ENDAT-N3410

For ENDAT-N3410 PCB ver. A00
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■ Installation notice

The manufacturer recommends using a grounded plug to ensure proper motherboard operation. Care should be used in proper conjunction with a grounded power receptacle to avoid possible electrical shock. All integrated circuits on this motherboard are sensitive to static electricity. To avoid damaging components from electrostatic discharge, please do not remove the board from the anti-static packing before discharging any static electricity to your body, by wearing a wrist-grounding strap. The manufacturer is not responsible for any damage to the motherboard due to improper operation.

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Revision History

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Revision	Description	Date
0.1	Initial release of the Mini-ITX boards with Intel "Braswell" SOC.	Sep 30 2015
0.2	Fix description errors	Oct 2 2015

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Disclaimer

This product specification applies to only the Unicorn Computer ENDAT-N3410 series.

All Unicorn Computer Boards are evaluated as Information Technology Equipment (I.T.E.) for use in personal computers (PC) for installation in homes, computer rooms, and similar locations.

The suitability of this product for other PC or embedded non-PC applications or other environments, such as medical, industrial, alarm systems, test equipment, etc. may not be supported without further evaluation by Unicorn Computer.

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Introduction

The ENDAT-N3410 Mini-ITX board uses Intel N3000 series boards, Single, Dual, or Quad-core CPU. It is compatible with Unicorn Computer ENDAT-N3410 specification and incorporates a single 10/100/1000 Mbps Ethernet controller, 10 digital I/O signals, four serial ports, one port of HDMI 1.4 video (with digital audio support), and one port of HDMI display interface (without digital audio support). Additionally, the ENDAT-N3410S contains is for slim type design support.

The Unicorn Computer ENDAT-N3410 series is allowing operation from -20° to +60°C without active cooling. The wide power input range of +9 to +35VDC also provides flexibility across various DC power sources.

Device drivers are available at "http://www.unicorn-computer.com.tw". For additional information, call Technical Support at +886- 2-2223-6699. You can also send a RMA Service Request Form by E-Mail or FAX when have the defective products.

The ENDAT-N3410 series SKU list:

ENDAT-N3410
Vehicle Computer solution: Intel Braswell based Mini-ITX board with Power over Ethernet (PoE)

ENDAT-N3410S
Slim type solution: Intel Braswell based Mini-ITX board with Power over Ethernet (PoE)

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1. Product Description

1.1. Product Specifications

Model name	ENDAT-N3410 / ENDAT-N3410S (Braswell)
Micro processor	Intel Braswell M/D
Memory	2 X SODIMM DDR3L Dual channel support 8GB (max)
CRT interface	VGA / Dual HDMI / Dual Ch. LVDS support, Panel Type selected by System BIOS
GFX core	Intel graphics HD
System Chip	Braswell M/D
ETHERNET	Dual Intel 82583V 2 xGbE 10/100/1000M (support EtherCAT(optinal))
SATA	2 x port SATA3 interface share w/ 1 x port mSATA with Hi-Speed Switch by jumper select
GPIO	8 bit in/out
Serial	4 Serial Ports w/+5, +12V Power select, COM2 / COM3 support RS232/422/485 by System BIOS; the COM2 ~ COM4 are box header type
USB 2.0 / USB 3.0	8 USB ports include 6 USB 2.0 + 2 USB 3.0
Other	2 x POE
EXPANSION SLOT	2 mini-PCIe socket design with One Full and One Half
I/O PORT (Rear Window)	2 x PoE + RJ-45 connector
	COM1, 2 x HDMI, 1 x VGA (For ENDAT-N3410)
	USB 2.0 x 4 (ENDAT-N3410S: USB2.0 x 2), USB 3.0 x 2
	DC Jack
BOX Header / Header	2.00mm Box Header support COM2 ~ COM4
	2.00mm Pin Header suppot Line-In, Line-Out, MIC-in and Speaker out
	2.00mm Pin Header suppot USB 2.0 x 2
	2.00mm Box Header for LPT; 2.00mm Pin Header for PS2 KB/MS
POWER SUPPLY	Wide range DC 9 - 35V input
Board Size	mini-iTX form factor of 170mm x 170mm

Figure1 - Product specifications

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1.2. Board Layout

Show the location of the major components on the top-side of Unicorn Board ENDAT-N3410.

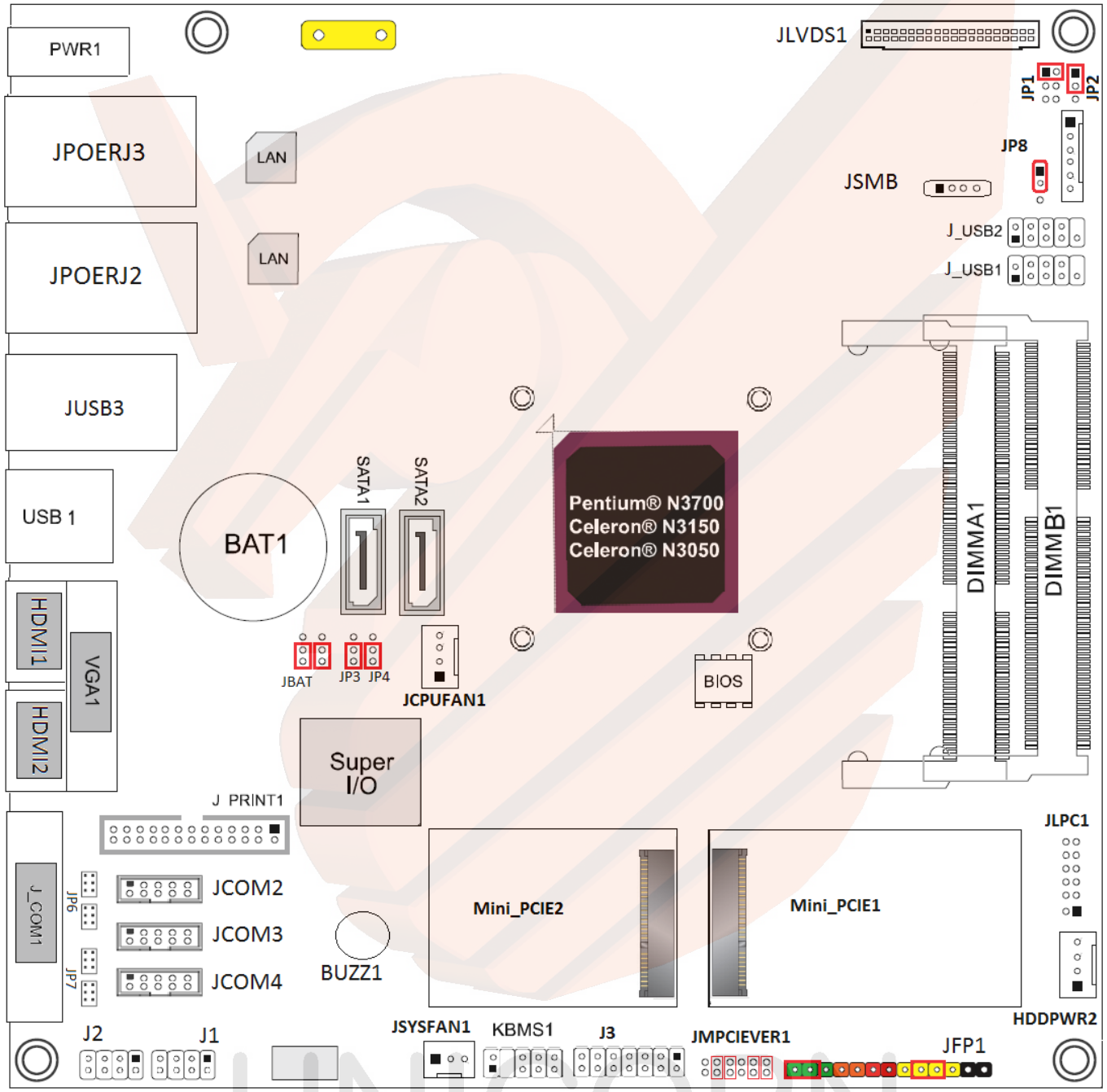


Figure2 - Board Components

"▪" Represents the 1st Pin.

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• Back panel I/O connectors

This section describes the board's connectors and headers. The connectors and headers can be divided

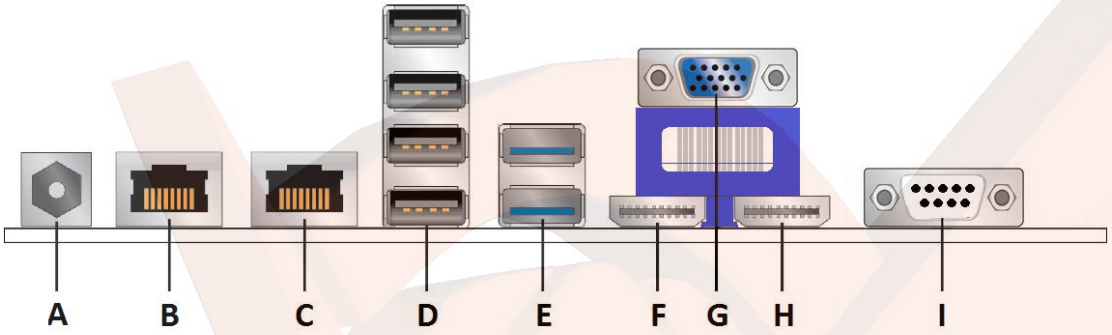


Figure 3 –Rear I/O for N3410

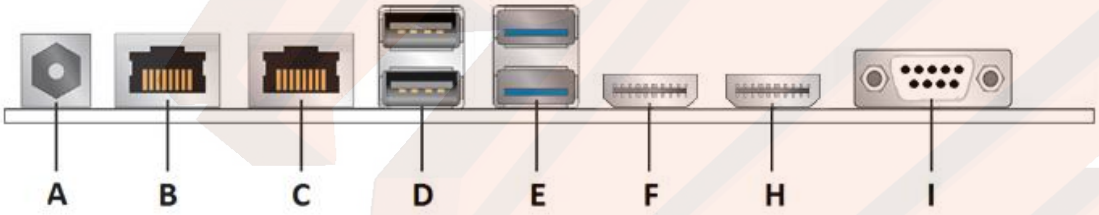


Figure 4 – Rear I/O for N3410S

Item	Description
A	DC +9 V to +35 V Power Jack
B	Ethernet RJ-45 (Without LED)
C	Ethernet RJ-45 (Without LED)
D	Four or Two Port USB 2.0 Connector (Option by model number)
T	Two Port USB 3.0 Connector
F	HDMI1 Connector (DDI0)
G	VGA Connector (DDI2, Slim type "N3410S" is not support)
H	HDMI2 Connector (DDI1)(Option: Switch LVDS by H/W BOM Changed)
I	Serial Port1 (Serial console function support)

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1.3. Components List

List all Jumper and Pins

Item/callout from	Description
JCMOS	CMOS Data Clear
JRTC	RTC Timer Clear
JP1	LCD Power
JP2	LVDS Inverter power
JP3	SATA#1, 5V selected (SATA DOM, pin7with power selected by jumper)
JP4	SATA#2, 5V selected (SATA DOM, pin7with power selected by jumper)
JP6	for and power select via pin#9 of JCOM1,2
JP7	for and power select via pin#9 of JCOM1,2
JP8	LVDS back-light select
JFP1	Front Panel, (Power LED, External Buzzer, Reset, PWBTN, SIO Enabled select)
JMPCIEVER1	Mini-PCI Slot 1.1 and 2.0 select.
J1	MIC / Line Out audio connector
J2	Speaker / Line-out audio connector
J3	Digital I/O header
KBMS1	Keyboard / Mouse header
JCPUFAN1	Processor fan header
JSYSFAN1	System fan header
JSMB	SM-bus Header
J_COM2	Serial port 2 Box Header
J_COM3	Serial port 3 Box Header
J_COM4	Serial port 4 Box Header
J_PRINT	Parallel Port Box Header
JLPC1	LPC header
J_USB1	USB 2.0 header
J_USB2	USB 2.0 header
JLVDS	LVDS Socket Connectors

Table 1: Onboard jumper setting for PCB: A0

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1.4. Block Diagram

Block diagram of the major functional areas of the board.

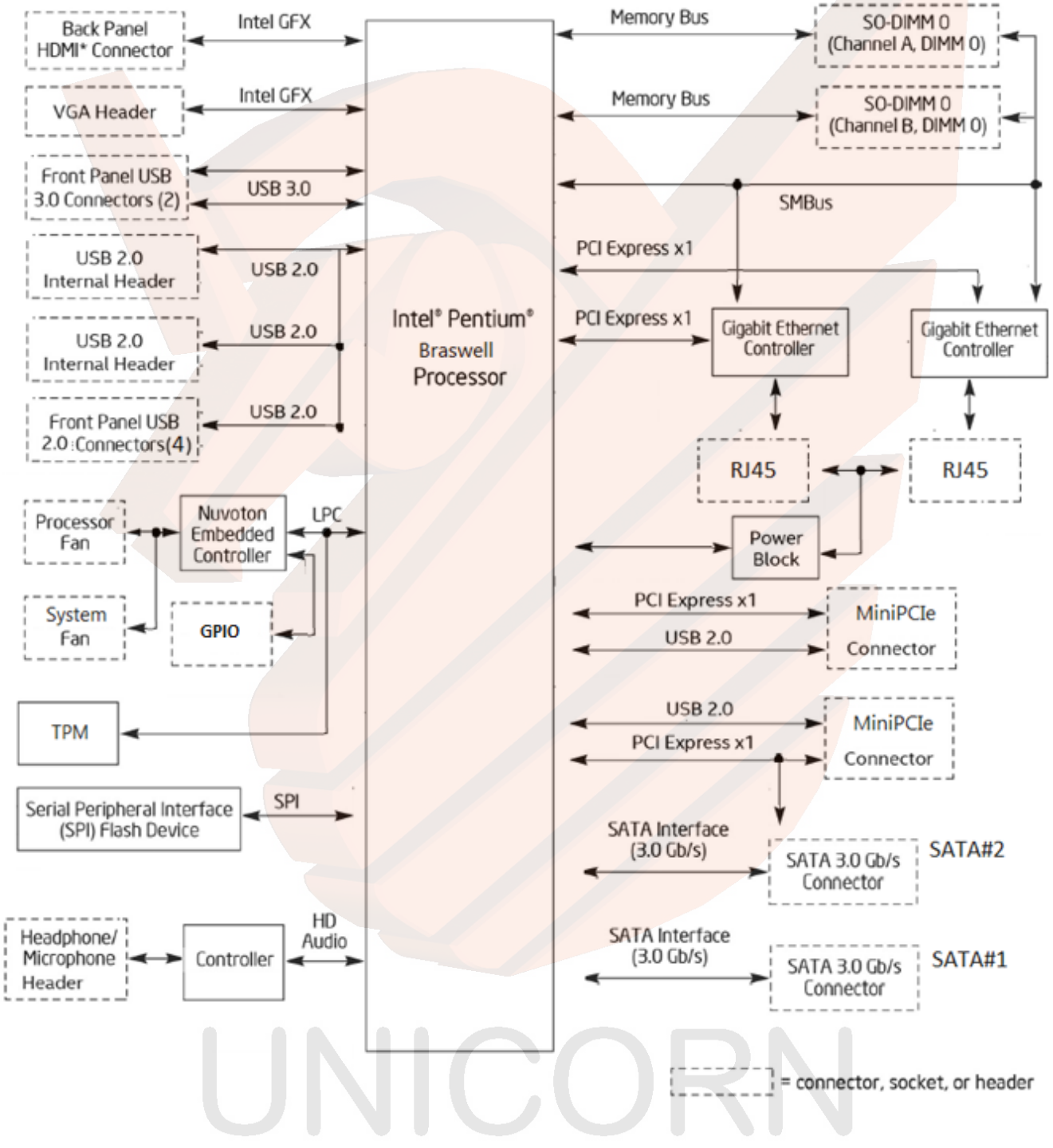


Figure5 - Block Diagram

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2.Technical Reference

2.1. Processor

Unicorn Computer ENDAT-N3410 has a soldered-down System-on-a-Chip (SoC), which consists of a dual-core Intel Celeron processor N3150 with up to 6 W TDP.

- Integrated graphics
- Integrated memory controller
- Integrated PCH

Processor Number	N3700	N3000	N3050	N3150
Cache	2 MB L2 Cache	2 MB L2 Cache	2 MB L2 Cache	2 MB L2 Cache
Instruction Set	64-bit	64-bit	64-bit	64-bit
Lithography	14 nm	14 nm	14 nm	14 nm
# of Cores	4	2	2	4
# of Threads	4	2	2	4
Processor Base Frequency	1.6 GHz	1.04 GHz	1.6 GHz	1.6 GHz
Burst Frequency	2.4 GHz	2.08 GHz	2.16 GHz	2.08 GHz
TDP	6 W	4 W	6 W	6 W

Table 2: SOC SKU list

NOTE:

This board has specific requirements for providing power to the processor.

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2.2. System Memory

The board has two 204-pin SO-DIMM sockets and supports the following memory features:

- 1.35 V DDR3L 1333/1600 MHz SDRAM SO-DIMM with gold plated contacts on Intel Celeron processor N3000 series.
- Support for 1066 MHz/1600 MHz memory speeds
- Dual memory channel
- Unbuffered, single-sided or double-sided SO-DIMMs
- Each channel was up8 GB maximum total system memory (with 4 Gb memory technology). Refer to Section BIOS SETUP on the total amount of addressable memory.
- Minimum recommended total system memory: 1024 MB
- Non-ECC SO-DIMMs
- Serial Presence Detect

NOTE:

If you install 1333 MHz, it will run at 1066 MHz

Supported Memory Configurations SO-DIMM

Capacity	Configuration (Note)	SDRAM Density	SDRAM Organization Front-side/Back-side	Number of SDRAM Devices
1024 MB	SS	1 Gbit	128 M x8/empty	8
2048 MB	DS	1 Gbit	128 M x8/128 M x8	16
2048 MB	SS	2 Gbit	256 M x8/empty	8
4096 MB	DS	2 Gbit	256 M x8/256 M x8	16
4096 MB	SS	4 Gbit	512 M x8/empty	8
8192 MB	DS	4 Gbit	512 M x8/512 M x8	16

Table 3: list the supported SD-DIMM configuration

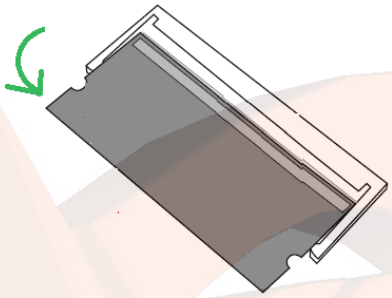
NOTE:

To be fully compliant with all applicable DDR SDRAM memory specifications, if non-SPD memory is installed, the BIOS will attempt to correctly configure the memory settings, but performance and reliability may be impacted or the SO-DIMMs may not function under the determined frequency.

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A. Memory Install

Step 1: Align a DIMM on the slot such that the notch on the DIMM matches the break on the Slot.



Step 2: Insert the DIMM firmly into the slot until the retaining chip snap back in place and the DIMM is properly seated.

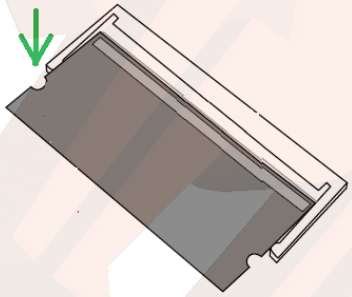


Figure 6 - Install a memory DIMM.

Note:

1. The DIMM must be installed to DIMMA1 slot first.
2. If the DIMM does not go in smoothly, do not force it. Pull it all the way out and try again.

B. Memory Capacity

DIMM Socket Location DDR3L Module Total Memory Size:

DIMMA1: 512MB/1GB/2GB/4GB/8GB

DIMMB1: 512MB/1GB/2GB/4GB/8GB Max is 8GB

C. Dual Channel Memory Installation

Please refer to the following requirements to activate Dual Channel function:

Install memory module of the same density in pairs, shown in the table.

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2.3. Memory Resources

Addressable Memory

The board utilizes up to 8 GB of addressable system memory. Typically the address space that is allocated for PCI Conventional bus add-in cards, PCI Express configuration space, BIOS (SPI Flash device), and chipset overhead resides above the top of DRAM (total system memory). On a system that has 8 GB of system memory installed, it is not possible to use all of the installed memory due to system address space being allocated for other system critical functions. These functions include the following:

- BIOS/SPI Flash device (64 Mbit)
- Local APIC (19 MB)
- Direct Media Interface (40 MB)
- PCI Express configuration space (256 MB)
- SoC base address registers PCI Express ports (up to 256 MB)
- Memory-mapped I/O (I/O fabric) that is dynamically allocated for PCI Express add-in cards (256 MB)

The board provides the capability to reclaim the physical memory overlapped by the memory mapped I/O logical address space. The board remaps physical memory from the top of usable DRAM boundary to the 4 GB boundary to an equivalent sized logical address range located just above the 4 GB boundary. All installed system memory can be used when there is no overlap of system addresses.

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2.4. Processor Graphics Subsystem

The board supports graphics through Intel HD Graphics.

2.4.1. Integrated Graphics

The board supports integrated graphics via the processor.

Intel® High Definition (Intel® HD) Graphics

The Intel HD graphics controller features the following:

I. HDMI 1.4b

II. 3D graphics hardware acceleration supporting DirectX*11.1, OpenCL* 1.2, OGL ES Halti/2.0/1.1, OpenGL* 4.2

III. Video decode hardware acceleration supporting H.265/HEVC @ Level 5, H.264 @ Level 5.2, MPEG2, MVC, VC-1, WMV9

IV. Video encode hardware acceleration supporting H.264 @ Level 5.1, JPEG and MVC formats JPEG and VP8 formats

V. High-Bandwidth Digital Content Protection (HDCP) 1.4/2.2 support for content protection

Video Memory Allocation

Intel® Dynamic Video Memory Technology (DVMT) is a method for dynamically allocating system memory for use as graphics memory to balance 2D/3D graphics and system performance. If your computer is configured to use DVMT, graphics memory is allocated based on system requirements and application demands (up to the configured maximum amount). When memory is no longer needed by an application, the dynamically allocated portion of memory is returned to the operating system for other uses.

High Definition Multimedia Interface* (HDMI*)

The HDMI port supports standard, enhanced, or high definition video, plus multi-channel digital audio on a single cable. The port is compatible high resolution and maximum supported resolution is 3840 x 2160 @ 30 Hz and 2560 x 1600 @ 60 Hz, 24 bpp (WUXGA). The HDMI port is compliant with the HDMI 1.4b specification.

Integrated Audio Provided by the HDMI Interfaces

The following audio technologies are supported by the HDMI 1.4b interfaces directly from the SoC:

- AC3 - Dolby* Digital and Dolby Digital Plus
- This HDMI audio support on HDMI only.

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2.5. USB 3.0 and 2.0 host controller

The USB port arrangement is as follows:

2.5.1. USB 3.0 ports:

Two ports are implemented with external front panel connectors (one blue and one orange charging capable)

Two ports are implemented with external back panel connectors (blue)

Maximum current is 900 mA for each blue port.

2.5.2. USB 2.0 ports:

Four ports are implemented with external back panel connectors (Black)

Maximum current is 500 mA for each port (2 A total)

Two ports via one dual-port internal 1x8 1.25 mm pitch header (Black)

Maximum current is 500 mA for each port of the header (1 A total)

Two ports via two dual-port internal Mini-Card Slot.

Maximum current is 500 mA for each port of the Mini-Card Socket. (1 A total)

All the USB ports are high-speed, full-speed, and low-speed capable (in OS).

NOTE:

Computer systems that have an unshielded cable attached to a USB port may not meet FCC Class B requirements, even if no device is attached to the cable. Use a shielded cable that meets the requirements for full-speed

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2.6. SATA Interface

The SoC provides one SATA port with a theoretical maximum transfer rate of 6 Gb/s. A point-to-point interface is used for host to device connections.

The underlying SATA functionality is transparent to the operating system. The SATA controller can operate in both legacy and native modes. In legacy mode, standard IDE I/O and IRQ resources are assigned (IRQ 14 and 15). In Native mode, standard PCI Conventional bus resource steering is used. Native mode is the preferred mode for configurations using Windows* operating systems.

- AHCI Mode

The board supports AHCI storage mode.

NOTE:

In order to use AHCI modes, AHCI mode force enabled in the BIOS. Microsoft* Windows 8 includes the necessary AHCI drivers without the need to install separate AHCI drivers during the operating system installation process. However, it is always good practice to update the AHCI drivers to the latest available by Intel.

- Pin 7 power designs for SATA modules

Power Pin 7 Design can be incorporated in all of our SATA DOM storage devices. Traditionally, a serial ATA device is connected to a board through a cable from the power supply. We support the SATA can switch with Power on Pin 7 by jumper, making it possible to plug your flash storage device onto your board without the need for any external cable.

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2.7. Real-Time Clock Subsystem

A coin-cell battery (CR2032) powers the real-time clock and CMOS memory. When the computer is not plugged into a wall socket, the battery has an estimated life of three years. When the computer is plugged in, the standby current from the power supply extends the life of the battery. The clock is accurate to ± 13 minutes/year at 25 ºC with 3.3 VSB applied via the power supply 5 V STBY rail.

NOTE:

1. If the battery and AC power fail, date and time values will be reset and the user will be notified during the POST.
2. When the voltage drops below a certain level, the BIOS Setup program settings stored in CMOS RAM (for example, the date and time) might not be accurate. Replace the battery with an equivalent one.

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2.8. Audio Subsystem

The board supports Intel HD Audio via the Realtek ALC888 audio codec. The audio subsystem supports the following features:

- Analog line-out/Analog Headphone/Analog Microphone jack on the front panel
- High Definition Audio via a stereo microphone/headphone jack on the back panel
- Support for 44.1 kHz/48 kHz/96 kHz/192 kHz sample rates on all analog outputs
- Support for 44.1 kHz/48 kHz/96 kHz sample rates on all analog inputs
- Internal 2.00mm header support Line-in, Line-out, MIC-in, Speaker.

Pins Define:

Speakers
Headphones
Microphone
Line-In

- Audio Software

Audio software and drivers are available from Unicorn Computer World Wide Web site.

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2.9. LAN Subsystem

The LAN subsystem consists of the following:

- Dual Intel 82583V Gigabit Ethernet Controller (10/100/1000 Mb/s)
- RJ-45 LAN connector without integrated status LEDs
- 10/100/1000 BASE-T IEEE 802.3 compliant

Additional features of the LAN subsystem include:

- CSMA/CD protocol engine
- Jumbo frame support 9K
- LAN connect interface between the SoC and the LAN controller
- Power management capabilities

  ACPI technology support

  LAN wake capabilities
- Support POE+ (PD) function support.
- TCP, IP, and UDP checksum offload (for IPv4 and IPv6)
- Full device driver compatibility

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2.10. Hardware Monitoring

The hardware monitoring and fan control subsystem is based on Nuvoton embedded controller, which supports the following:

- Processor and system ambient temperature monitoring
- Chassis fan speed monitoring
- Voltage monitoring of +12v, +5 V, +3.3 V,
- SM-Bus interface

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2.11. ACPI

ACPI gives the operating system direct control over the power management and Plug and Play functions of a computer. The use of ACPI with this board requires an operating system that provides full ACPI support. ACPI features include:

- Plug and Play (including bus and device enumeration)
- Power management control of individual devices, add-in boards (some add-in boards may require an ACPI-aware driver), video displays, and disk drives
- Methods for achieving less than 15-watt system operation in the power-on/standby sleeping state
- A Soft-off feature that enables the operating system to power-off the computer
- Support for multiple wake-up events
- Support for a front panel power and sleep mode switch (by OS setting)

Lists the system states based on how long the power switch is pressed, depending on how ACPI is configured with an ACPI-aware operating system.

If the system is in this state	And the power switch is pressed for	The system enter this state
Off (ACPI G2/G5 – Soft off)	Less than four seconds	Power-on (ACPI G0 – Working state)
on (ACPI G0 – Working state)	Less than four seconds	Soft-off/Standby (ACPI G1 – Sleeping state)
on (ACPI G0 – Working state)	More than six seconds	Fail safe power-off (ACPI G2/G5 – Soft off)
Sleep (ACPI G1 – Sleeping state)	Less than four seconds	Wake-up (ACPI G0 – Working state)
Sleep (ACPI G1 – Sleeping state)	More than six seconds	Power-off (ACPI G2/G5 – Soft off)

Table 4 - Effects of Pressing the Power Switch

Note:

This is depending on power management setting in operating system.

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•System States and Power States

Under ACPI, the operating system directs all system and device power state transitions. The operating system puts devices in and out of low-power states based on user preferences and knowledge of how devices are being used by applications. Devices that are not being used can be turned off. The operating system uses information from applications and user settings to put the system as a whole into a low-power state.

List the power states supported by the board along with the associated system power targets. See the ACPI specification for a complete description of the various system and power states.

Global States	Sleeping States	Processor States	Device States	Targeted System Power (Note 1)
G0 – working state	S0 – working	C0 – working	D0 – working state.	Full power
G1 – sleeping state	S3 – Suspend to RAM. Context saved to RAM.	No power	D3 – no power except for wake-up logic.	Power < 5 W (Note 2)
G1 – sleeping state	S4 – Suspend to disk. Context saved to disk.	No power	D3 – no power except for wake-up logic.	Power < 5 W (Note 2)
G2/S5	S5 – Soft off. Context not saved. Cold boot is required.	No power	D3 – no power except for wake-up logic.	Power < 5 W (Note 2)
G3 – mechanical off AC power is disconnected from the computer.	No power to the system.	No power	D3 – no power for wake-up logic, except when provided by battery or external source.	No power to the system. Service can be performed safely.

Table 5 - Power States and Targeted System Power

Notes:

1. Total system power is dependent on the system configuration, including add-in boards and peripherals powered by the system chassis' power supply.

2. Dependent on the standby power consumption of wake-up devices used in the system.

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•That lists the devices or specific events that can wake the computer from specific states.

Device events that wake up the system…	…from this sleep state	Comments
Power switch	S3, S4, S5	
RTC alarm	S5 (Note 1)	Monitor to remain in sleep state
LAN	S3, S4, S5 (Notes 1, 2)	"S5 WOL after G3" must be supported; monitor to remain in sleep state
USB	S3, S4 (Note 3, 4)	Wake S4, S5 controlled by BIOS option
PCIe via WAKE#	S3, S4, S5 (Note 1)	Via WAKE; monitor to remain in sleep state

Table 6 - Wake ACPI support list

Command if these wake-up events from an ACPI state requires an operating system that provides full ACPI support. In addition, software, drivers, and peripherals must fully support ACPI wake events.

Notes:

1. Monitor will remain in "sleep" state
2. "S5 WoL after G3" supported w/Deep Sleep disabled
3. Wake from S3 and S4 only supported.
4. Wake from device/event not supported immediately upon return from DC loss

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2.12. Hardware Support

The board provides several power management hardware features, including:

- Wake from Power Button signal
- Instantly Available PC technology
- LAN wake capabilities
- Wake from USB (S3,S4 only)
- WAKE# signal wake-up support
- Wake from S5.

Note: The use of Wake from USB from an ACPI state requires an operating system that provides full ACPI support.

•Power Input

When resuming from an AC power failure, the computer may return to the power state it was in before power was interrupted (on or off). The computer's response can be set using the Last Power State feature in the BIOS Setup program's Boot menu.

•Instantly Available PC Technology

Instantly Available PC technology enables the board to enter the ACPI S3 (Suspend-to-RAM) sleep-state. While in the S3 sleep-state, the computer will appear to be off (the power supply is off, and the front panel LED is amber off on single colored.) When signaled by a wake-up device or event, the system quickly returns to its last known wake state. The use of Instantly Available PC technology requires operating system support and drivers for any installed Mini PCI Express add-in card.

•LAN Wake Capabilities

LAN wake capabilities enable remote wake-up of the computer through a network. The LAN subsystem monitors network traffic at the Media Independent Interface. Upon detecting a Magic Packet* frame, the LAN subsystem asserts a wake-up signal that powers up the computer.

•Wake from USB

USB bus activity wakes the computer from an ACPI S3, S4 states.

Note: Wake from USB requires the use of a USB peripheral that supports Wake from USB.

•WAKE# Signal Wake-up Support

When the WAKE# signal on the PCI Express bus is asserted, the computer wakes from an ACPI S3, S4, or S5 state.

•Wake from S5

When the RTC Date and Time is set in the BIOS, the computer will automatically wake from an ACPI S5 state.

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3. Onboard

3.1. Connectors and Headers

CAUTION

Only the following connectors and headers have over current protection: back panel and front panel USB.

• Back panel connectors

This section describes the board's connectors and headers. The connectors and headers can be divided into these groups:

Figure 7 & figure 8 shows the location of the back panel connector for the board

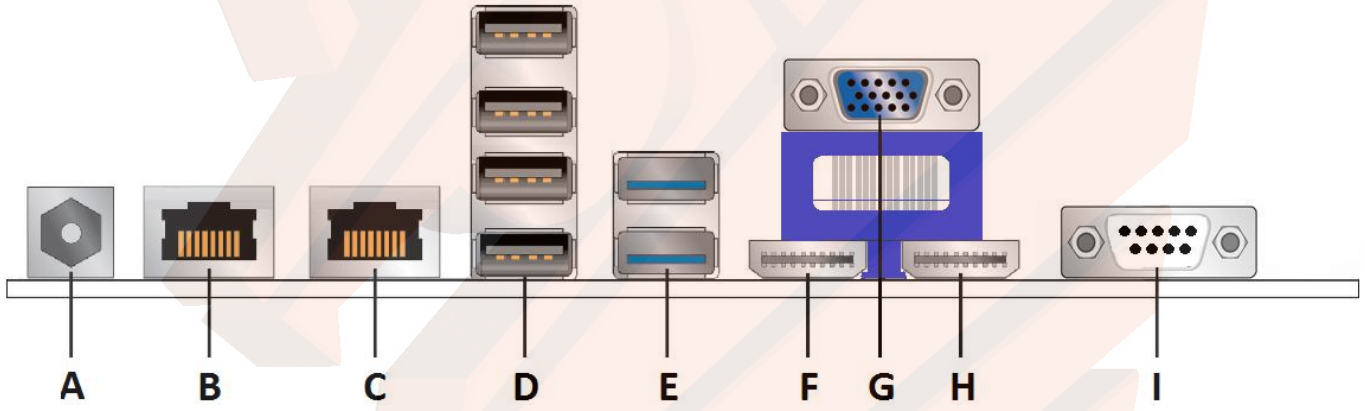


Figure 7 – Rear I/O

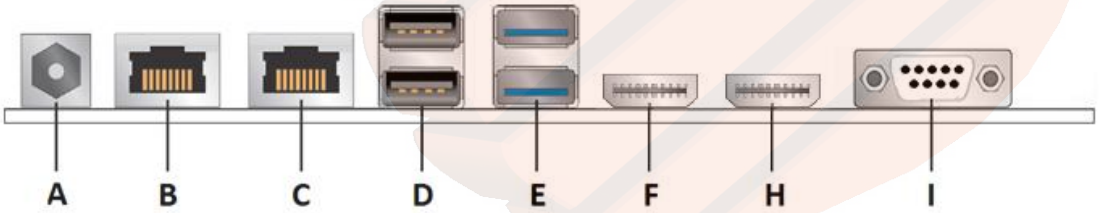


Figure 8 – Rear I/O for N3410S

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Table7. Rear I/O

Item	Description
A	DC +9 V to +35 V Power Jack
B	Ethernet RJ-45 (Without LED)
C	Ethernet RJ-45 (Without LED)
D	Four Port USB 2.0 Connector
E	Two Port USB 3.0 Connector
F	HDMI1 Connector (DDI0)
G	VGA Connector (DDI2)
H	HDMI2 Connector (DDI1)(Option: Switch LVDS by H/W BOM Changed)
I	Serial Port1 (Serial console function support)

A. DC Input Power Jack

The board has the following power supply connector:

•External Power Supply – the board can be powered through a 9-35 V DC connector on the back panel. The back panel DC connector is compatible with a 6.4 mm/OD (outer diameter) and 2.5 mm/ID (inner diameter) plug, where the inner contact is +9 (-5%)to +35 (+5%) V DC and the shell is GND. The maximum current rating is 2A/12V.

Contact resistance: 30m Ohm Max. At AC 100mA Max .1KHz
Insertion force: 3.0K g Maximum.
Rated voltage and current: DC12V.2A Max
Dielectric withstanding voltage: 500V AC for 1 Minute

NOTE: External power voltage, 9 - 35 V DC, is dependent on the type of power source used.

B. POE (PD type)

From power source equipment (PSE) provided power via conventional CAT5 Ethernet cable.
PoE+ power sourcing equipment provides 50 to 57 Vdc – an increased and much tightened range compared to 44 to 57 Vdc for PoE. Also, consider this: the current for PoE is 350mA, while the current for PoE+ is a whopping 600mA. This provides as much as 25W at the powered device after allowing for cable voltage drops.

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PD

The PD is limited to a maximum of 13.0 W for Type 1, 25.5 W for Type 2 over two pairs, or 51 W for Type 2 over four pairs, all over a voltage range between 37 V to 57 VDC (which accounts for worst-case power losses in the cable). The PD must be capable of receiving power regardless of which powering scheme is used.

The PD negotiates a power class during the time of initial connection (see "Power Management"). To prevent damage to non-PoE devices, all PDs must include a 25 k Om resistor across powered pairs to allow for detection by the PSE. This scheme also allows the PSE to detect when a PD is disconnected from the network. The detection signature is visible by both Alternative A and Alternative B PSEs.

During link power-up, after determining the type of link, the PSE must determine the power classification of the PD (basically how much power must be supplied to the PD). The standard provides two mechanisms for managing power supplied to the PD: physical layer or data link-layer classification.

Physical Layer Classification

Physical layer classification uses the link's cable and PD electrical characteristics to determine which power class to assign the PD. This classification mechanism is similar to that used in 802.3af but adds an additional power class (Table 8). Four-pair PDs may exhibit different class levels for each of their connections.

Table8. Power Classes (for Two-Pair Powering)

Power Class	Maximum Average Power Available at PD
Class 0	13W
Class 1	3.84W
Class 2	6.49W
Class 0	13W
Class 3	25.5W

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3.2. Jumper Setting

The illustration shows how to set up jumpers. When the jumper cap is placed on pins, the jumper is "close", if not, that means the jumper is "open".

Jumper List

JCMOS	CMOS Data Clear
JRTC	RTC Timer Clear
JP1	LCD Power
JP2	LVDS Inverter power
JP3	SATA#1, Power select for SATA-DOM module
JP4	SATA#2, Power select for SATA-DOM module
JP5	N/A
JP6	for and power select via pin#9 of JCOM1,2
JP7	for and power select via pin#9 of JCOM1,2
JP8	LVDS back-light select

JCMOS1: Clear CMOS Jumper

The jumper allows users to restore the BIOS safe setting and the CMOS data.

Please carefully follow the procedures to avoid damaging the motherboard.

Item	Normal Operation	Clear CMOS data
Pin Close	1-2 (Default)	2-3

※ Clear CMOS Procedures:

1. Remove AC power line.
2. Set the jumper to "Pin 1-2 close", you can use a metal object like a screwdriver to touch the two pins.
3. Wait for five seconds.
4. After clearing the CMOS values, be sure the jumper is "Pin 1-2 open".
5. Plug-in DC power input.
6. Power on the system, then hold function key"F2" enter to BIOS SETUP by keyboard Press
7. Load Optimal Defaults and save settings in CMOS.

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JRTC: Clear CMOS Jumper

The Clear RTC RAM (3-pin CLRTC) jumper allows you to clear the Real Time Clock (RTC) RAM in CMOS. It also allows clearing of date, time, and system setup parameter memories in CMOS, by erasing the RTC RAM data. The onboard button cell battery powers the RAM data in CMOS, including system setup information.

Item	Normal Operation	Clear CMOS data
Pin Close	1-2 (Default)	2-3

※ **Clear RTC-RAM in c Procedures:**

1. Turn off the PC and unplug the power cord.
2. Move the JRTC jumper cap from pins 1-2 (normal) to pins 2-3 (clear CMOS).
3. Keep the jumper cap on pins 2-3 for 5 to 10 seconds, and then move back to pins 1-2.
4. Plug in the power cord and turn on the PC.
5. Enter the BIOS setup to change the BIOS settings.

JP1: LCD Power

The jumper allows users to restore the BIOS safe setting and the CMOS data.
Please carefully follow the procedures to avoid damaging the motherboard.

Item	+3.3	+5V	+12V
Pin Close	1-2 (Default)	3-4	5-6

JP2: Panel Inverter power select

The jumper allows users to restore the BIOS safe setting and the CMOS data.
Please carefully follow the procedures to avoid damaging the motherboard.

Item	+5V	+12V
Pin Close	1-2 (Default)	2-3

JP3: SATA#1, Power select for SATA-DOM module

The jumper for 5V selected, provide pin7 with +5V power for SATA DOM device

Item	GND	+5V
Pin Close	1-2 (Default)	2-3

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JP4: SATA#2, Power select for SATA-DOM module

The jumper for 5V selected, provide pin7 with +5V power for SATA DOM device

Item	GND	+5V
Pin Close	1-2 (Default)	2-3

JP6: JCOM1, 2 for signal pin#9 select

The jumper for signal power selected, provide pin9 with power for DTE device

JCOM1 JCOM2

Define	Pin Close	Define	Pin Close
+12V	1-2	+12V	7-8
RI	3-4 (Default)	RI	9-10 (Default)
+5V	5.6	+5V	11-12

JP7: JCOM3, 4 for signal pin#9 select

The jumper for signal power selected, provide pin9 with power for DTE device

JCOM3 JCOM4

Define	Pin Close	Define	Pin Close
+12V	1-2	+12V	7-8
RI	3-4 (Default)	RI	9-10 (Default)
+5V	5.6	+5V	11-12

JP8: LVDS back-light Active power select

The jumper allows users to restore the BIOS safe setting and the CMOS data.

Please carefully follow the procedures to avoid damaging the motherboard.

Item	+3.3V	+5V
Pin Close	1-2 (Default)	2-3

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3.3. Pin Header Defined

Header Defined List

JFP1	Front Panel, (Power LED, External Buzzer, Reset, PWBTN, SIO Enabled select)
JMPCIEVER1	Mini-PCI Slot 1.1 and 2.0 select.
J1	MIC / Line Out audio connector
J2	Speaker / Line-out connector
J3	Digital I/O header
KBMS1	Keyboard / Mouse header
JCPUFAN1	Processor fan header
JSYSFAN1	System fan header
JSMB	SM-bus Header
J_COM2	Serial port 2 Header
J_COM3	Serial port 3 Header
J_COM4	Serial port 4 Header
J_PRINT	Parallel Port Header
JLPC1	LPC Interface header
J_USB1	USB 2.0 header
J_USB2	USB 2.0 header
JLVDS	LVDS header

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JFP1: Front Panel header

Pins	Defined	Pins	Defined
1	+HDD	2	HDD_GND
3	Buzzer_GND	4	Buzzer_GND
5	Onboard Buzzer (+)	6	External Buzzer (+)
7	Reset #	8	GND
9	Power Button #	10	GND
11	GND	12	Power LED (+)
13	WDT Enabled	14	PMC_Reset

JMPCIEVER1: Mini-PCI Slot 1.0 and 1.2 select. Jumper

Mini-PCIE1

Pin Close \ Type	1.0	1.2 (Default)
1-2	Close	None
3-4	None	Close
5-6	None	Close

Mini-PCIE2

Pin Close \Type	1.0	1.2 (Default)
7-8	Close	None
9-10	None	Close
11-12	None	Close

J1: MIC / Line Out audio connector

Pins	Defined	Pins	Defined
1	INE1_L_HDR_CN	2	MICIN1_L
3	LINE1_JD	4	MIC1_JD
5	AUD_GND	6	
7	LINE1_R_HDR_CN	8	MICIN1_R

J2: Speaker / Line-out connector

Pins	Defined	Pins	Defined
1	SPEEAKER_L	2	FRONT_L_HDR_CN
3	FRONT_JD	4	FRONT_JD
5	AMP_GND	6	
7	SPEEAKER_R	8	FRONT_R_HDR_CN

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J3: Digital I/O header

Pins	Defined	Pins	Defined
1	+5VSB	2	+5VSB
3	SDIO0 Input	4	SDIO0 output
5	SDIO1 Input	6	SDIO1 output
7	GND	8	GND
9	SDIO2 Input	10	SDIO2 output
11	SDIO3 Input	12	SDIO3 output
13	+3.3VSB	14	+3.3VSB

KBMS1: Keyboard & Mouse header

Pins	Defined	Pins	Defined
1	KBDA	2	MDA
3	Key Lock	4	Key Lock
5	GND	6	GND
7	+5V	8	+5V
9	KBCLK	10	MCLK

JCPUFAN1: Processor fan header

Pins	Defined	Pins	Defined
1	GND	2	+12V
3	FAN Speed	4	Control

JSYSFAN1: System fan header

Pins	Defined	Pins	Defined
1	GND	2	+12V
3	FAN Speed		

JSMB: SM-bus Header

Pins	Defined	Pins	Defined
1	SMB_DATA	2	SMB_CLK
3	+5V	4	GND

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J_USB1, J_USB2: Dual-Port Internal USB 2.0 Header (2.0 mm Pitch)

Pins	Defined	Pins	Defined
1	+5V	2	+5V
3	-Data	4	-Data
5	+Data	6	+Data
7	GND	8	GND
9	GND	10	GND

JLPC1: LPC interface header

Pins	Defined	Pins	Defined
1	AD 0	2	+3.3V
3	AD 1	4	PLT_RST_BUF
5	AD 2	6	LPC_FRAME#
7	AD 3	8	LPC_PORT80_CLK
9	LPC_IRQ	10	GND
11	NC	12	NC

J_COM2, J_COM3, J_COM4: COM Port 2, 3, 4 Headers

Pins	RS-232	RS-422 *2	RS-485 *2
1	DCD	TX-	Data -
2	RX	TX+	Data +
3	TX	RX+	
4	DTR	RX-	
5	GND	GND	GND
6	DSR		
7	RTS		
8	CTS		
9	RI *1		
10	NC	NC	NC

*1: By Jumper JP6 & JP7

*2: RS-422 and RS-485 function only for COM2 and COM3, function changed by BIOS SETUP Manual

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J_LPT: Parallel Port Header

Pins	Defined	Pins	Defined
1	STB	2	Data 0
3	Data 1	4	Data 2
5	Data 3	6	Data 4
7	Data 5	8	Data 5
9	Data 7	10	ACK
11	BUSY	12	Paper Out
13	Select	14	Line Feed
15	Error	16	Reset
17	Select Print	18	GND
19	GND	20	GND
21	GND	22	GND
23	GND	24	GND
25	GND	26	GND

VGA Header

Pin	**Signal Name**	**Pin**	**Signal Name**
1	CLK	2	DATA
3	VCC	4	VSYNC
5	HSYNC	6	GND
7	RED	8	GND
9	GREEN	10	GND
11	BLUE	12	KEY

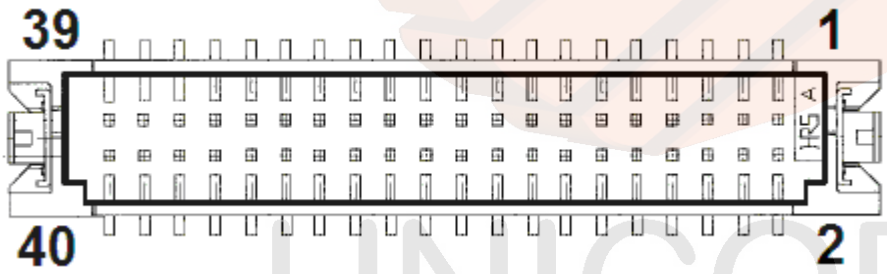
SATA Power Header

Pin	Signal Name	Pin	Signal Name
1	5 V	4	GND
2	5 V	5	GND
3	3.3 V		

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JLVDS: LVDS interface header

Pins	Defined	Pins	Defined
1	VBL	2	VBL
3	GND	4	GND
5	BLEN	6	GND
7	LCD-PWR	8	LCD-PWR
9	GND	10	GND
11	Odd 0+	12	Odd 0-
13	Odd 1+	14	Odd 1-
15	Odd 2+	16	Odd 2-
17	Odd 3+	18	Odd 3-
19	Odd CLK+	20	Odd CLK -
21	GND	22	GND
23	Even 0+	24	Even 0-.
25	Even 1+	26	Even 1-
27	Even 2+	28	Even 2-
29	Even 3+	30	Even 3-
31	Even CLK+	32	Even CLK-
33	LCD-PWR	34	LCD-PWR
35	GND	36	GND
37	GND	38	GND
39	VBL	40	VBL



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