

NXE-I945B MotherBoard
Hardware Document

Document Revision History**User's Notice**

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I. Introduction

The **NXE-I945B(Burberry)** motherboard offers a time-to-market consumer application solution featuring the Intel Pentium4, Pentium-D, Core2Duo and Conroe-L processor with the 1066/800/533 MHz system bus and Intel 945G & ICH7R Chipset. Additional H/W platform features include integrated graphics controller core, DDR2 667/533/400 System memory, Ultra ATA100, SATA2(3Gbps), Low Pin Count (LPC) interface, Universal Serial Bus 2.0, PCI Express 16x, PCI audio solution with AC97 CODEC and Realtek Gigabit PCI Express Ethernet.

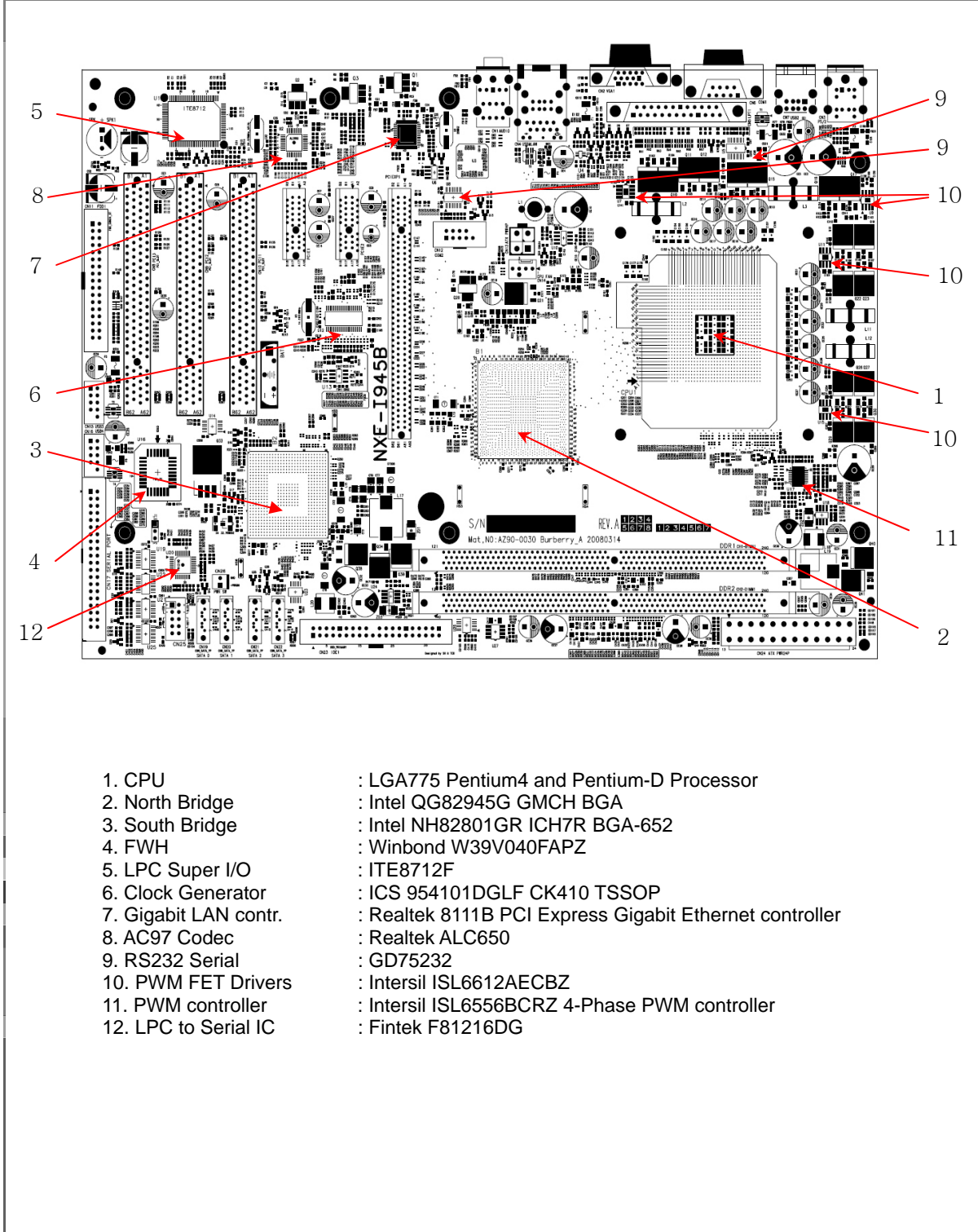
1. General description

- θ Main board
 - PCB size in the special form factor
 - 305mm * 210mm * 1.6T (4 Layers)
- θ Processors
 - **Intel Pentium 4 with HT, Pentium D processor (LGA775)**
 - **Intel Celeron processor**
 - **Intel Core2Duo , Conroe-L processor**
- θ Main Chipset
 - Graphic Memory Control Hub (GMCH) : **Intel 945G**
 - I/O Control Hub (ICH) : **Intel ICH7R (with RAID Function)**
 - LPC SIO Controller : **ITE8712F**
 - LPC to UART Controller : **Fintek F81216D**
 - Ethernet controller : **Realtek 8111B Gigabit PCI Ex Ethernet**
 - Audio Subsystem : **AC 97 Link - RealTek ALC650 CODEC**
 - DC-DC Subsystem : **Intersil ISL6326CRZ + ISL6612AECBZ (VRD11.0)**
 - Clock Generator : **ICS954101DGLF (TSSOP / CK410) + IDT23S05**
- θ Memory Subsystem
 - System Memory
 - DDR2 667/533/400 memory types
 - 2GB Maximum memory
 - Bandwidth up to 10.7GB/s (DDR2 667) in dual channel Interleaved mode.
 - Non-ECC memory only
 - 256-Mb, 512-Mb and 1-Gb DDR2 technologies
 - Flash Memory (LPC) : programmable 4 Mb Flash memory for BIOS
- θ Integrated Graphics Device
 - Core frequency of 400 MHz / 1.6 GP/s pixel rate
 - Supports 8/16/32/64MB Frame Buffer sizes
 - High-Quality 3D Setup and Render Engine
 - High-Quality Texture Engine
 - VLD/iDCT for enabling dual Intel High Definition streams for MPEG playback
- θ Analog Display Support
 - 400 MHz Integrated 24-bit RAMDAC
 - Up to 2048x1536 @ 75 Hz refresh
 - Hardware Color Cursor Support
 - DDC2B Compliant Interface
- θ Digital Display Support
 - Two SDVO ports multiplexed with PCI Express Graphics interface
 - 200 MHz dot clock on each 12-bit interface
 - Can combine two channels to form one larger interface
 - Flat panels up to 2048x1536 @ 60 Hz or Digital CRT/HDTV at 1920x1080 @ 85 Hz
 - Dual independent display options with digital display
 - Multiplexed digital display channels (Supported with ADD2 Card)
 - Supports TMDS transmitters or TV-Out encoders
 - ADD2/ADD2+ card uses PCI Express graphics x16 connector

- ① PCI Express Graphics Interface
 - One x16 PCI Express port
 - Compatible with the PCI Express Base Specification, Revision 1.0a
 - Raw bit rate on data pins of 2.5 Gb/s resulting in a real bandwidth per pair of 250 MB/s
- ① PCI Express
 - 2 PCI Express root ports
 - Supports PCI Express 1.0a
 - Support for full 2.5 Gb/s bandwidth in each direction per x1 lane
 - Module based Hot-Plug supported (e.g., Express-card)
- ① PCI Bus Interface
 - Supports PCI Rev 2.3 Specification at 33 MHz
- ① Integrated Serial ATA Host Controller
 - Four ports
 - Data transfer rates up to 3.0 Gb/s (SATA II)
 - Integrated AHCI controller
- ① Integrated IDE Controller
 - Independent timing of up to two drives
 - Ultra ATA/100/66/33, BMIDE and PIO modes
- ① USB2.0
 - Includes four UHCI Host Controllers, supporting eight external ports (USB 1.1 ports)
 - Includes one EHCI Host Controller that supports all eight ports (USB 2.0 ports)
 - Supports legacy Keyboard/Mouse software
- ① Audio Subsystem
 - RealTek ALC650 CODEC
 - AC'97 2.2 compliant
 - 18 bit ADC and 20-bit DAC resolution
 - 3D Stereo enhancement
 - Embedded 50mW/20ohm OP at front LINE output
 - External amplifier power down capability
 - Built18-bit stereo full-duplex CODEC with independent and variable sampling rate
- ① Ethernet Subsystem (LAN – Realtek RTL8111B)
 - Supports PCI Express 1.0a
 - Integrated 10/100/1000 transceiver
 - Auto-Negotiation with Next Page capability
 - Supports Full Duplex flow control (IEEE 802.3x)
 - Fully compliant with IEEE 802.3, IEEE 802.3u, IEEE 802.3ab
 - Serial EEPROM
 - Supports IEEE 802.1P Layer 2 Priority Encoding
 - Transmit/Receive on-chip buffer (48KB) support
- ① Super I/O Subsystem
 - LPC Interface
 - Motherboard GLUE Logic
 - Power Sequencing
 - Power OK Signal Generation
 - Resume Reset Signal Generation
 - SMBus Isolation Circuitry
 - Floppy Disk Controller
 - Keyboard Controller
 - Serial Ports
 - Two Full Function Serial Ports
 - High Speed 16C550A Compatible UART with Send/Receive 16-Byte FIFOs
 - Multi-Mode Parallel Port
 - IEEE 1284 Compliant Enhanced Capabilities Port

II. System Overview

1. Burberry Mother-Board



- | | |
|-----------------------|---|
| 1. CPU | : LGA775 Pentium4 and Pentium-D Processor |
| 2. North Bridge | : Intel QG82945G GMCH BGA |
| 3. South Bridge | : Intel NH82801GR ICH7R BGA-652 |
| 4. FWH | : Winbond W39V040FAPZ |
| 5. LPC Super I/O | : ITE8712F |
| 6. Clock Generator | : ICS 954101DGLF CK410 TSSOP |
| 7. Gigabit LAN contr. | : Realtek 8111B PCI Express Gigabit Ethernet controller |
| 8. AC97 Codec | : Realtek ALC650 |
| 9. RS232 Serial | : GD75232 |
| 10. PWM FET Drivers | : Intersil ISL6612AECBZ |
| 11. PWM controller | : Intersil ISL6556BCRZ 4-Phase PWM controller |
| 12. LPC to Serial IC | : Fintek F81216DG |

2. Upgradeability

2-1. Processor

User can upgrade CPU
- Pentium 4 / Pentium-D / Core2Due / Celeron / Conroe-L

2-2. Memory

The **Burberry** motherboard has two Dual Inline Memory Module (DIMM), minimum 256MB to maximum 2GB memory size. The BIOS detects the memory type, size, and speed through SMBUS interface between the core chipset and DIMM module automatically.

The motherboard supports the following memory features

- Maximum memory size : 2GB
- Directly supports one or two channels of memory (each channel consisting of 64 data lines)
- Supports DDR2 400, DDR2 533, and DDR2 667
- Available bandwidth up to 5.3 GB/s (DDR2 667) for single-channel mode or dual-channel asymmetric mode and 10.7 GB/s (DDR2 667) in dual-channel Interleaved mode.
- Supports DDR2 memory DIMM frequencies of 400MHz, 533MHz, and 667MHz. The speed used in all channels is the speed of the slowest DIMM in the system.
- Supports 256-Mb, 512Mb, and 1-Gb DDR2 technologies for x8 and x16 devices.
- Supports four banks for all DDR2 devices up to 512-Mbit density
- DDR2-667 4-4-4 is Not supported
- Supports only unbuffered DIMMs
- SPD (Serial Presence Detect) scheme for DIMM detection support
- Supports configurations defined in the JEDEC DDR DIMM specification only

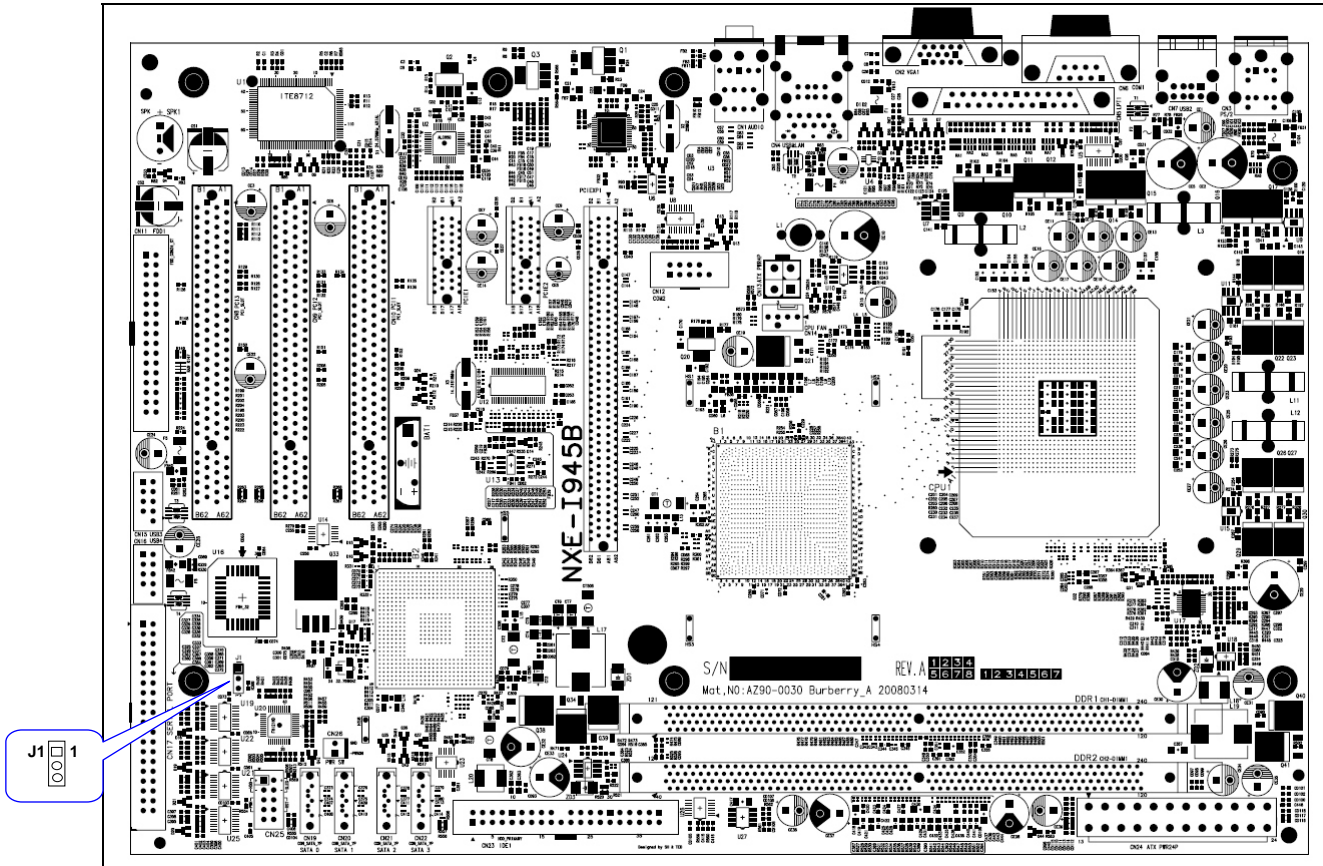
2-3 BIOS

θ Flash memory (FWH) organization

The **Burberry** motherboard uses a AMI BIOS, which is stored in the flash memory and can be upgraded using a disk-based or Windows-based program. An old version of the BIOS can be updated to the newer version using the Flash Memory Update utility in a floppy diskette or HDD.

III. Jumpers , Connectors & Ports Descriptions

1. Board Jumpers Settings

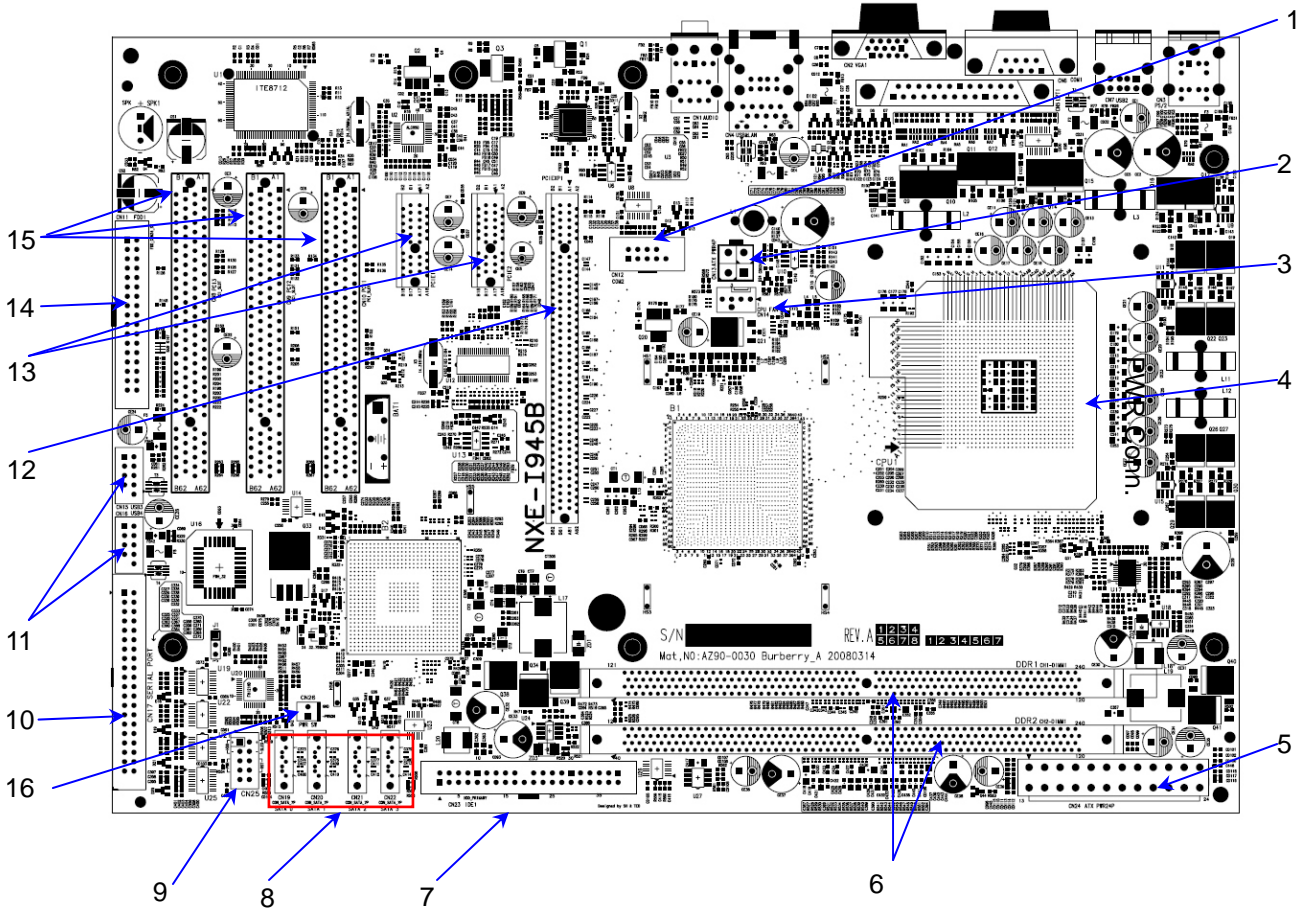


1-1. Jumper Descriptions

Jumper	Function	1-2	2-3	Remarks
J1	CMOS Clear	Normal	CMOS Clear	

2. I/O Headers , Slots & Connectors Descriptions

2-1. Motherboard Internal Connectors

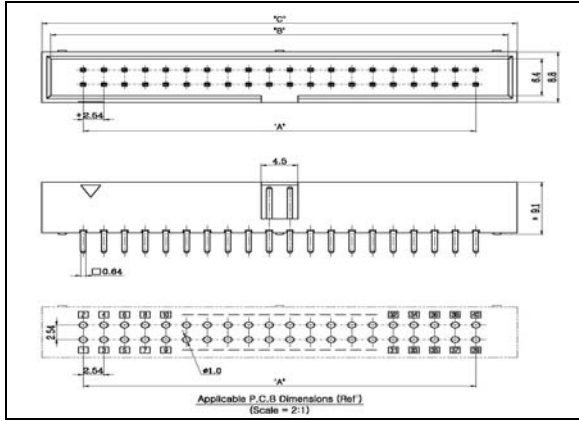


2-1-1. Main Connector, Slot & DIMM

No.	Ref No.	Description 1	Description 2
2	CN13	-	CPU Power 4 pin
4	CPU1	-	LGA775 CPU socket
5	CN24	-	Main Power 24 pin
6	DDR1 ~ DDR2	U : DDR1 → DDR2 : D	DDR2 DIMM slots
7	CN23	IDE1	IDE connector
8	CN19 ~ 22	L : CN19 → CN22 : R L : SATA0 → SATA3 : R	SATA II Connectors
12	PCIEXP1	-	PCI express 16X slots
13	PCIE1 ~ PCIE2	L : PCIE1 → PCIE2 : R	PCI express 1X slots
14	CN11	FDD1	FDD connector
15	CN8 ~ CN10	L : PCI3 → PCI1 : R	PCI Slots

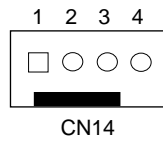
2-1-2. I/O Header & connectors

θ 1 : Serial interface connector (CN12 – COM2)



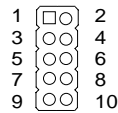
Pin number	Signal description
1	-DCD
2	RXD
3	TXD
4	-DTR
5	GND
6	-DSR
7	-RTS
8	-CTS
9	-RI
10	KEY(NC)

θ 3 : CPU FAN connector (CN14)



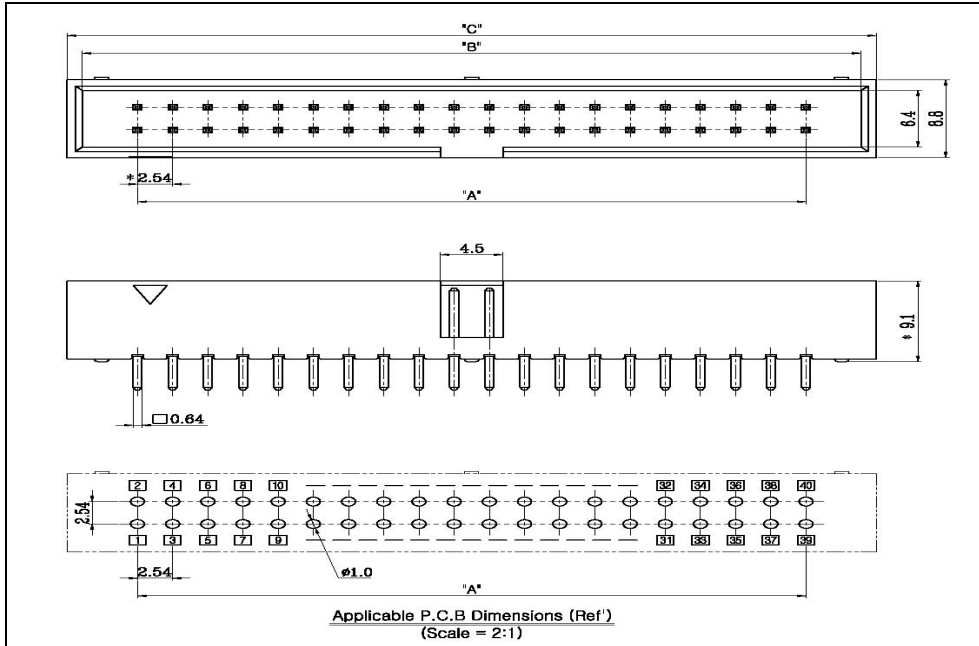
Pin number	Signal description
1	GND
2	+12V
3	FAN_Tacho output
4	FAN_CTL

θ 9 : Front panel connector (CN25)



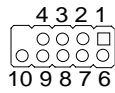
Pin number	Signal description
1	HDD_LED+
2	System_LED+
3	HDD_LED-
4	System_LED-
5	GND
6	GND
7	-PWR_ON
8	-System_RST
9	GND
10	NC

0 10 : Serial 4 Ports 40Pin Box Header (CN17)



Pin description	Pin No.	Pin description	Port No.
DCD3	1	DSR3	Serial Port 3
RXD3	3	RTS3	
TXD3	5	CTS3	
DTR3	7	RI3	
GND	9	N.C.	
DCD4	11	DSR4	Serial Port 4
RXD4	13	RTS4	
TXD4	15	CTS4	
DTR4	17	RI4	
GND	19	N.C.	
DCD5	21	DSR5	Serial Port 5
RXD5	23	RTS5	
TXD5	25	CTS5	
DTR5	27	RI5	
GND	29	N.C.	
DCD6	31	DSR6	Serial Port 6
RXD6	33	RTS6	
TXD6	35	CTS6	
DTR6	37	RI6	
GND	39	N.C.	

① **11** : USB2.0 interface connector(CN15, CN16)



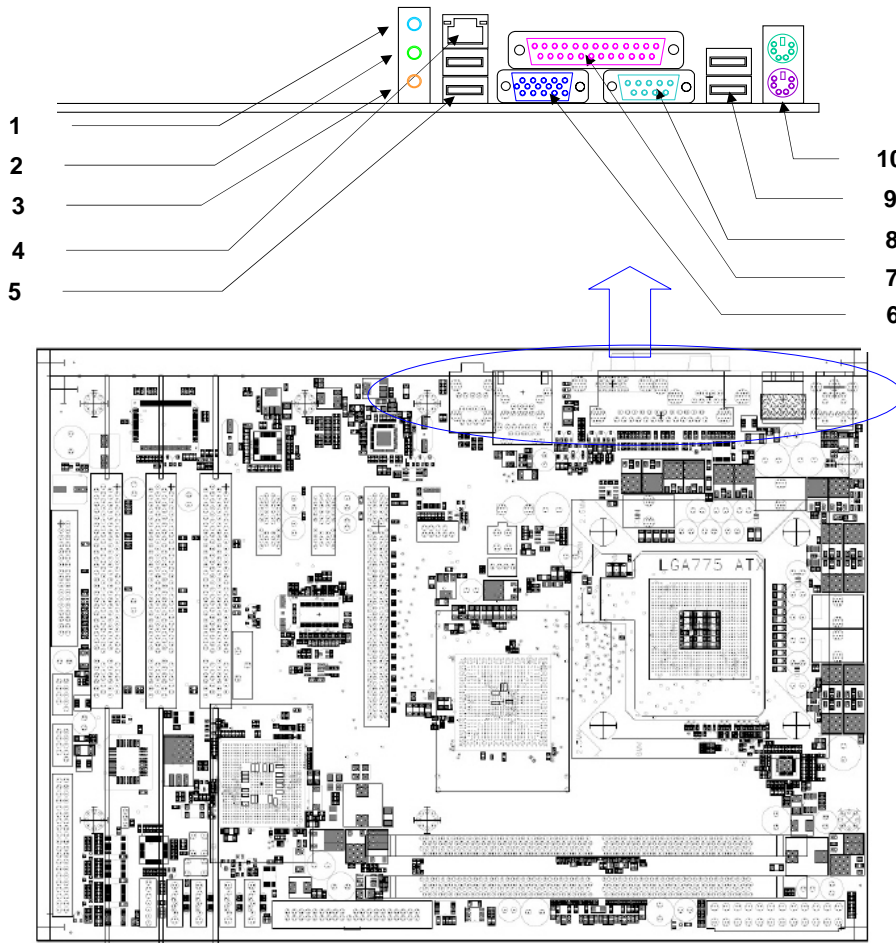
<i>Pin number</i>	<i>Signal description</i>
1	VCC
2	USB-
3	USB+
4	GND
5	KEY
6	VCC
7	USB-
8	USB+
9	GND
10	GND

① **16** : Power switch connector (CN26)



<i>Pin number</i>	<i>Signal description</i>
1	-PWR_ON
2	GND

3. Rear Ports Description



No.	Functions	Description 1	Description 2
1	Rear Audio Ports	Line IN	CN1
2		Line OUT	
3		Microphone IN	
4	LAN USB Stack	RJ-45 Gigabit LAN port	CN4
5		USB 2.0 X 2 ports	
6	D-Sub Ports	Dsub15 VGA port	CN2
7		Dsub25 parallel port	CN5
8		Dsub9 Serial port	CN6
9	USB Stack	USB 2.0 X 2 ports	CN7
10	Mini DIN connector	PS2 Keyboard(D) Mouse(U)	CN3