



User's Manual

Industrial ATX Motherboard V1.0

2801310

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Introduction

Welcome to the 2801310 SOCKET 478 PENTIUM 4 Single Board Computer. The 2801310 board is an AGP/PCI form factor board, which comes equipped with high performance Processor and advanced high performance multi-mode I/O, designed for the system manufacturers, integrators, or VARs that want to provide all the performance, reliability, and quality at a reasonable price.

It's AGP interface supports 0.8V/1.5V signaling with 8X/4X data transfers ,but it's not support any 3.3V AGP-card. The integrated graphics controller provides 3D, 2D, and display capabilities.

2801310 supports one or two 64-bit wide DDR data channels. Available bandwidth up to 2.7GB/s for single-channel mode and 5.4GB/s in dual-channel mode.

For the application that needs high speed serial transmission, the 2801310 provides USB2.0 for your choice. The high speed USB2.0 host controller implements an ECHI interface that provides 480Mb/s bandwidth.

2801310 is equipped with a high speed SATA disk interface. Besides its better performance than traditional IDE interface, it can also reduce the cabling of hard disk and supports longer cable.

1.1 Specifications

CPU(PGA 478)	Intel Pentium 4 Processor, supports 400/533/800 MHz PSB (set by BIOS)
Bus interface	AGP/PCI/ISA bus
Bus speed	PCI: 33Mhz,ISA: 8Mhz
DMA channels	7
Interrupt levels	15
Chipset	INTEL 865G / ICH5
RAM memory	Four 184-pin DIMM sockets support DDR333/400 SDRAM .Support one or four 64-bit wide DDR data channels. The max. Memory is up to 4GB.
Ultra DMA 100 IDE interface	Up to four PCI Enhanced IDE hard drives. The Ultra DMA 100 IDE can handle data transfer up to 100MB/s. Compatible with existing ATA IDE specifications its best advantage, so there is no need to do any changes for users' current accessories.
Floppy disk drive interface	Supports up to two floppy disk drives, 5.25"(360KB and 1.2MB) and/or 3.5" (720KB, 1.44MB, and 2.88MB)
Serial ports	Six RS232 ports with 16C550 UART (or compatible) with 16-byte FIFO buffer. Support up to 115.2Kbps. Ports can be individually configured to COM1,2,3,4,5,6 or disabled.
Bi-directional parallel port	Configurable to LPT1, LPT2, LPT3 or disabled. Supports EPP/ECP/SPP
Hardware monitor	Built-in to monitor power supply voltage, fan speed status and temperature
IrDA port	Supports Serial Infrared(SIR) and Amplitude Shift Keyed IR(ASKIR) interface
USB 2.0/1.1 port	Supports 8 USB 2.0/1.1 ports for future expansion

Watchdog timer	Software Programmable, reset generated when CPU does not periodically trigger the timer.
Serial ATA	Supports two independent serial ATA channels. Data transfer rate is up to 150MB/s
Ethernet	PCI interface. INTEL 82541PI or Realtek RTL8110SC Gigabit Ethernet controller. Supports full 10,100 and1000-bast-T Ethernet
Keyboard and PS/2 mouse connector	A connector is located on the mounting bracket for easy connection to a keyboard or PS/2 mouse.
Audio	AC'97 Audio CODEC
Compact flash	It can be used with a passive adapter (True IDE Mode) in a Type I/II CF Socket.
Power consumption	PENTIUM4: 3.0GHz, 2GB DDR400 DDR-SDRAM +5V @ 4.7A , +12V @ 6.1A , +3.3V @ 0.7A , -12V @ 0.2A , +5VSB @ 0.7A Recommended : 350-watt power supply or higher
Operating temperature	0° ~ 60° C (*CPU needs Cooler & silicone heatsink paste*)

WARNING : 1. Use ATX-12V Power Connector (CN5) to provide power for the CPU.

1.2 What You Have

In addition to this *User's Manual*, the 2801310 package includes the following items:

- 2801310 Single Board Computer X1.
- RS-232 Cable with bracket .
- RS422/485 cable with bracket .
- PATA IDE cable .
- SATA IDE cable .
- SATA Power cable .
- I/O shielding .
- Driver CD .
- Quick installation guide.

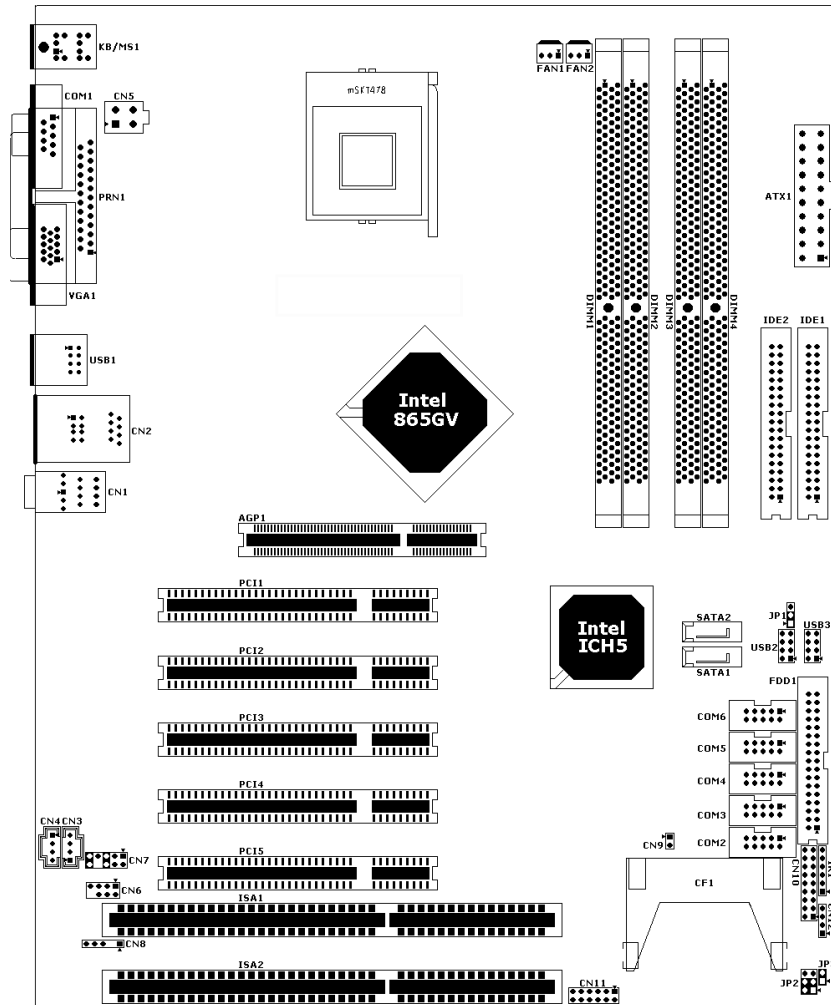
If any of these items are missing or damaged, contact Global American, Inc. Save the shipping materials and carton in case you want to ship or store the product in the future.

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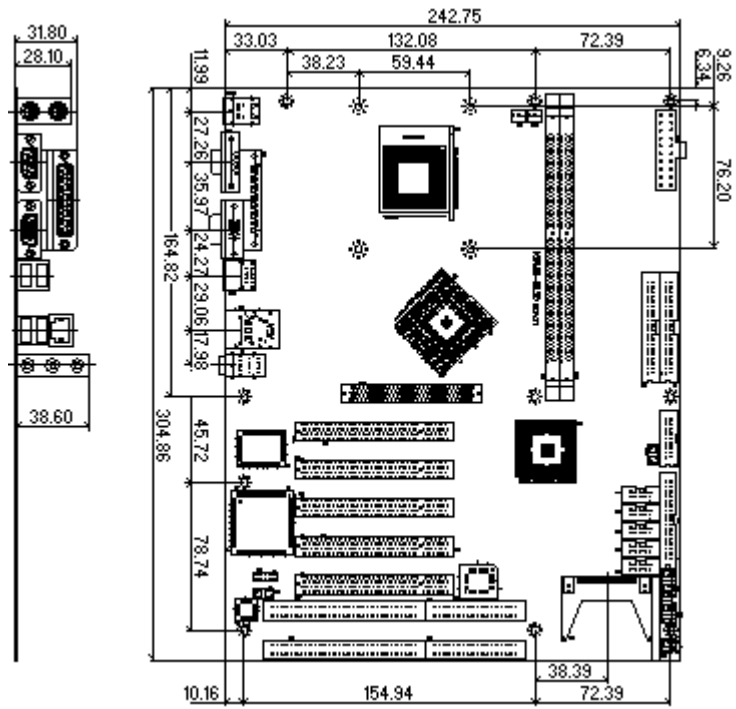
Installation

This chapter describes how to install the 2801310. First a layout diagram of the 2801310 is shown, followed by unpacking information that should be carefully followed.

2.1 2801310 Layout



2.2 2801310 Dimensions (Unit : mm)



2.3 Unpacking Precautions

Some components on 2801310 are very sensitive to static electric charges and can be damaged by a sudden rush of power. To protect it from unintended damage, be sure to follow these precautions:

- ✓ Ground yourself to remove any static charge before touching your 2801310. You can do it by using a grounded wrist strap at all times or by frequently touching any conducting materials that is connected to the ground.
- ✓ Handle your 2801310 by its edges. Don't touch IC chips, leads or circuitry if not necessary.
- ✓ Do not plug any connector or jumper while the power is on.

Note: All shaded rows in tables of this manual are the default settings for the 2801310.

2.4 Clear CMOS Setup

To clear the CMOS Setup (e.g., you have forgotten the password, you must clear the CMOS to reset the password), you have to close the JP1 (pin 2-3) for about 3 seconds, then open it. After that, pin 1-2 has to be short for normal operation.

- **JP1 : Clear CMOS Setup**

JP1	Description
1-2 (default)*	Keep CMOS Setup (Normal Operation)
Short 2-3	Clear CMOS Setup

2.5 COM3 RS232/RS422/485 Selection

- **JP2: COM3 RS232/RS422/485 Selection**

JP2	Description
1-3 Short (default)*	RS232
3-5 Short 2-4 Short	RS422
3-5 Short 4-6 Short	RS485

Note: When RS422/485 is in use, the COM3's RS232 port will be disabled.

2.6 Compact Flash Master/Slave Function Setting

- **JP3 : Compact Flash Master/Slave Function Setting**

JP3	Description
Short*	Master
Open	Slave

Connection

This chapter describes how to connect peripherals, switches and indicators to the **2801310** board.

Label	Function
IDE1 & IDE2	Ultra ATA100 Primary & Secondary IDE connectors
FDD1	Floppy connector
PRN1	Parallel port connector
COM1,2,3,4,5,6	Serial port connectors
CF1	Compact Flash Storage Card Type II connector
IR1	IRDA infrared interface port
USB1	USB port connector
USB2	USB dual port connector
USB3	USB dual port connector
KB/MS1	Keyboard & Mouse connector
FAN1 & FAN2	FAN connectors
SATA1 & SATA2	Serial ATA connectors
VGA1	VGA connector
CN1	Audio connector
CN2	USB dual port & LAN RJ45 connectors
CN3	Audio AUX in connector
CN4	Audio CD in connector
CN5	ATX +12V Power connector
CN6	5.1 Channel Audio connector
CN7	Front Panel Audio connector
CN8	S/PDIF connector
CN9	iButton connector
CN10	Digital I/O connector
CN11	External switches and indicators
CN12	RS422/485 connector
PCI1,2,3,4,5	PCI slots
ISA1,2	ISA slots
ATX1	ATX Power connector

3.1 PCI E-IDE Disk Drive Connector

You can attach up to four IDE(Integrated Device Electronics) devices.

- **IDE1 : Primary IDE Connector**
- **IDE2 : Secondary IDE Connector**

PIN	DESCRIPTION	PIN	DESCRIPTION
1	RESET#	2	GROUND
3	DATA 7	4	DATA 8
5	DATA 6	6	DATA 9
7	DATA 5	8	DATA 10
9	DATA 4	10	DATA 11
11	DATA 3	12	DATA 12
13	DATA 2	14	DATA 13
15	DATA 1	16	DATA 14
17	DATA 0	18	DATA 15
19	GROUND	20	N/C
21	DRQ	22	GROUND
23	IOW#	24	GROUND
25	IOR#	26	GROUND
27	CHRDY	28	REV. PULL LOW
29	DACK	30	GROUND-DEFAULT
31	INTERRUPT	32	N/C
33	SA1	34	N/C
35	SA0	36	SA2
37	HDC CS0#	38	HDC CS1#
39	HDD ACTIVE#	40	GROUND

3.2 Floppy Connector

The 2801310 board is equipped with a 34-pin daisy-chain drive connector cable.

- **FDD1 : Floppy Connector**

PIN	DESCRIPTION	PIN	DESCRIPTION
1	GROUND	2	RWC0-
3	GROUND	4	NC
5	GROUND	6	RWC1-

7	GROUND	8	INDEX-
9	GROUND	10	MO-A
11	GROUND	12	DS-B
13	GROUND	14	DS-A
15	GROUND	16	MO-B
17	GROUND	18	DIR-
19	GROUND	20	STEP-
21	GROUND	22	WD-
23	GROUND	24	WGATE-
25	GROUND	26	TRK0-
27	GROUND	28	WP-
29	GROUND	30	RDATA-
31	GROUND	32	HEAD-
33	GROUND	34	DSKCHG-

3.3 Parallel Port Connector

Usually, a printer is connected to the parallel port. The 2801310 includes an on-board parallel port

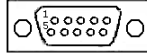
- **PRN1 : Parallel Port Connector**

PIN	DESCRIPTION	PIN	DESCRIPTION
1	STROBE#	2	DATA 0
3	DATA 1	4	DATA 2
5	DATA 3	6	DATA 4
7	DATA 5	8	DATA 6
9	DATA 7	10	ACKNOWLEDGE
11	BUSY	12	PAPER EMPTY
13	PRINTER SELECT	14	AUTO FORM FEED #
15	ERROR#	16	INITIALIZE
17	PRINTER SELECT LN#	18	GROUND
19	GROUND	20	GROUND
21	GROUND	22	GROUND
23	GROUND	24	GROUND
25	GROUND		

3.4 Serial Port

The 2801310 offers Six high speed NS16C550 compatible UART's with 16-byte Read/Receive FIFO serial ports.

- **COM1: D-SUB Serial Port Connector**



PIN	DESCRIPTION	PIN	DESCRIPTION
1	DCD	6	DSR
2	RXD	7	RTS
3	TXD	8	CTS
4	DTR	9	RI
5	GROUND		

- **COM2,3,4,5,6: Serial Port Connector**



PIN	DESCRIPTION	PIN	DESCRIPTION
1	DCD	2	DSR
3	RXD	4	RTS
5	TXD	6	CTS
7	DTR	8	RI
9	GROUND	10	GROUND

3.5 Compact Flash Storage Card Socket

The 2801310 configures Compact Flash Storage Card in IDE Mode. This type II Socket is compatible with IBM Micro Drive.

- **CF1 : Compact Flash Storage Card Socket pin assignment**

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GROUND	26	PULL DOWN
2	D3	27	D11
3	D4	28	D12
4	D5	29	D13
5	D6	30	D14
6	D7	31	D15
7	CS1#	32	CS3#
8	N/C	33	N/C

9	GROUND	34	IOR#
10	N/C	35	IOW#
11	N/C	36	VCC
12	N/C	37	IRQ15
13	VCC	38	VCC
14	N/C	39	MASTER/SLAVE
15	N/C	40	N/C
16	N/C	41	RESET#
17	N/C	42	IORDY
18	A2	43	N/C
19	A1	44	VCC
20	A0	45	ACTIVE#
21	D0	46	PDIAG#
22	D1	47	D8
23	D2	48	D9
24	N/C	49	D10
25	PULL DOWN	50	GROUND

3.6 IrDA Infrared Interface Port

The 2801310 comes with an integrated IrDA port which supports either a Serial Infrared(SIR) or an Amplitude Shift Keyed IR(ASKIR) interface.

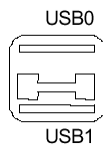
- **IR1: IrDA connector**

PIN	DESCRIPTION
1	VCC
2	NC
3	IR-RX
4	Ground
5	IR-TX
6	CIRRX

3.7 USB Port Connector

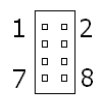
The 2801310 is equipped with Eight USB(Version. 2.0) ports for the future new I/O bus expansion.

- **USB1 : 2 ports USB Connector**




PIN	DESCRIPTION	PIN	DESCRIPTION
1	VCC	5	VCC
2	DATA0-	6	DATA1-
3	DATA0+	7	DATA1+
4	GROUND	8	GROUND

- **USB2 : 2 ports USB Connector**




PIN	DESCRIPTION	PIN	DESCRIPTION
1	VCC	2	GROUND
3	DATA2-	4	DATA3+
5	DATA2+	6	DATA3-
7	GROUND	8	VCC

- **USB3 : 2 ports USB Connector**



PIN	DESCRIPTION	PIN	DESCRIPTION
1	VCC	2	GROUND
3	DATA4-	4	DATA5+
5	DATA4+	6	DATA5-
7	GROUND	8	VCC

- **CN2 : 2 ports USB Connector**

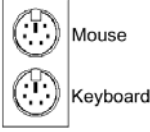


PIN	DESCRIPTION	PIN	DESCRIPTION
1	VCC	5	VCC
2	DATA6-	6	DATA7-
3	DATA6+	7	DATA7+
4	GROUND	8	GROUND

3.8 Keyboard/Mouse Connector

The 2801310 has a keyboard/mouse connector

- **KB/MS1 : Keyboard/Mouse Connector**



PIN	DESCRIPTION	PIN	DESCRIPTION
1	KB DATA	7	MS DATA
2	NC	8	NC
3	GROUND	9	GROUND
4	KB VCC	10	MS VCC
5	KB CLOCK	11	MS CLOCK
6	NC	12	NC

3.9 Fan Connector

The 2801310 also has a CPU with cooling fan connector and chassis fan connector, which can supply 12V/500mA to the cooling fan. There is a “rotation” pin in the fan connector, which transfers the fan’s rotation signal to the system BIOS in order to recognize the fan speed. Please note that only specific fans offer a rotation signal.

- **FAN1,FAN2 : CPU Fan Connector**

PIN	DESCRIPTION
1	Ground
2	+12V
3	Rotation Signal

3.10 Serial ATA Connector

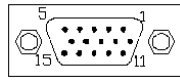
The 2801310 provide 2 Serial ATA ports to connect with Serial ATA devices.

- **SATA1, SATA2 : Serial ATA Connector**

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	S_TXP	3	S_RXN
2	S_TXN	4	S_RXP

3.11 VGA Connector

- **VGA1: 15-pin Female Connector**

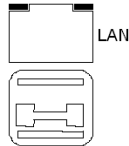


PIN	DESCRIPTION	PIN	DESCRIPTION
1	RED	2	GREEN
3	BLUE	4	NC
5	GROUND	6	GROUND
7	GROUND	8	GROUND
9	VCC / NC	10	GROUND
11	NC	12	DDC DAT
13	HSYNC	14	VSYNC
15	DDCCLK		

3.12 LAN Connector

The 2801310 is equipped with Ethernet Controllers 10/100Mbps, which are connected to the LAN via an RJ45 LAN connector. The pin assignments are as follows:

- **CN2 : RJ45 Connector (10/100/1000)**

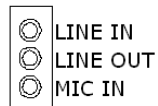


PIN	DESCRIPTION	PIN	DESCRIPTION
L1	TX0+	L7	TX3+
L2	TX0-	L8	TX3-
L3	TX1+	L9	Active +
L4	TX2+	L10	Active -
L5	TX2-	L11	LINK +
L6	TX1-	L12	LINK -

3.13 Audio Connector

The onboard AC'97 CODEC supports several audio functions. The audio connectors are described below.

- **CN1 : Audio connector**
(Line in, Line out, MIC in)



• **CN3 : Audio AUX In connector**



PIN	DESCRIPTION
1.	AUX (LEFT)
2.	GROUND
3.	GROUND
4.	AUX (RIGHT)

• **CN4 : Audio CD In connector**



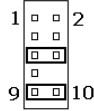
PIN	DESCRIPTION
1.	CD SIGNAL (LEFT)
2.	GROUND
3.	GROUND
4.	CD SIGNAL (RIGHT)

• **CN6 : 5.1 Channel Audio connector**



PIN	DESCRIPTION	PIN	DESCRIPTION
1	SUR OUT(L)	2	CEN OUT
3	GROUND	4	GROUND
5	SUR OUT(R)	6	LFE OUT
7	GROUND		

• **CN7 : Front Panel Audio connector**



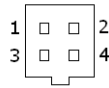
PIN	DESCRIPTION	PIN	DESCRIPTION
1	MIC IN	2	GROUND
3	MIC BIAS	4	5V
5	LINE OUT(R)	6	LINE OUT (R) Return
7	NC		
9	LINE OUT(L)	10	LINE OUT (L) Return

• **CN8 : S/PDIF connector**

PIN	DESCRIPTION
1.	5V
3.	S/PDIF OUT
4.	GROUND
5.	S/PDIF IN

3.14 ATX +12V Power connector

- CN5: ATX +12V Power connector



PIN	DESCRIPTION
1.	GROUND
2.	GROUND
3.	+12V
4.	+12V

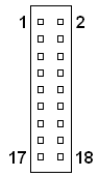
3.15 iButton connector

- CN9: I button connector

PIN	DESCRIPTION	PIN	DESCRIPTION
1	iButton input/output	2	GROUND

3.16 Digital I/O connector

- CN10: Digital I/O connector

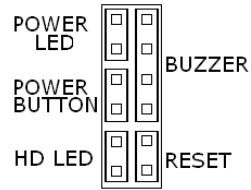


PIN	DESCRIPTION	PIN	DESCRIPTION
1	DGPI0	2	DGPO0
3	DGPI1	4	DGPO1
5	DGPI2	6	DGPO2
7	DGPI3	8	DGPO3
9	DGPI4	10	DGPO4
11	DGPI5	12	DGPO5
13	DGPI6	14	DGPO6
15	DGPI7	16	DGPO7
17	GROUND	18	VCC

3.17 External Switches and Indicators

There are several external switches and indicators for monitoring and controlling your CPU board. All functions are in the CN11 connector.

- **CN11 : Pin Assignment and Functions**



FUNCTION	PIN	DESCRIPTION
BUZZER	2	BUZZER-
	4	NC
	6	NC
	8	VCC
RESET	10	RESET
	12	GROUND
HDD LED	9	IDE_LED+
	11	IDE_LED-
POWER LED	1	LED+
	3	LED-(GROUND)
POWER BUTTON	5	VCC
	7	POWER BUTTON


3.18 RS422/485 connector

- **CN12: RS422/485 connector**

PIN	DESCRIPTION
1.	TX+
2.	TX-
3.	RX+
4.	RX-

3.19 ATX Power connector

- ATX1: ATX Power connector



PIN	DESCRIPTION	PIN	DESCRIPTION
1	VCC3	11	VCC3
2	VCC3	12	-12V
3	GROUND	13	GROUND
4	5V	14	PS-ON
5	GROUND	15	GROUND
6	5V	16	GROUND
7	GROUND	17	GROUND
8	POWER GOOD	18	NC
9	5VSB	19	5V
10	+12V	20	5V

Appendix A. Watchdog Timer

The Watchdog Timer is provided to ensure that standalone systems can always recover from catastrophic conditions that cause the CPU to crash. This condition may have occurred by external EMI or a software bug. When the CPU stops working correctly, hardware on the board will either perform a hardware reset (cold boot) or a Non-Maskable Interrupt (NMI) to bring the system back to a known state.

A BIOS function call (INT 15H) is used to control the Watchdog Timer:

INT 15H:

AH – 6FH
<u>Sub-function:</u>
AL – 2 : Set the Watchdog Timer's period
BL : Time-out value(Its unit--second or minute, is dependent on the item "Watchdog Timer unit select" in CMOS setup).

You have to call sub-function 2 to set the time-out period of Watchdog Timer first. If the time-out value is not zero, the Watchdog Timer will start counting down. While the timer value reaches zero, the system will reset. To ensure that this reset condition does not occur, the Watchdog Timer must be periodically refreshed by calling sub-function 2. However the Watchdog timer will be disabled if you set the time-out value to be zero.

A tolerance of at least 10% must be maintained to avoid unknown routines within the operating system (DOS), such as disk I/O that can be very time-consuming.

Note: when exiting a program it is necessary to disable the Watchdog Timer, otherwise the system will reset.

Example program:

```
; INITIAL TIMER PERIOD COUNTER
;
;
W_LOOP:
    MOV  AX, 6F02H    ;setting the time-out value
    MOV  BL, 30      ;time-out value is 48 seconds
    INT  15H
;
; ADD YOUR APPLICATION PROGRAM HERE
;
    CMP  EXIT_AP, 1  ;is your application over?
    JNE  W_LOOP      ;No, restart your application

    MOV  AX, 6F02H   ;disable Watchdog Timer
    MOV  BL, 0
    INT  15H
;
; EXIT
;
;
```

Appendix B. Address Mapping

IO Address Map

I/O address Range	Description
000-01F	DMA Controller
020-021	Interrupt Controller
040-05F	System time
060-06F	Keyboard Controller
070-07F	System CMOS/Real time Clock
080-09F	DMA Controller
0A0-0A1	Interrupt Controller
0C0-0DF	DMA Controller
0F0-0FF	Numeric data processor
1F0-1F7	Primary IDE Channal
2E8-2EF	Serial Port 4 (COM4)
2F8-2FF	Serial Port 2 (COM2)
378-37F	Parallel Printer Port 1 (LPT1)
3B0-3BB	Intel(R) 82865 Graphics Controller
3C0-3DF	Intel(R) 82865 Graphics Controller
3E8-3EF	Serial Port 3 (COM3)
3F6-3F6	Primary IDE Channal
3F7-3F7	Standard floppy disk controller
3F8-3FF	Serial Port 1 (COM1)
4E8-4EF	Serial Port 5 (COM5)
4F8-4FF	Serial Port 6 (COM6)

1st MB Memory Address Map

Memory address	Description
00000-9FFFF	System memory
A0000-BFFFF	VGA buffer
F0000-FFFFF	System BIOS
1000000-	Extend BIOS

*Default setting

IRQ Mapping Table

IRQ0	System Timer	IRQ8	RTC clock
IRQ1	Keyboard	IRQ9	AUDIO/SMBus Cntrlr
IRQ2	Available	IRQ10	COM4/COM6
IRQ3	COM2	IRQ11	COM3/COM5
IRQ4	COM1	IRQ12	PS/2 mouse
IRQ5	VGA/SMBus Cntrlr	IRQ13	FPU
IRQ6	FDC	IRQ14	Primary IDE
IRQ7	Available	IRQ15	Secondary IDE

DMA Channel Assignments

Channel	Function
0	Available
1	Available
2	Floppy disk (8-bit transfer)
3	Available
4	Cascade for DMA controller 1
5	Available
6	Available
7	Available

Appendix C. Install memory modules

2801310 has four dual in line memory module (DIMM) sockets . The BIOS will automatically detects memory type and size. To install the memory module, just push it vertically into the DIMM socket. The DIMM module can only fit in one direction due to the notch. Memory size can vary between sockets.

2801310 supports the Dual Channel Technology. After operating the Dual Channel Technology, the bandwidth of Memory Bus will add double up to 6.4GB/s.

2801310 includes 4 DIMM sockets, and each Channel has two DIMM socket.

If you want to operate the Dual Channel Technology, please note the following explanations due to the limitation of Intel® chipset specifications.

1. Only one DDR memory module is installed: The Dual Channel Technology can't operate when only one DDR memory module is installed.
2. Two DDR memory modules are installed (the same memory size and type): The Dual Channel Technology will operate when two memory modules are inserted individually into Channel A and B

Any advice or comments about our products and service, or anything we can help you with please don't hesitate to contact with us. We will do our best to support you for your products, projects and business.

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