

*TriGem Micro-ATX Motherboard (Anaheim2A)*  
*Hardware Document*

*February, 03, 2000*

*Revision 1.2*

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Document Revision History

Released date	Revision	Description
August, 31 1999	Rev. 0.9	First released version for this document. This document describes the major specification of the <b>Anaheim2</b> motherboard and the functional feature to be extended by the customer. The motherboard revision number is EVT1(PR1)
September 17,1999	Rev.1.0	Mass product version for eMachines configuration
January 27,2000	Rev.1.1	Added to Supported Processor type Added to Sound/USB Interface to Front daughter Board
February 03,2000	Rev.1.2	I/O Controller Hub is changed.(FW82801AB→FW82801AA) Audio Chipset is changed. (CS4280→CS4281) Form a new model <b>Anaheim2A</b>

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## I. Introduction

The **Anaheim2A** Micro ATX motherboard offers a time to market consumer and corporate desktop solution featuring the Intel Celeron PPGA or FC-PGA processor with 66/100MHz front side bus and the Whitney chipsets in a Micro ATX low profile motherboards. In addition, the integrated onchip graphics controller supports 4MB of SDRAM purpose of Display cache memory.

The **Anaheim2A** motherboard was designed to be highly minimized system cost. In this effort, a smaller form factor, Micro-ATX, gives the greater space economy and more affordable systems. Integrating onchip graphics controller and SDRAM, as well as AC'97 audio solution with AC97 Codec onto the motherboard eliminates the need for more expensive graphic and audio add-in cards. The end result is a system platform with a primary component level of integration with translates into affordable solution for entry level users.

### 1. General description

#### ❑ Motherboard

- Small PCB size in the Micro ATX form factor (ATX V1.2 form factor)
- 238mm \* 238mm \* 1.6t (4 Layers)

#### ❑ Processor

- Intel Socket-370 (Socket-370)
  - Intel Celeron 300/333/366/400/433/466/500/533MHz processor(PPGA-Type)@66MHZ Host clock
  - Intel Celeron Coppermine 566/600MHz processor (FC-PGA Type) @66MHZ Host clock
  - Intel TBD @100MHZ Host clock
- Cyrix Socket-370 (370pin PPGA Socket)
  - Cyrix Goby TBD @66MHZ Host clock

#### ❑ Main Chipset

- Graphics and Memory Controller Hub (GMCH) : Intel FW82810-DC100 / **FW82810**
- I/O Controller Hub (ICH) : **Intel FW82801AA**
- PCI Audio : Cirrus CS4281
- Audio Codec : Cirrus CS4297A-JQ
- Super I/O : ITE IT8702F-A
- DC-DC Converter : HARRIS HIP6021CB
- Clock : ICS 9250BF-10 (66/100MHz host clock,  
100Mhz SDRAM Clock support)

#### ❑ Memory Configuration

- System Memory
  - Two banks of 3.3V SDRAM (168pin unbuffered DIMM) with max 256MB
  - SDRAM operation in 100MHz front side bus
- Display Cache Memory (option)
  - Two 1M\*16 3.3V SDRAM (4MB)
  - SDRAM operation in 100MHz
- Flash Memory

- Intel N82802AB, 4Mb PLCC Type
- Firm Ware Hub (FWH) Interface for platform operation
- Address/Address Multiplexed Interface for programming during manufacturing

#### □ I/O Feature

- Integrated standard I/O functions in the rear side
  - One multi-mode parallel port
  - One FIFO serial ports and optional port by header type
  - PS/2 styles keyboard and mouse port
  - One USB port
  - Three audio jack for Speaker output, Line input and MIC input
- Integrated standard I/O functions in the front side (*Factory Option for eMachines*)
  - One Joystick port
  - One USB port
- I/O Controller (IT8702)
  - Low Pin Count (LPC) interface with Host controller (ICH)
  - FDC, Parallel, Serial, keyboard/Mouse supported

#### □ Audio Subsystem

- Crystal CS4281 PCI audio controller with fully DOS Games compatibility via PC/PCI, DDMA support
- Compatible with sound blaster, sound blaster pro, and window sound system
- Enhanced Stereo full duplex operation
- Advanced MPC3-compatible input and output mixer
- Joystick port and MPU-401 compatible MIDI interface
- PC97 and PC98 compliance (and compliance with preliminary PC99)

#### □ GMCH Subsystem

- Host/Memory(DRAM) Controller features
  - 66/100Mhz System Bus Frequency
  - 100Mhz system memory bus frequency
  - Refresh mechanism: CBR only supported
  - Support for Asymmetrical DRAM addressing only
  - Support for Asymmetrical DRAM addressing only
  - Support for 64-bit data interface
  - Suspend to RAM support
- Graphics Controller features
  - 3D Hyper Pipelined Architecture (PDP, PPI)
  - Full 2D H/W Acceleration
  - Motion Video Acceleration
  - H/W motion Compensation Assistance for S/W MPEG2 Decode
  - Software DVD at 30fps

- 3D Graphics features
  - Flat & Gouraud Shading
  - Mip Maps with Bilinear and Anisotropic Filtering
  - Fogging Atmospheric Effects
  - Z Buffering
  - 3D Pipe 2D Clipping
  - Backface Culling
  - Per Pixel Perspective Correction Texture Mapping
  - Texture Compositing
  - Texture Color Keying/Croma Keying
- Display features
  - Integrated 24-bit 230Mhz RAMDAC
  - Gamma Corrected Video
  - DDC2B Compliant
- Graphics memory controller features
  - Intel D.V.M Technology (Dynamic Video Memory)
- Display Cache Interface (82810-DC100 only)

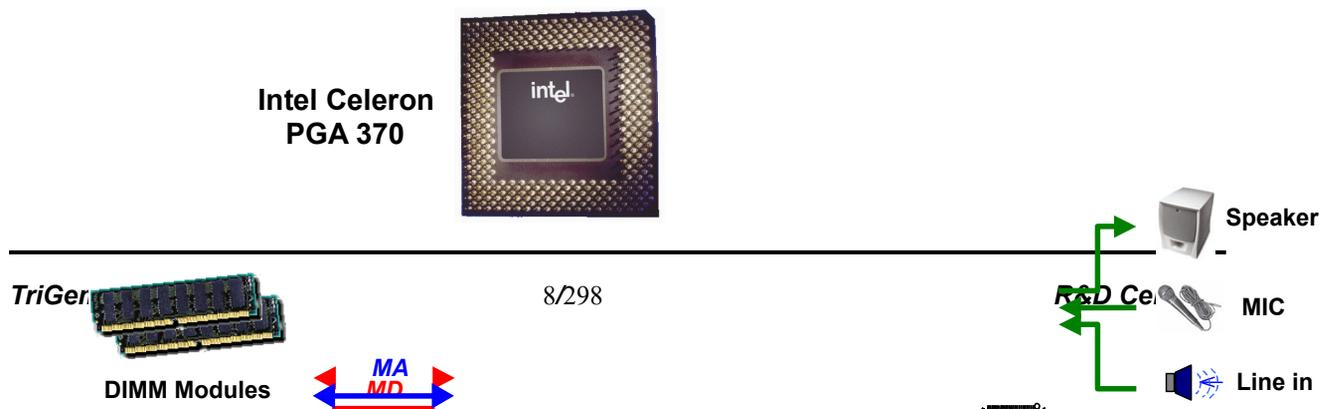
□ ICH Subsystem

- PCI Bus Interface
- Integrated IDE controller
- USB
- AC'97 Link for Audio and Modem
- Interrupt Controller
- Low Pin Count Interface
- SM Bus
- Firmware Hub Interface

□ GMCH,ICH vs GMCH0,ICH0 Configuration Difference

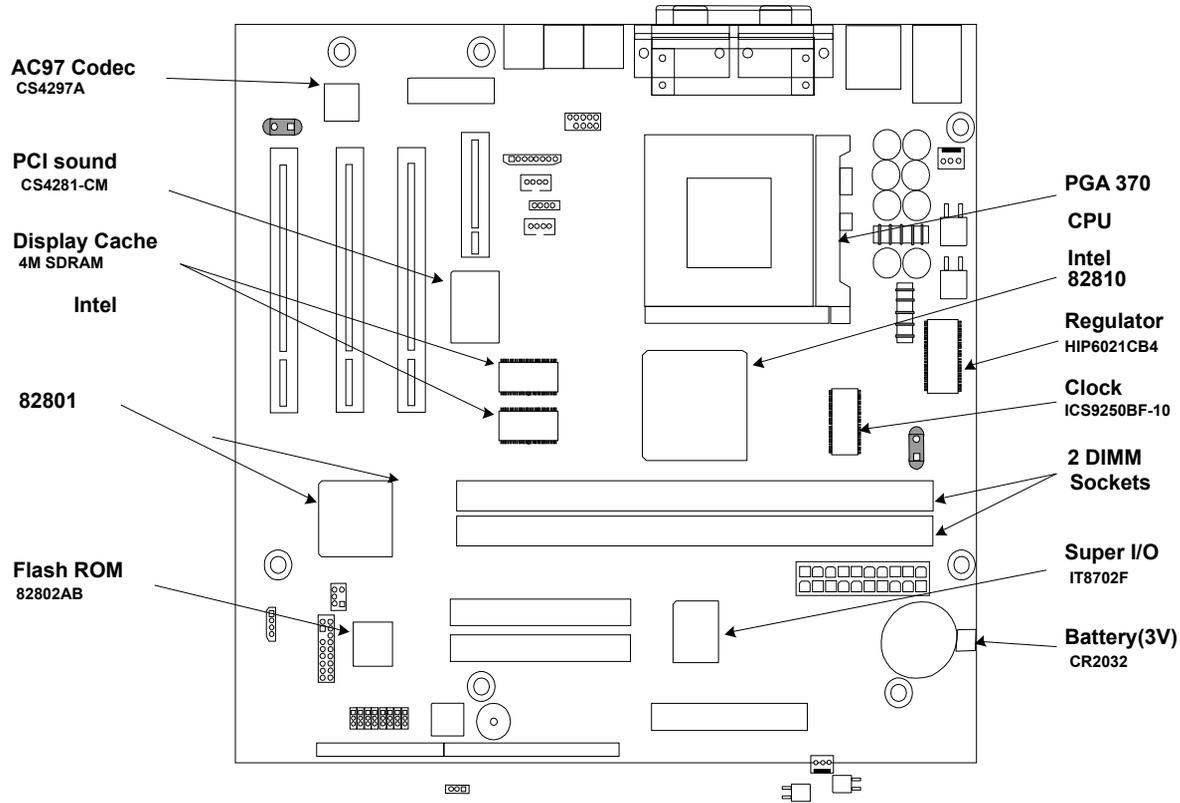
GMCH, ICH	GMCH0, ICH0
Display Cache (4MB) Support	<b>No Display Cache (4MB) Support</b>
Up to Ultra 66 ATA Spec. Support	<b>Up to Ultra 33 ATA Spec. Support</b>
6 PCI Slots Support	<b>4 PCI Slots Support</b>
Alert on LAN Support	<b>N/A</b>

2. Function Block Diagram





# 1. Major Units



## 2. Upgradeability

### 2-1. Processor

**Anaheim2A** motherboard provides the 370pin PGA370 socket that is not backward compatible with ZIF socket-7 processors. The Processor's VID pins automatically program the voltage regulator on the motherboard to the required processor voltage. The motherboard supports processors that run internally at 300/333/366/400 /433/466/500/533MHz.

- Supported Intel Celeron Processors (PPGA Socket Type)
  - Host Clock 66MHz : Celeron 400MHz : Celeron 433MHz  
: Celeron 466MHz : Celeron 500MHz  
: Celeron 533MHz  
: Celeron 533MHz(FC-PGA)  
: Celeron 566MHz(FC-PGA)  
: Celeron 600MHz(FC-PGA)
  - Host Clock 100MHz : tbd
- Supported Cyrix Goby Processors (PPGA Socket Type)
  - Host Clock 66MHz : tbd

### 2-2. Main Chipset Configuration

**Anaheim2A** Motherboard has two main chipset configurations.

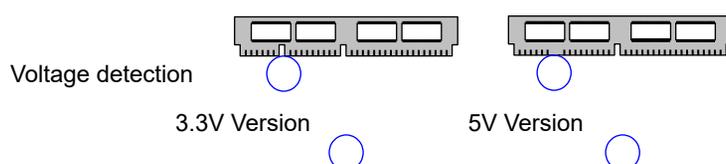
- 810DC100 Configuration
  - GMCH + ICH : 82810DC100 + 82801AA
- 810L Configuration
  - GMCH0 + ICH : 82810 + 82801AA

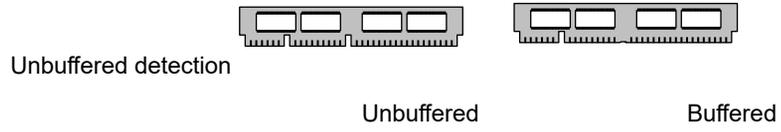
### 2-3. Memory

The motherboard has two, dual inline memory module (DIMM), minimum 16MB to maximum 256MB memory size. The BIOS can automatically detect the memory type, size, and speed through SMBUS interface between the core chipset and DIMM module.

The motherboard supports the following memory features

- 3.3V and unbuffered 168-pin DIMM





- 100MHz unbuffered SDRAM (PC100)
- Non-ECC memory only
- Single or double-sided DIMM with the following types (per each side of each DIMM)

DIMM size	Non-ECC memory	DIMM size	Non-ECC memory
8MB	4*(1M * 16 bit)	64MB	8*(8M * 8 bit)
16MB	8*(2M * 8 bit)	64MB	4*(8M * 16 bit)
32MB	4*(4M * 16 bit)	128MB	8*(16M * 8 bit)
32MB	2*(4M * 32 bit)		

**2-4 BIOS**

The motherboard uses a TriGem-Phoenix BIOS, which is stored in flash memory and can be upgraded using a disk-based program. A new version of the BIOS can be upgraded from a diskette using the Flash Memory Update utility.

Flash memory organization

Address (Hex)	Size	Functional description
FFFF0000 – FFFFFFFF	64KB	Boot block
FFF82000 – FFFEFFFF	440KB	Main BIOS block
FFF80000 - FFF81FFF	8KB	ESCD block

On-board device management

The BIOS can manage the devices on the motherboard over the CMOS setup menu.

Device	Description	CMOS setup menu	Default value
PS/2 Mouse	Intel 82801AA (ICH)	Enable / Disable / Auto Detect	Auto Detect
Regacy USB Function	Intel 82801AA (ICH)	Enable / Disable	Disable
On board FDC	Super I/O (ITE8702)	Enable / Disable	Enable
On board serial	Super I/O (ITE8702)	Enable / Disable	Enable
On board parallel	Super I/O (ITE8702)	Enable / Disable	Enable
Midi port	Super I/O (ITE8702)	Enable / Disable / Auto	Auto
Game port	Super I/O (ITE8702)	Enable / Disable / Auto	Auto

**2-5. Expansion Slot**

The motherboard support PCI and GMCH function. PCI functions are extended to the additional slot with 3 PCI, and GMCH function is designed in the motherboard with Integrated System/Graphics controller.

PCI configuration space map

Bus number	Device number	Function number	Device
00	30	00	Intel 82801AA(ICH) PCI Bridge
00	31	00	Intel 82801AA(ICH) LPC Bridge
00	31	01	Intel 82801AA(ICH) Bus master IDE
00	31	02	Intel 82801AA(ICH) USB Host Controller
00	31	03	Intel 82801AA(ICH) SM Bus Controller
00	31	04	Reserved

00	31	05	Intel 82801AA(ICH) AC'97 Audio Controller
00	31	06	Intel 82801AA(ICH) AC'97 Modem Controller
00	31	07	Reserved
00	00	00	Intel 82810DC100(GMCH) System/Graphics Controller
00	01	00	Intel 82810DC100(GMCH) Internal Graphics Device
00	0B	00	CS4281 PCI Audio
01	0E	00	PCI slot1
01	0D	00	PCI slot2
01	0C	00	PCI slot3

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- PCI interrupt & master number routing map

Intel 82801AA (ICH) PCI bridge has four programmable interrupt request input signals. Any PCI interrupt source connects to one of these interrupts signals and assigned to the free proper interrupt number by PnP BIOS.

ICH INT signals	First PCI slot	Second PCI slot	Third PCI slot	ICH USB device	ICH SM Bus
PIRQA	INTA	INTB	INTC		
PIRQB	INTB	INTC	INTD		
PIRQC	INTC	INTD	INTA		
PIRQD	INTD	INTA	INTB	INTC	INTB
Master	REQ0	REQ1	REQ2		
IDSEL	AD30	AD29	AD27		

ICH INT signals	ICH AC'97 Audio	ICH AC'97 Audio	GMCH Internal Graphics Device
PIRQA			
PIRQB			
PIRQC			
PIRQD	INTB	INTB	INTA
Master			
IDSEL			

**2-6. Advanced Configuration and Power Interface (ACPI)**

The motherboard and system BIOS support the ACPI that requires an ACPI-aware operating system such as Windows-NT 5.0 or Windows 98 SE. ACPI feature include

- Plug and play and APM functionality normally contained in the BIOS
- Power management control of individual devices : add-in cards, hard disk drives, USB devices, and Video
- A soft-off feature that enables operating system to power off the computer
- Support for multiple wakeup events
- Indication LED for normal mode (Green), standby mode (Blinking Green), and suspend mode (Blinking Green) but this function is dependent on the LED logic.

- Wakeup devices and events

Wakeup device	Wakeup events and functionality
Power switch	Wakeup from Power-off status and S1Status
LAN	Wakeup from S1 status

Modem	Wakeup from S1 status
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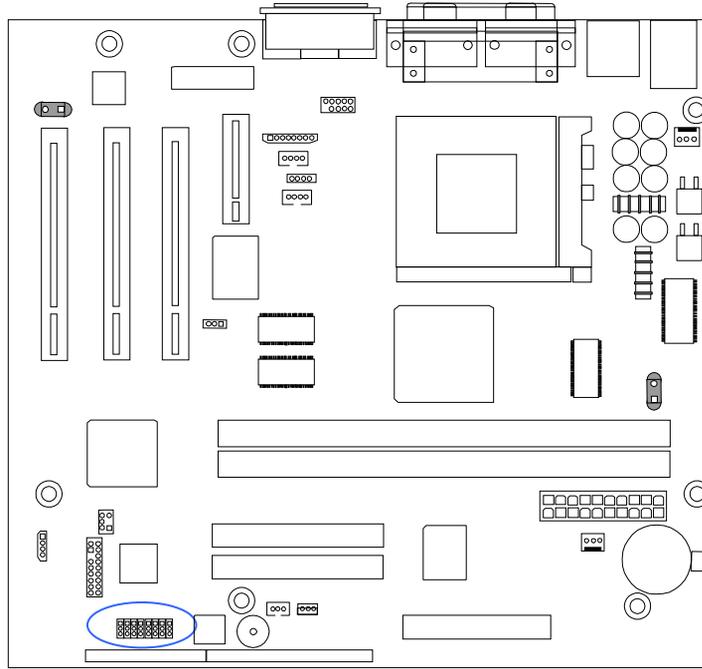
**2-7. Manufacturing Options**

The motherboard has several manufacturing options according to OEM/ODM requirement. Make sure that these options can be applied in the assembly stage, and it's impossible to upgrade or change in the customer field.

Option items	Selectable functionality	Feature changes
Joystick port	Front side / <b>Rear side</b>	Use additional board or <b>not</b>
USB port	Front side / <b>Rear side</b>	Use additional board or <b>not</b>
Super I/O	IT8712 / <b>IT8702</b>	Include H/W monitoring or <b>not</b>
Graphics controller	FW82810 / <b>FW82810-DC100</b>	<b>Display Cache</b> or not
Display Cache memory	None / <b>4MB</b>	<b>Display Cache</b> or not

### III. Jumper & Connector Description

#### 1. Motherboard Jumper Setting



J9



J1 – J8

1-1. Selection for Processor CPU Clock

 Intel Celeron PPGA Processor is auto set the core to bus frequency ratio.

1-2. System functionality

Jumper Pin	Function	1-2(Default)	2-3
J4	FDD write protect	Enable write/save Enable to write data	Disable to write data to Floppy disk
J5	CMOS setup function	Enable to edit CMOS contents	Disable to edit CMOS contents
J6	CMOS RAM function	Normal	Clear CMOS RAM
J7	Audio Function(AMR)	Primary_down enable	Primary_down disable
J8	Password function	Enable password	disable password

1-3. PCI graphics device function

No jumper does set the functionality of the GMCH graphics controller  
 PCI Graphics device operates automatically if PCI Graphics card is inserted .

1-4. OEM/ODM selector (TG Option)

These jumpers (J1, J2 & J3) will be optional parts for the OEM/ODM logo message selector of Trigem.

<b>BIOS</b>	J2(2-3), J3(2-3),J4(2-3)	Reserved	J2(2-3), J3(2-3),J4(1-2)	Reserved
<b>Factory</b>	J2(2-3), J3(1-2), J4(2-3)	Reserved	J2(2-3), J3(1-2), J4(1-2)	Reserved
<b>Setting</b>	J2(1-2), J3(2-3), J4(2-3)	Reserved	J2(1-2), J3(2-3), J4(1-2)	Reserved

(J1,2,3)	J2(1-2), J3(1-2), J4(2-3)	Reserved	<b>J2(1-2), J3(1-2), J4(1-2)</b>	Reserved
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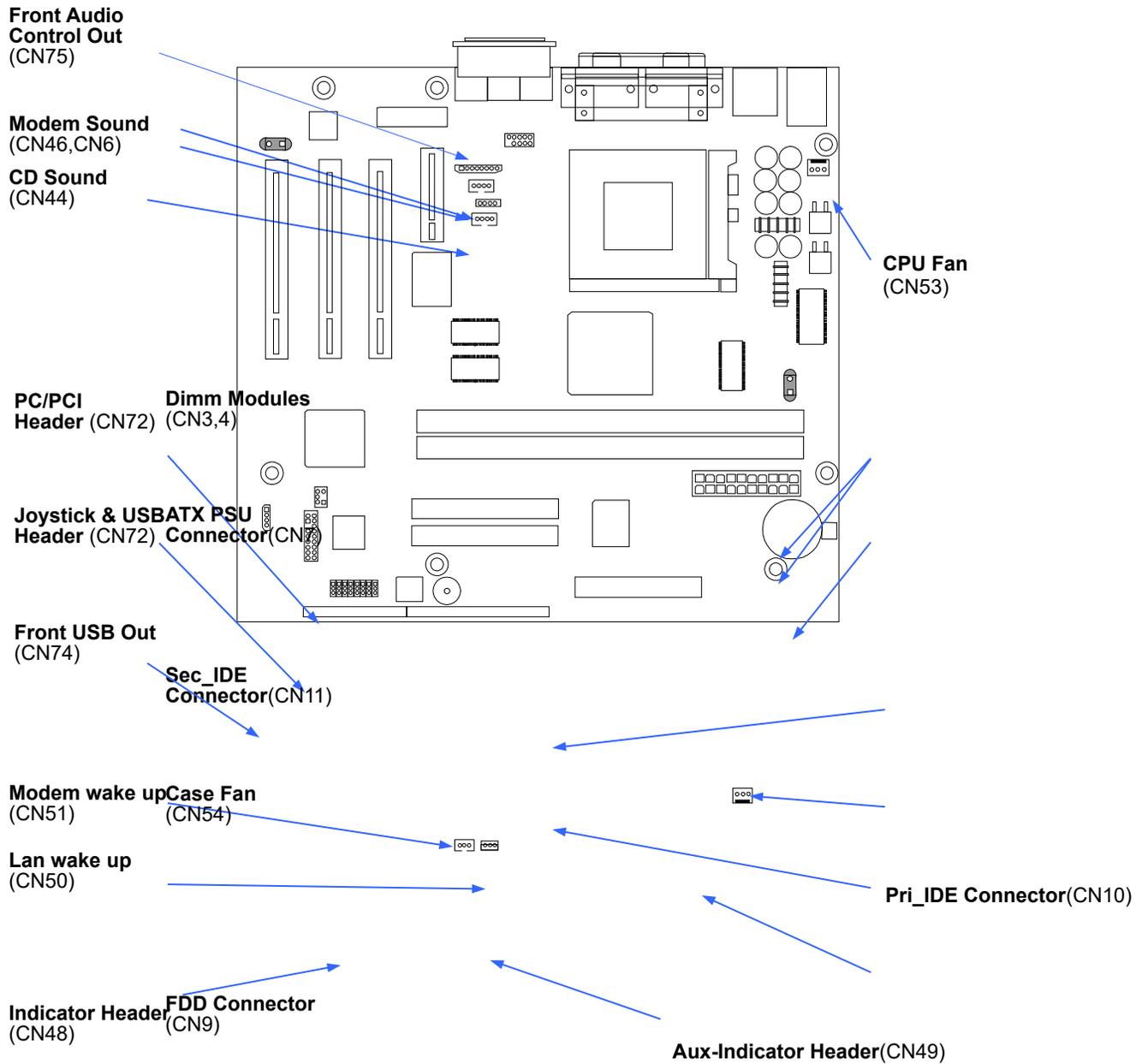
\* Factory Default Setting - bold type text

1-5. Other option Jumper

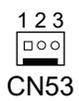
Jumper Pin	Function	1-2(Default)	2-3
<b>J9</b>	On board PCI Audio Enable/Disable	<b>Enable</b>	Disable

## 2. I/O Header Connector Description

### 2-1. Motherboard Internal Connector



- CPU FAN connector (CN53)



Pin number	Signal description
1	GND
2	FAN power
3	Tachometer (speed)

- System Chassis FAN connector (CN54)



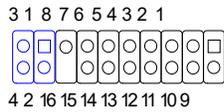
<i>Pin number</i>	<i>Signal description</i>
1	GND
2	FAN control
3	Tachometer (Speed) (GND)

□ PC/PCI connector (CN23) (TG Option)



Pin	Signal description	Pin	Signal description
1	/PCGNTA	4	/PCREQA
2	GND	5	N.C
3	Key	6	SER_IRQ

□ Joystick & USB connector (CN72) (TG Option)



Pin	Signal description	Pin	Signal description
1	VCC	9	VCC
2	GD(4)	10	GD(6)
3	GD(0)	11	GD(2)
4	GND	12	MIDI OUT
5	GND	13	GD(3)
6	GD(1)	14	GD(7)
7	GD(5)	15	MIDI IN
8	VCC	16	Key
1	GND	3	Positive DATA
2	Negative DATA	4	VCC

□ Modem Sound (CN46, CN6) (TG Option)

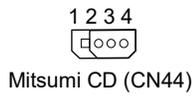


Pin	Signal description	Pin	Signal description
1	MIC	4	GND
2	GND	5	MONO IN
3	MONO OUT		



Pin	Signal description	Pin	Signal description
1	MONO IN	3	GND
2	GND	4	MIC

□ CD Sound (CN43(TG Option), CN44)



Pin	Signal description	Pin	Signal description
1	GND	3	GND
2	Left Sound	4	Right Sound

LAN Wakeup (CN50) (TG Option)



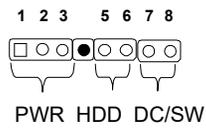
Pin	Signal description	Pin	Signal description
1	+5VSB	3	LANWK
2	GND		

Modem Wakeup (CN51) (TG Option)



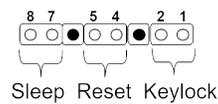
Pin	Signal description	Pin	Signal description
1	Modem Ring	3	+5VSB
2	GND		

HPD Indicator Header (CN73) (TG Option)



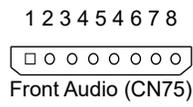
Pin	Signal description
1	NC
2	GND
3	LED POWER
4	NC
5	LED POWER
6	HDD access signal
7	GND
8	Power-ON switch signal

Aux. Indicator Header (CN49) (TG Option)



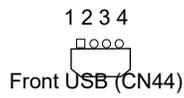
Pin	Signal description	Pin	Signal description
1	Key lock Signal to Super I/O	2	GND
3	Key	4	Reset signal
5	GND	6	Key
7	Sleep Function signal	8	GND

□ Front Audio Control Connector (CN75) (TG Option)



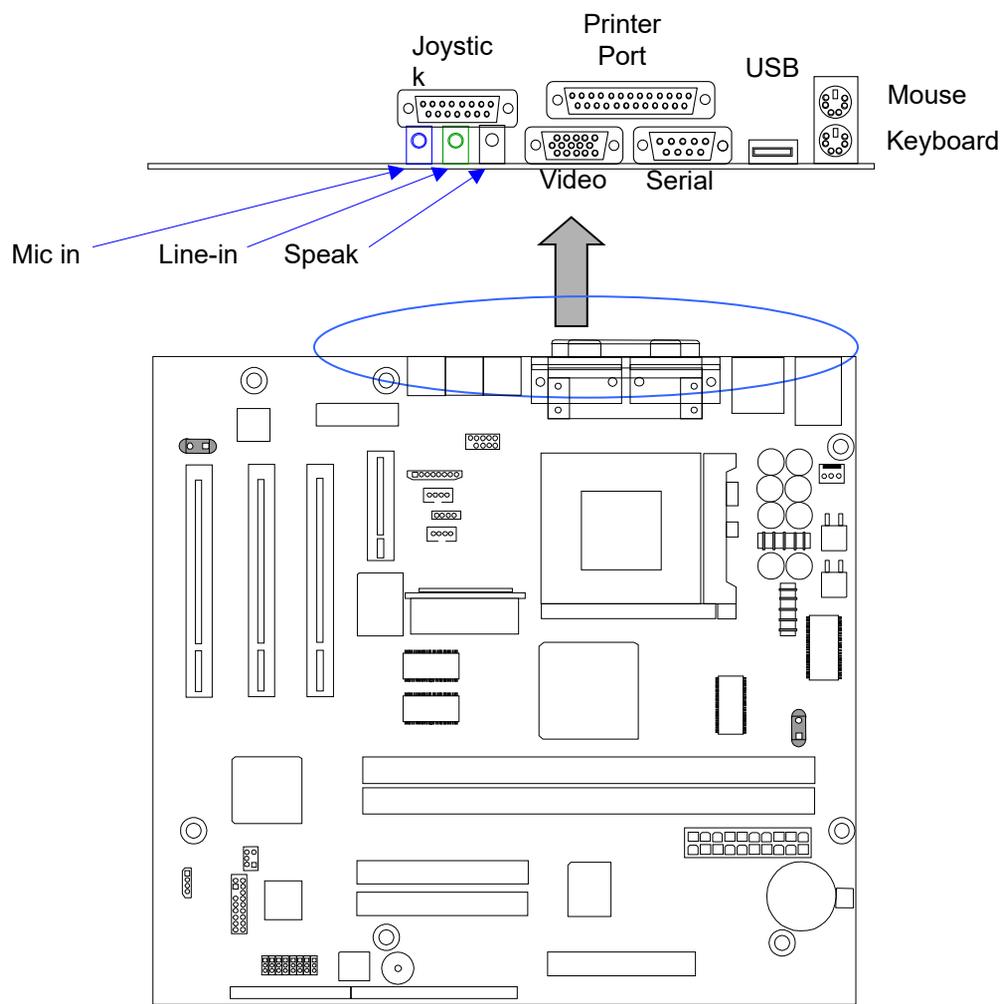
Pin	Signal description
1	LEFT_MIC_INPUT
2	+5VA
3	AGND
4	RIGHT_DAC_OUT
5	LEFT_DAC_OUT
6	AGND
7	NC
8	NC

□ Front USB Connector (CN74) (TG Option)

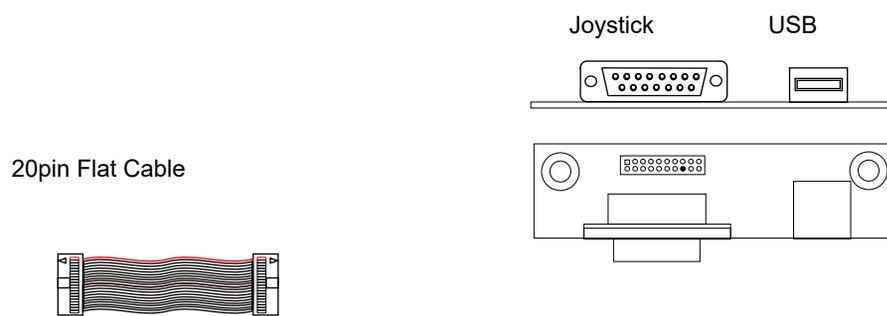


Pin	Signal description
1	VCC
2	Negative DATA
3	Positive DATA
4	GND

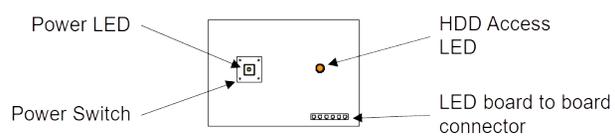
2-2. Motherboard External I/O Port



### 3. Joystick & USB daughter board (eMachines Option)



### 4. LED & Power S/W board (eMachines Option)







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