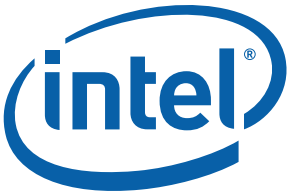

Intel® Atom™ Processor D400/D500 Storage Platform

Start-up Guide

March 2009

Order Number: 323310-001US

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Revision History

Date	Revision	Description
March 2009	001	Initial release.

1.0 Storage Board Features

This section briefly describes the features of Intel® Atom™ Processor D400/D500. Table 1 summarizes the major features of this board.

Table 1. Features Summary

Label	Description
Form Factor	MiniITX (171.45 millimeters [6.75 inches] x 171.45 millimeters [6.75 inches]).
Processor	Intel® Atom™ Processor D500 Series or higher. OR Intel® Atom™ Processor D500 Series 1.66GHz or higher.
Main Memory	• Two DDR2 SDRAM Memory Module (DIMM) socket. • Support up to 4GB of system memory.
Chipset	Intel® 82801IR I/O Controller.
LAN Support	Two Network Gigabit (10/100/1000Mb/s) Ethernet Controllers: • x1 integrated using the Intel® 82567LM PHY. • x1 discrete Intel® 82574L LAN Controller.
Expansion Capabilities	• One PCI Express x1 connector (On main board). • Support up to four x1 PCI Express lanes.
Peripherals Support	• Up to 6 USB 2.0 ports: — Four ports routed to the back panel. — Two ports routed to USB headers. • Six Serial ATA (SATA) channel (3.0Gb/s), includes two external SATA (eSATA) channel.
BIOS	AMI BIOS with Storage Features integrated.
Power Management	• Support for Advanced Configuration and Power Interface (ACPI). • Wake-On-LAN, USB and front panel. • Energy Star Capable.

1.1 Supported Operating Systems

The Storage Reference Board supports the following operating systems:

- Microsoft Windows Home Server Version 1.0 with Power Pack-3.
- Microsoft Windows 2008 Storage Server (32-bit version).
- Microsoft Windows 2008 Storage Server (64-bit version).
- Any distribution supporting Linux Kernel 2.6.30 or higher.

2.0 Board Components - Main Board

Figure 1, "Storage Platform - Main board" on page 8 shows the approximate location of all the major component, interface headers and connectivity interfaces for the Intel® Atom™ Processor D400/D500.

Figure 1. Storage Platform - Main board

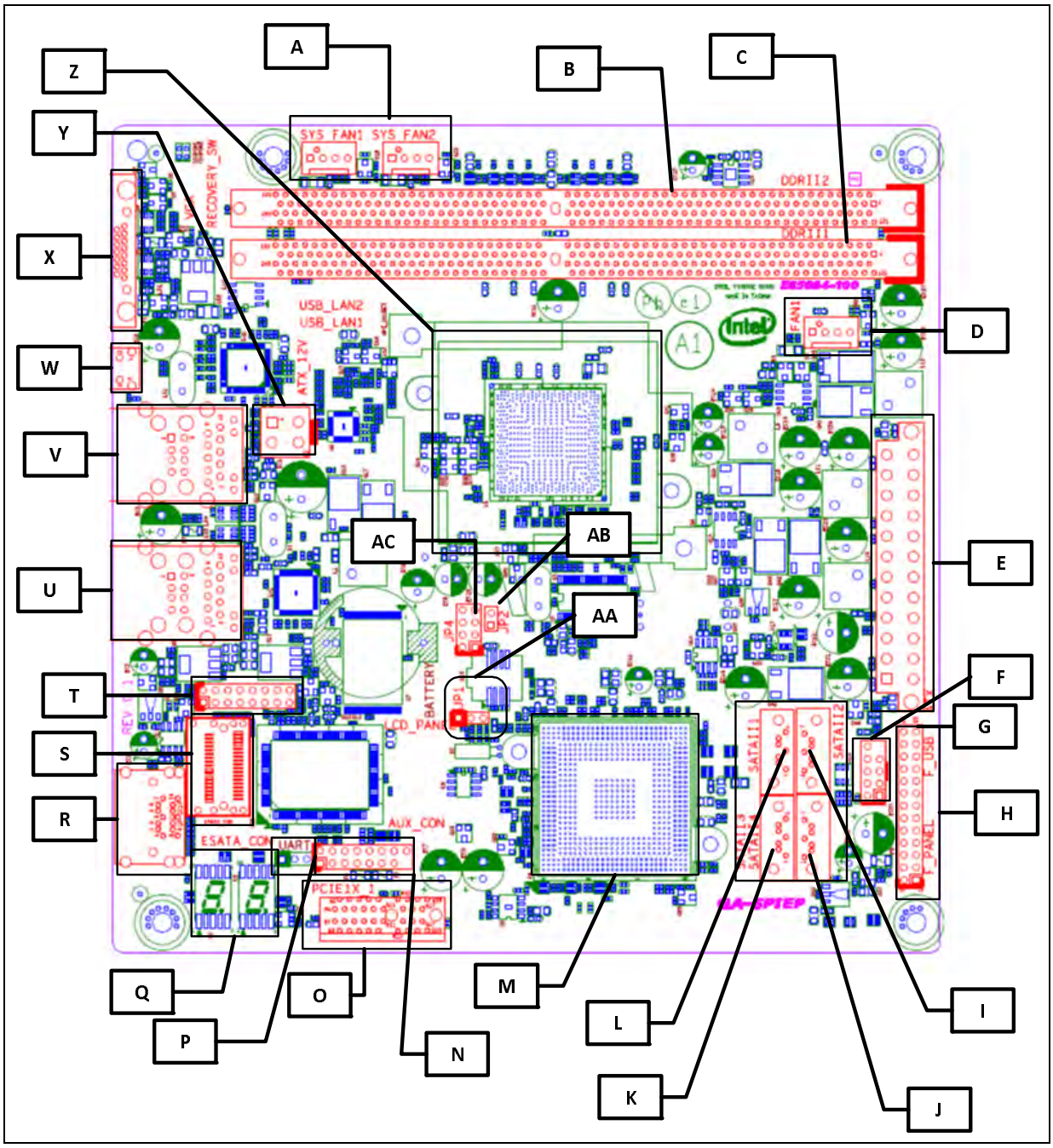


Table 2. Intel® Atom™ Storage Board Components

Label	Description
A	Rear chassis fan headers (4-pin).
B	Channel A DDR2 DIMM 1 sockets.
C	Channel A DDR2 DIMM 0 sockets.
D	Processor fan header (4-pin).
E	Main Power connector (2 x 12-pin).
F	USB Header.
G	Power Switch (2-pin).
H	Front Panel header.
I	Serial ATA connector - Port 1.
J	Serial ATA connector - Port 3.
K	Serial ATA connector - Port 2.
L	Serial ATA connector - Port 0.
M	Intel® 82801IR I/O Controller.
N	AUX Connector. Need to be connected with the debug board via 15 pin cable for COM1 and PS/2 support.
O	PCI Express x1 connector 1.
P	Serial LCD Interface UART Connector (3-pin).
Q	Port Display (Boot/Error Codes).
R	External Serial ATA Connectors (Port 4 & Port 5).
S	iPASS Connector for connecting with Debug board.
T	Parallel LCD Interface (16-pin).
U	• High-speed USB 2.0 (2 ports). • Network GbE (82567LM - - Integrated as part of 82801IR I/O Controller).
V	• High-speed USB 2.0 (2 ports). • Network GbE (82574L - Discrete).
W	Recovery Switch.
X	VGA Adapter.
Y	12V processor core voltage connector (2 x 2-pin).
Z	Intel® Atom™ Processor.
AA	BIOS Reset (2-pin).
AB	System Reset (2-pin).
AC	SPI Header (6-pin).

3.0 Board Components - Debug/Expansion Board

Figure 2 shows the approximate location of all the major component, interface headers and connectivity interfaces for the *Intel® Atom™ Processor D400/D500 Storage Debug/Expansion Board*.

Figure 2. Debug/Expansion Board

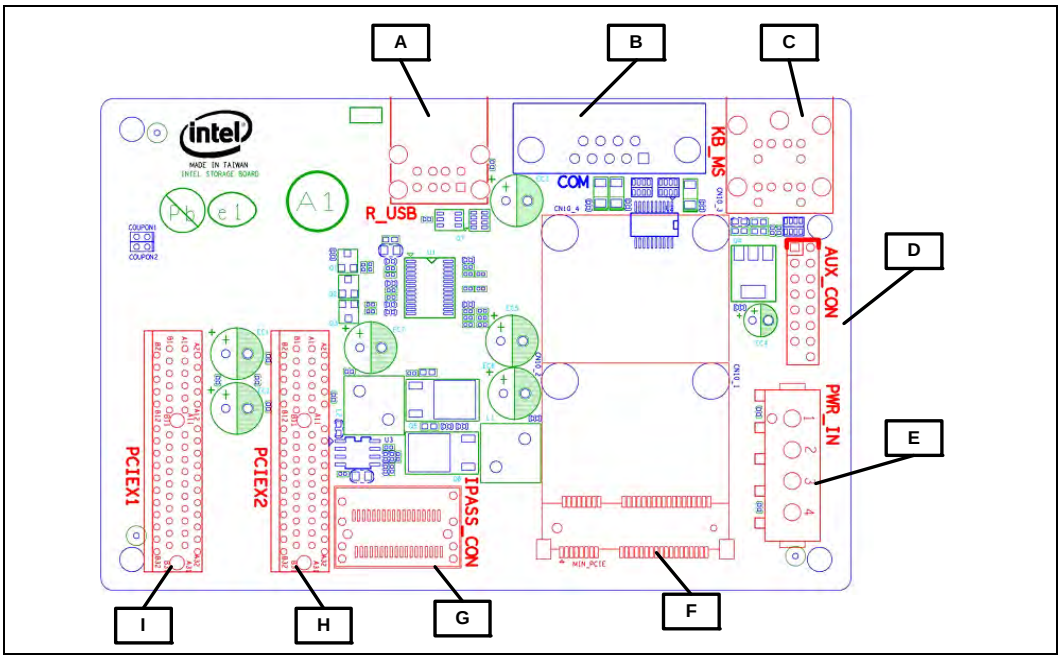


Table 3. *Intel® Atom™ Processor D400/D500 Storage Debug/Expansion Board* Components

Label	Description
A	High-speed USB 2.0 (2 ports).
B	Serial Port.
C	PS/2 Connectors (Mouse and Keyboard).
D	AUX Connector. Need to be connected with the main board via 15-pin cable for COM1 and PS/2 support.
E	Power connector (4-pin).
F	Mini PCI Express x1 connector.
G	iPASS Connector for connecting with Main board.
H	PCI Express x2 connector 1.
I	PCI Express x1 connector 1.

4.0 Getting Started

This section provides information on how to:

- Connect the power supply cables.
- Connect the Serial ATA cables to the platform.
- Connect the External SATA (eSATA) to the platform.
- Install and remove the memory.
- Connecting the internal headers.

4.1 Before Begining

Caution: The procedures in this chapter assume familiarity with the general terminology associated with personal computers and with the safety practices and regulatory compliance required for using and modifying electronic equipment.

Caution: Disconnect the computer from its power source and from any telecommunications links, networks, or modems before performing any of the procedures described in this section. Failure to disconnect power, telecommunications links, networks, or modems before opening the computer or perform any procedures can result in personal injury or equipment damage. Some circuitry on the board can continue to operate even though the front panel power button is off.

Caution: Follow these guidelines before begining:

- Always follow the steps in each procedure in the correct order.
- Set up a log to record information about your computer, such as model, serial numbers, installed options, and configuration information.
- Electrostatic discharge (ESD) can damage components. Perform the procedures described in this chapter only at an ESD workstation using an antistatic wrist strap and a conductive foam pad. When such a station is not available, provide some ESD protection by wearing an antistatic wrist strap and attaching it to a metal part of the computer chassis.

4.2 Installation Precautions

When installing and testing the Intel Reference Board, observe all warnings and cautions in the installation instructions.

To avoid injury, be careful of:

- Sharp pins on connectors.
- Sharp pins on printed circuit assemblies.
- Rough edges and sharp corners on the chassis.
- Hot components (such as processors, voltage regulators, and heat sinks).
- Damage to wires that could cause a short circuit.
- Observe all warnings and cautions that direct referring computer servicing to a qualified technical personnel.

4.2.1 Prevent Power Supply Overload

Do not overload the power supply output. To avoid overloading the power supply, make sure that the calculated total current loads of all the modules within the computer is less than the output current rating of each of the power supplies output circuits.

4.2.2 Observe Safety and Regulatory Requirements

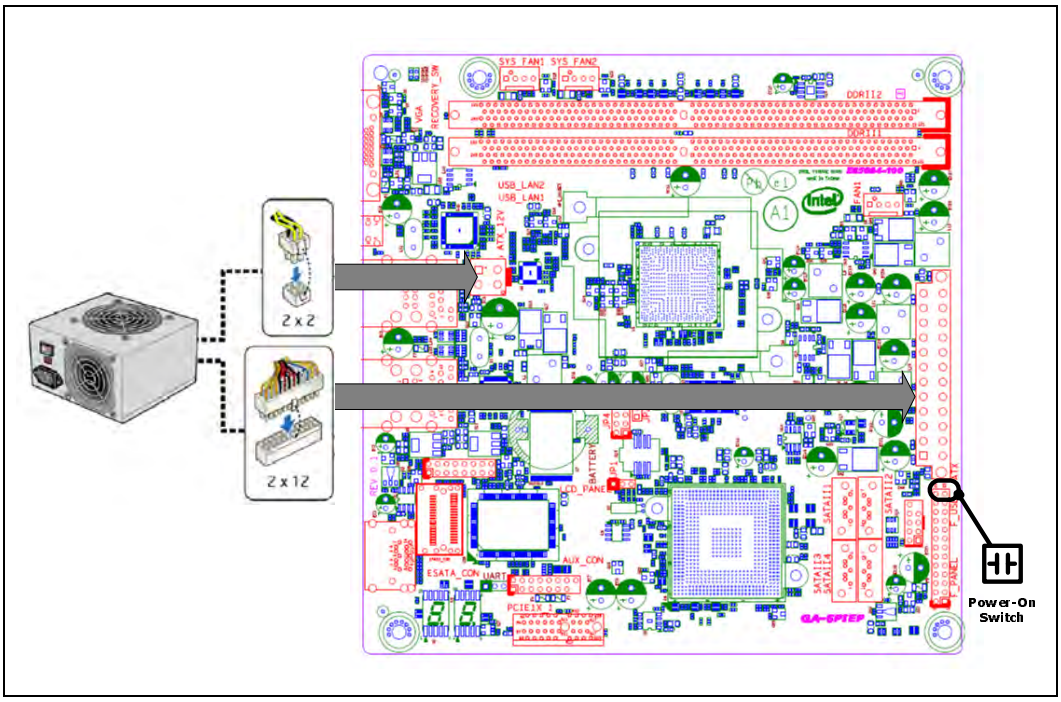
Read and adhere the instructions in this section and the instructions supplied with the chassis and associated modules. When not following these instructions and the instructions provided by the chassis and module suppliers, there is an increased safety risk and the possibility of noncompliance with regional laws and regulations. When the instructions for the chassis are inconsistent with these instructions or the instructions for associated modules, contact supplier technical support to find out how to ensure the computer meets safety and regulatory requirements.

4.2.3 Connecting Power Supply Cables

Caution: Failure to use an appropriate power supply and/or not connecting the 12V (2 x 2 pin) power connector to the Reference Board may result in damage to the board or the system may not function properly.

Caution: Connect the main power supply cable to the 2 x 12 pin connector. Also, connect the 12V processor core voltage power supply cable to the 2 x 2 pin power connector.

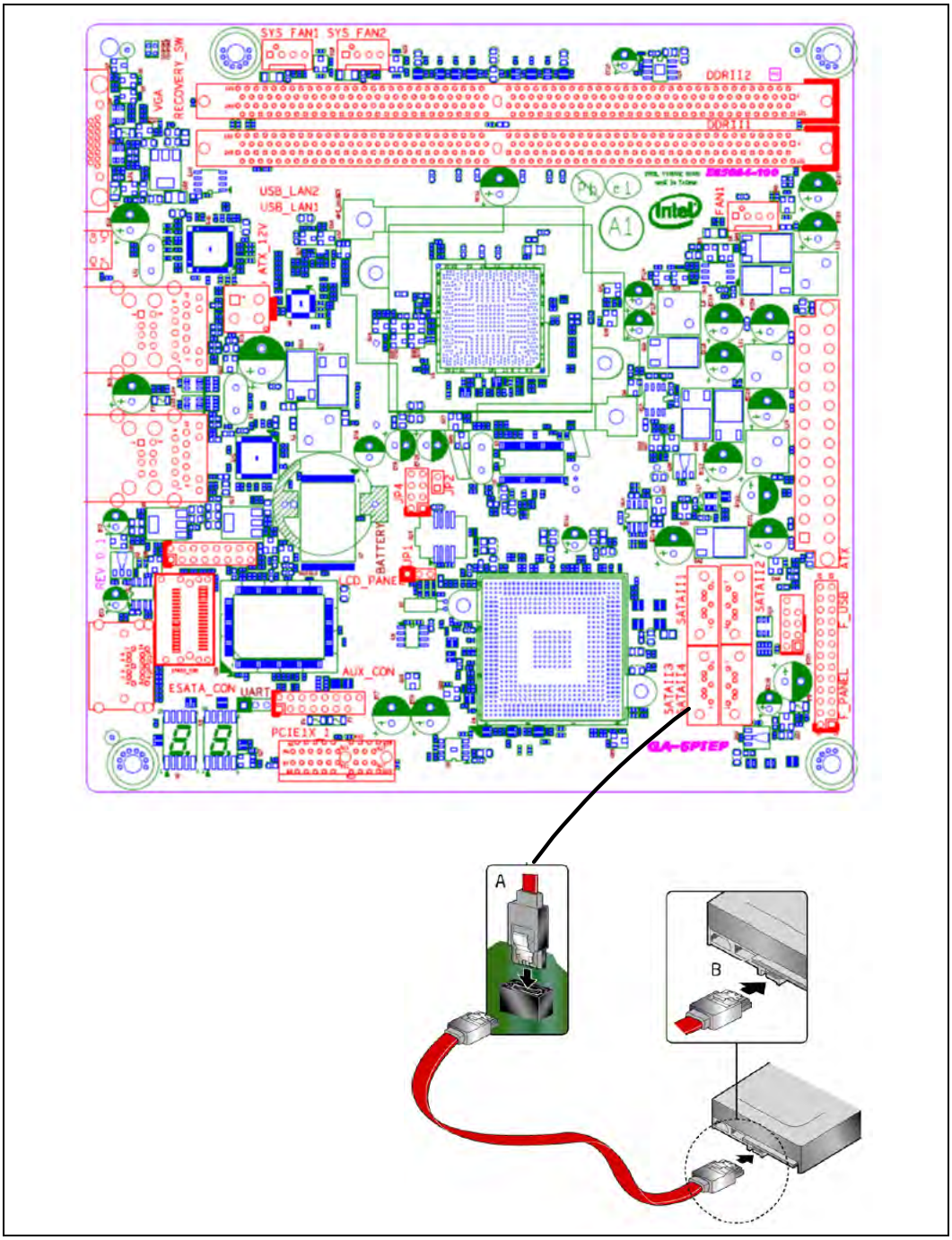
Figure 3. Connecting Power to Board



4.2.4 Connecting the Serial ATA (SATA) Cables

SATA cables support the Serial ATA protocol. Each cable can be used to connect a single internal SATA drive to the Reference Board. Attach one end of the SATA cable to one of the black SATA connectors on the board as shown in the Figure 2, "Debug/Expansion Board" on page 10 and attach the other end of the cable to the SATA drive.

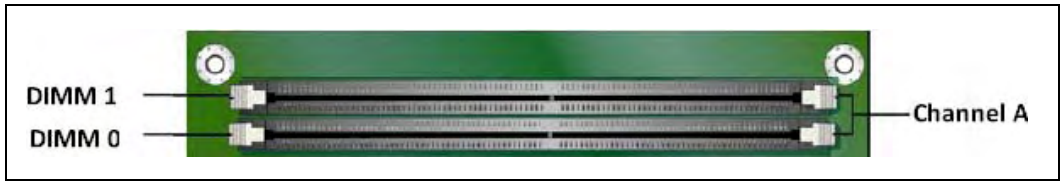
Figure 4. Connecting to SATA Port



4.2.5 Installing and Removing Memory

Note: To be fully compliant with all applicable Intel SDRAM memory specifications, the Intel® Atom™ Processor D400/D500 reference board has two 240-pin DDR2 DIMM sockets (667/800) arranged as DIMM 0 and DIMM 1 in Channel A.

Figure 5. DIMM Slots

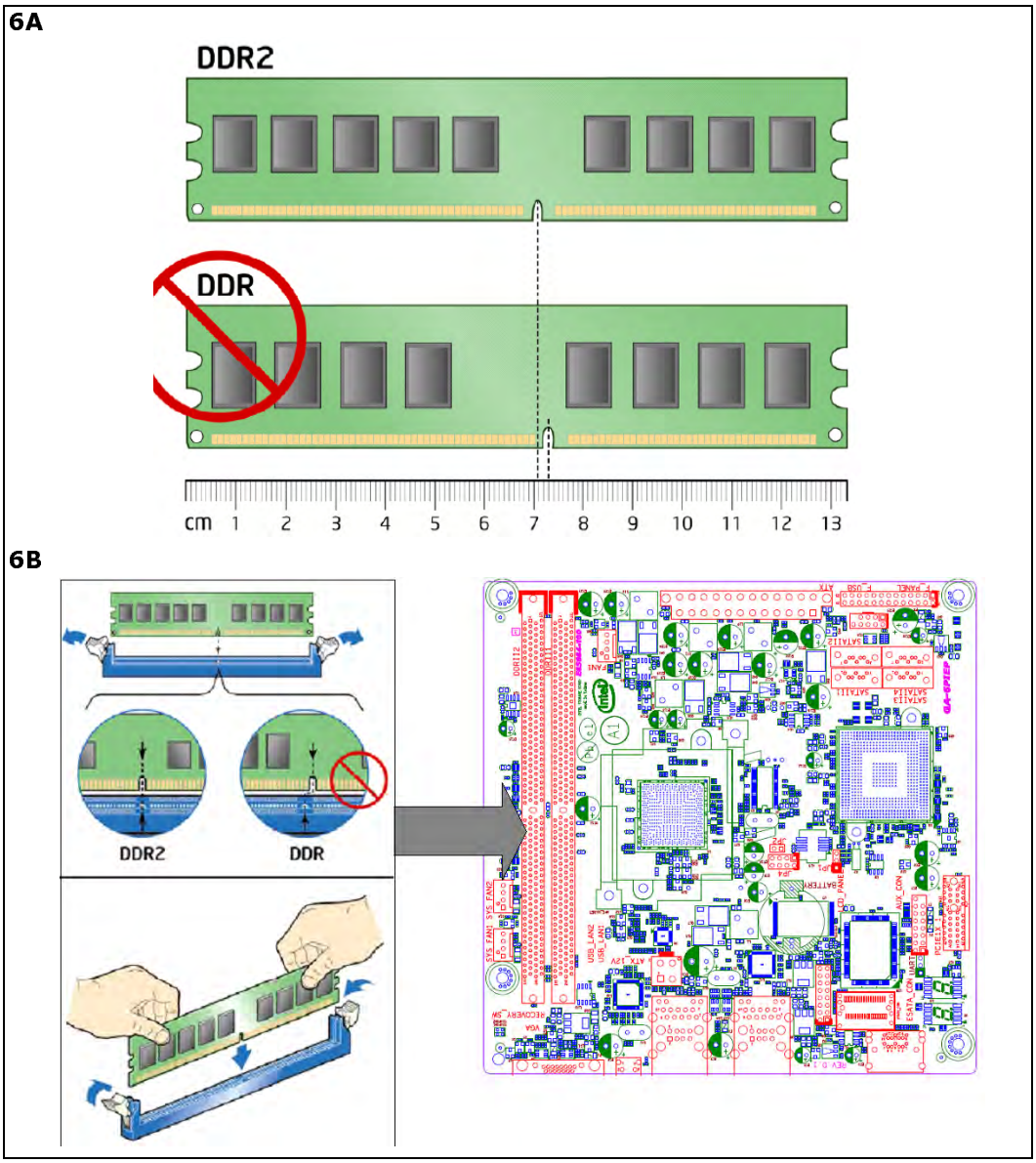


Note: When using a single DIMM, install the memory module on the DIMM 0 slot.

4.2.6 Installing DIMMs

To make sure to have the correct DIMM, place it on the illustration of the DDR2 DIMM in Figure 4, "Connecting to SATA Port" on page 14. All the notches should match with the DDR2 DIMM.

Figure 6. Selecting Correct DIMM Type



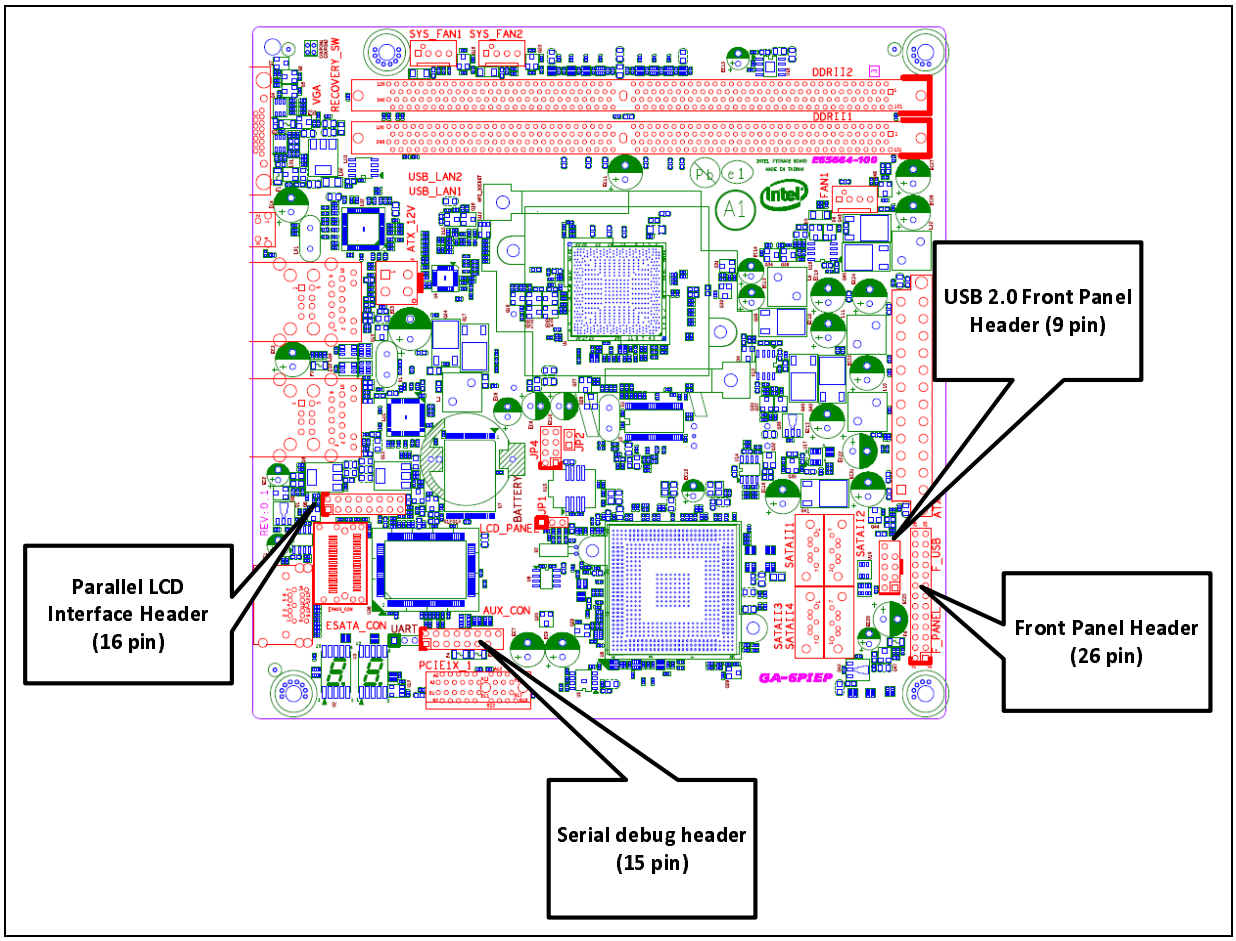
To install a DIMM, follow these steps:

1. Turn off all peripheral devices connected to the computer.
2. Turn off the computer and disconnect the AC power cord.
3. Locate the DIMM sockets and install/replace the DIMM (see Figure 5, "DIMM Slots" on page 15).

4.2.7 Connecting Internal Headers

The following diagram provides the location of the board's internal headers.

Figure 7. Reference Platform Internal Headers



4.2.8 Connecting to the Front Header

The following diagram provides the location of the boards the front panel headers and pin assignments.

Figure 8. Front Panel Header Signal Names

	Pin#		
LED VCC	1	2	LED GND
HDD1_P_LED	3	4	HDD1_S_LED
HDD2_P_LED	5	6	HDD2_S_LED
HDD3_P_LED	7	8	HDD3_S_LED
HDD4_P_LED	9	10	HDD4_S_LED
HDD5_P_LED	11	12	HDD5_S_LED
HDD6_P_LED	13	14	HDD6_S_LED
SYS_P_LED	15	16	SYS_STATUS
		18	LED GND
SATA ACT+	19	20	SATA ACT-
LAN1 ACT+	21	22	LAN1 ACT-
LAN2 ACT+	23	24	LAN2 ACT-
PWR BTN+	25	26	PWR BTN-

4.2.9 Connecting To the Serial Port Header

The following diagram provides the location of the boards the serial port headers and pin assignments.

Figure 9. Serial Port Header Signal Names

	Pin#		
DCD1-	1	2	RXD1
TXD1	3	4	DTR1-
GND	5	6	DSR1-
RTS1	7	8	CTS1-
RI1	9	10	Power (3.3V)
MSCLK	11	12	
MSDATA	13	14	KBCLK
		16	KBDATA

4.2.10 Connecting To the USB 2.0 Front Panel Header

Storage reference board has one USB 2.0 header and it connects to two USB devices. The following diagram shows the location of the USB 2.0 port headers and pin assignments.

Figure 10. USB 2.0 Front Panel Header Signal Names

	Pin#		
Power (+5V)	1	2	Power (+5V)
USB 4 -	3	4	USB 5 -
USB 4 +	5	6	USB 5+
GND	7	8	GND
KEY	9	10	NO CONNECTION

4.2.11 Connecting To LCD Panel Header

The following diagram shows the location of the LCD panel header and pin assignments.

Figure 11. LCD header Signal Names

	Pin#		
VDD	1	2	GND
RS	3	4	VO
E	5	6	R/W#
PD1	7	8	PD0
PD3	9	10	PD2
PD5	11	12	PD4
PD7	13	14	PD6
GND	15	16	A/VEE

5.0 Finding Current Software and Related Collateral

This section provides instructions for obtaining Intel® Atom™ Processor D400/D500 platform drivers and related collateral.

Download the following documents and software collateral before starting to install the Operating System on the Intel® Atom™ Processor D400/D500 reference platform.

- *Intel® Atom™ Processor D400 Specification Update*.
- *Intel® Atom™ Processor D500 Specification Update*.
- *Intel® Atom™ Processor D400/D500 Storage Platform Specification Update*.
- *Intel® Atom™ Processor D400/D500 Storage Platform Addendum*.
- *Intel® Atom™ Processor D400/D500 Storage Platform (Drivers & BIOS Updates)*.

6.0 Installation

This section provides instructions on how to install operating system on a system with AHCI or RAID mode enabled.

6.1 Installing OS in AHCI Mode (Windows Only)

1. Assemble system and attach one or more SATA hard drives to SATA connectors.
2. Enter system BIOS Setup by pressing the <F2> key after the Power-On-Self-Test (POST) memory tests begin.
3. Go to Advanced tab , select the <Drive Configuration> option and then select <Configure SATA>; ensure that AHCI is selected. Then save your settings by pressing <F10>.

6.1.1 Loading Intel® AHCI Storage Drivers

1. Begin Windows Setup by booting from the Windows installation CD.
2. When using Microsoft Windows Home Server (Version 1.0), press <F6> at the beginning of Windows Setup to install a third-party SCSI or RAID driver. When prompted, insert the diskette labeled Intel Rapid Storage Technology (RST) Driver into a USB floppy drive. Install the Intel® ICH9 SATA AHCI Controller driver.
3. Or when using Microsoft Windows 2008, no additional driver is needed during install as it would install the inbox driver as default.
4. Finish the Windows installation and install all necessary drivers/updates.

6.1.2 Updating Intel® AHCI for Port Multiplier Support

1. Copy the AHCI driver update in the USB drive.
2. Open the device manager in Windows and click on the current AHCI driver installed.
3. Click on the "Update driver" and launch the update wizard.
4. Select "No, not this time" and then select "Install from the list or specific location (Advanced)".
5. Select "Don't search, I will choose the driver to install" and click <Next>.
6. Select the "Have Disk" option and select "Browse" to specify the location of the update drivers.
7. Select the updated driver and click install.
8. Once the driver update is completed, close all the application and select reboot the machine.

6.2 Installing RST Storage Manager (Windows 2008 Only)

1. Assemble your system and attach one or more SATA hard drives to the SATA connectors.
2. Enter system BIOS Setup by pressing the <F2> key after the Power-On-Self-Test (POST) memory tests begin.
3. Go to Advanced tab, select <Drive Configuration>, select <Configure SATA>; ensure that <RAID> is selected. Then save your settings by pressing <F10>.

6.2.1 Creating RAID Set

1. Upon re-boot, the following Intel RST Option ROM status message is displayed on the screen: Press <Ctrl-I> to enter the RAID Configuration Utility. Press <Ctrl-I> and enter the RAID Configuration Utility.
2. In the Intel Rapid Storage Manager option ROM Main Menu, select option #1: Create RAID Volume. Enter a volume name and press <Enter>.

Note: The RAID Volume name must be in English alphanumeric ASCII characters.

3. Use the arrow keys to select RAID 0 or RAID 1 (when only two SATA drives are available), RAID 5 and RAID 10 (these options will only appear when three or four SATA drives are installed respectively). Press <Enter> upon selecting the RAID LEVEL.
4. Select the drives to be used in the RAID array (only when there are more than two drives available) and press <Enter>.
5. Select the strip size, when necessary, and press <Enter>.
6. Enter the size of the volume (when entering less than the maximum volume size, creating a second RAID array is available on the remaining portion of the volume) then press <Enter>.
7. Finally, press <Enter> to Create Volume. Exit the Option ROM user interface by pressing <Esc> or going to the EXIT option in the MAIN MENU.

6.2.2 Loading the Intel® RST RAID Drivers and Software

1. Install the Intel® RST software from the package downloaded from the web link specified in *Intel® Atom™ Processor D400/D500 Storage Platform (Drivers & BIOS Updates)* document.
2. Begin Windows Setup by booting from the Windows installation CD.
3. When using Microsoft Windows 2008, follow the setup installation steps until the section "Where do you want to install Windows?" is reached. Click on the "Load Drivers" option and insert the Intel Express Installer CD/DVD into your optical drive or insert the diskette labeled Intel RST RAID Driver into a USB floppy drive. Select to install the Intel ICH9 SATA AHCI Controller driver.
4. Finish the Windows installation and install all necessary drivers.

6.2.3 Setting Up a "RAID Ready" System

1. The Intel RST Console software offers the flexibility to upgrade from a single Serial ATA drive to RAID without reinstalling the operating system, when a second SATA hard drive is added to the system.
2. Follow the steps described in the headings from this section: "Configuring the BIOS for Intel RST" and "Loading the Intel RST RAID Drivers and Software".

6.3 Installing Graphic Driver for Power Management Support (Windows Only)

1. Copy the Graphic driver on to the USB drive.
2. Open the device manager in Windows and click on the "Display adapters" and highlight the Standard VGA device.
3. Click on the "Update driver" and launch the update wizard.
4. Select "No, not this time" and then select "Install from the list or specific location (Advanced)". Then select "Don't search, I will choose the driver to install" and click <Next>.
5. Select the "Have Disk" option and select "Browse" to specify the location of the update drivers. Select the updated driver and click install.
6. Once the driver update is completed, close all the application and select reboot the machine.
7. Once the system is rebooted, enabling the "Stand-by" is allowed, under the Power option in the control pan.

§ §