

TKS-G21-CV05

Fanless Embedded Box

Intel® Atom™ D2550 1.86 GHz Processor

2 GbE LAN, 4 USB2.0, 6 COM, 1 VGA

1 Mini PCIe, 1 CFast™

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Packing List

Before you begin operating your PC, please make sure that the following materials are enclosed:

- 1 TKS-G21-CV05 Embedded Controller
- 1 CD-ROM for manual (in PDF format) and drivers

If any of these items should be missing or damaged, please contact your distributor or sales representative immediately.

Safety & Warranty

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

- d. The equipment does not work well, or you cannot get it to work according to the user's manual.
 - e. The equipment has been dropped and damaged.
 - f. The equipment has obvious signs of breakage.
15. DO NOT LEAVE THIS EQUIPMENT IN AN ENVIRONMENT WHERE THE STORAGE TEMPERATURE IS BELOW -20°C (-4°F) OR ABOVE 55°C (131°F). IT MAY DAMAGE THE EQUIPMENT.

FCC

Warning!



This device complies with Part 15 FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received including interference that may cause undesired operation.

Caution:

There is a danger of explosion if the battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions and your local government's recycling or disposal directives.

Below Table for China RoHS Requirements

产品中有毒有害物质或元素名称及含量

AAEON Boxer/ Industrial System

部件名称	有毒有害物质或元素					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
印刷电路板 及其电子组件	×	○	○	○	○	○
外部信号 连接器及线材	×	○	○	○	○	○
外壳	×	○	○	○	○	○
中央处理器 与内存	×	○	○	○	○	○
硬盘	×	○	○	○	○	○
电源	×	○	○	○	○	○
<p>O: 表示该有毒有害物质在该部件所有均质材料中的含量均在 SJ/T 11363-2006 标准规定的限量要求以下。</p> <p>X: 表示该有毒有害物质至少在该部件的某一均质材料中的含量超出 SJ/T 11363-2006 标准规定的限量要求。</p> <p>备注:</p> <p>一、此产品所标示之环保使用期限，系指在一般正常使用状况下。</p> <p>二、上述部件物质中央处理器、内存、硬盘、电源为选购品。</p>						

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Chapter

1

General Information

1.1 Introduction

The newest EmBox series TKS-G21-CV05 has been introduced by AAEMON and it utilizes Intel® Atom™ processor. In this era of information explosion, the advertising of consumer products will not be confined to the family television, but will also spread to high-traffic public areas, like department stores, the bus, transportation station, the supermarket etc. The advertising marketing industry will resort to every conceivable means to transmit product information to consumers. System integrators will need a multifunction device to satisfy commercial needs for such public advertising.

The TKS-G21-CV05 is designed for indoor environments due to the following reasons; first, the TKS-G21-CV05 offers low power consumption system that while operating in ambient temperatures ranging from 0° to 50°C. The TKS-G21-CV05 is a standalone high performance controller designed for long-life operation and with high reliability. It can replace traditional methods and become the mainstream controller for the multimedia entertainment market.

1.2 Features

- Intel® Atom™ D2550 1.86 GHz Processor
- DDR3 1066 SODIMM x 1, Up To 4 GB
- CRT (VGA) Single View
- Realtek ALC 662 Codec for 2CH HD Audio
- Gigabit Ethernet x 2
- 2.5" SATA Hard Disk Drive Bay x 1
- USB2.0 x 4, COM x 6, 8-Bit Digital I/O
- Mini PCIe x 1, CFast™ x 1
- WiFi & Bluetooth® Combo Module (Optional To Occupy One PCI-Express Slot)
- +12V Power Input
- Fanless

1.3 Specifications

CPU		Onboard Intel® Atom™ D2550 Processor up to 1.86 GHz
Chipset		Intel® Atom™ D2550 + NM10
System Memory		204-pin DDR3 SODIMM x 1, Max. 4 GB (DDR3 1066)
Display Interface	VGA	D-SUB 15 x 1
Storage Device	SSD	CFast™ x 1
	HDD	2.5" Hard Disk Drive Bayx1
Network	LAN	Realtek RTL 8111E, 10/100/1000 Base-TX Ethernet
	Wireless	802.11b/g/n WiFi (Optional)
Front I/O	USB Host	USB Type A x 2
	Serial Port	COM x 3
	Audio	Line-out, Mic-in
Rear I/O	USB Host	USB Type A x 2
	LAN	RJ-45 x 2
	Serial Port	COM x 3
	DIO	8-bit (Programmable) x 1
	KB/MS	Through USB port
Expansion	Mini Card	Mini Card x 1 (Internal)
Indicator	Front	Power LED x 1, HDD LED x 1
Power Requirement		+12V DC Input
System Cooling		Fanless

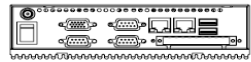
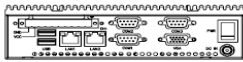
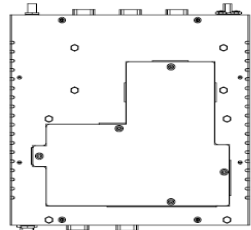
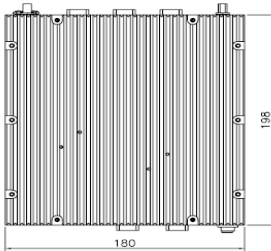
Mounting	Desktop or Wallmount (optional)
Operating Temperature	32°F ~ 122°F (0°C ~ 50°C)
Storage Temperature	-40°F ~ 176°F (-40°C ~ 80°C)
Anti-Vibration	5 g rms/ 5 ~ 500Hz/ random operation (CFast™); 1 g rms/ 5 ~ 500Hz/ random operation (Internal Hard Disk Drive active Module)
Anti-Shock	50 G peak acceleration (11 msec. duration) (CFast™); 20 G peak acceleration (11 msec. duration) (Hard Disk Drive Module)
Certification EMC	CE/FCC Class A
Dimension	7" x 7" x 1.97" (180mm x 180mm x 50mm)
Gross Weight	Heavy duty steel (1.78 kg/ 3.92 lb)

Chapter

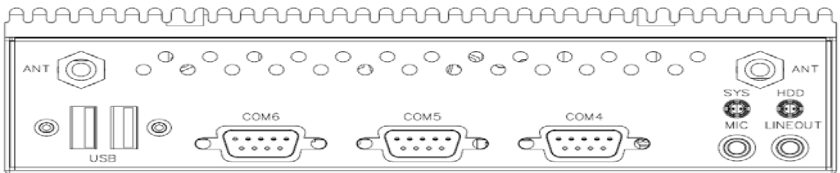
2

**Quick
Installation
Guide**

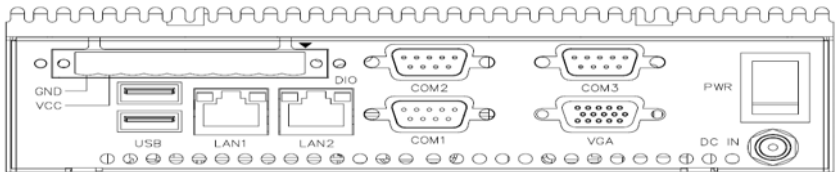
2.1 Dimension and I/O of TKS-G21-CV05



Front side

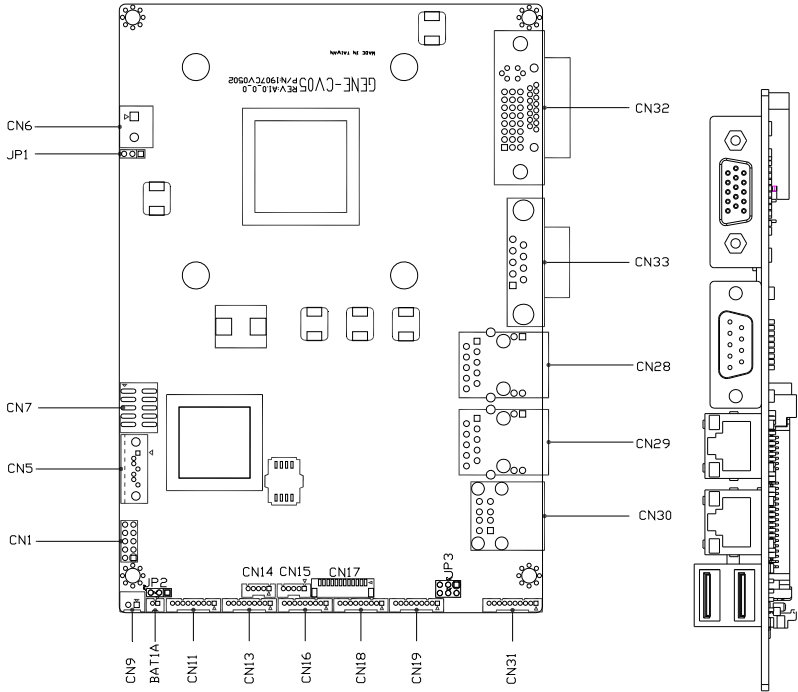


Back side

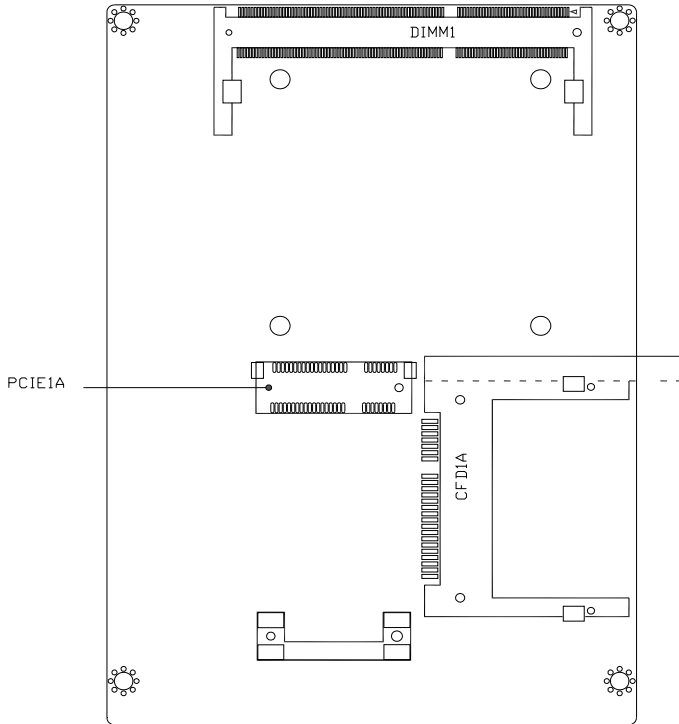


2.2 Location of Connectors and Jumpers of the Main Board

Component Side



Solder Side



2.3 List of Jumpers

The board has a number of jumpers that allow you to configure your system to suit your application.

The table below shows the function of each of the board's jumpers:

Label	Function
JP1	Auto Power Button Selection
JP2	Clear CMOS
JP3	COM2 RI/+5/+12V Selection

2.4 List of Connectors

The board has a number of connectors that allow you to configure your system to suit your application.

The table below shows the function of each of the board's connectors:

Label	Function
CN1	Front Panel
CN5	SATA Port
CN6	External 12V Input
CN7	Digital I/O
CN9	+5V Output for SATA HDD using
CN11	COM Port #6
CN13	COM Port #5
CN16	COM Port #4
CN18	COM Port #3
CN19	COM Port #2

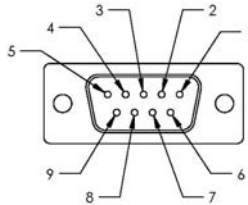
CN28	2 nd RJ-45 Ethernet
CN29	1 st RJ-45 Ethernet
CN30	USB Port #1 and #2
CN31	Audio Line In/Out and MIC
CN32	CRT/DVI (Configured by manufacturing)
CN33	COM Port #1
CFD1	CFAST
PCIE1	Mini Card/mSATA (Configured by Manufacturing)
DIMM1	DDR3 SODIMM Slot

2.5 COM Port #2 RS-232/422/485 Selection (CN19)

COM2 RS-232/422/485 selection for AAEON TKS series is set in BIOS setting as following:

Entering BIOS Setting Menu: Choose "Integrated Peripherals → Super IO device → COM2 select". (Default setting is at "RS-232")

Different devices implement the RS-232/422/485 standard in different ways. If you have problems with a serial device, check the pin assignments below for the connector.



RS-232 Mode

Pin	Signal	Pin	Signal
1	DCDB	2	DSRB
3	RXB	4	RTSB
5	TXB	6	CTSB
7	DTRB	8	RIB / +5 Volt. / (+12 Volt.)
9	Ground	10	N/C

RS-422 Mode

Pin	Signal	Pin	Signal
1	TXD-	2	N/C
3	RXD+	4	N/C

5	TXD+	6	N/C
7	RXD-	8	N/C / +5 Volt. / (+12 Volt.)
9	Ground	10	N/C

RS-485 Mode

Pin	Signal	Pin	Signal
1	TXD-	2	N/C
3	N/C	4	N/C
5	TXD+	6	N/C
7	N/C	8	N/C / +5 Volt. / (+12 Volt.)
9	Ground	10	N/C

Note:

Issue: COM port limitation for the speed test during the communication.

Root Cause:

In serial communication, data bits received at the serial port are bundled into a byte and transmitted into the serial port hardware buffer. From the buffer, the byte is sent into the CPU. If a new byte arrives before the byte in the buffer is moved into the CPU, a Hardware Overrun Error occurs.

Solution:

1. Try hardware handshaking.
2. See if the UART is an older un-buffered version or a new buffered UART (such as a 16550A or 16750). You should use a buffered UART for the reasons discussed above.
3. Change the Receive (Rx Trigger) buffer to 8, 4, or 1 (1 is a last resort).
4. For the product, the speed setting of Series Port (COM) is under 9600bps.

2.6 Digital I/O Connector (CN7)

Note: The max. rating of Pin 1 ~ Pin 8 is 3.3V@8mA

The max. rating of Pin 9 is 3.3V@0.5A

This connector offers 4-pair of digital I/O functions.

BIOS using the I2C Bus to read/write internal DIO registers and the Serial Bus address is 0x6E.

The pin definitions are illustrated below:

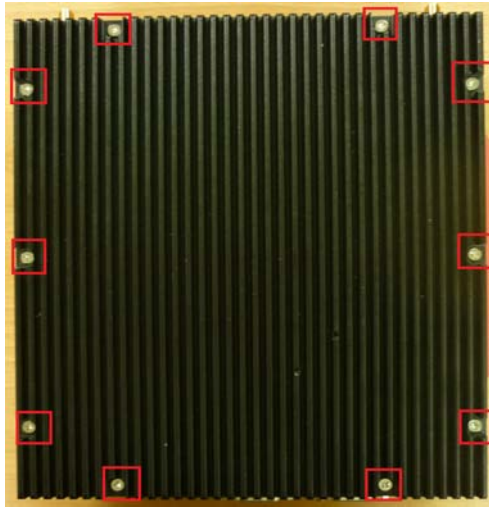


Pin	Signal	Pin	Signal
1	Port 1	2	Port 2
3	Port 3	4	Port 4
5	Port 5	6	Port 6
7	Port 7	8	Port 8
9	+3.3V	10	Ground

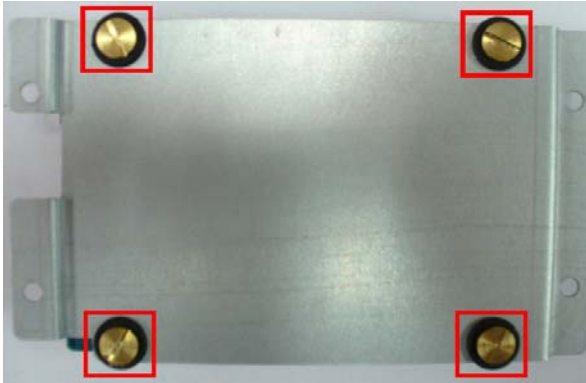
BIOS Setting (I2C address)	Connector Definition	Address(Register)		F75111 GPIO Setting
		Output	Input	
Port 1 @6Eh	Pin 1	21h/Bit 0	22h/Bit 0	U44 Pin 6 (GPIO 20)
Port 2 @6Eh	Pin 2	21h/Bit 1	22h/Bit 1	U44 Pin 7 (GPIO 21)
Port 3 @6Eh	Pin 3	21h/Bit 2	22h/Bit 2	U44 Pin 8 (GPIO 22)
Port 4 @6Eh	Pin 4	21h/Bit 3	22h/Bit 3	U44 Pin 24(GPIO 23)
Port 5 @6Eh	Pin 5	21h/Bit 4	22h/Bit 4	U44 Pin 23(GPIO 24)
Port 6 @6Eh	Pin 6	21h/Bit 5	22h/Bit 5	U44 Pin 22(GPIO 25)
Port 7 @6Eh	Pin 7	21h/Bit 6	22h/Bit 6	U44 Pin 21(GPIO 26)
Port 8 @6Eh	Pin 8	21h/Bit 7	22h/Bit 7	U44 Pin 20(GPIO 27)

2.7 Hard Disk Installation

Step 1: Unfasten the screws on the top of the heat-sink and you will see the inside of the system.



Step 2: Fasten the four HDD screws and black damper, and then you can put the HDD on the opposite side for screwing it up.



Step 3: Putting the HDD with the HDD bracket in by 45 degree height and make sure the bracket holes are matched with the chassis stand.

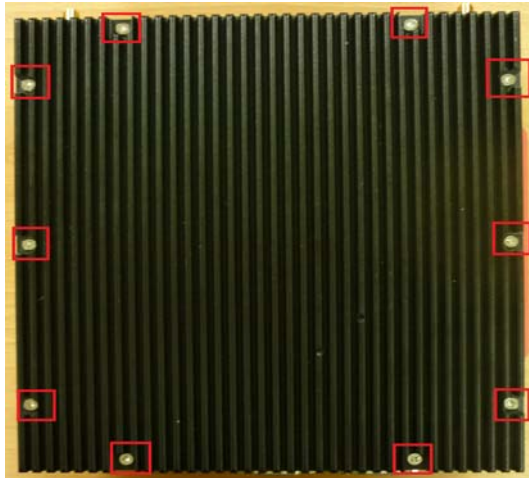


Step 4: Screwing the HDD bracket up and connecting the HDD cables with the MB (GENE-CV05).



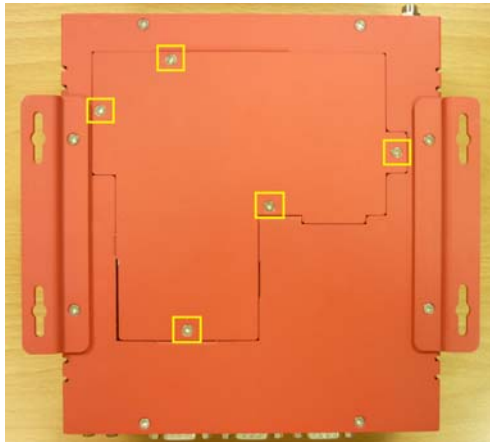


Step 5: Putting the chassis heat-sink on the top and fastening the screws up.

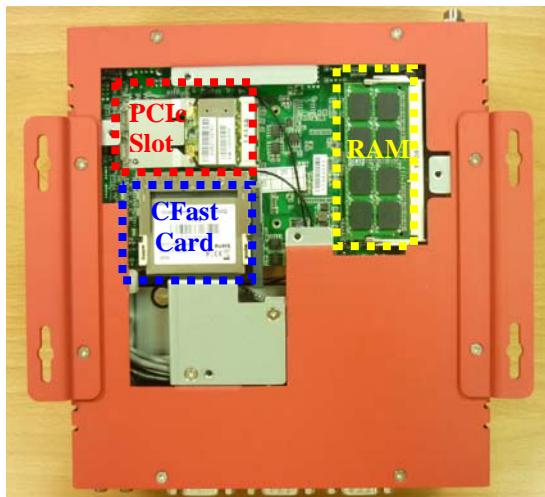


2.8 Accessory Installation

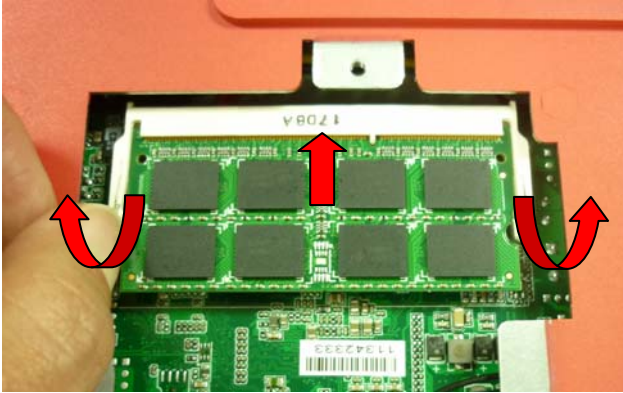
Step 1: Unfasten the 5 screws where is on the bottom of the box.



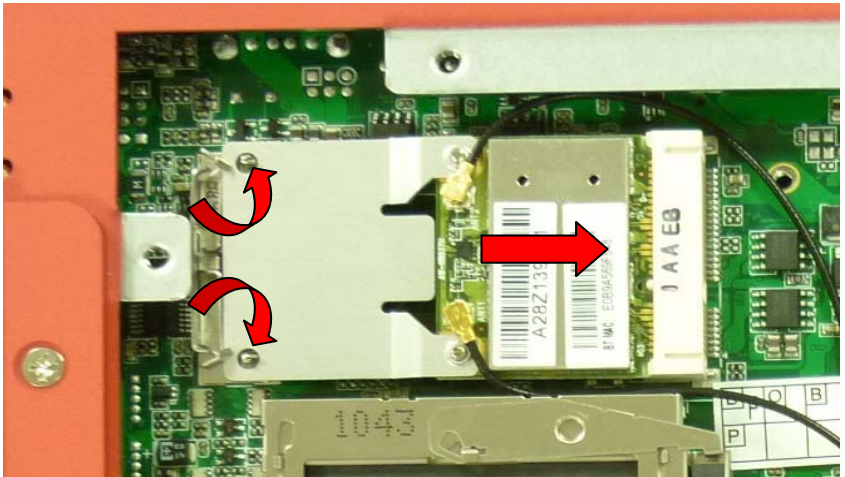
Step 2: You can see the inside placement of RAM, CFast™ card, PCIe slot for you installation.



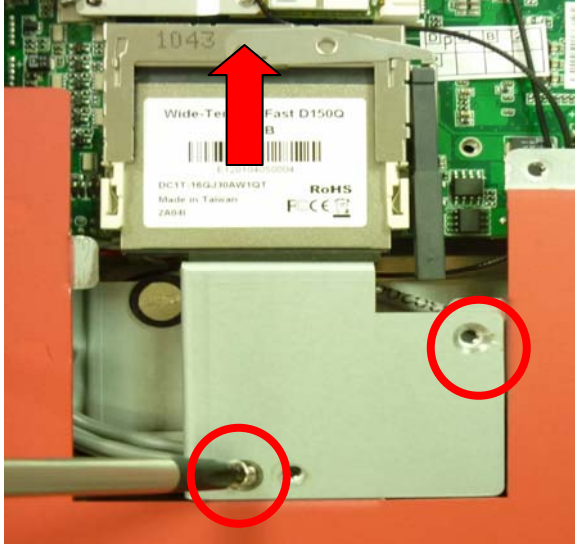
Step 2-1: Locate the memory module, insert the gold colored contact into the Socket. Push the module down, until it is firmly seated by locking Two latches on the sides.



Step 2-2: Locate the mini card module, insert the gold colored contact into the Socket. Push the module down, until it is firmly seated by locking two latches on the sides.

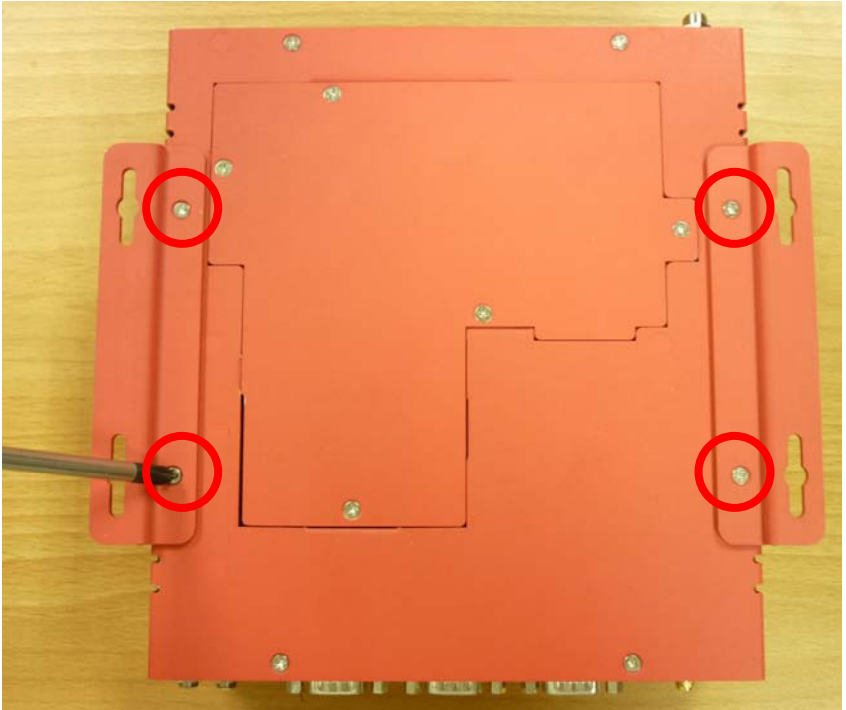


Step 2-3: Insert the Compact-Fast card into the socket until it is firmly seated, and then put the card bracket and screws it up.



2.9 Wallmount Kit Installation

Get the brackets ready and fasten appropriate four screws on each bracket. After fastening the two brackets on the bottom lid of, the wall mount kits installation has been finished.



Chapter

3

AMI BIOS Setup

3.1 System Test and Initialization

These routines test and initialize board hardware. If the routines encounter an error during the tests, you will either hear a few short beeps or see an error message on the screen. There are two kinds of errors: fatal and non-fatal. The system can usually continue the boot up sequence with non-fatal errors.

System configuration verification

These routines check the current system configuration against the values stored in the CMOS memory. If they do not match, the program outputs an error message. You will then need to run the BIOS setup program to set the configuration information in memory.

There are three situations in which you will need to change the CMOS settings:

1. You are starting your system for the first time
2. You have changed the hardware attached to your system
3. The CMOS memory has lost power and the configuration information has been erased.

The TKS-G21-CV05 CMOS memory has an integral lithium battery backup for data retention. However, you will need to replace the complete unit when it runs down.

3.2 AMI BIOS Setup

AMI BIOS ROM has a built-in Setup program that allows users to modify the basic system configuration. This type of information is stored in battery-backed CMOS RAM so that it retains the Setup information when the power is turned off.

Entering Setup

Power on the computer and press or <F2> immediately. This will allow you to enter Setup.

Main

Set the date, use tab to switch between date elements.

Advanced

Advanced BIOS Features Setup including TPM, ACPI, etc.

Chipset

Host bridge parameters.

Boot

Enables/disable quiet boot option.

Security

Set setup administrator password.

Save&Exit

Exit system setup after saving the changes.

Note:

1. If the "**Control LVDS2 (CH7511)**" has been set "**Disable**," and then, the screen cannot be switched to LVDS2 under the OS.

2. If the "**Control LVDS2 (CH7511)**" has been set "**Enable**," and then, the screen can be switched to LVDS2 under the OS.
3. This model does not support LVDS2 output under DOS mode. So if it is a dual LVDS application, users have to enable "**Onboard LVDS 2**" on the LVDS1 panel under BIOS interface, and then, enter to the OS.
4. For LVDS1 + LVDS2 application, this model does not support scaling after entering the OS, users have to set the fixed resolution on their LCD Panel under BIOS interface, and then, enter to the OS.

Chapter

4

**Driver
Installation**

The TKS-G21-CV05 comes with a CD-ROM that contains all drivers and utilities that meet your needs.

Follow the sequence below to install the drivers:

Step 1 – Install Chipset Driver

Step 2 – Install VGA Driver

Step 3 – Install LAN Driver

Step 4 – Install Audio Driver

Step 5 – Install AHCI Driver

Step 6 – Install Wireless LAN Driver (Optional)

4.1 Installation:

Insert the TKS-G21-CV05 CD-ROM into the CD-ROM Drive. And install the drivers from Step 1 to Step 6 in order.

Step 1 – Install Chipset Driver

1. Click on the **STEP1-CHIPSET** folder and double click on the **Setup.exe**
2. Follow the instructions that the window shows
3. The system will help you install the driver automatically

Step 2 – Install VGA Driver

1. Click on the **STEP2-VGA** folder and double click on the **Setup.exe**
2. Follow the instructions that the window shows
3. The system will help you install the driver automatically

Step 3 – Install LAN Driver

1. Click on the **STEP3-LAN** folder and double click on the **setup.exe**
2. Follow the instructions that the window shows
3. The system will help you install the driver automatically

Step 4 – Install Audio Driver

1. Click on the **STEP4-AUDIO** folder and double click on the **Setup.exe**
2. Follow the instructions that the window shows
3. The system will help you install the driver automatically

Step 5 – Install AHCI Driver

1. Click on the **STEP5-AHCI** folder and double click on the **setup.exe**
2. Follow the instructions that the window shows
3. The system will help you install the driver automatically

Step 6 – Install Wireless LAN Driver (Optional)

1. Click on the **STEP6-WIRELESS LAN** folder and select the folder of **WLAN** or **BT_7.4.0.98**
2. For WLAN, select the folder of **WLAN**, and then select the folder of **Install_CD**. Double click on the **setup.exe** file located in the folder of **Install_CD**.

For Bluetooth, select the folder of **BT_7.4.0.98**, and double click on the **Bluetooth_Suite_win7.exe** file

3. Follow the instructions that the window shows
4. The system will help you install the driver automatically

Appendix

A

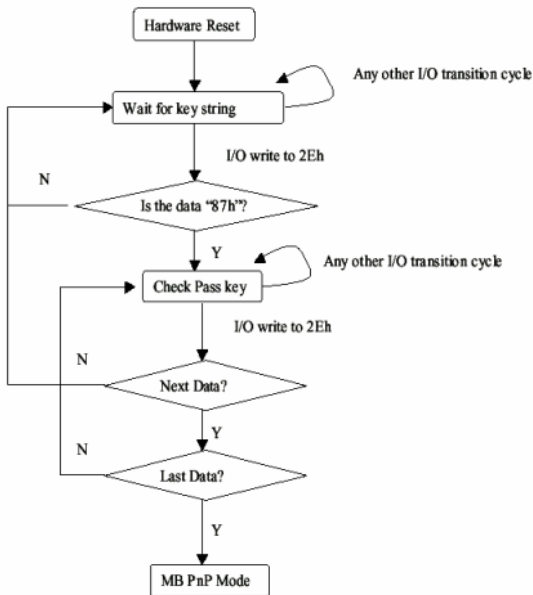
Programming the Watchdog Timer

A.1 Programming

TKS-G21-CV05 utilizes ITE 8783 chipset as its watchdog timer controller. Below are the procedures to complete its configuration and the AAEON initial watchdog timer program is also attached based on which you can develop customized program to fit your application.

Configuring Sequence Description

After the hardware reset or power-on reset, the ITE 8783 enters the normal mode with all logical devices disabled except KBC. The initial state (enable bit) of this logical device (KBC) is determined by the state of pin 121 (DTR1#) at the falling edge of the system reset during power-on reset.



There are three steps to complete the configuration setup: (1) Enter the MB PnP Mode; (2) Modify the data of configuration registers; (3) Exit the MB PnP Mode. Undesired result may occur if the MB PnP Mode is not exited normally.

(1) Enter the MB PnP Mode

To enter the MB PnP Mode, four special I/O write operations are to be performed during Wait for Key state. To ensure the initial state of the key-check logic, it is necessary to perform four write operations to the Special Address port (2EH). Two different enter keys are provided to select configuration ports (2Eh/2Fh) of the next step.

	Address Port	Data Port
87h, 01h, 55h, 55h:	2Eh	2Fh

(2) Modify the Data of the Registers

All configuration registers can be accessed after entering the MB PnP Mode. Before accessing a selected register, the content of Index 07h must be changed to the LDN to which the register belongs, except some Global registers.

(3) Exit the MB PnP Mode

Set bit 1 of the configure control register (Index=02h) to 1 to exit the MB PnP Mode.

WatchDog Timer Configuration Registers

LDN	Index	R/W	Reset	Configuration Register or Action
All	02h	W	NA	Configure Control

07h	71h	R/W	00h	Watch Dog Timer Control Register
07h	72h	R/W	001s0000b	Watch Dog Timer Configuration Register
07h	73h	R/W	38h	Watch Dog Timer Time-out Value (LSB) Register
07h	74h	R/W	00h	Watch Dog Timer Time-out Value (MSB) Register

Configure Control (Index=02h)

This register is write only. Its values are not sticky; that is to say, a hardware reset will automatically clear the bits, and does not require the software to clear them.

Bit	Description
7-2	Reserved
1	Returns to the "Wait for Key" state. This bit is used when the configuration sequence is completed.
0	Resets all logical devices and restores configuration registers to their power-on states.

Watch Dog Timer 1, 2, 3 Control Register (Index=71h,81h,91h Default=00h)

Bit	Description
7	WDT Timeout Enable(WTE) 1: Disable. 0: Enable.
6	WDT Reset upon Mouse Interrupt(WRKMI) 0: Disable. 1: Enable.
5	WDT Reset upon Keyboard Interrupt(WRKBI) 0: Disable. 1: Enable.
4	Reserved
3-2	Reserved
1	Force Time-out(FTO) This bit is self-clearing.
0	WDT Status(WS) 1: WDT value reaches 0. 0: WDT value is not 0.

Watch Dog Timer 1, 2, 3 Configuration Register (Index=72h, 82h, 92h Default=001s0000b)

Bit	Description
7	WDT Time-out Value Select 1 (WTVS) 1: Second 0: Minute
6	WDT Output through KRST (Pulse) Enable(WOKE) 1: Enable 0: Disable
5	WDT Time-out value Extra select(WTVES) 1: 64ms x WDT Timer-out value (default = 4s) 0: Determined by WDT Time-out value select 1 (bit 7 of this register)
4	WDT Output through PWROK (Pulse) Enable(WOPE) 1: Enable 0: Disable During LRESET#, this bit is selected by JP7 power-on strapping option
3-0	Select interrupt level^{Note1} for WDT(SIL)

Watch Dog Timer 1,2,3 Time-Out Value (LSB) Register (Index=73h,83h,93h, Default=38h)

Bit	Description
7-0	WDT Time-out Value 7-0(WTV)

Watch Dog Timer 1,2,3 Time-Out Value (MSB) Register (Index=74h,84h,94h Default=00h)

Bit	Description
7-0	WDT Time-out Value 15-8(WTV)

A.2 ITE8783 Watchdog Timer Initial Program

```
.MODEL SMALL
.CODE
Main:
CALL Enter_Configuration_mode
CALL Check_Chip
mov cl, 7
call Set_Logic_Device
;time setting
mov cl, 10 ; 10 Sec
dec al
Watch_Dog_Setting:
;Timer setting
mov al, cl
mov cl, 73h
call Superio_Set_Reg
;Clear by keyboard or mouse interrupt
mov al, 0f0h
mov cl, 71h
call Superio_Set_Reg
;unit is second.
mov al, 0C0H
mov cl, 72h
```

```
call Superio_Set_Reg  
; game port enable  
mov cl, 9  
call Set_Logic_Device
```

```
Initial_OK:  
CALL Exit_Configuration_mode  
MOV AH,4Ch  
INT 21h
```

```
Enter_Configuration_Mode PROC NEAR  
MOV SI,WORD PTR CS:[Offset Cfg_Port]
```

```
MOV DX,02Eh  
MOV CX,04h  
Init_1:  
MOV AL,BYTE PTR CS:[SI]  
OUT DX,AL  
INC SI  
LOOP Init_1  
RET  
Enter_Configuration_Mode ENDP
```

```
Exit_Configuration_Mode PROC NEAR  
MOV AX,0202h
```

```
CALL Write_Configuration_Data
RET
Exit_Configuration_Mode ENDP
```

```
Check_Chip PROC NEAR
```

```
MOV AL,20h
CALL Read_Configuration_Data
CMP AL,87h
JNE Not_Initial
```

```
MOV AL,21h
CALL Read_Configuration_Data
CMP AL,81h
JNE Not_Initial
```

```
Need_Initial:
```

```
STC
```

```
RET
```

```
Not_Initial:
```

```
CLC
```

```
RET
```

```
Check_Chip ENDP
```

```
Read_Configuration_Data PROC NEAR
```

```
MOV DX,WORD PTR CS:[Cfg_Port+04h]
```

```
OUT DX,AL
MOV DX,WORD PTR CS:[Cfg_Port+06h]
IN AL,DX
RET
Read_Configuration_Data ENDP
```

```
Write_Configuration_Data PROC NEAR
MOV DX,WORD PTR CS:[Cfg_Port+04h]
OUT DX,AL
XCHG AL,AH
MOV DX,WORD PTR CS:[Cfg_Port+06h]
OUT DX,AL
RET
Write_Configuration_Data ENDP
```

```
Superio_Set_Reg proc near
push ax
MOV DX,WORD PTR CS:[Cfg_Port+04h]
mov al,cl
out dx,al
pop ax
inc dx
out dx,al
ret
Superio_Set_Reg endp.Set_Logic_Device proc near
```



```
Set_Logic_Device    proc    near
push ax
push cx
xchg al,cl
mov cl,07h
call Superio_Set_Reg
pop cx
pop ax
ret
Set_Logic_Device endp
```

```
;Select 02Eh->Index Port, 02Fh->Data Port
Cfg_Port DB 087h,001h,055h,055h
DW 02Eh,02Fh
```

END Main

Note: Interrupt level mapping

0Fh-Dh: not valid

0Ch: IRQ12

.

.

03h: IRQ3

02h: not valid

01h: IRQ1

00h: no interrupt selected

Appendix

B

I/O Information

B.1 I/O Address Map

Input/output (IO)	
[00000000 - 0000001F]	Direct memory access controller
[00000000 - 00000CF7]	PCI bus
[00000010 - 0000001F]	Motherboard resources
[00000020 - 00000021]	Programmable interrupt controller
[00000022 - 0000003F]	Motherboard resources
[00000024 - 00000025]	Programmable interrupt controller
[00000028 - 00000029]	Programmable interrupt controller
[0000002C - 0000002D]	Programmable interrupt controller
[0000002E - 0000002F]	Motherboard resources
[00000030 - 00000031]	Programmable interrupt controller
[00000034 - 00000035]	Programmable interrupt controller
[00000038 - 00000039]	Programmable interrupt controller
[0000003C - 0000003D]	Programmable interrupt controller
[00000040 - 00000043]	System timer
[00000044 - 0000005F]	Motherboard resources
[0000004E - 0000004F]	Motherboard resources
[00000050 - 00000053]	System timer
[00000060 - 00000060]	Standard PS/2 Keyboard
[00000061 - 00000061]	Motherboard resources
[00000062 - 00000063]	Motherboard resources
[00000063 - 00000063]	Motherboard resources
[00000064 - 00000064]	Standard PS/2 Keyboard
[00000065 - 00000065]	Motherboard resources
[00000065 - 0000006F]	Motherboard resources
[00000067 - 00000067]	Motherboard resources
[00000070 - 00000070]	Motherboard resources
[00000070 - 00000077]	System CMOS/real time clock
[00000072 - 0000007F]	Motherboard resources
[00000080 - 00000080]	Motherboard resources
[00000080 - 00000080]	Motherboard resources
[00000081 - 00000091]	Direct memory access controller
[00000084 - 00000086]	Motherboard resources
[00000088 - 00000088]	Motherboard resources
[0000008C - 0000008E]	Motherboard resources
[00000090 - 0000009F]	Motherboard resources
[00000092 - 00000092]	Motherboard resources
[00000093 - 0000009F]	Direct memory access controller
[000000A0 - 000000A1]	Programmable interrupt controller
[000000A2 - 000000BF]	Motherboard resources
[000000A4 - 000000A5]	Programmable interrupt controller
[000000A8 - 000000A9]	Programmable interrupt controller
[000000AC - 000000AD]	Programmable interrupt controller
[000000B0 - 000000B1]	Programmable interrupt controller
[000000B2 - 000000B3]	Motherboard resources
[000000B4 - 000000B5]	Programmable interrupt controller
[000000B8 - 000000B9]	Programmable interrupt controller
[000000BC - 000000BD]	Programmable interrupt controller
[000000C0 - 000000DF]	Direct memory access controller

[000000E0 - 000000EF]	Motherboard resources
[000000F0 - 000000F0]	Numeric data processor
[000002E0 - 000002E7]	Communications Port (COM6)
[000002E8 - 000002EF]	Communications Port (COM4)
[000002F0 - 000002F7]	Communications Port (COM5)
[000002F8 - 000002FF]	Communications Port (COM2)
[00000378 - 0000037F]	Printer Port (LPT1)
[000003B0 - 000003BB]	Intel(R) Graphics Media Accelerator 3600 Series
[000003C0 - 000003DF]	Intel(R) Graphics Media Accelerator 3600 Series
[000003E8 - 000003EF]	Communications Port (COM3)
[000003F8 - 000003FF]	Communications Port (COM1)
[00000400 - 0000047F]	Motherboard resources
[00000400 - 0000047F]	Motherboard resources
[000004D0 - 000004D1]	Motherboard resources
[000004D0 - 000004D1]	Programmable interrupt controller
[00000500 - 0000053F]	Motherboard resources
[00000500 - 0000057F]	Motherboard resources
[00000600 - 0000061F]	Motherboard resources
[00000680 - 0000069F]	Motherboard resources
[000006A0 - 000006AF]	Motherboard resources
[000006B0 - 000006EF]	Motherboard resources
[00000A00 - 00000A1F]	Motherboard resources
[00000A20 - 00000A2F]	Motherboard resources
[00000A30 - 00000A3F]	Motherboard resources
[00000D00 - 0000FFFF]	PCI bus
[00001000 - 0000100F]	Motherboard resources
[0000D000 - 0000D0FF]	Realtek PCIe GBE Family Controller #2
[0000D000 - 0000DFFF]	Intel(R) N10/ICH7 Family PCI Express Root Port - 27D2
[0000E000 - 0000E0FF]	Realtek PCIe GBE Family Controller
[0000E000 - 0000EFFF]	Intel(R) N10/ICH7 Family PCI Express Root Port - 27D0
[0000F000 - 0000F01F]	Intel(R) N10/ICH7 Family SMBus Controller - 27DA
[0000F020 - 0000F02F]	Intel(R) NM10 Express Chipset
[0000F040 - 0000F05F]	Intel(R) N10/ICH7 Family USB Universal Host Controller - 27CB
[0000F060 - 0000F07F]	Intel(R) N10/ICH7 Family USB Universal Host Controller - 27CA
[0000F080 - 0000F09F]	Intel(R) N10/ICH7 Family USB Universal Host Controller - 27C9
[0000F0A0 - 0000F0BF]	Intel(R) N10/ICH7 Family USB Universal Host Controller - 27C8
[0000F0C0 - 0000F0C3]	Intel(R) NM10 Express Chipset
[0000F0D0 - 0000F0D7]	Intel(R) NM10 Express Chipset
[0000F0E0 - 0000F0E3]	Intel(R) NM10 Express Chipset
[0000F0F0 - 0000F0F7]	Intel(R) NM10 Express Chipset
[0000F100 - 0000F107]	Intel(R) Graphics Media Accelerator 3600 Series
[0000FFFF - 0000FFFF]	Motherboard resources
[0000FFFF - 0000FFFF]	Motherboard resources

B.2 1st MB Memory Address Map

Address Range	Device Name
[00000000 - 00000FFF]	Motherboard resources
[00000000 - 00000FFF]	Motherboard resources
[00000000 - 00003FFF]	Motherboard resources
[000A0000 - 000BFFFF]	Intel(R) Graphics Media Accelerator 3600 Series
[000A0000 - 000BFFFF]	PCI bus
[000C0000 - 000DFFFF]	PCI bus
[000E0000 - 000EFFFF]	PCI bus
[000F0000 - 000FFFFFF]	PCI bus
[3F800000 - 3FFFFFFF]	PCI bus
[40000000 - FEBFFFFFF]	PCI bus
[DFC00000 - DFCFFFFFF]	Intel(R) Graphics Media Accelerator 3600 Series
[DFD00000 - DFD03FFF]	Realtek PCIe GBE Family Controller #2
[DFD00000 - DFD0FFFF]	Intel(R) N10/ICH7 Family PCI Express Root Port - 27D2
[DFD04000 - DFD04FFF]	Realtek PCIe GBE Family Controller #2
[DFE00000 - DFE03FFF]	Realtek PCIe GBE Family Controller
[DFE00000 - DFEFFFFFF]	Intel(R) N10/ICH7 Family PCI Express Root Port - 27D0
[DFE04000 - DFE04FFF]	Realtek PCIe GBE Family Controller
[DFF00000 - DFF03FFF]	High Definition Audio Controller
[DFF04000 - DFF043FF]	Intel(R) NM10 Express Chipset
[DFF05000 - DFF053FF]	Intel(R) N10/ICH7 Family USB2 Enhanced Host Controller - 27CC
[E0000000 - EFFFFFFF]	System board
[FEC00000 - FEC00FFF]	Motherboard resources
[FED00000 - FED003FF]	High precision event timer
[FED14000 - FED19FFF]	System board
[FED1C000 - FED1FFFF]	Motherboard resources
[FED1C000 - FED1FFFF]	Motherboard resources
[FED20000 - FED8FFFF]	Motherboard resources
[FED45000 - FED8FFFF]	Motherboard resources
[FEE00000 - FEE00FFF]	Motherboard resources
[FF000000 - FFFFFFFF]	Intel(R) 82802 Firmware Hub Device
[FF000000 - FFFFFFFF]	Intel(R) 82802 Firmware Hub Device
[FFC00000 - FFFFFFFF]	Motherboard resources

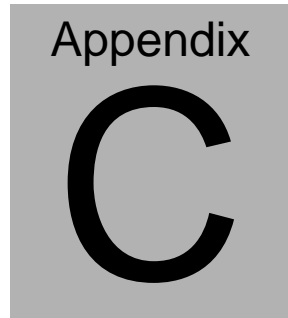
B.3 IRQ Mapping Chart

Interrupt request (IRQ)	Description
(ISA) 0x00000000 (00)	System timer
(ISA) 0x00000001 (01)	Standard PS/2 Keyboard
(ISA) 0x00000003 (03)	Communications Port (COM2)
(ISA) 0x00000004 (04)	Communications Port (COM1)
(ISA) 0x00000005 (05)	Communications Port (COM5)
(ISA) 0x00000007 (07)	Communications Port (COM6)
(ISA) 0x00000008 (08)	System CMOS/real time clock
(ISA) 0x0000000A (10)	Communications Port (COM3)
(ISA) 0x0000000B (11)	Communications Port (COM4)
(ISA) 0x0000000C (12)	Microsoft PS/2 Mouse
(ISA) 0x0000000D (13)	Numeric data processor
(ISA) 0x00000051 (81)	Microsoft ACPI-Compliant System
(ISA) 0x00000052 (82)	Microsoft ACPI-Compliant System
(ISA) 0x00000053 (83)	Microsoft ACPI-Compliant System
(ISA) 0x00000054 (84)	Microsoft ACPI-Compliant System
(ISA) 0x00000055 (85)	Microsoft ACPI-Compliant System
(ISA) 0x00000056 (86)	Microsoft ACPI-Compliant System
(ISA) 0x00000057 (87)	Microsoft ACPI-Compliant System
(ISA) 0x00000058 (88)	Microsoft ACPI-Compliant System
(ISA) 0x00000059 (89)	Microsoft ACPI-Compliant System
(ISA) 0x0000005A (90)	Microsoft ACPI-Compliant System
(ISA) 0x0000005B (91)	Microsoft ACPI-Compliant System
(ISA) 0x0000005C (92)	Microsoft ACPI-Compliant System
(ISA) 0x0000005D (93)	Microsoft ACPI-Compliant System
(ISA) 0x0000005E (94)	Microsoft ACPI-Compliant System
(ISA) 0x0000005F (95)	Microsoft ACPI-Compliant System
(ISA) 0x00000060 (96)	Microsoft ACPI-Compliant System
(ISA) 0x00000061 (97)	Microsoft ACPI-Compliant System
(ISA) 0x00000062 (98)	Microsoft ACPI-Compliant System
(ISA) 0x00000063 (99)	Microsoft ACPI-Compliant System
(ISA) 0x00000064 (100)	Microsoft ACPI-Compliant System
(ISA) 0x00000065 (101)	Microsoft ACPI-Compliant System
(ISA) 0x00000066 (102)	Microsoft ACPI-Compliant System
(ISA) 0x00000067 (103)	Microsoft ACPI-Compliant System
(ISA) 0x00000068 (104)	Microsoft ACPI-Compliant System
(ISA) 0x00000069 (105)	Microsoft ACPI-Compliant System
(ISA) 0x0000006A (106)	Microsoft ACPI-Compliant System
(ISA) 0x0000006B (107)	Microsoft ACPI-Compliant System
(ISA) 0x0000006C (108)	Microsoft ACPI-Compliant System
(ISA) 0x0000006D (109)	Microsoft ACPI-Compliant System
(ISA) 0x0000006E (110)	Microsoft ACPI-Compliant System
(ISA) 0x0000006F (111)	Microsoft ACPI-Compliant System
(ISA) 0x00000070 (112)	Microsoft ACPI-Compliant System
(ISA) 0x00000071 (113)	Microsoft ACPI-Compliant System
(ISA) 0x00000072 (114)	Microsoft ACPI-Compliant System
(ISA) 0x00000073 (115)	Microsoft ACPI-Compliant System
(ISA) 0x00000074 (116)	Microsoft ACPI-Compliant System
(ISA) 0x00000075 (117)	Microsoft ACPI-Compliant System
(ISA) 0x00000076 (118)	Microsoft ACPI-Compliant System
(ISA) 0x00000077 (119)	Microsoft ACPI-Compliant System
(ISA) 0x00000078 (120)	Microsoft ACPI-Compliant System
(ISA) 0x00000079 (121)	Microsoft ACPI-Compliant System
(ISA) 0x0000007A (122)	Microsoft ACPI-Compliant System
(ISA) 0x0000007B (123)	Microsoft ACPI-Compliant System
(ISA) 0x0000007C (124)	Microsoft ACPI-Compliant System
(ISA) 0x0000007D (125)	Microsoft ACPI-Compliant System
(ISA) 0x0000007E (126)	Microsoft ACPI-Compliant System
(ISA) 0x0000007F (127)	Microsoft ACPI-Compliant System
(ISA) 0x00000080 (128)	Microsoft ACPI-Compliant System
(ISA) 0x00000081 (129)	Microsoft ACPI-Compliant System
(ISA) 0x00000082 (130)	Microsoft ACPI-Compliant System

(ISA) 0x00000083 (131)	Microsoft ACPI-Compliant System
(ISA) 0x00000084 (132)	Microsoft ACPI-Compliant System
(ISA) 0x00000085 (133)	Microsoft ACPI-Compliant System
(ISA) 0x00000086 (134)	Microsoft ACPI-Compliant System
(ISA) 0x00000087 (135)	Microsoft ACPI-Compliant System
(ISA) 0x00000088 (136)	Microsoft ACPI-Compliant System
(ISA) 0x00000089 (137)	Microsoft ACPI-Compliant System
(ISA) 0x0000008A (138)	Microsoft ACPI-Compliant System
(ISA) 0x0000008B (139)	Microsoft ACPI-Compliant System
(ISA) 0x0000008C (140)	Microsoft ACPI-Compliant System
(ISA) 0x0000008D (141)	Microsoft ACPI-Compliant System
(ISA) 0x0000008E (142)	Microsoft ACPI-Compliant System
(ISA) 0x0000008F (143)	Microsoft ACPI-Compliant System
(ISA) 0x00000090 (144)	Microsoft ACPI-Compliant System
(ISA) 0x00000091 (145)	Microsoft ACPI-Compliant System
(ISA) 0x00000092 (146)	Microsoft ACPI-Compliant System
(ISA) 0x00000093 (147)	Microsoft ACPI-Compliant System
(ISA) 0x00000094 (148)	Microsoft ACPI-Compliant System
(ISA) 0x00000095 (149)	Microsoft ACPI-Compliant System
(ISA) 0x00000096 (150)	Microsoft ACPI-Compliant System
(ISA) 0x00000097 (151)	Microsoft ACPI-Compliant System
(ISA) 0x00000098 (152)	Microsoft ACPI-Compliant System
(ISA) 0x00000099 (153)	Microsoft ACPI-Compliant System
(ISA) 0x0000009A (154)	Microsoft ACPI-Compliant System
(ISA) 0x0000009B (155)	Microsoft ACPI-Compliant System
(ISA) 0x0000009C (156)	Microsoft ACPI-Compliant System
(ISA) 0x0000009D (157)	Microsoft ACPI-Compliant System
(ISA) 0x0000009E (158)	Microsoft ACPI-Compliant System
(ISA) 0x0000009F (159)	Microsoft ACPI-Compliant System
(ISA) 0x000000A0 (160)	Microsoft ACPI-Compliant System
(ISA) 0x000000A1 (161)	Microsoft ACPI-Compliant System
(ISA) 0x000000A2 (162)	Microsoft ACPI-Compliant System
(ISA) 0x000000A3 (163)	Microsoft ACPI-Compliant System
(ISA) 0x000000A4 (164)	Microsoft ACPI-Compliant System
(ISA) 0x000000A5 (165)	Microsoft ACPI-Compliant System
(ISA) 0x000000A6 (166)	Microsoft ACPI-Compliant System
(ISA) 0x000000A7 (167)	Microsoft ACPI-Compliant System
(ISA) 0x000000A8 (168)	Microsoft ACPI-Compliant System
(ISA) 0x000000A9 (169)	Microsoft ACPI-Compliant System
(ISA) 0x000000AA (170)	Microsoft ACPI-Compliant System
(ISA) 0x000000AB (171)	Microsoft ACPI-Compliant System
(ISA) 0x000000AC (172)	Microsoft ACPI-Compliant System
(ISA) 0x000000AD (173)	Microsoft ACPI-Compliant System
(ISA) 0x000000AE (174)	Microsoft ACPI-Compliant System
(ISA) 0x000000AF (175)	Microsoft ACPI-Compliant System
(ISA) 0x000000B0 (176)	Microsoft ACPI-Compliant System
(ISA) 0x000000B1 (177)	Microsoft ACPI-Compliant System
(ISA) 0x000000B2 (178)	Microsoft ACPI-Compliant System
(ISA) 0x000000B3 (179)	Microsoft ACPI-Compliant System
(ISA) 0x000000B4 (180)	Microsoft ACPI-Compliant System
(ISA) 0x000000B5 (181)	Microsoft ACPI-Compliant System
(ISA) 0x000000B6 (182)	Microsoft ACPI-Compliant System
(ISA) 0x000000B7 (183)	Microsoft ACPI-Compliant System
(ISA) 0x000000B8 (184)	Microsoft ACPI-Compliant System
(ISA) 0x000000B9 (185)	Microsoft ACPI-Compliant System
(ISA) 0x000000BA (186)	Microsoft ACPI-Compliant System
(ISA) 0x000000BB (187)	Microsoft ACPI-Compliant System
(ISA) 0x000000BC (188)	Microsoft ACPI-Compliant System
(ISA) 0x000000BD (189)	Microsoft ACPI-Compliant System
(ISA) 0x000000BE (190)	Microsoft ACPI-Compliant System

B.4 DMA Channel Assignments

- Direct memory access (DMA)
- 4 Direct memory access controller



Digital I/O

C.1 Digital I/O

The F75111 provides one serial access interface, I2C Bus, to read/write internal registers. The address of Serial Bus is 0x6E (0110_1110)

The related register for configuring DIO is list as follows:

Configuration and Control Register-Index 01h

Power-on default [7:0]=0000_1000b

Bit	Name	R/W	PWR	Description
7	INIT	R/W	VSB3V	Software reset for all registers including Test Mode registers. Users use only.
6	Reserved	R/W	VSB3V	
5	EN_WDT10	R/W	VSB3V	Enable Reset Out. If set to 1, enable WDTOUT10# output. Default is disable.
4	Reserved	R/W	VSB3V	
3	Reserved	R/W	VSB3V	
2	Reserved	R/W	VSB3V	
1	SMART_P OWR_MAG EMENT	R/W	VSB3V	Set this bit to 1 will enable auto power down mode, when all function are idle then 20ms the chip will auto power down, it will wakeup when GPIO state change or read write register
0	SOFT_PO WR_DOW N	R/W	VSB3V	Set this bit to 1 will power down all of the analog block and stop internal clock, write 0 to clear this bit or when GPIO state change will auto clear this bit to 0.

GPIO2x Output Control Register-Index 20h

Power-on default [7:0]=0000_0000b

Bit	Name	R/W	PWR	Description
7	GP27_OCTL	R/W	VSB3V	GPIO 27 output control. Set to 1 for output function. Set to 0 for input function (default).
6	GP26_OCTL	R/W	VSB3V	GPIO 26 output control. Set to 1 for output function. Set to 0 for input function (default).
5	GP25_OCTL	R/W	VSB3V	GPIO 25 output control. Set to 1 for output function. Set to 0 for input function (default).
4	GP24_OCTL	R/W	VSB3V	GPIO 24 output control. Set to 1 for output function. Set to 0 for input function (default).
3	GP23_OCTL	R/W	VSB3V	GPIO 23 output control. Set to 1 for output function. Set to 0 for input function (default).
2	GP22_OCTL	R/W	VSB3V	GPIO 22 output control. Set to 1 for output function. Set to 0 for input function (default).
1	GP21_OCTL	R/W	VSB3V	GPIO 21 output control. Set to 1 for output function. Set to 0 for input function (default).
0	GP20_OCTL	R/W	VSB3V	GPIO 20 output control. Set to 1 for output function. Set to 0 for input function (default).

GPIO2x Output Data Register-Index 21h

Power-on default [7:0]=0000_0000b

Bit	Name	R/W	PWR	Description
7	GP27_ODATA	R/W	VSB3V	GPIO 27 output data.
6	GP26_ODATA	R/W	VSB3V	GPIO 26 output data.
5	GP25_ODATA	R/W	VSB3V	GPIO 25 output data.

4	GP24_ODA TA	R/W	VSB3V	GPIO 24 output data.
3	GP23_ODA TA	R/W	VSB3V	GPIO 23 output data.
2	GP22_ODA TA	R/W	VSB3V	GPIO 22 output data.
1	GP21_ODA TA	R/W	VSB3V	GPIO 21 output data.
0	GP20_ODA TA	R/W	VSB3V	GPIO 20 output data.

GPIO2x Input Status Register-Index 22h

Power-on default [7:0]=xxxx_xxxx_b

Bit	Name	R/W	PWR	Description
7	GP27_PST S	RO	VSB3V	Read the GPIO27 data on the pin.
6	GP26_PST S	RO	VSB3V	Read the GPIO26 data on the pin.
5	GP25_PST S	RO	VSB3V	Read the GPIO25 data on the pin.
4	GP24_PST S	RO	VSB3V	Read the GPIO24 data on the pin.
3	GP23_PST S	RO	VSB3V	Read the GPIO23 data on the pin.
2	GP22_PST S	RO	VSB3V	Read the GPIO22 data on the pin.
1	GP21_PST S	RO	VSB3V	Read the GPIO21 data on the pin.
0	GP20_PST S	RO	VSB3V	Read the GPIO20 data on the pin.

The following is a sample code for 8 input

```
.MODEL SMALL
```

```
.CODE
```

begin:

```

mov  cl,01h
mov  al,80h
call CT_I2CWriteByte
call Delay5ms

```

```

mov  al,00h
mov  cl,20h
call CT_I2CWriteByte

mov  cl,22h
call CT_I2CReadByte

```

;Input : CL - register index

; CH - device ID

;Output : AL - Value read

Ct_I2CReadByte Proc Near

```

mov  ch,06eh

```

```

mov  dx, 0f000h + 00h ; Host Control Register

```

```

mov  al, 0ffh ; Clear previous

```

commands

```

out  dx, al

```

```
    call    Delay5ms

    mov     dx, 0f000h + 04h      ; Transmit Slave Address
Register
    inc     ch                    ; Set the slave address and
    mov     al, ch                ; prepare for a READ command
    out     dx, al

    mov     dx, 0f000h + 03h     ; Host Command Register
    mov     al, cl                ; offset to read
    out     dx, al

    mov     dx, 0f000h + 05h
    xor     al, al                ; Clear old data
    out     dx, al

    mov     dx, 0f000h + 02h ; Host Control Reegister
    mov     al, 48h              ; Start a byte access
    out     dx, al

    call    CT_Chk_SMBus_Ready
    mov     dx, 0f000h + 05h
    in      al, dx

    ret
```

Ct_I2CReadByte Endp

;Input : CL - register index

; CH - device ID

; AL - Value to write

;Output: none

Ct_I2CWriteByte Proc Near

mov ch,06eh

xchg ah, al

mov dx, 0f000h + 00h ; Host Control Register

mov al, 0ffh ; Clear previous

commands

out dx, al

call Delay5ms

mov dx, 0f000h + 04h ; Transmit Slave Address

Register

mov al, ch ; Set the slave address and

out dx, al ; prepare for a WRITE

command

mov dx, 0f000h + 03h ; Host Command Register

mov al, cl ; offset to write

```
    out    dx, al

    mov    dx, 0f000h + 05h
    mov    al, ah
    out    dx, al

    mov    dx, 0f000h + 00h ; Host Control Register
    mov    al, 48h    ; Start a byte access
    out    dx, al

    call   CT_Chk_SMBus_Ready
    ret

Ct_I2CWriteByte   Endp

; Wait until the busy bit clears, indicating that the SMBUS
; activity has concluded.

CT_Chk_SMBus_Ready Proc Near
    mov    dx, 0f000h+ 0;status port
    cld
    mov    cx, 0800h

Chk_I2c_OK:
    in     al, dx        ;get status
    call   Delay5ms
```

```
    out    dx,al          ;clear status
    call   Delay5ms

    test   al, 02H        ;termination of command ?
    jnz    short Clear_final

    and    al, NOT 40H    ;mask INUSE bit
    or     al,al          ;status OK ?
    jz     short Clear_final

    test   al,04h        ;device error
    jnz    short SMBus_Err

    loop   short Chk_I2c_OK
;SMBus error due to timeout
SMBus_Err:

    stc
    ret

Clear_final:
    clc
    ret

CT_Chk_SMBus_Ready   Endp

END   begin
```