
11	DIO_5	12	DIO_13
13	DIO_6	14	DIO_14
15	DIO_7	16	DIO_15
17	+5V	18	GND
Pitch:2.54mm			

Table 35 CN11 RS-232/422/485 COM2 Pin Header



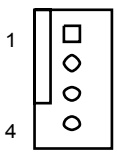
Pin	RS-232	RS-422	Half Duplex RS-485	Full Duplex RS-485
1	DCD	TX-	DATA-	TX-
2	RXD	TX+	DATA+	TX+
3	TXD	RX+	N/A	RX+
4	DTR	RX-	N/A	RX-
5	GND	GND	GND	GND
6	DSR	N/A	N/A	N/A
7	RTS	N/A	N/A	N/A
8	CTS	N/A	N/A	N/A
9	RI/+5V/+12V*	RI/+5V/+12V*	RI/+5V/+12V*	RI/+5V/+12V*
10	Key	Key	Key	Key
Pitch:2.54mm * : Selected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

Table 36 CN14 Front Panel Audio Pin Header



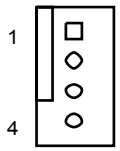
Pin	Signal	Pin	Signal
1	MIC2-L	2	Audio GND
3	MIC2-R	4	Audio GND
5	Line2-R	6	MIC2_JD
7	Audio GND	8	Key
9	Line2-L	10	Line2_JD
Pitch:2.54mm			

Table 37 FAN1 System FAN Wafer



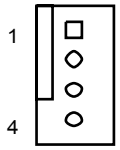
Pin	Signal
1	GND
2	+12V
3	SENSE
4	PWM
Pitch:2.54mm	

Table 38 FAN2 CPU FAN Wafer



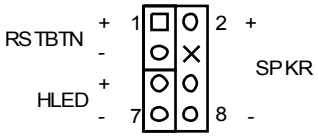
Pin	Signal
1	GND
2	+12V
3	SENSE
4	PWM
Pitch:2.54mm	

Table 39 FAN3 AUX FAN Wafer



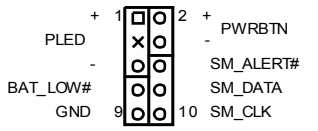
Pin	Signal
1	GND
2	+12V
3	SENSE
4	PWM
Pitch:2.54mm	

Table 40 FP1 Front Panel Pin Header 1



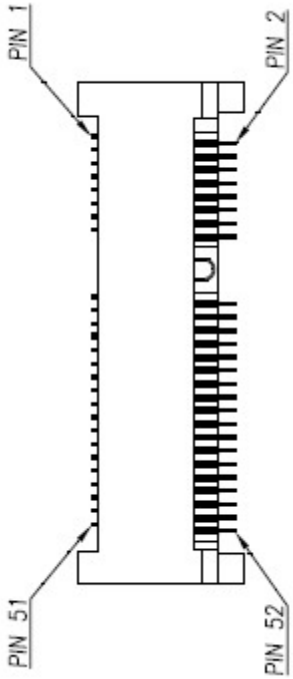
Pin	Signal	Pin	Signal
1	Reset Button +	2	Speaker +
3	Reset Button -	4	NC
5	HDD LED +	6	Internal Speaker-
7	HDD LED -	8	Speaker -
Pitch:2.54mm Note：Internal Buzzer is enabled when Pin6-8 is shorted.			

Table 41 FP2 Front Panel Pin Header 2



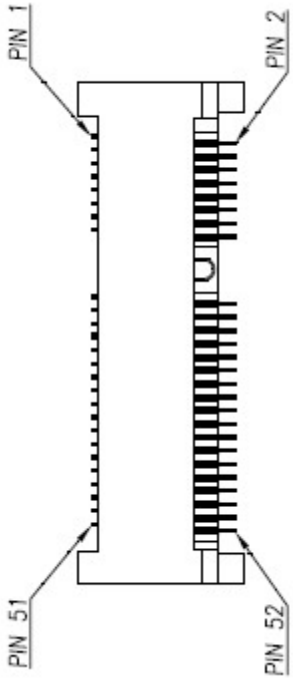
Pin	Signal	Pin	Signal
1	Power LED +	2	Power Button +
3	NC	4	Power Button -
5	Power LED -	6	SM_ALERT#
7	BAT_LOW#	8	SMBus Data
9	GND	10	SMBus Clock
Pitch:2.54mm			

Table 42 MPCIE1 Full Size mPCIE / mSATA Socket (KEMB-8000 only)



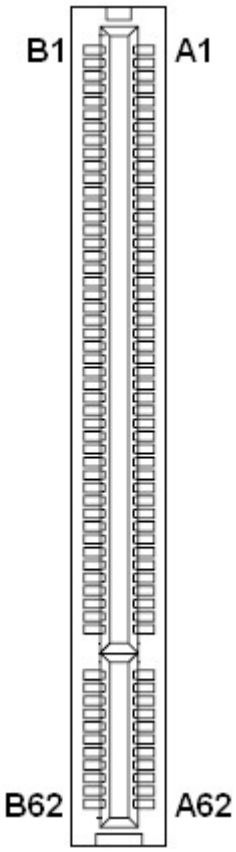
Signal	Pin	Pin	Signal
WAKE#	1	2	+3.3VSB
Reserved	3	4	Ground
Reserved	5	6	+1.5V
CLKREQ#	7	8	UIM_PWR*
Ground	9	10	UIM_DATA*
REFCLK-	11	12	UIM_CLK*
REFCLK+	13	14	UIM_RESET*
Ground	15	16	UIM_VPP*
Reserved	17	18	Ground
Reserved	19	20	W_Disable#
Ground	21	22	PERST#
PERn / SATA_RX+*	23	24	+3.3VSB
PERp / SATA_RX-*	25	26	Ground
Ground	27	28	+1.5V
Ground	29	30	SMB_CLK
PETn / SATA_TX-*	31	32	SMB_DATA
PETp / 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 * : mPCIE / mSATA.			

Table 43 MPCIE2 Full Size mPCIE / mSATA Socket (KEMB-8001/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 * : mPCIE / mSATA.			

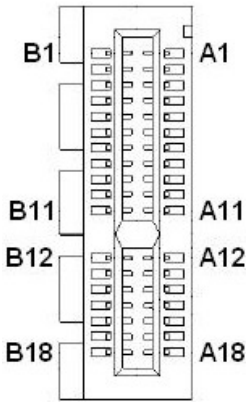
Table 4 4 PCI1,2,3,4 32-bit, 33MHz PCI Slot 1,2,3,4



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]

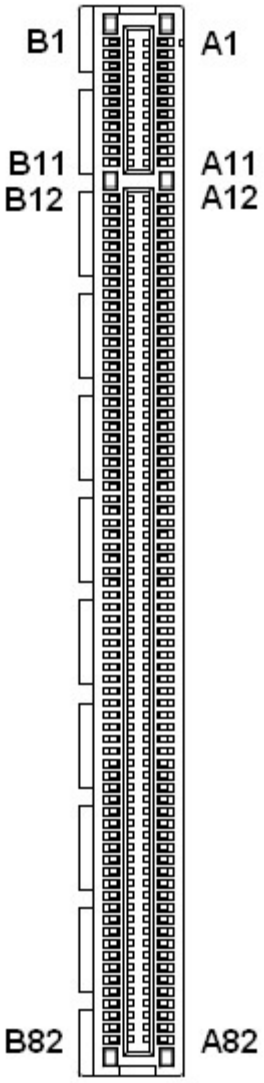
Pin	Side B	Side A
56	AD[03]	Ground
57	Ground	AD[02]
58	AD[01]	AD[00]
59	+5V	+5V
60	Reserved	Reserved
61	+5V	+5V
62	+5V	+5V

Table 45 PCIE1,2 PCIEx1 Slot 1,2



Pin	Side B	Side A
1	+12V	NC
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	PETX+	REFCLK-
15	PETX-	Ground
16	Ground	PERX+
17	NC	PERX-
18	Ground	Ground

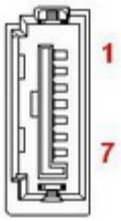
Table 46 PEG1 PCIE Express x16 Slot



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 47 SATA1,2,3,4,5,6 Serial ATA Port-0,1,2,3,4,5 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) DIP SATA-7P 180D CONN. BLACK/double row pin/parallel positioning peg [WIN WIN WATM-07ABN4A2B8UW] (SATA5,6)	

Table 4.8 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 PCIe x16 slot, 2x PCIe x1
- 1x mPCIe socket (KEMB-8000) / 2x mPCIe/mSATA socket (KEMB-8001/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.

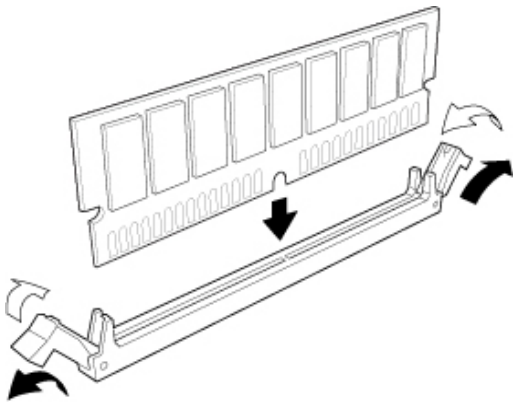


Figure 6 Spread apart the ejector tabs, align the DIMM with the socket and push it straight down until the tabs pop up

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 49 BIOS Main Menu

BIOS SETUP UTILITY						
Main	Advanced	Power	Security	Boot	Save & Exit	
Product Information						→ ←: Select Screen
Product Name			KEMB-8001			↑↓: Select Item
BIOS Version			R0.05 (x64)			Enter: Select
BIOS Build Date			08/04/2015			+-: Change Opt.
ME FW Version			9.1.25.1005			F1: General Help
						F2: Previous Values
CPU Information						F3: Optimized Defaults
Intel® Core™ i7-4790S CPU @ 3.20GHz						F4: Save & Reset
Microcode Revision			1c			ESC: Exit
Processor Cores			4			
Memory Information						
Total Size			4096 MB (DDR3)			
Frequency			1600 Mhz			
System Date			[Thu 01/15/2015]			
System Time			[20:29:57]			
Access Level			Administrator			
Version 2.17.1249. Copyright (C) 2015, American Megatrends, Inc.						

■ Advanced Menu

Table 50 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		
> Intel® Rapid Start Technology		
> DIO Configuration		
> H/W Monitor		

Version 2.17.1249. Copyright (C) 2015, American Megatrends, Inc.

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 51 Advanced Menu – Display Configuration

BIOS SETUP UTILITY					
Main	**Advanced**	Power	Security	Boot	Save & Exit
Display Configuration				→ ←: Select Screen ↑↓: Select Item	
Primary Display		[Auto]		Enter: Select	
UMA Frame Buffer Size		[256 MB]		+-: Change Opt.	
DVMT Pre-Allocated		[64M]		F1: General Help	
DVMT Total Gfx Mem		[256 M]		F2: Previous Values	
				F3: Optimized Defaults	
Primary IGFX Boot Display		[VBIOS Default]		F4: Save & Reset	
				ESC: Exit	
Version 2.17.1249. Copyright (C) 2015, American Megatrends, Inc.					

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

DVMT Total Gfx Mem

Options: 128M, 256M, MAX

Primary IGFX Boot Display

Options: VBIOS Default, CRT, DVI, DP

Table 52 Advanced Menu – Super IO Configuration

BIOS SETUP UTILITY					
Main	**Advanced**	Power	Security	Boot	Save & Exit
Super IO Chip Parameters. >Serial Port 1 Configuration >Serial Port 2 Configuration >Serial Port 3 Configuration >Serial Port 4 Configuration >Serial Port 5 Configuration >Serial Port 6 Configuration					→ ←: Select Screen ↑↓: Select Item Enter: Select +-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit
Version 2.17.1249. Copyright (C) 2015, American Megatrends, Inc.					

Table 53 Advanced Menu –Super IO Configuration – Serial Port 1 Configuration

BIOS SETUP UTILITY					
Main	**Advanced**	Power	Security	Boot	Save & Exit
Serial Port 1 Configuration Serial Port Device Settings Change Settings Serial Port 1 Type			[Enabled] IO=3F8h; IRQ=4; [Auto] [RS232]		→ ←: Select Screen ↑↓: Select Item Enter: Select +-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit
Version 2.17.1249. Copyright (C) 2015, American Megatrends, Inc.					

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 54 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 ↑↓: Select Item Enter: Select +-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit
Serial Port			[Enabled]		
Device Settings			IO=2F8h; IRQ=3;		
Change Settings			[Auto]		
Serial Port 2 Type			[RS232]		
Version 2.17.1249. Copyright (C) 2015, American Megatrends, Inc.					

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 55 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 ↑↓: Select Item Enter: Select +-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit
Serial Port			[Enabled]		
Device Settings			IO=3E8h; IRQ=7;		
Change Settings			[Auto]		
Version 2.17.1249. Copyright (C) 2015, American Megatrends, Inc.					

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 56 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 ↑↓: Select Item Enter: Select +-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit
Serial Port			[Enabled]		
Device Settings			IO=2E8h; IRQ=7;		
Change Settings			[Auto]		
Version 2.17.1249. Copyright (C) 2015, American Megatrends, Inc.					

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 57 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 ↑↓: Select Item Enter: Select +-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit
Serial Port			[Enabled]		
Device Settings			IO=2F0h; IRQ=7;		
Change Settings			[Auto]		
Version 2.17.1249. Copyright (C) 2015, American Megatrends, Inc.					

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 58 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 ↑↓: Select Item Enter: Select +-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit
Serial Port			[Enabled]		
Device Settings			IO=2E0h; IRQ=7;		
Change Settings			[Auto]		
Version 2.17.1249. Copyright (C) 2015, American Megatrends, Inc.					

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 59 Advanced Menu –CPU Chipset Configuration

BIOS SETUP UTILITY					
Main	**Advanced**	Power	Security	Boot	Save & Exit
CPU Chipset Configuration				→ ←: Select Screen ↑↓: Select Item	
EIST		[Enabled]		Enter: Select	
Active Processor Cores		[All]		+-: Change Opt.	
Limit CPUID Maximum		[Disabled]		F1: General Help	
Execute Disable Bit		[Enabled]		F2: Previous Values	
Intel® Virtualization Technology		[Disabled]		F3: Optimized Defaults	
				F4: Save & Reset	
				ESC: Exit	
Version 2.17.1249. Copyright (C) 2015, American Megatrends, Inc.					

EIST

Options: Disabled, Enabled

Active Processor Cores

Options: All, 1

Limit CPUID Maximum

Options: Disabled, Enabled

Execute Disable Bit

Options: Disabled, Enabled

Intel® Virtualization Technology

Options: Disabled, Enabled

Table 60 Advanced Menu – SATA Configuration

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

SATA Configuration		→ ←: Select Screen ↑↓: Select Item Enter: Select +-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit
SATA Controller(s)	[Enabled]	
SATA Mode Selection	[AHCI]	
SATA Controller Speed	[Default]	
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]	

Version 2.17.1249. Copyright (C) 2015, American Megatrends, Inc.

SATA Controller(s)

Options: Enabled, Disabled

SATA Mode Selection

Options: IDE, AHCI, RAID

SATA Controller Speed

Options: Default, Gen 1, Gen 2, Gen 3

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 61 Advanced Menu – USB Configuration

BIOS SETUP UTILITY					
Main	**Advanced**	Power	Security	Boot	Save & Exit
USB Configuration				→ ←: Select Screen ↑↓: Select Item Enter: Select +-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit	
USB Devices: 2 Hubs					
Legacy USB Support			[Enabled]		
XHCI Legacy Support			[Enabled]		
XHCI hand-off			[Enabled]		
EHCI Hand-off			[Disabled]		
USB Mass Storage Driver Support			[Enabled]		
Version 2.17.1249. Copyright (C) 2015, American Megatrends, Inc.					

Legacy USB Support

Options: Enabled, Disabled, Auto

XHCI Legacy Support

Options: Enabled, Disabled

XHCI hand-off

Options: Enabled, Disabled

EHCI hand-off

Options: Disabled, Enabled

USB Mass Storage Driver Support

Options: Disabled, Enabled

Table 62 Advanced Menu – AMT Configuration (KEMB-8001/8001T only)

BIOS SETUP UTILITY					
Main	**Advanced**	Power	Security	Boot	Save & Exit
AMT Configuration				→ ←: Select Screen ↑↓: Select Item Enter: Select +-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit	
Intel AMT			[Enabled]		
Un-Configure ME			[Disabled]		
Version 2.17.1249. Copyright (C) 2015, American Megatrends, Inc.					

Intel AMT

Options: Disabled, Enabled

Un-Configure ME

Options: Disabled, Enabled

Table 63 Advanced Menu – TPM Configuration (KEMB-8001/8001T only)

BIOS SETUP UTILITY					
Main	**Advanced**	Power	Security	Boot	Save & Exit
TPM Configuration Security Device Support			[Disabled]	→ ←: Select Screen ↑↓: Select Item Enter: Select +-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit	
Current Status Information					
Version 2.17.1249. Copyright (C) 2015, American Megatrends, Inc.					

Security Device Support

Options: Disabled, Enabled

Table 64 Advanced Menu – Intel® Rapid Start Technology (KEMB-8001/8001T only)

BIOS SETUP UTILITY					
Main	**Advanced**	Power	Security	Boot	Save & Exit
Intel® Rapid Start Technology			[Disabled]	→ ←: Select Screen ↑↓: Select Item Enter: Select +-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit	
Version 2.17.1249. Copyright (C) 2015, American Megatrends, Inc.					

Intel® Rapid Start Technology

Options: Disabled, Enabled

Table 65 Advanced Menu – DIO Configuration

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

DIO Configuration		→ ←: Select Screen
		↑↓: Select Item
User Configuration	[Disabled]	Enter: Select
		+-: Change Opt.
DIO_0 Value	1	F1: General Help
DIO_1 Value	1	F2: Previous Values
DIO_2 Value	1	F3: Optimized Defaults
DIO_3 Value	1	F4: Save & Reset
DIO_4 Value	1	ESC: Exit
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	

Version 2.17.1249. Copyright (C) 2015, American Megatrends, Inc.

User Configuration

Options: Enabled, Disabled

Table 66 Advanced Menu – H/W Monitor

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

PC Health Status		→ ←: Select Screen
		↑↓: Select Item
CPU Warning Temperature	[Disabled]	Enter: Select
>Smart FAN Configuration		+-: Change Opt.
		F1: General Help
CPU Temperature	: +40 C	F2: Previous Values
System Temperature	: +31 C	F3: Optimized Defaults
		F4: Save & Reset
CPU Fan Speed	: 5212 RPM	ESC: Exit
SYS Fan Speed	: N/A	
AUX Fan Speed	: N/A	
+VCORE	: +1.741 V	
+12V	: +12.164 V	
+5V	: +5.066 V	
+VMEM	: +1.533 V	
+3.3VSB	: +3.312V	
+3.3V	: +3.376 V	
+VRTC	: +3.312 V	
+1.05V	: +1.040 V	

Version 2.17.1249. Copyright (C) 2015, American Megatrends, Inc.

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 67 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					
Version 2.17.1249. Copyright (C) 2015, American Megatrends, Inc.					

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, 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 68 Security Menu

BIOS SETUP UTILITY	
Main Advanced Power **Security** Boot Save & Exit	
Password Description If ONLY the Administrator's password is set, then this only limits access to Setup and is only asked for when entering Setup 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 The password length must be in the following range: Minimum Length 3 Maximum length 20 Administrator Password User Password	→ ←: Select Screen ↑↓: Select Item Enter: Select +-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit
Version 2.17.1249. Copyright (C) 2015, American Megatrends, Inc.	

■ Boot Menu

Table 69 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	
Version 2.17.1249. Copyright (C) 2015, American Megatrends, Inc.					

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 70 Save & Exit Menu

BIOS SETUP UTILITY					
Main	Advanced	Power	Security	Boot	**Save & Exit**
Save Changes and Reset Discard Changes and Reset Save Options Save Changes Discard Changes Restore Defaults					→ ←: Select Screen ↑↓: Select Item Enter: Select +-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit
Version 2.17.1249. Copyright (C) 2015, 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-8000 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-8000 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-8000                                 //
//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-8000 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();
}
```