

TriGem Micro-ATX Motherboard (COGNAC)
Hardware Document

July, 27 1999

Revision 1.0
Prepared by JS Kim
Approved by SE Hong

Document Revision History

Released date	Revision	Description
June, 10 1999	Rev. 0.9	First released version for this document. This document describes the major specification of the Cognac motherboard and the functional feature to be extended by the customer. The motherboard revision number is EVT3(PR1)
July, 27 1999	Rev. 1.0	1. PCB Rev Up (A→C) 2. It is modified in the connector option of M/B

Marketing Information

Address 45-2 Yoidodong, Youngdeungpoku, Seoul, Korea
Telephone 82-2-3774-4251 (International Business Team)
Fax 82-2-786-9478
Email jhpark@trigem.co.kr (Jin Hyun Park)

Technical Support

Address 1055 Shingil-Dong, Ansan, Kyunggi-Do, Korea
Telephone 82-345-491-9528 (Ext. 608)
Fax 82-345-593-6721
Email sehong@trigem.co.kr (Seung Eung Hong)
yccpark@trigem.co.kr (Young chul Park)
jskim2@trigem.co.kr (Jin Soo Kim)

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I. Introduction

The COGNAC Micro ATX motherboard offers a time to market consumer and corporate desktop solution featuring the Intel Celeron PPGA 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 *Cognac* 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 onchip 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 (370pin PPGA Socket)
 - Intel Celeron 400/433/466/500MHz processor @66MHZ Host clock
 - Intel TBD @100MHZ Host clock
- ❑ Main Chipset
 - Graphics and Memory Controller Hub (GMCH) : Intel FW82810-DC100 / FW82810
 - I/O Controller Hub (ICH) : Intel FW82801AA / FW82801AB
 - AC 97' Controller : Intel FW82801AA/AB included
 - Audio Codec : Cirrus CS4299-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
 - Two 1M*16 3.3V SDRAM (4MB)
 - SDRAM operation in 100MHz
 - Flash Memory
 - Intel N82802AB, 4Mb PLCC Type
 - FirmWare 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
 - Two USB port
 - Three audio jack for Speaker output ,Line input and MIC input
 - One Joystick port
 - I/O Controller (IT8702F-A)
 - Low Pin Count (LPC) interface with Host controller(ICH)
 - FDC, Parallel, Serial, keyboard/Mouse supported
 - Joystick port and MPU-401 compatible MIDI interface
- ❑ Audio Subsystem
 - Intel 82801AA/AB AC'97 Audio/Modem controller
 - Independent channels for PCM in and PCM out, Microphone in

- Left and Right audio channels
- 16 bit sample resolution
- multiple sample rates
- AC'97 2.1 compliant AC-link interface

❑ 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 (FW82810-DC100 only)

❑ ICH Subsystem

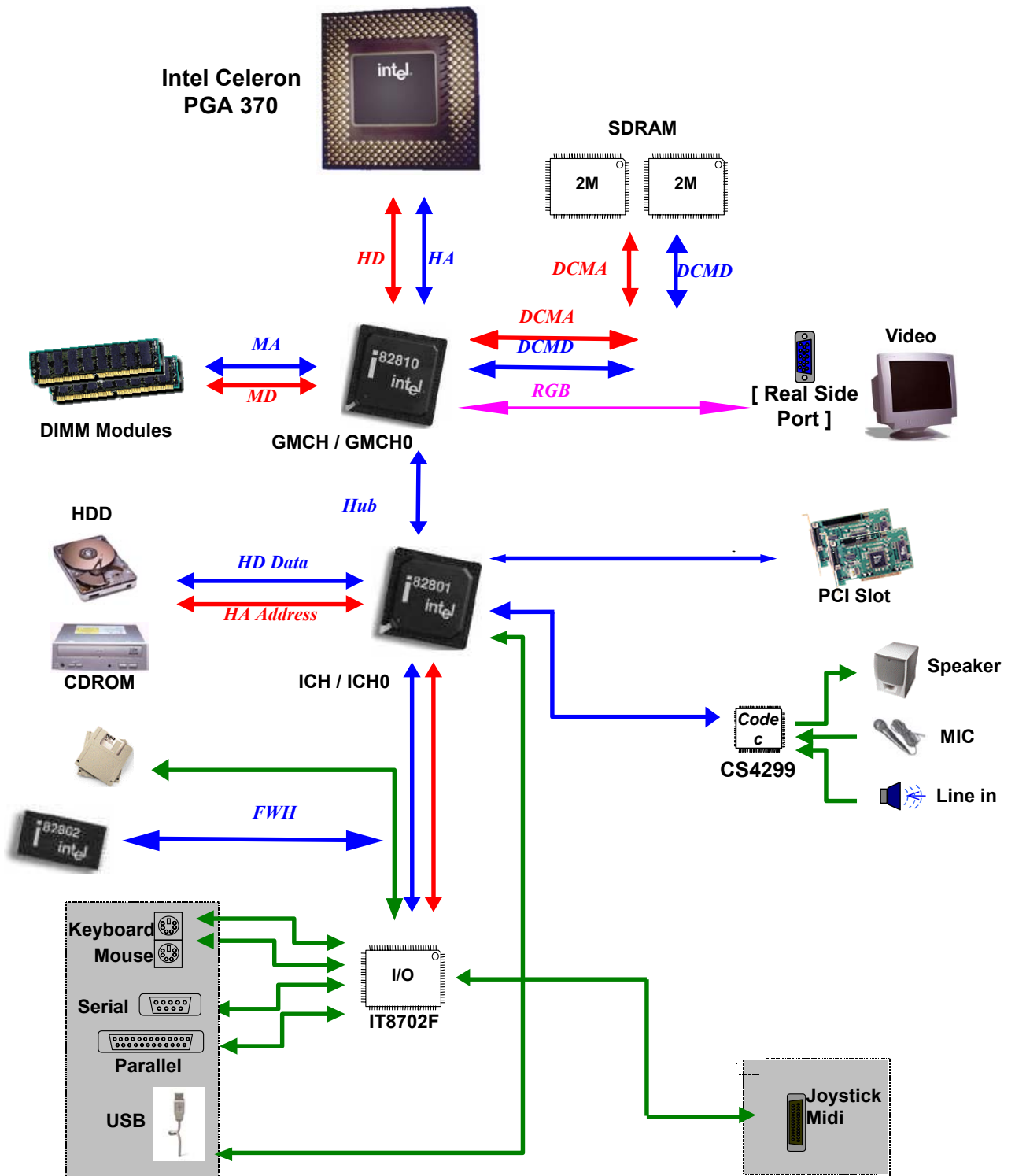
- PCI Bus Interface
- Integrated IDE controller
- USB
- AC'97 Link for Audio and Modem
- Interrupt Controller
- Low Pin Count Interface
- SM Bus
- Firmware Hub Interface

❑ GMCH, ICH vs GMCH0, ICH0 Configuration Difference

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

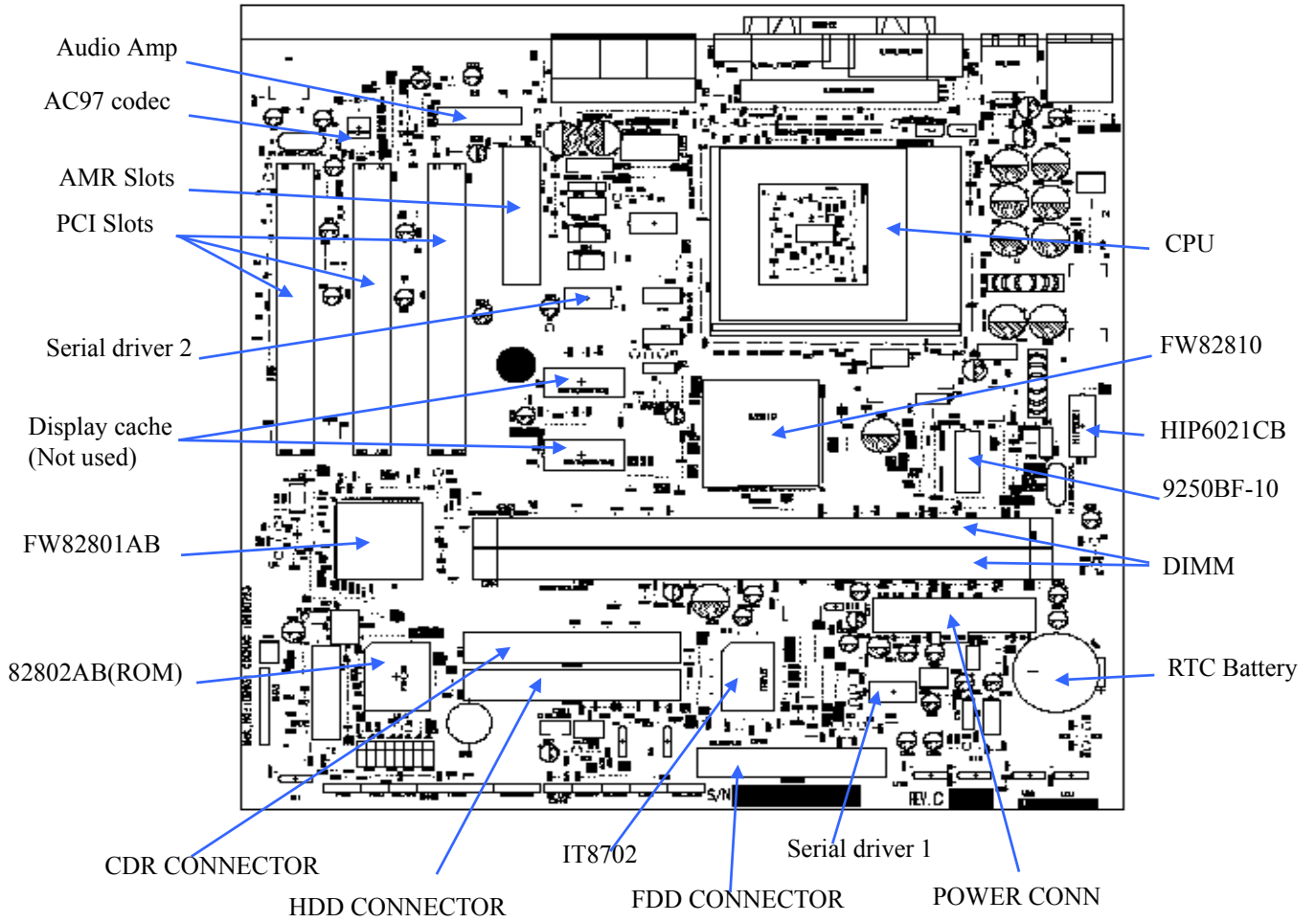
Note : Pavilion 6530/6535 uses the GMCH0, ICH0

2. Function Block Diagram



II. System Overview

1. Major Units



2. Upgradeability

2-1. Processor

COGNAC 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 300/333/366/400/433/466/500MHz.

- ❑ Supported Intel Celeron Processors (PPGA Socket Type)
 - Host Clock 66MHz : Celeron 400MHz
: Celeron 433MHz
: Celeron 466MHz
: Celeron 500MHz
: tbd
 - Host Clock 100MHz : tbd
- ❑ Supported Cyrix Goby Processors (PPGA Socket Type)
 - Host Clock 66MHz : tbd

2-2. Main Chipset Config

Cognac Motherboard has two main chipset configurations.

- ❑ 810DC100 Configuration
 - GMCH + ICH : FW82810DC100 + FW82801AA
- ❑ **810L Configuration**
 - **GMCH0 + ICH0 : FW82810 + FW82801AB**

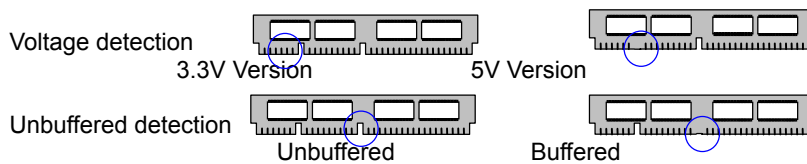
→ It's applied to Cognac, Cognac+

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 82801AB (ICH)	Enabled / Disabled / Auto Detect	Auto Detect
Legacy USB	Intel 82801AB (ICH)	Enabled/ Disabled	Disabled
AC'97 Audio	ICH with CS4299 Codec	Enabled / Disabled	Enabledd
On board FDC	Super I/O (ITE8702)	Enabled / Disabled	Enabled
On board serial A	Super I/O (ITE8702)	Enabled / Disabled	Enabled
On board serial B	Super I/O (ITE8702)	Enabled / Disabled	Disabled
On board parallel	Super I/O (ITE8702)	Enabled / Disabled	Enabled
Midi port	Super I/O (ITE8702)	Enabled / Disabled / Auto	Auto
Game port	Super I/O (ITE8702)	Enabled / Disabled / 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 82801AB(ICH0) PCI Bridge
00	31	00	Intel 82801AB(ICH0) LPC Bridge
00	31	01	Intel 82801AB(ICH0) Bus master IDE
00	31	02	Intel 82801AB(ICH0) USB Host Controller
00	31	03	Intel 82801AB(ICH0) SM Bus Controller
00	31	04	Reserved
00	31	05	Intel 82801AB(ICH0) AC'97 Audio Controller
00	31	06	Intel 82801AB(ICH0) AC'97 Modem Controller
00	31	07	Reserved
00	00	00	Intel 82810(GMCH0) System/Graphics Controller
00	01	00	Intel 82810(GMCH0) Internal Graphics Device
01	0E	00	PCI slot1
01	0D	00	PCI slot2
01	0C	00	PCI slot3

❑ PCI interrupts & Master Number Routing Maps

Intel 82801AB (ICH0) PCI bridge has four programmable interrupt request input signals. Any PCI interrupt source connects to one of these interrupt signals and it's assigned to the free proper interrupt number by PnP BIOS.

ICH INT signals	First PCI slot	Second PCI slot	Third PCI slot	ICH0 USB device	ICH0 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	ICH0 AC'97 Audio	ICH0 AC'97 Modem	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 supports 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) 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

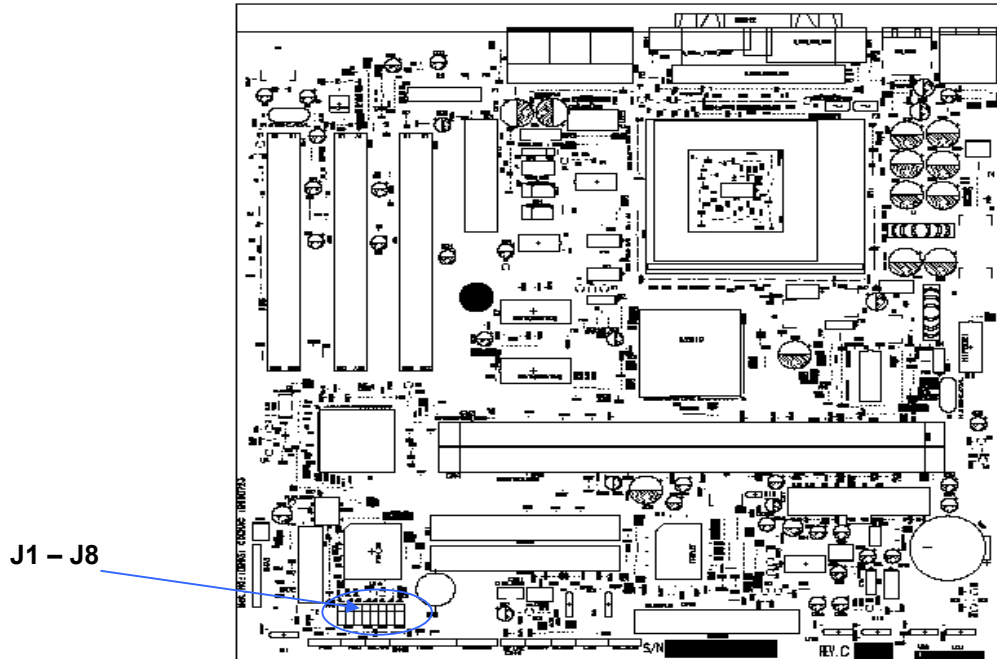
2-7. Manufacturing Options

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 / Rear side	Use additional board or not
USB port	Front side / Rear side	Use additional board or not
Super I/O	IT8712 / IT8702	Include H/W monitoring or not
Graphics controller	FW82810 / FW82810-DC100	Display Cache or not
Display Cache memory	None / 4MB	Display Cache or not

III. Jumper & Connector Description

1. Motherboard Jumper Setting



1-1. Selection for Processor CPU Clock

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

1-2. System functionality (J1,2,3,4,5,8 is TG Option)

DIP Switch	Function	1-2(Default)	2-3
J6	Clear CMOS	Disable	Enable
J7	Audio Function(AMR) Primary Down	Enable	Disable

* Note : Pavilion 6530 uses J6,7
Pavilion 6535 uses J6

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)

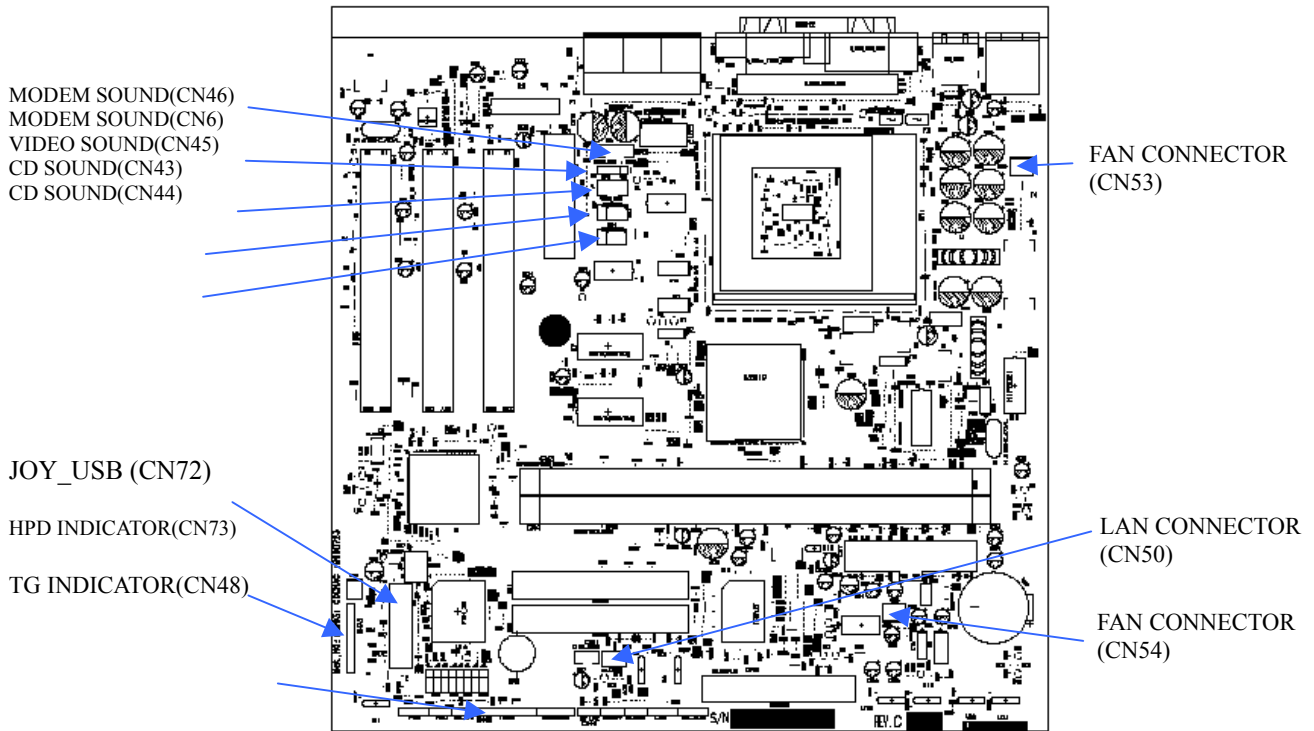
These jumpers (J1, J2 & J3) will be optional parts for the OEM/ODM logo message selector of Trigem.

BIOS Factory Setting (J1,2,3)	J2(2-3), J3(2-3),J4(2-3)	Reserved	J2(2-3), J3(2-3),J4(1-2)	Reserved
	J2(2-3), J3(1-2), J4(2-3)	Reserved	J2(2-3), J3(1-2), J4(1-2)	Reserved
	J2(1-2), J3(2-3), J4(2-3)	Reserved	J2(1-2), J3(2-3), J4(1-2)	Reserved
	J2(1-2), J3(1-2), J4(2-3)	Reserved	J2(1-2), J3(1-2), J4(1-2)	Reserved

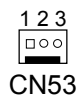
*** Factory Default Setting - bold type text**

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)



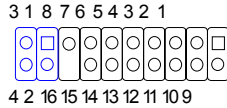
Pin number	Signal description
1	GND
2	FAN control
3	Tachometer (Speed)(GND)

- 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

- Video Sound (CN45) (TG Option)



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

- Modem Sound (CN46, CN6) (TG Option)

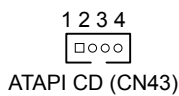


Pin	Signal description	Pin	Signal description
1	MIC	4	GND
2	GND	5	MONO IN
3	MONO OUT		

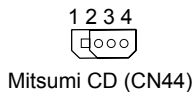


Pin	Signal description	Pin	Signal description
1	MONO IN	3	GND
2	GND	4	MIC

- CD Sound (CN43(TG Option), CN44)



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



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		

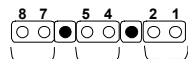
- HPD Indicator Header (CN73)



PWR HDD DC/SW

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

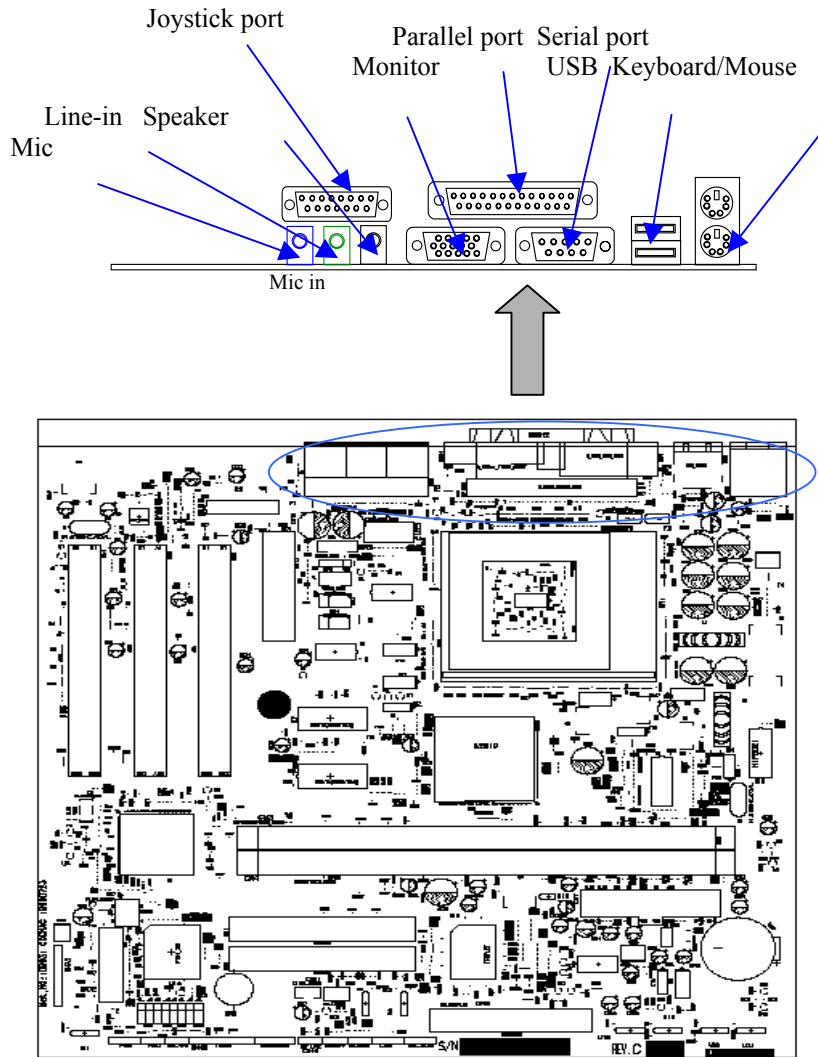
- Aux. Indicator Header (CN49) (TG Option)



Sleep Reset Keylock

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

2-2. Motherboard External I/O Port



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