# TriGem Micro-ATX Motherboard (**Napoli-2**)

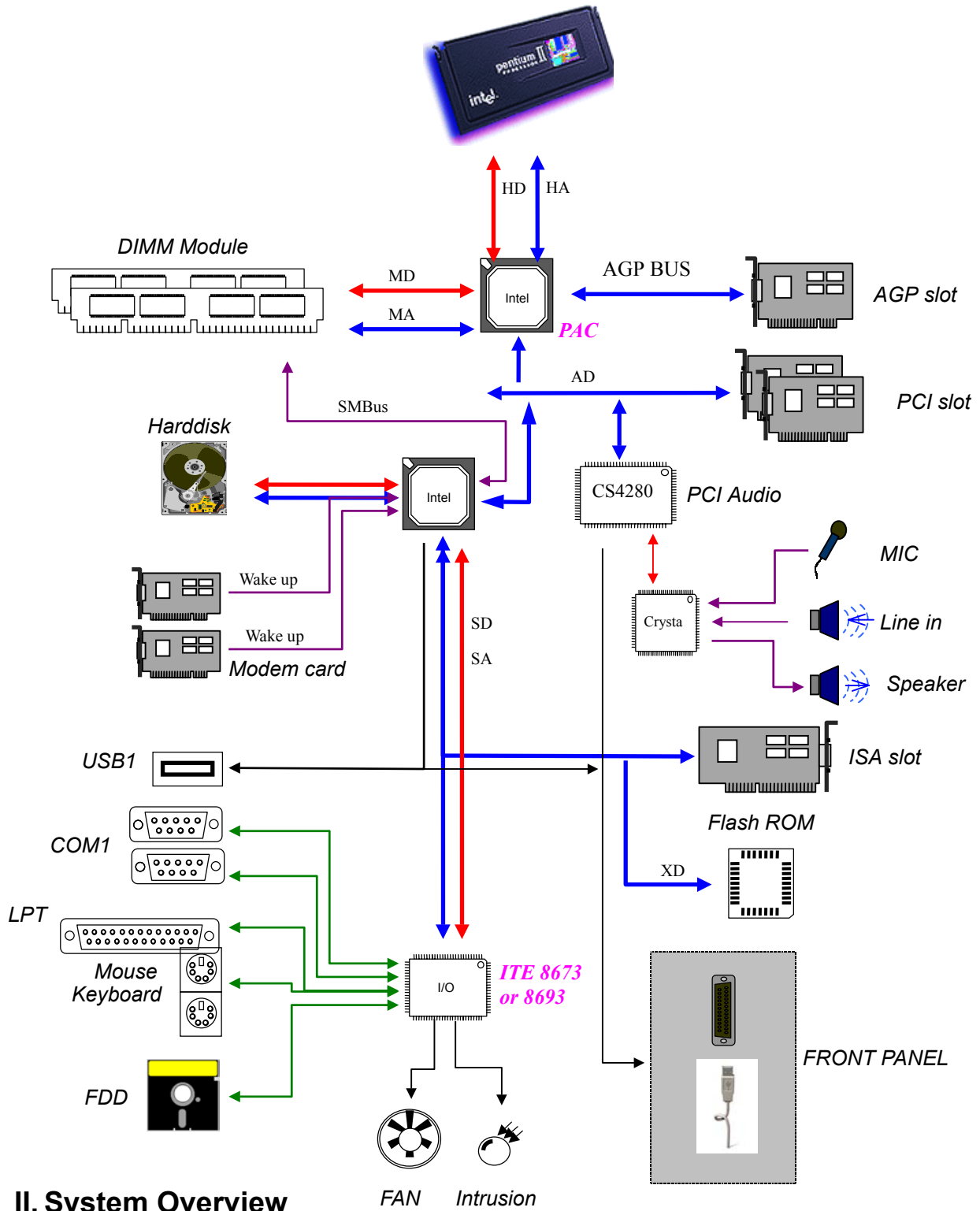## <u>**Table of Contents**</u>

# I. Introduction

The *Napoli-2* Micro ATX motherboard offers a time to market consumer and corporate desktop solution featuring the Pentium-II,III(R) processor with 66/100MHz front side bus and the Intel 443BX(or ZX) sets in a Micro ATX low profile motherboards

The Napoli-2 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 AGP graphics controller and SDRAM, as well as PCI audio solution 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.
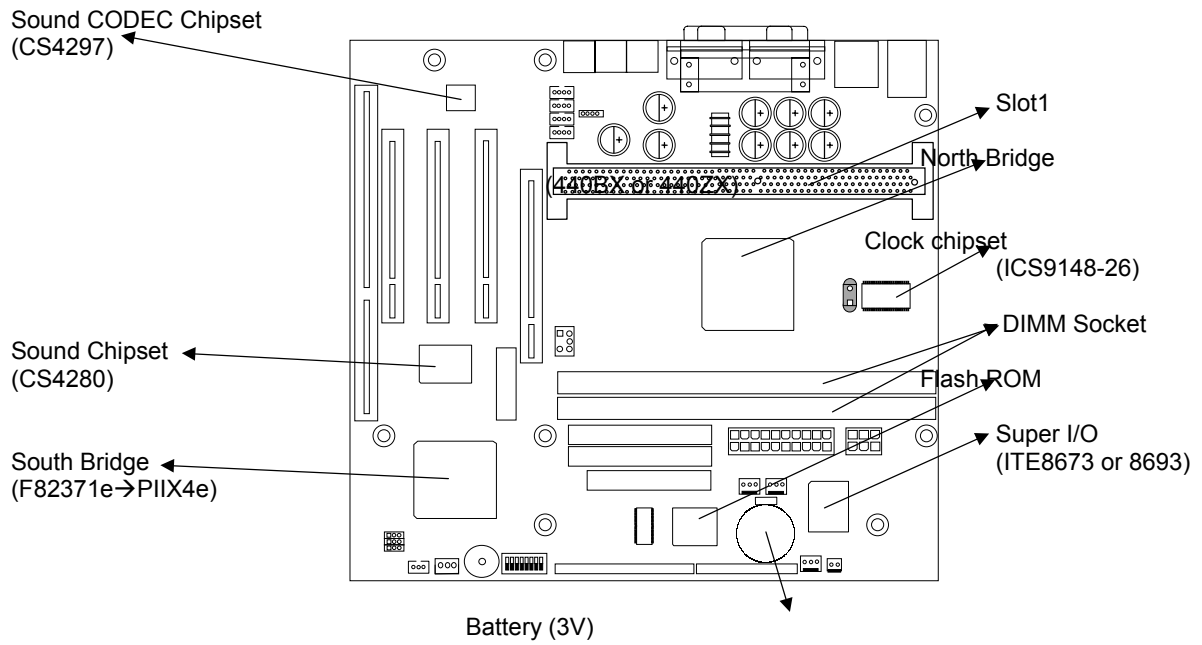
## 1. General description

- ❑ Motherboard
  - Small PCB size in the Micro ATX form factor (ATX V1.2 form factor)
  - 227mm * 240mm * 1.6t (4 Layers)

- ❑ Processor
  - Single Slot 1 Connector
  - Intel Pentium-II processor 233/266/300/333MHz & Pentium-III 300/366/400/450/500/550MHz
  - Single edge contact cartridge design include a dedicated 512KB L2 cache

- ❑ Main Chipset
  - AGPsets PCI/AGP Controller : Intel 440ZX(82443ZX) or 440BX(82443BX) AGP Set
  - PCI bus mastering controller, and Power management interface : PIIX4e(82371EB)
  - Audio     : Crystal CS4280 + CS4297
  - Super I/O : ITE 8673 or 8693
  - DC-DC Converter      : SC1164CS
  - Clock     : ICS 9148-26 (60/66/75/83/90/100MHz host clock support)

- ❑ Memory Configuration
  - System Memory
    - Two banks of 3.3V EDO/SDRAM (168pin unbuffered DIMM) with max 256MB
    - EDO/SDRAM operation in 66MHz front side bus and 100MHz SDRAM with 100MHz FSB.
  - Flash Memory     : Programmable 2MB Flash memory

- ❑ 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 Line input, Speaker output and MIC input
  - Integrated standard I/O functions in the front side
    - One Joystick port
    - One USB port

- ❑ Audio Subsystem
  - PCI Version 2.1 Bus Master
  - PC'97 and PC'98 Compliance(and compliance with preliminary PC'99)
  - Enhanced Stereo full duplex operation
  - Advanced MPC3-compatible input and output mixer
  - Joystick port and MPU-401 compatible MIDI interface

# 2. Function Block Diagram



## II. System Overview

# 1. Major Units

Sound CODEC Chipset
(CS4297)

Sound Chipset
(CS4280)

South Bridge
(F82371e→PIIX4e)

Battery (3V)

Slot1

North Bridge
(440BX or 440ZX)

Clock chipset
(ICS9148-26)

DIMM Socket

Flash ROM

Super I/O
(ITE8673 or 8693)

# 2. Upgradeability

This section describes the major specification of user upgrade parts. CPU, Memory, and extension slot will provide a user to upgrade the overall performance by adding or changing these parts with other higher.

- ❑ CPU : Pentium II processor 233/266/300/333/366MHz and Pentium III processor 350/400/450/500/550MHz
- ❑ Memory : EDO, SDRAM Modules (2bank, 16MB-256MB)
- ❑ Expansion slot : Three master PCI and One ISA slot One shared, One AGP slot

## 2-1. Processor

This motherboard supports a single Pentium II processor or Pentium III processor. The processor's VID pins automatically program the voltage regulator, which is on the motherboard for the required processor voltage. The motherboard supports processors that run internally at 300/333/300/350/400/450/500/550MHz, and have a 512Kb second level cache.

- ❑ Packing
- ❑ Expansion slot : Three master PCI and One ISA slot One shared, One AGP slot

## 2-2. 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 unbuffered168-pin DIMM

Voltage detection



3.3V Version          5V Version

Unbuffered detection



Unbuffered          Buffered
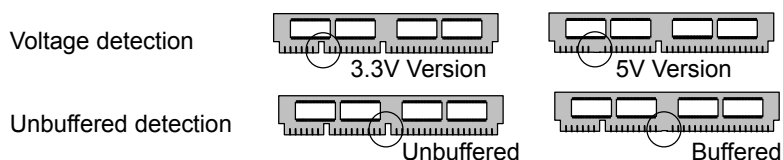
- 66MHz and 100MHz unbuffered SDRAM, and also EDO DRAM
- Non-ECC memory and ECC memory support
- Single or double-sided DIMM with the following types

| DIMM size | Non-ECC memory | ECC memory |
|-----------|----------------|------------|
| 16MB | 2Mbit * 64bit | 2Mbit * 72bit |
| 32MB | 4Mbit * 64bit | 4Mbit * 72bit |
| 64MB | 8Mbit * 64bit | 8Mbit * 72bit |
| 128MB | 16Mbit * 64bit | 16Mbit * 72bit |

## 2-3 BIOS

The motherboard uses a TriGem-AMI 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 |
| FFFA0000 – FFFEFFFF | 256KB | Main BIOS block |
| FF9F0000 - FFF9FFFF | 8KB | Used by BIOS (Event logging) |
| FFF9E000 - FFF9EFFF | 8KB | OEM logo or can flash area |
| FFF9C000 - FFF9DFFF | 16KB | DMI configuration data, PnP, |
| FFF90000 - FFF9BFFF | 96KB | Fault tolerant storage |
| FFF80000 - FFF8FFFF | 64KB | Fault tolerant backup block |

❑  On-board device management

The BIOS can manage the devices on the motherboard over the CMOS setup menu. However the built-in AGP graphics controller can be disabled by the corresponding jumper as described Jumper Setting section later.

| Device | Description | CMOS setup menu | Default value |
|---|---|---|---|
| Internal Cache | Pentium Processor | Enable / Disable | Enabled |
| PS/2 Mouse | Super I/O (ITE8673 or 8693) | Enable / Disable | Enabled |
| USB Function | South Bridge (PIIX4e) | Enable / Disable | Enabled |
| On board Sound | CS4280 + CS4297 | Enable / Disable | Enabled |
| On board FDC | Super I/O (ITE8673 or 8693) | Auto / Enable / Disable | Auto |
| On board serial | Super I/O (ITE8673 or 8693) | Auto / 3F8 / 2F8 / 3E8 / 2E8 | Auto |
| On board parallel | Super I/O (ITE8673 or 8693) | Auto / Disable / 378 / 278 / 3BC | Auto |
| On board IDE | South Bridge (PIIX4e) | Disable / Primary / Secondary / Both | Both |

## 2-4.  Expansion Slot

The motherboard support ISA, PCI and AGP function. ISA and PCI functions are extended to the additional slot with two ISA and two PCI, and AGP function is designed in the motherboard with AGP graphics controller.

❑  PCI configuration space map

| Bus number | Device number | Function number | Device |
|---|---|---|---|
| 00 | 00 | 00 | F82443BX or ZX (North bridge) |
| 00 | 01 | 00 | PIIX4e (South bridge) |
| 00 | 07 | 00 | PCI/ISA bridge (South bridge) |
| 00 | 07 | 01 | IDE bus master (South bridge) |
| 00 | 07 | 02 | USB (South bridge) |
| 00 | 07 | 03 | Power management (South bridge) |
| 01 | 00 | 00 | AGP Slot |
| 00 | 13 | 00 | PCI slot1 |
| 00 | 12 | 00 | PCI slot2 |
| 00 | 11 | 00 | PCI slot3 |
| 02 | 10 | 00 | CS4280(Sound Controller) |

❑ PCI interrupt & master number routing map

The F82371e(PIIX4e) PCI/ISA 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.

| SB INT Signals | First PCI slot | Second PCI slot | | Sound Device | AGP * slot | PIIX4e USB device |
|---|---|---|---|---|---|---|
| PIRQA | INTA | INTB | | | INTA | |
| PIRQB | INTB | INTC | | | | |
| PIRQC | INTC | INTD | | | | |
| PIRQD | INTD | INTA | | INT D | | INTA |
| Master | REQ0 | REQ1 | | | | |
| IDSEL | AD30 | AD29 | AD27 | AD22 | GAD17 | AD18 |

## 2-5. 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. 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 (Amber), standby mode (Blinking Amber ), and suspend mode (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 power-off function |
| LAN | Wakeup from power-off status |
| Modem | Wakeup from power-off status |
| Thermal event | Wakeup from power-off status |
| Sleep button | Wakeup from power-off status and go to suspend mode (option) |

## 2-6. Manufacturing Options

The motherboard has several manufacturing option 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 |

# III. Jumper & Connector Description

## 1. Motherboard Jumper Setting

### 1-1. DIP Switch Setting Method



OFF
ON
8 7 6 5 4 3 2 1

❑ CPU Freq Ratio

| Ratio | SW1 | SW2 | SW3 | SW4 |
|-------|-----|-----|-----|-----|
| 2x | ON | ON | ON | ON |
| 3x | ON | OFF | ON | ON |
| 4x | OFF | ON | ON | ON |
| 5x | OFF | OFF | ON | ON |
| 2.5x | ON | ON | OFF | ON |
| 3.5x | ON | OFF | OFF | ON |
| 4.5x | OFF | ON | OFF | ON |
| 2x | OFF | OFF | OFF | OFF |
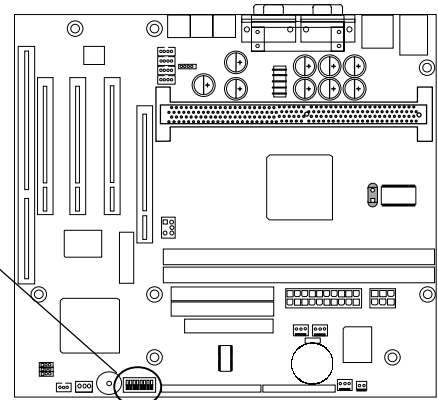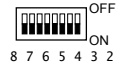
❑ Other functionality

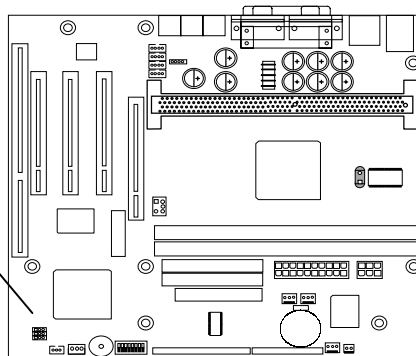| DIP Switch | Function | ON | OFF |
|------------|----------|-----|-----|
| SW5 | CMOS RAM function | Clear CMOS RAM | Enable write/save |
| SW6 | Password function | Clear password | Enable password |
| SW7 | CMOS setup function | Disable to edit CMOS contents | Enable to edit CMOS contents |
| SW8 | FDD write protect | Disable to write data to Floppy disk | Enable to write data to Floppy disk |

### 1-2. Jumper Setting Method
❑ OEM/ODM selector

These jumpers (J2,3, 7) will be optional parts for the OEM/ODM logo message selector.

*For the proper operation, these jumpers should be set together.*

| J2 | J3 | J7 | ODM Vendor |
|----|----|----|------------|
| ***2-3*** | ***2-3*** | ***2-3*** | ***ODM*** |
| 2-3 | 2-3 | 1-2 | Trigem Export |
| 2-3 | 1-2 | 2-3 | Trigem Domestic |
| 2-3 | 1-2 | 1-2 | Reserved |



1 2 3
J11
J12
J13

# 2. I/O Header Connector Description

## 2-1. Motherboard Internal Connector

Joystick & USB Header (CON1,CN71)

Slot 1 (CN1)

ISA (CN17)

PCI (CN14, CN13, CN12)

Modem Sound (CN46, CN70)
Video Sound (CN45)
CD Sound (CN43, CN44)

DIMM Module

ATX PSU connector (CN7)

AGP Slot (CN21)

Sec-IDE connector (CN11)
Pri-IDE connector (CN10)

PC/PCI (CN23)

FDD connector (CN9)

CPU FAN(CN53)

Chassis FAN(CN55)

LAN Wakeup (CN50)

Chassis Connector (CN52)

Aux.-Indicator Header (CN48)

Indicator Header (CN49)

Modem Wakeup (CN51)   System FAN (CN54)

❑ CPU FAN connector (CN53)

1 2 3
CN53

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

❑ System FAN connector (CN54)

1 2 3
CN54

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

❑ Chassis FAN connector (CN55)

1 2 3

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

❑ PC/PCI connector (CN23)

2 4 6
1 3 5

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

❑ Joystick connector (CON1,CN71)

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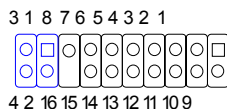
| Pin | Signal description | Pin | Signal description |
| --- | --- | --- | --- |
| 1 | VCC | 9 | VCC |
| 2 | GD(4) | 10 | GD(6) |
| 3 | GD(0) | 11 | GD(2) |
| 4 | GND | 12 | MIDI OUT |
| 5 | GND | 13 | GD(3) |
| 6 | GD(1) | 14 | GD(7) |
| 7 | GD(5) | 15 | MIDI IN |
| 8 | VCC | 16 | Key |
| 1 | GND |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

❑ Video Sound (CN45)

1 2 3 4
CN45

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

❑ Modem Sound (CN46, CN70)

1 2 3 4 5
CN46

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

1 2 3 4
CN70

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

❑ CD Sound (CN43, CN44)
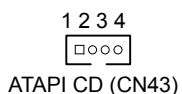
1 2 3 4
ATAPI CD (CN43)

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

1 2 3 4
Mitsumi CD (CN44)
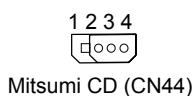
| Pin | Signal description | Pin | Signal description |
| --- | --- | --- | --- |
| 1 | GND | 3 | GND |
| 2 | Left Sound | 4 | Right Sound |

❑ LAN Wakeup (CN50)

1 2 3 4

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

❑ Modem Wakeup (CN51)

1 2 3 4

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

❑ Indicator Header (CN49)

1 2 3   5 6   8 9   11 12 13 14 15 16 17  19 20 21 22

PWR  HDD DC SW   IrDA   Speaker
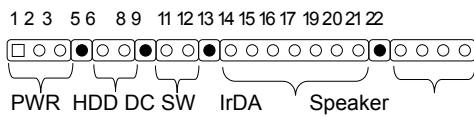
| Pin | Signal description | Pin | Signal description |
|---|---|---|---|
| 1 | VCC | 12 | GND |
| 2 | PM indicator signal | 13 | IRTX |
| 3 | GND | 14 | VCC |
| 4 | Key | 15 | IRSEL |
| 5 | VCC | 16 | N.C |
| 6 | HDD access signal | 17 | GND |
| 7 | Key | 18 | Key |
| 8 | Power-ON switch signal | 19 | VCC |
| 9 | GND | 20 | GND |
| 10 | Key | 21 | N.C |
| 11 | IRRX | 22 | Speaker signal |

**2-2. Motherboard External I/O Port**

Parallel port

Mouse

MIC  L_IN  SPK  COM2  COM1  USB  Keyboard
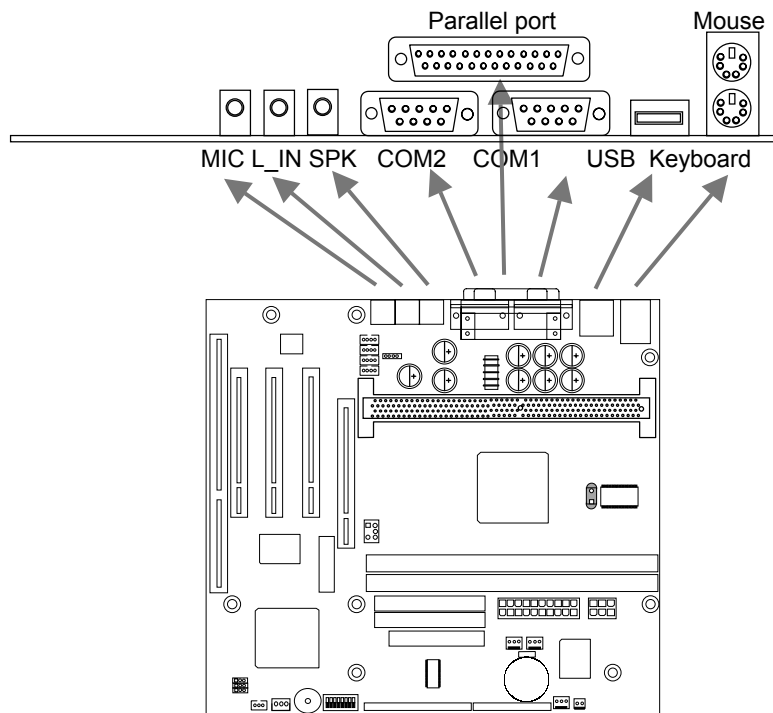
# 3. Joystick & USB daughter board

Joystick          USB

20pin Flat Cable
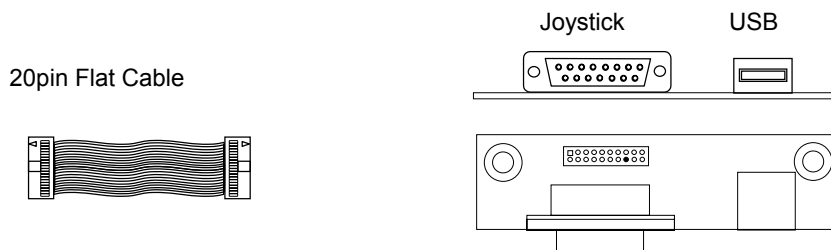
# 4. LED & Power S/W board

Power LED

Power Switch

HDD Access LED

LED board to board connector
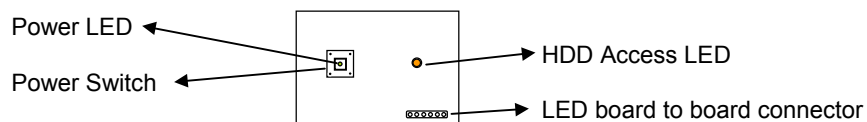
Power LED color :     Green (normal working)
                      Blinking Green (power management mode)
HDD LED color :       Green light on (HDD access)
                      *Light off (no access to HDD device)*