A2SAN-LN4-E/-C

USER'S MANUAL

Revision 1.0a

Preface

About This Manual

This manual is written for system integrators, IT technicians and knowledgeable end users. It provides information for the installation and use of the A2SAN-LN4-E/-C motherboard.

About This Motherboard

The A2SAN-LN4-E/-C motherboard provides powerful graphics and increased media processing performance with multi-frame technology. Paired with the Intel® (System-on-a-Chip) E3940 and Celeron® J3455 processors, the A2SAN-LN4-E/-C delivers more computing power for faster memory speeds and bandwidth while maintaining energy efficiency. Utilizing Intel TCC (Time Coordinated Computing) Technology, the A2SAN-LN4-E/-C resolves latency issues in applications and improves determinism across connected devices. The motherboard features advanced technologies such as Intel Virtualization to improve security and reliabity of systems, Thermal Monitoring to reduce power consumption, and WiFi BT support.

Please note that this motherboard is intended to be installed and serviced by professional technicians only. For processor/memory updates, please refer to our website at http://www.supermicro.com/products/.

Conventions Used in the Manual

Special attention should be given to the following symbols for proper installation and to prevent damage done to the components or injury to yourself:

Warning! Indicates important information given to prevent equipment/property damage or personal injury.

Warning! Indicates high voltage may be encountered while performing a procedure.

Important: Important information given to ensure proper system installation or to relay safety precautions.

Note: Additional Information given to differentiate various models or to provide information for proper system setup.

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Appendix A BIOS Codes

Appendix B Software Installation

Appendix C Standardized Warning Statements

Appendix D UEFI BIOS Recovery

Chapter 1

Introduction

Congratulations on purchasing your computer motherboard from an industry leader. Supermicro motherboards are designed to provide you with the highest standards in quality and performance.

In additon to the motherboard, several important parts that are included in the retail box are listed below. If anything listed is damaged or missing, please contact your retailer.

1.1 Checklist

Main Parts List (Retail Single Package)		
Description	**Part Number**	**Quantity**
Supermicro Motherboard	A2SAN-LN4-E/-C	1
Quick Reference Guide	MNL-2285-QRG	1
SATA Data Cable (25cm)	CBL-SAST-0881	1
SATA Power Cable (25cm)	CBL-PWEX-0982	1
DC IN Power cable 2x4P 2.0mm pitch to 2x2P (15cm)	CBL-PWEX-1029	1
COM Port Cable (15cm)	CBL-OTHR-1061-15	1
USB 2.0 Cable (20cm)	CBL-CUSB-0983	1
Heatsink 19mm height (for A2SAN-LN4-C)	SNK-C0103L-1	1
Heatsink 20mm height (for A2SAN-LN4-E)	SNK-C0103L	1

Main Parts List (Bulk Package)		
Description	**Part Number**	**Quantity**
Supermicro Motherboard	A2SAN-LN4-E/-C	1
SATA Data Cable (25cm)	CBL-SAST-0881	1
SATA Power Cable (25cm)	CBL-PWEX-0982	1
Heatsink 19mm height (for A2SAN-LN4-C)	SNK-C0103L-1	1
Heatsink 20mm height (for A2SAN-LN4-E)	SNK-C0103L	1
DC IN Power cable 2x4P 2.0mm pitch to 2x2P (15cm)	CBL-PWEX-1029	1

Optional Parts List		
Description	**Part Number**	**Quantity**
Power Adapter (40W)	MCP-250-10124-0N	1
Power Adapter (60W)	MCP-250-10117-0N	1
DC IN Power cable 2x2P to 5.5x2.5 DC JACK (17cm)	CBL-PWEX-1110-15	1

Important Links

For your system to work properly, please follow the links below to download all necessary drivers/utilities and the user's manual for your server.

- Supermicro product manuals: http://www.supermicro.com/support/manuals/

- Product drivers and utilities: https://www.supermicro.com/wdl/driver

- Product safety info: http://www.supermicro.com/about/policies/safety_information.cfm

- A secure data deletion tool designed to fully erase all data from storage devices can be found at our website: https://www.supermicro.com/about/policies/disclaimer.cfm?url=/wdl/utility/Lot9_Secure_Data_Deletion_Utility/

- If you have any questions, please contact our support team at: support@supermicro.com

This manual may be periodically updated without notice. Please check the Supermicro website for possible updates to the manual revision level.

Figure 1-1. A2SAN-LN4-E Motherboard Image
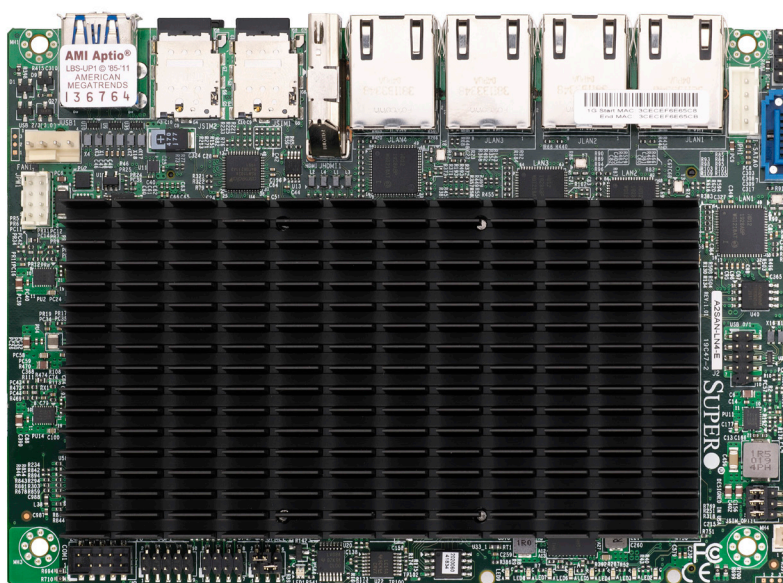
A2SAN-LN4-C Motherboard Image
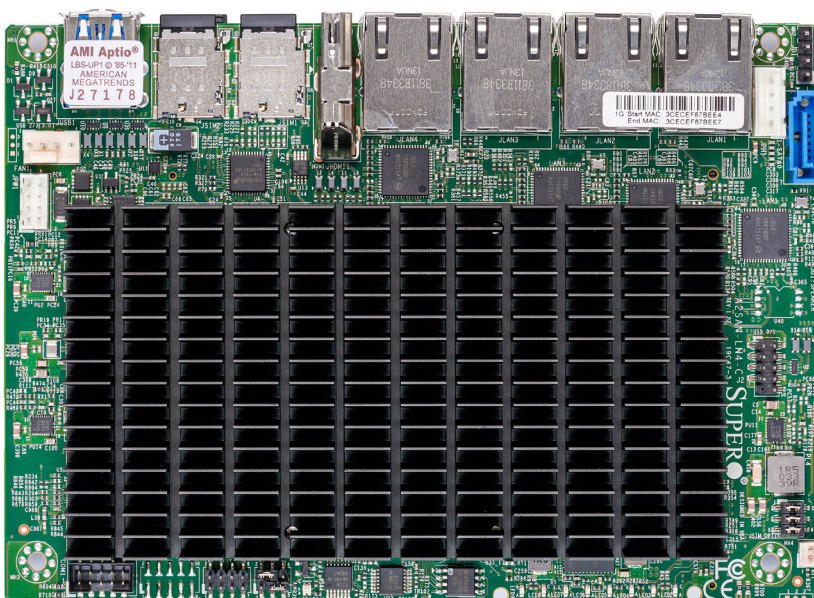
Note: All graphics shown in this manual were based upon the latest PCB revision available at the time of publication of the manual. The motherboard you received may or may not look exactly the same as the graphics shown in this manual.

Figure 1-2. A2SAN-LN4-E/-C Motherboard Image (Bottom Side)
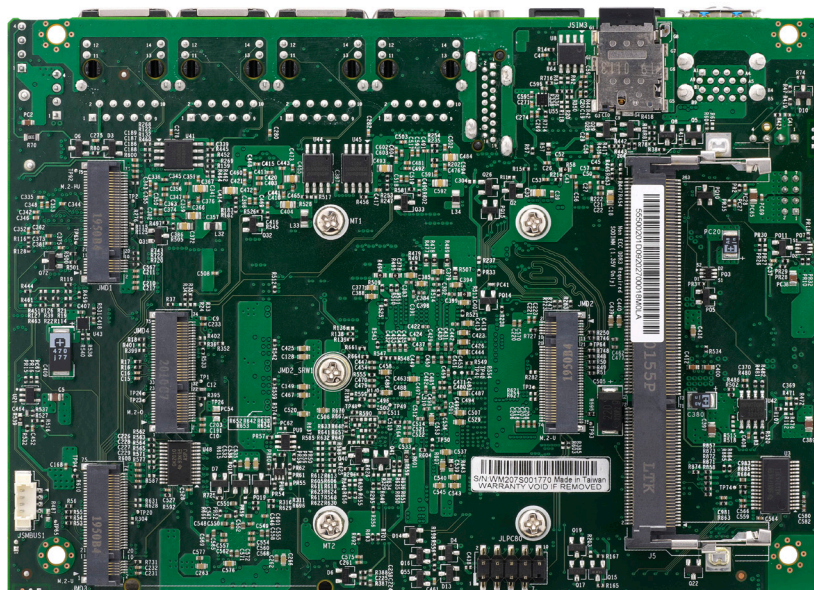
Figure 1-3. A2SAN-LN4-E/-C

Motherboard Mechanical Drawings

Motherboard Top Side
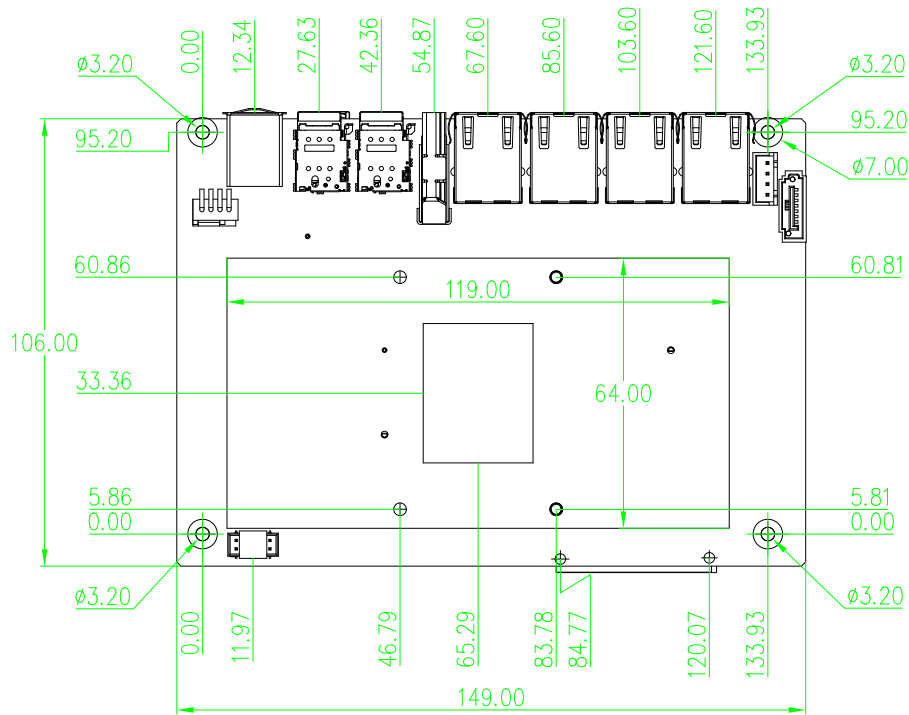
Motherboard Bottom Side
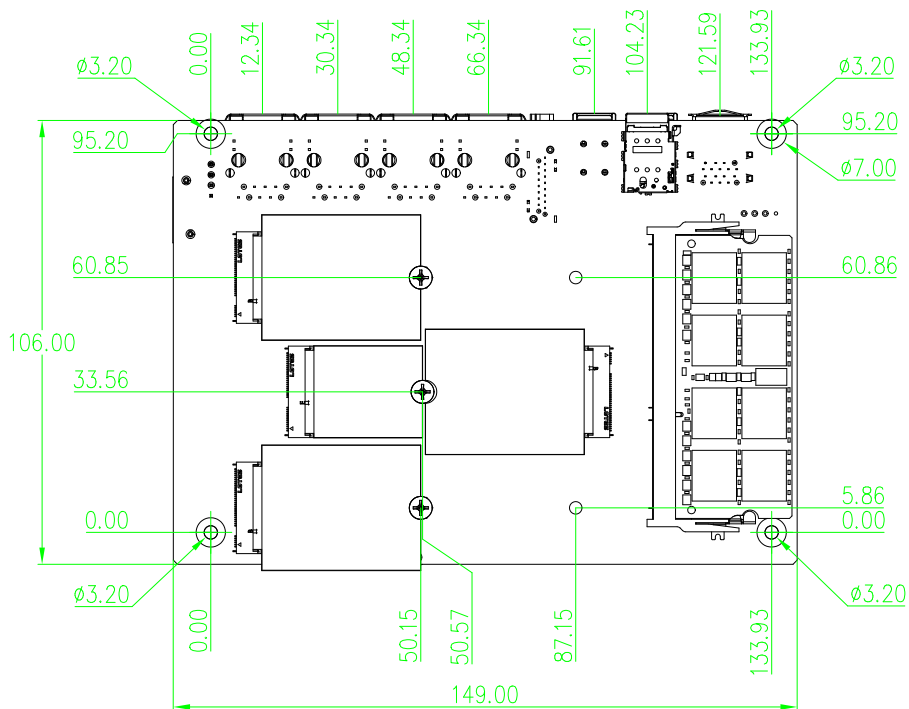
Figure 1-4. A2SAN-LN4-E/-C

Back Panel I/O Mechanical Drawings

Back Panel I/O With Heatsink (A2SAN-LN4-E)

30.70

9.10
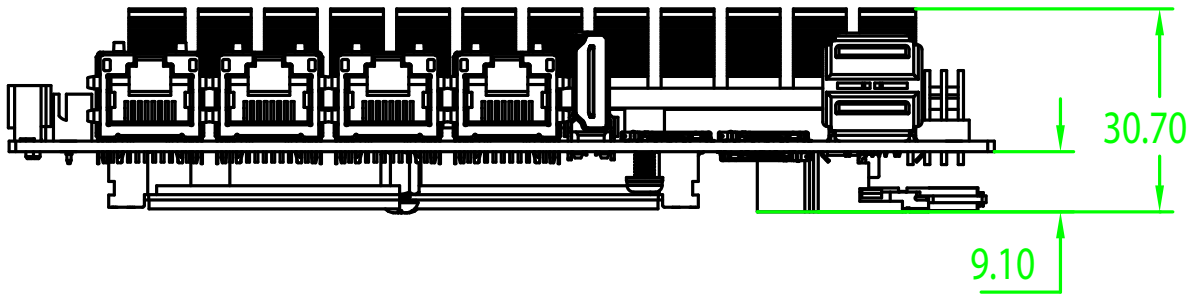
Back Panel I/O With Heatsink (A2SAN-LN4-C)

29.70

9.10
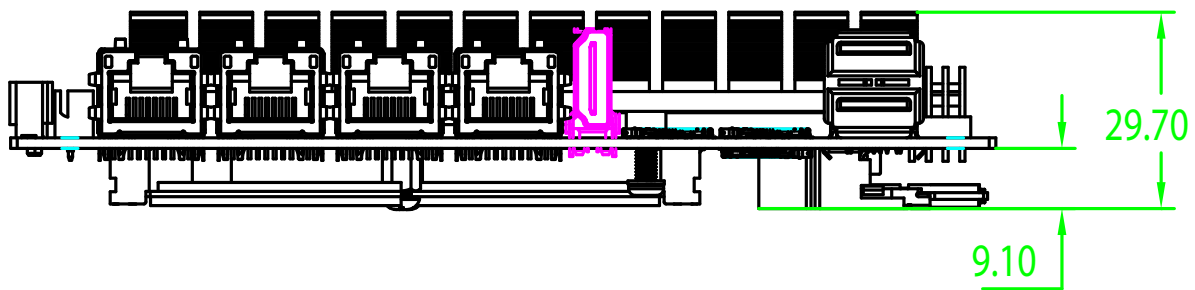
Back Panel I/O Without Heatsink

16.50

27.20

9.10
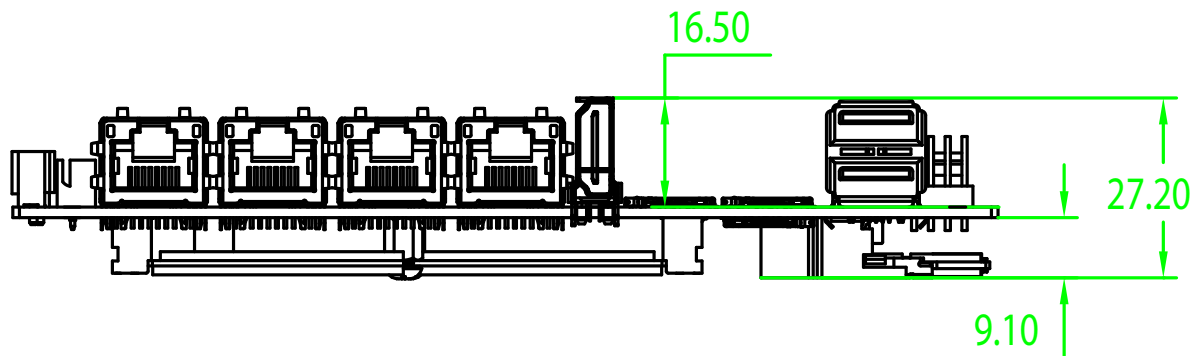
Figure 1-5. A2SAN-LN4 Motherboard Layout
(not drawn to scale)

Top Layout
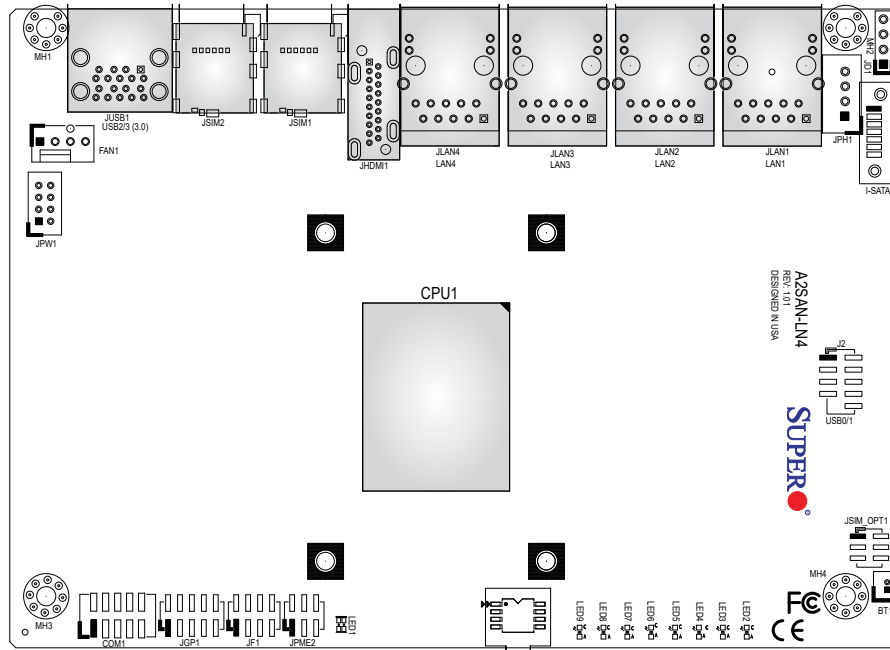
Bottom Layout
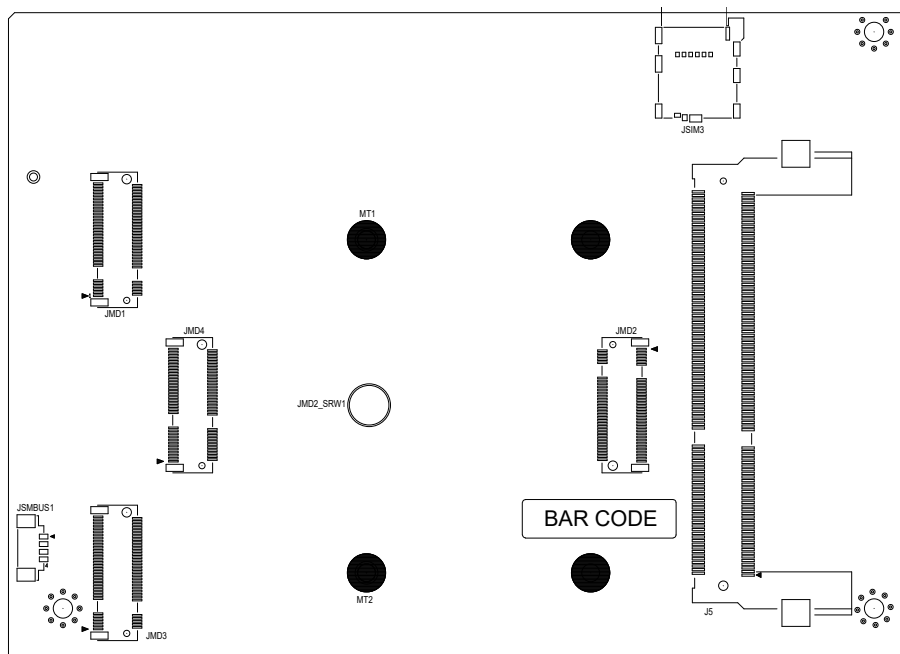
Note: Components not documented are for internal testing only.

Quick Reference
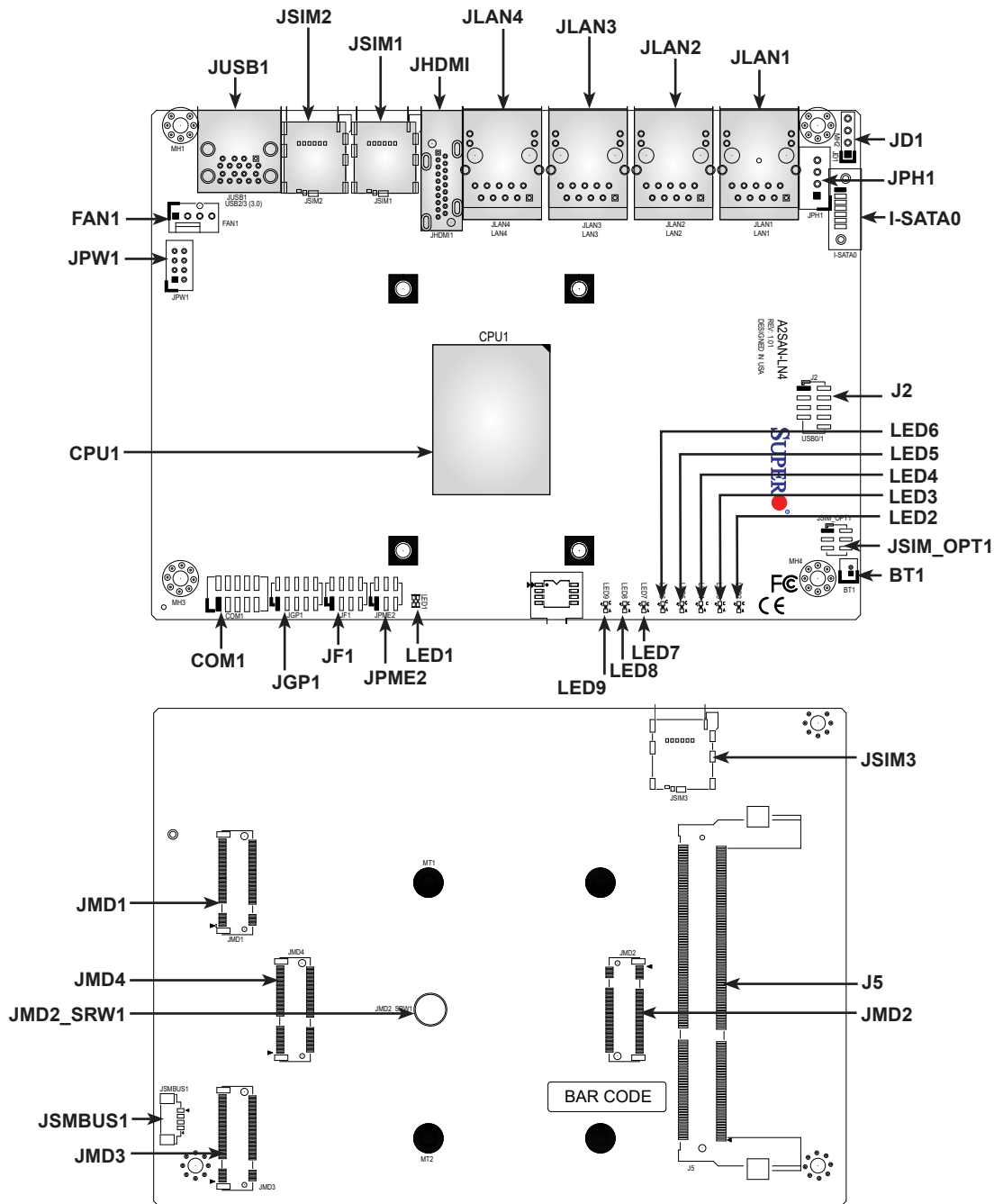
Notes:

- See Chapter 2 for detailed information on jumpers, I/O ports, and JF1 front panel connections. Jumpers/LED indicators not indicated are used for testing only.

- "▪" indicates the location of Pin 1.

- Please use the correct type battery to avoid possible explosion.

Quick Reference Table

Jumper	Description	Default Setting (*)	
JPME2	Manufacturing Mode	Pins 1-3: ME Manufacturing Mode Pins 3-5: Normal* (Default)	
JPME2	Power Force On	Pins 2-4: Power Force On* Pins 4-6: PWR BTN Power On	
JSIM_OPT1	SIM Card Detection	Pins 1-2 (JSIM1) Pins 3-4 (JSIM2) Pins 5-6 (JSIM3)	Open: High Active Closed: Low Active* (Default)

LED	Description	Status
LED1	Power Good LED	Solid Green: All Power Good Solid Red: Power Fail
LED2	M.2 Active LED (for JMD1)	Activity Behavior: Depends on Module
LED3	M.2 Active LED (for JMD2)	Activity Behavior: Depends on Module
LED4	M.2 Active LED (for JMD3)	Activity Behavior: Depends on Module
LED5	M.2 Active LED (for JMD4)	Activity Behavior: Depends on Module
LED6	GbE LAN Active LED (for JLAN1)	Blinking Amber: LAN Active
LED7	GbE LAN Active LED (for JLAN2)	Blinking Amber: LAN Active
LED8	GbE LAN Active LED (for JLAN3)	Blinking Amber: LAN Active
LED9	GbE LAN Active LED (for JLAN4)	Blinking Amber: LAN Active

Connector	Description
BT1	Battery Connector (To clear the CMOS, remove the battery and power input, short pins 1-2 for more than 10 seconds and install the battery.)
COM1	Serial COM Port (supports RS-232 x 1)
FAN1	System Fan Header
I-SATA0	Intel PCH SATA 3.0 Port
J2	USB 2.0 Header
J5	SO-DIMM Slot (bottom side layout)
JD1	Speaker Header (Pins 1-4)
JF1	Front Control Panel Header
JGP1	8-bit General Purpose I/O Header
JHDMI1	Back Panel HDMI Port
JLAN1 - JLAN4	LAN1 - LAN4 (RJ45) Ports
JMD1	M.2 B-Key 2242/3042 Slot (supports USB2.0/3.0 with Nano SIM for LTE/3G) (supports SATA upon request)
JMD2, JMD3	M.2 B-Key 2242/3042 Slots (supports USB2.0/3.0 with Nano SIM for LTE/3G)
JMD4	M.2 E-Key 2230 Slot (supports PCIe x1/USB2.0 with WiFi + BT)
JMD2_SRW1	M.2 Mounting Screw for JMD2 (bottom side layout)

Connector	Description
JPH1	SATA Power Connector (for one HDD system)
JPW1	8-pin 12V DC Power Connector
JSIM1	Nano SIM Card Slot for JDM1
JSIM2	Nano SIM Card Slot for JDM2
JSIM3	Nano SIM Card Slot for JDM3 (bottom side layout)
JSMBUS1	System Management Bus Header (bottom side layout)
JUSB1	Back Panel Universal Serial Bus (USB) 3.0 Ports (USB 3.0 x 2)
MH1 - MH4	Mounting Holes
MT1	M.2 Mounting Screw for JDM1 (bottom side layout)
MT2	M.2 Mounting Screw for JDM3 (bottom side layout)

Motherboard Features

Motherboard Features
CPU
• A2SAN-LN4-E: Intel® Atom™ x5-E3940 Processor, Quad Core, 2M Cache, 1.6GHz-1.8GHz, TDP 9.5W • A2SAN-LN4-C: Intel® Celeron® J3455 Processor, Quad Core, 2M Cache, 1.5GHz-2.3GHz, TDP 10W
Memory
• Integrated memory controller supports up to 8GB DDR3L 1866MHz Non-ECC SO-DIMM
DIMM Size
• Single channel DDR3L Up to 8GB
Expansion Slots
• Two M.2 B-Key 2242/3042 Slots (support USB2.0/3.0 with Nano SIM for LTE/3G) • One M.2 B-Key 2242/3042 Slot (supports USB2.0/3.0 with Nano SIM for LTE/3G) (supports SATA upon request) • One M.2 E-Key 2230 Slot (supports PCIe x1/USB2.0 with WiFi + BT)
Network
• Four Intel i210-IT Ethernet Controller for A2SAN-LN4-E • Four Intel i211-AT Ethernet Controller for A2SAN-LN4-C
Graphics
• Intel HD Graphics GT Series   • Features: OpenGL 5.0, DirectX 12, OpenCL 2.1 • Hardware Decode: AVC/H.264, MPEG2, VC1/WMV9, JPEG/MJPEG, HEVC/H.265, VP8, VP9, MVC • Hardware Encode: AVC/H.264, JPEG/MJPEG, HEVC/H.265, VP8, VP9, MVC • Display: HDMI 1.4 (resolution up to 3840x2160 at 30Hz),
I/O Devices
• Serial (COM) Header   • One front accessible serial header (COM1) • SATA 3.0 Port   • One SATA 3.0 port (I-SATA1) with SATA power • SMBus Header   • One SMBus box header (JSMBUS1) • Speaker   • One Speaker header (JD1)
Peripheral Devices
• Two USB 3.0 ports on the rear I/O panel (USB0/1) • Two USB 2.0 headers (USB2/3, Pin Header)
BIOS
• 128Mb SPI AMI BIOS® • ACPI 6.0, SMBIOS 3.0, UEFI 2.5, PCI F/W 3.0, BIOS rescue hot-key, Riser Card auto detection support

Motherboard Features
Power Management
• ACPI power management • S3, S4, S5 • Power button override mechanism • Power-on mode for AC power recovery • Wake-On-LAN • TXE Management Engine • Force Power On by Jumper • RTC Battery (typical voltage: 3.0V, normal discharge capacity: 220mAh)
System Health Monitoring
• Onboard voltage monitoring for +3.3V, +3.3V Stby, CPU, DDR3L voltage, system temperature, and peripheral temperature
Fan Control
• One 4-pin fan header
System Management
• SuperDoctor® 5, RoHS
LED Indicators
• Power/Suspend-state indicator LED • M.2 Active LED • GbE LAN Active LED
Dimensions
• 4.17" (L) x 5.87" (W) (106mm x 149mm) (Follow 3.5" SBC screw hole location)
Environment
• Operating Temperature Range: A2SAN-LN4-E/-C supports 0°C ~ 60°C (32°F - 140°F). • Non-Operating Temperature Range: -40°C - 85°C (-40°F - 185°F) • Operating Relative Humidity Range: 8% - 90% (non-condensing) • Non-Operating Relative Humidity Range: 10% - 95% (non-condensing)

Note 1: The CPU maximum thermal design power (TDP) is subject to chassis and heatsink cooling restrictions. For proper thermal management, please check the chassis and heatsink specifications for proper CPU TDP sizing.

**Figure 1-6.
System Block Diagram**
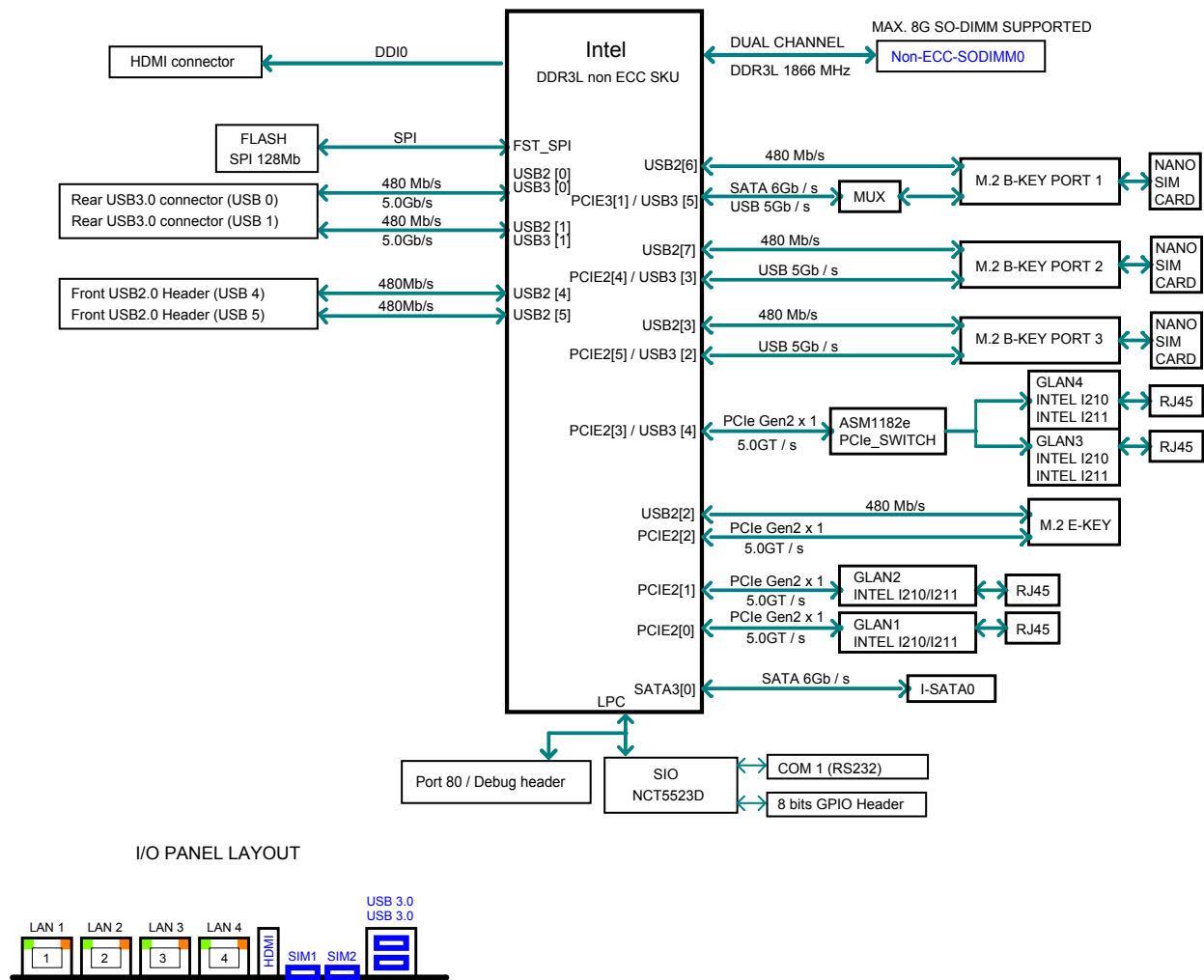
Note 1: This is a general block diagram and may not exactly represent the features on your motherboard. See the previous pages for the actual specifications of your motherboard.

Figure 1-7.
A2SAN-LN4 Series Specification Chart

Model	CPU	# of Core	Base Freq.	Turbo Freq.	CPU TDP	GbE	HDMI	RS-232	USB3.0	USB2.0	GPIO	Temp.	Passive Heatsink
A2SAN-LN4-E	E3940	4	1.6GHz	1.8GHz	9.5W	4 x I210IT	1	1	2	2	8-bits	0-60 °C	SNK-C0103L 20mm
A2SAN-LN4-C	J3455	4	1.5GHz	2.3GHz	10W	4 x I211AT	1	1	2	2	N/A	0-60°C	SNK-C0103L-1 19mm

1.2 Processor Overview

Built upon the functionality and capability of the Intel Atom Soc E3940 of the A2SAN-LN4-E and the Intel Celeron J3455 of the A2SAN-LN4-C, these motherboards offer maximum I/O expandability, energy efficiency, and data reliability in a small form factor, with a maximum capacity of 8GB or memory, and is optimized for embedded storage solutions, networking applications, or cloud-computing platforms. The A2SAN-LN4-E/-C drastically increases system performance for a multitude of server applications.

The A2SAN-LN4-E/-C dramatically increases system performance for a multitude of server applications and supports the following features:

• Support for Trusted Execution Engine (TXE)

• Improved I/O capabilities

• SPI Enhancements

• Intel Virtualization Technology for Directed I/O (Intel VT-d)

• Enhanced Intel SpeedStep® Technology

• Video Connector: HDMI 1.4

• Adaptive Thermal Management/Monitoring

• Gen3 SATA ports with transfer rates of up to 6Gb/s

• System Management Bus (SMBus) Specification, Version 2.0

• Two M.2 B-Key 2242/3042 slots for USB with Nano SIM for LTE/3G, one M.2 B-Key 2242/3042 slot for SATA/USB with Nano-SIM for LTE/3G, and one M.2 E-Key 2230 slot for PCI-E x1/USB with WiFi + BT

1.3 Special Features

Recovery from AC Power Loss

The Basic I/O System (BIOS) provides a setting that determines how the system will respond when AC power is lost and then restored to the system. You can choose for the system to remain powered off (in which case you must press the power switch to turn it back on), or for it to automatically return to the power-on state. See the Advanced BIOS Setup section for this setting. The default setting is **Last State.**

1.4 ACPI Features

ACPI stands for Advanced Configuration and Power Interface. The ACPI specification defines a flexible and abstract hardware interface that provides a standard way to integrate power management features throughout a computer system, including its hardware, operating system and application software. This enables the system to automatically turn on and off peripherals such as CD-ROMs, network cards, hard disk drives and printers.

In addition to enabling operating system-directed power management, ACPI also provides a generic system event mechanism for Plug and Play, and an operating system-independent interface for configuration control. ACPI leverages the Plug and Play BIOS data structures, while providing a processor architecture-independent implementation that is compatible with appropriate Windows operating systems. For detailed information regarding OS support, please refer to the Supermicro website.

1.5 Power Supply

As with all computer products, a stable power source is necessary for proper and reliable operation. It is even more important for processors that have high CPU clock rates. In areas where noisy power transmission is present, you may choose to install a line filter to shield the computer from noise. It is recommended that you also install a power surge protector to help avoid problems caused by power surges.

1.6 Serial Port

The A2SAN-LN4-E motherboard supports one serial communication connection. COM1 can be used for input/output. The UART provides legacy speeds with a baud rate of up to 115.2 Kbps as well as an advanced speed with baud rates of 250 K, 500 K, or 1 Mb/s, which support high-speed serial communication devices.

1.7 Advanced Power Management

The following new advanced power management features are supported by the motherboard.

Trusted Execution Engine (TXE)

Intel Atom SoC only supports the TXE 3.0 function.

Chapter 2

Installation

2.1 Static-Sensitive Devices

Electrostatic Discharge (ESD) can damage electronic components. To avoid damaging your system board, it is important to handle it very carefully. The following measures are generally sufficient to protect your equipment from ESD.

Precautions

- Use a grounded wrist strap designed to prevent static discharge.

- Touch a grounded metal object before removing the board from the antistatic bag.

- Handle the motherboard by its edges only; do not touch its components, peripheral chips, memory modules or gold contacts.

- When handling chips or modules, avoid touching their pins.

- Put the motherboard and peripherals back into their antistatic bags when not in use.

- For grounding purposes, make sure that your computer chassis provides excellent conductivity between the power supply, the case, the mounting fasteners and the motherboard.

- Use only the correct type of onboard CMOS battery. Do not install the onboard battery upside down to avoid possible explosion.

Unpacking

The motherboard is shipped in antistatic packaging to avoid static damage. When unpacking the motherboard, make sure that the person handling it is static protected.

2.2 Motherboard Installation

All motherboards have standard mounting holes to fit different types of chassis. Make sure that the locations of all the mounting holes for both the motherboard and the chassis match. Although a chassis may have both plastic and metal mounting fasteners, metal ones are highly recommended because they ground the motherboard to the chassis. Make sure that the metal standoffs click in or are screwed in tightly.

Tools Needed

**Phillips
Screwdriver
(1)**

**Phillips Screws
(4)**

**Standoffs (4)
Only if Needed**
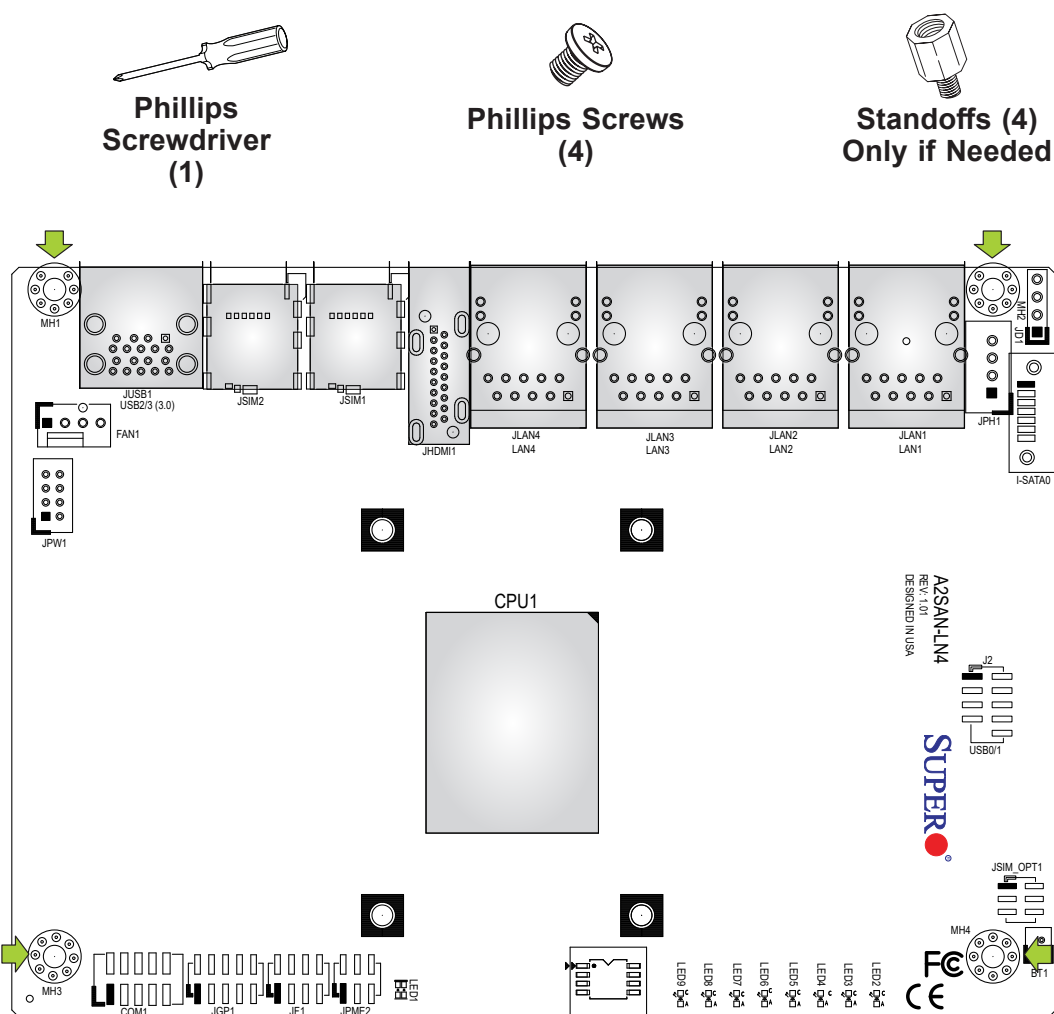
Location of Mounting Holes

Note: 1) To avoid damaging the motherboard and its components, please do not use a force greater than 8 lbf-in on each mounting screw during motherboard installation. 2) Some components are very close to the mounting holes. Please take precautionary measures to avoid damaging these components when installing the motherboard to the chassis.

Installing the Motherboard

1. Locate the mounting holes on the motherboard. See the previous page for the location.
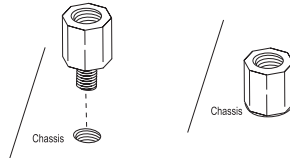
2. Locate the matching mounting holes on the chassis. Align the mounting holes on the motherboard against the mounting holes on the chassis.
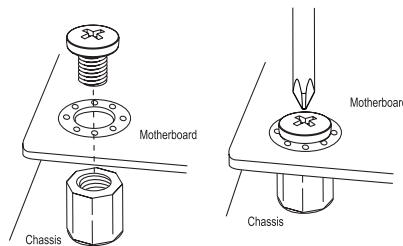
3. Install standoffs in the chassis as needed.

4. Install the motherboard into the chassis carefully to avoid damaging other motherboard components.

5. Using the Phillips screwdriver, insert a pan head #6 screw into a mounting hole on the motherboard and its matching mounting hole on the chassis.

6. Repeat Step 5 to insert #6 screws into all mounting holes.

7. Make sure that the motherboard is securely placed in the chassis.

   Note: Images displayed are for illustration only. Your chassis or components might look different from those shown in this manual.

2.3 Memory Support and Installation

Note: Check the Supermicro website for recommended memory modules.

Important: Exercise extreme care when installing or removing DIMM modules to prevent any possible damage.

Memory Support

The A2SAN-LN4-E/-C supports supports 8GB DDR3L 1866MHz Non-ECC SO-DIMM in one memory slot on the bottom side of the motherboard.

Bottom Layout
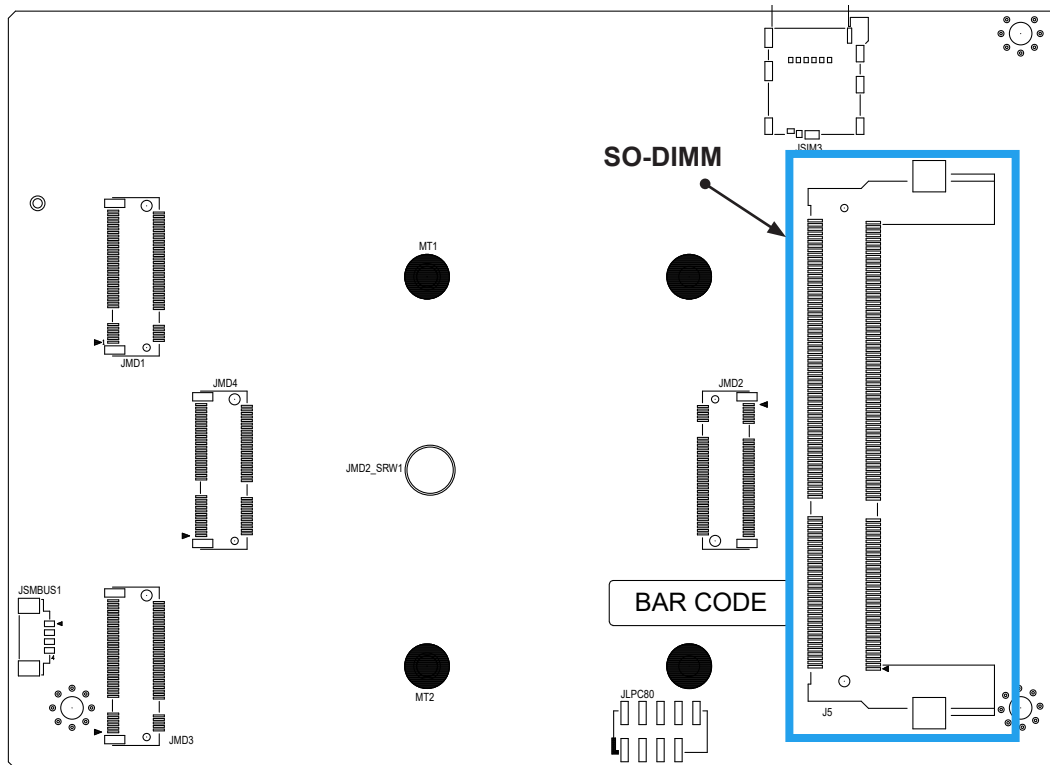
SO-DIMM Installation

1. Insert the SO-DIMM module vertically at about a 45 degree angle. Press down until the module locks into place. The side clips will automatically secure the SO-DIMM module, locking it into place.

Insert this end first

Locking clip
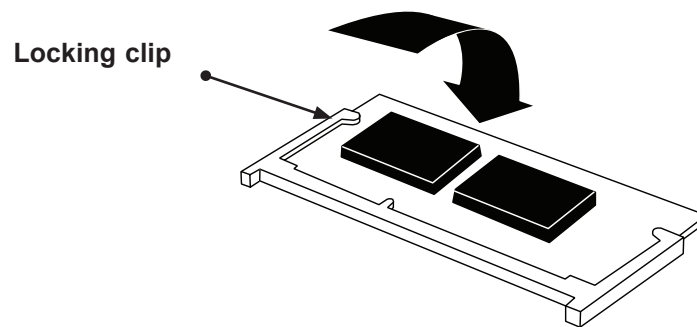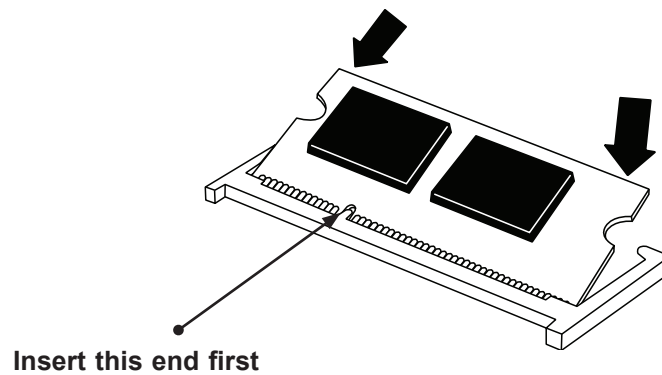
SO-DIMM Removal

1. Push the side clips at the end of the slot to release the SO-DIMM module. Pull the SO-DIMM module up to remove it from the slot.

2.4 M.2 Installation for JMD2 and JMD4

1. Unfasten the screw from JMD2-SRW1, insert the M.2 modules into JMD2 and JMD4, press the modules down at the same time and secure them by fastening the screw.
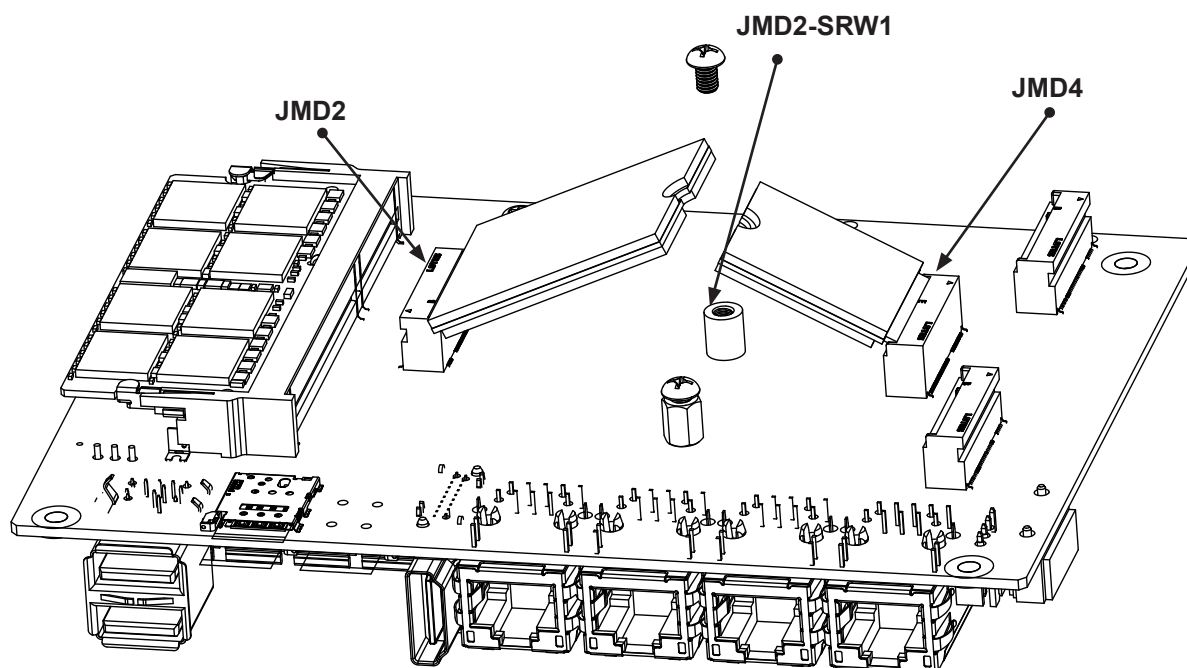
2.5 Rear I/O Ports

See Figure 2-1 below for the locations and descriptions of the various I/O ports on the rear of the motherboard.
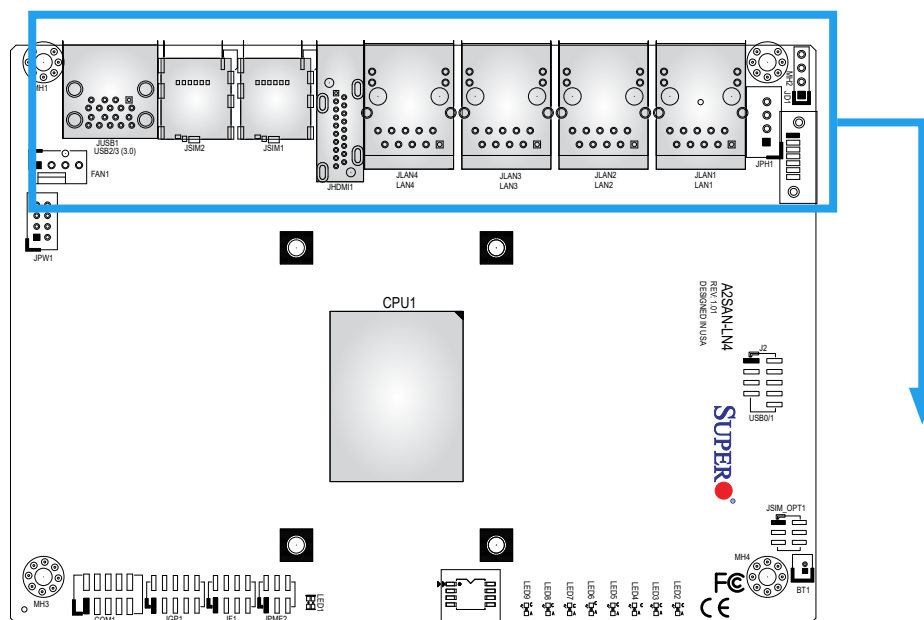
Figure 2-1. I/O Port Locations and Definitions
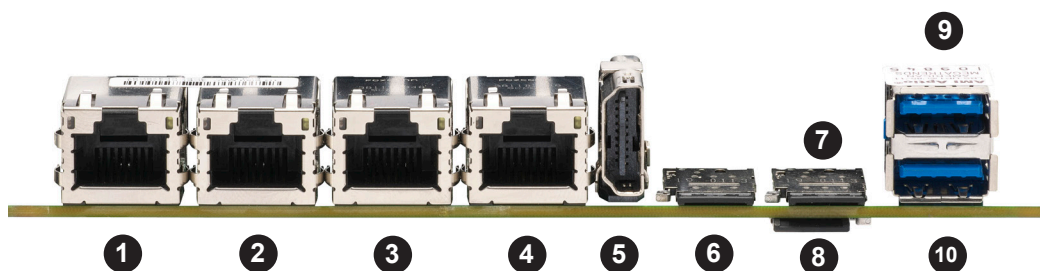
#	Definition	#	Description	#	Description
1	LAN1	5	HDMI Port	9	USB1
2	LAN2	6	SIM Slot 1 (JMD1)	10	USB0
3	LAN3	7	SIM Slot 2 (JMD2)		
4	LAN4	8	SIM Slot 3 (JMD3)		

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HDMI Port

The HDMI (High-Definition Multimedia Interface) port is used to display both high definition video and digital sound through an HDMI-capable display, using the same (HDMI) cable.

Universal Serial Bus (USB) Ports

There are two USB 3.0 ports (USB0/1) located on the I/O back panel. J2 is a front accessible USB 2.0 header.

Back Panel USB 3.0 (0/1) Pin Definitions			
Pin#	Definition	Pin#	Definition
A1	VBUS	B1	VBUS
A2	D1-N	B2	D2-N
A3	D1-P	B3	D2-P
A4	GND	B4	GND
A5	Stda_SSRX1-N	B5	Stda_SSRX2-N
A6	Stda_SSRX1-P	B6	Stda_SSRX2-P
A7	GND_DRAIN	B7	GND_DRAIN
A8	Stda_SSTX1-N	B8	Stda_SSTX2-N
A9	Stda_SSTX1-P	B9	Stda_SSTX2-P

Front Panel USB 2.0 Header Header Pin Definitions			
Pin#	Definition	Pin#	Definition
1	P5V_DUAL_F	2	P5V_DUAL_F
3	USBCON_N2	4	USBCON_N3
5	USBCON_P2	6	USBCON_P3
7	Ground	8	Ground
9		10	NC
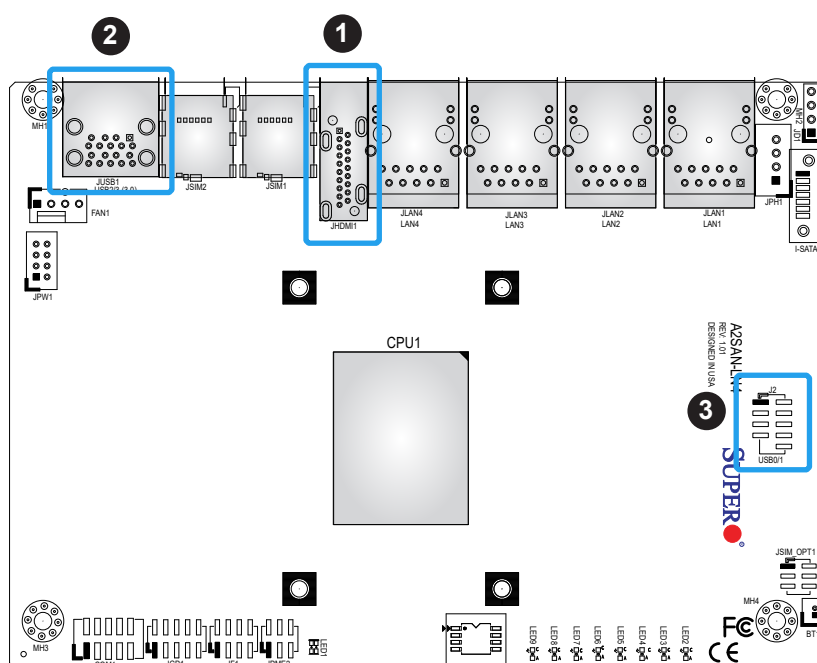
1. HDMI Port
2. USB3.0 (0/1)
3. USB 2.0 Header

Nano SIM Slots

Thre are two Nano SIM card slots on the I/O back panel. Nano SIM slot 1 is for JMD1 and Nano SIM slot 2 is for JDM2. Nano SIM slot 3 (JMD3) on the bottom of the motherboard

Top Layout
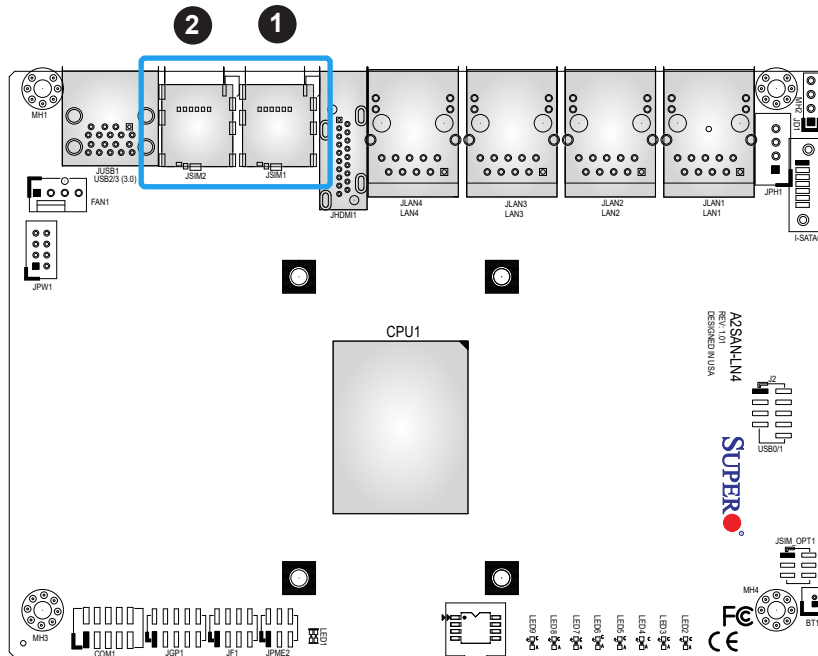
1. Nano SIM Slot 1
2. Nano SIM Slot 2
3. Nano SIM Slot 3

Bottom Layout
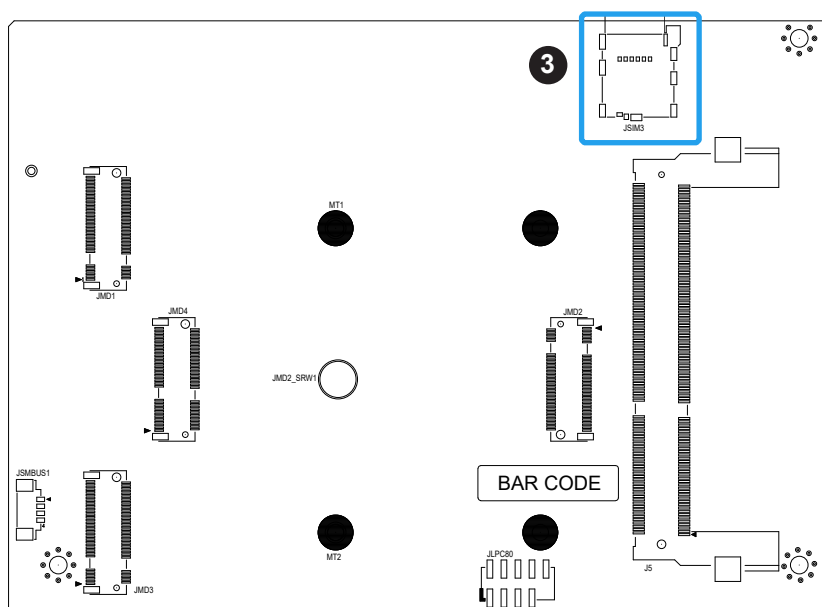
LAN Ports

Four Gigabit Ethernet ports (LAN1 - LAN4) are located on the I/O back panel. All of these ports accept RJ45 cables. Please refer to the LED Indicator section for LAN LED information.

LAN Port Pin Definition			
Pin#	Definition	Pin#	Definition
1	TD0-	11	P3V3_Dual
2	TD0+	12	Act LED (Yellow)
3	TD1-	13	Link 1000 (Amber)
4	TD1+	14	Link 100 LED (Green)
5	TD2-	15	GND
6	TD2+	16	GND
7	TD3-	17	GND
8	TD3+	18	GND
9	COMMCT		
10	GND		
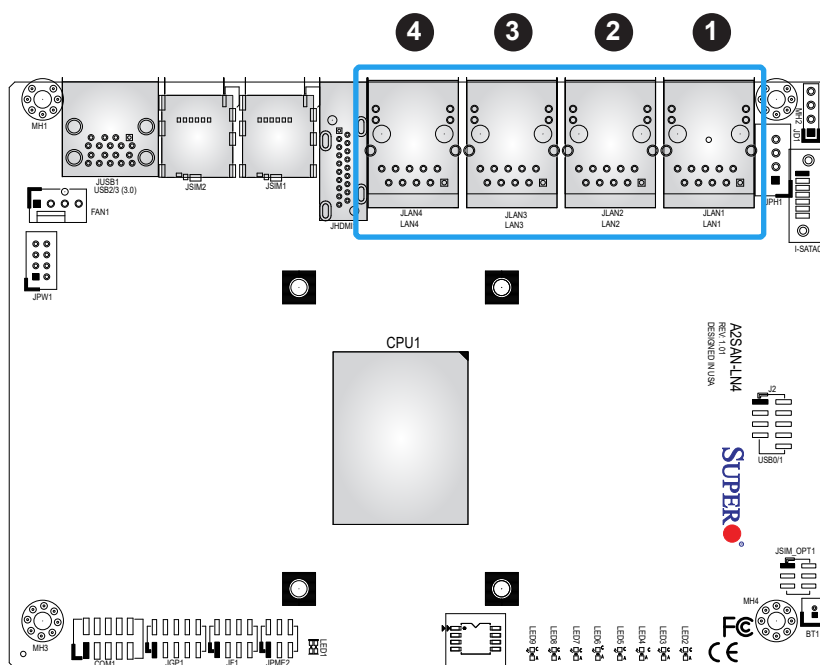
1. LAN1
2. LAN2
3. LAN3
4. LAN4

2.6 Front Control Panel

JF1 contains header pins for various buttons and indicators that are normally located on a control panel at the front of the chassis. These connectors are designed specifically for use with Supermicro chassis. See the figure below for the descriptions of the front control panel buttons and LED indicators.
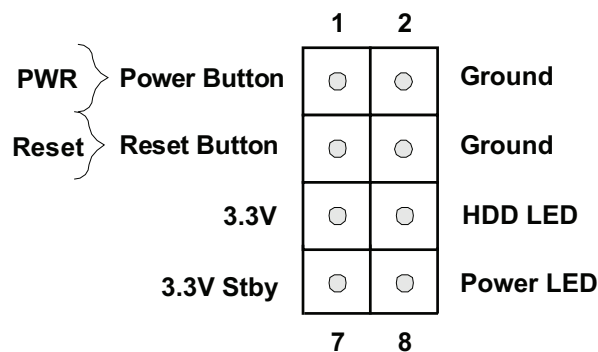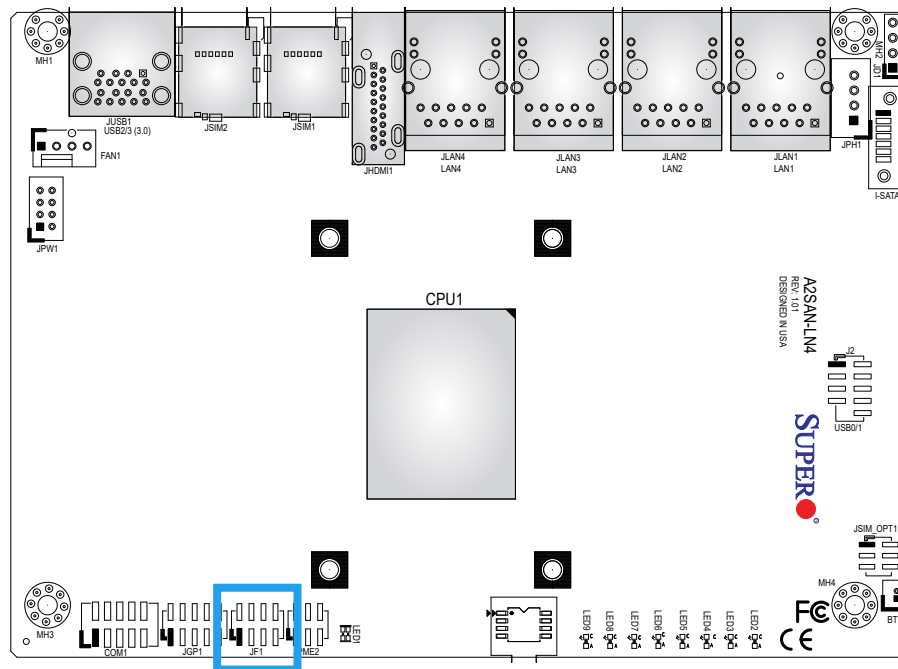
Figure 2-2. JF1 Header Pins

Power Button

The Power Button connection is located on pins 1 and 2 of JF1. Momentarily contacting both pins will power on/off the system. This button can also be configured to function as a suspend button (with a setting in the BIOS - see Chapter 4). To turn off the power when the system is in suspend mode, press the button for 4 seconds or longer. Refer to the table below for pin definitions.

Power Button Pin Definitions (JF1)	
Pin#	Definition
1	Signal
2	Ground

Reset Button

The Reset Button connection is located on pins 3 and 4 of JF1. Attach it to a hardware reset switch on the computer case to reset the system. Refer to the table below for pin definitions.

Reset Button Pin Definitions (JF1)	
Pin#	Definition
3	Reset
4	Ground

	1	2	
① PWR 〉 Power Button	○	○	Ground
② Reset 〉 Reset Button	○	○	Ground
3.3V	○	○	HDD LED
3.3V Stby	○	○	Power LED
	7	8	
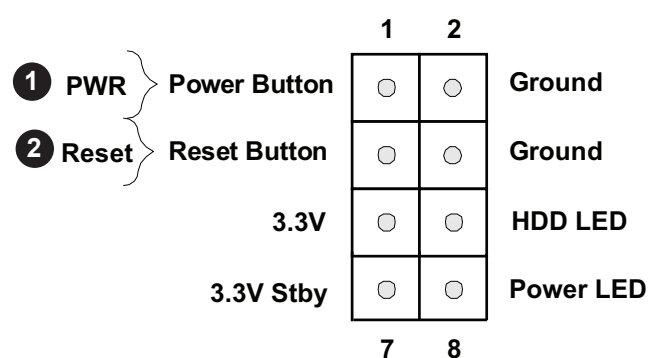
1. PWR Button
2. Reset Button

HDD LED

The HDD LED connection is located on pins 5 and 6 of JF1. Attach a cable here to indicate the status of HDD-related activities, including SATA activities. Refer to the table below for pin definitions.

HDD LED Pin Definitions (JF1)	
Pin#	Definition
5	+3.3V
6	HDD Active LED

Power LED

The Power LED connection is located on pins 7 and 8 of JF1. Refer to the table below for pin definitions.

Power LED Pin Definitions (JF1)	
Pin#	Definition
7	+3.3VSB
8	Power LED Low

	1	2	
PWR } Power Button	○	○	Ground
Reset } Reset Button	○	○	Ground
3.3V	○	○	HDD LED ❶
3.3V Stby	○	○	Power LED ❷
	7	8	
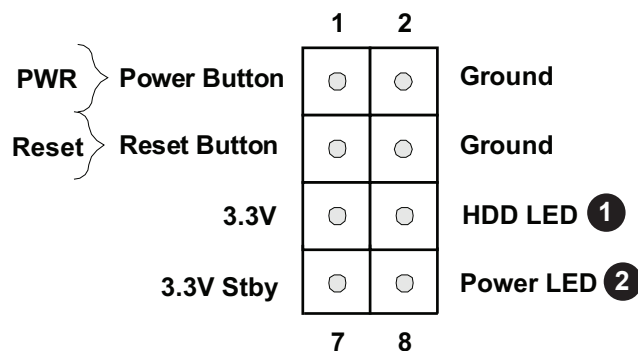
1. Power Fail LED

2. OH/Fan Fail LED

2.7 Connectors

Power Connections

SATA Power Connector

The 4-pin SATA power connector JPH1 provides power to onboard HDD devices. Refer to the table below for pin definitions.

4-pin HDD Power Pin Definitions	
Pin#	Definition
1	12V
2-3	Ground
4	5V

8-Pin Power Connector

JPW1 is an 8-pin 12V DC power input for the CPU that must be connected to the power supply. Refer to the table below for pin definitions.

8-pin Power Pin Definitions	
Pin#	Definition
1 - 4	P12VSB
5 - 8	Ground

Required Connection

1. SATA Power

2. 8-Pin Power

Headers

Fan Headers

There is one fan header with 4-pins on the motherboard. Pins 1-3 are backward compatible with traditional 3-pin fans. The onboard fan speeds are controlled by Thermal Management (via Hardware Monitoring) in the BIOS. When using the Thermal Management setting, please use all 3-pin fans or all 4-pin fans.

Fan Header Pin Definitions	
Pin#	Definition
1	Ground (Black)
2	2.5A/+12V (Red)
3	Tachometer
4	PWM_Control

Speaker

If you wish to use an external speaker, connect a cable to pins 1-4 on the JD1 header. Refer to the table below for pin definitions.

Speaker Connector Pin Definitions	
Pin#	Signal
1	P5V
2	NC
3	NC
4	R_SPKPIN
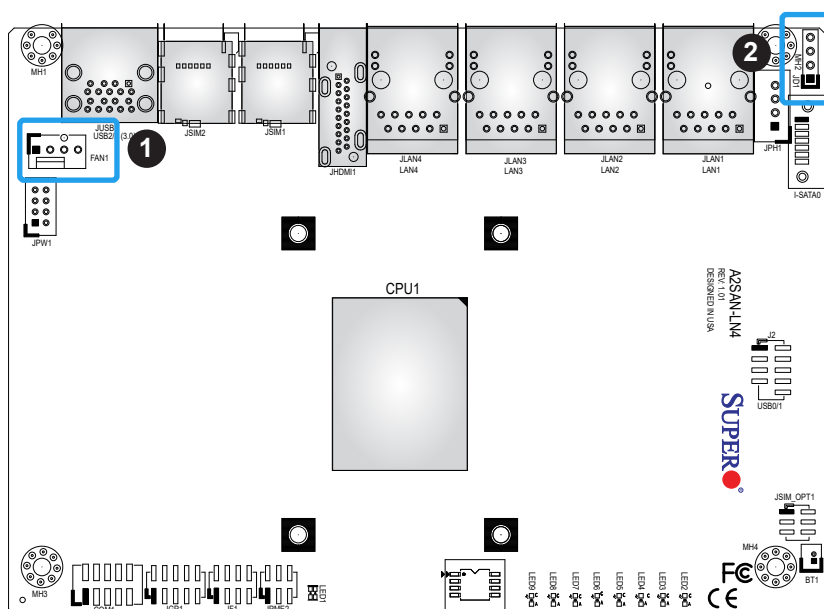
1. FAN1
2. Speaker

General Purpose I/O Header

The JGP1 (General Purpose Input/Output) header is a general purpose I/O expander on a pin header via the SMBus. Each pin can be configured to be an input pin or output pin. The GPIO is controlled by the SIO NCT5523D (pins GP20 - GP27). Refer to the table below for pin definitions.

GPIO Header Pin Definitions			
Pin#	Definition	Pin#	Definition
1	P3V3SB	2	GND
3	GP_P3V3_GP0	4	GP_P3V3_GP4
5	GP_P3V3_GP1	6	GP_P3V3_GP5
7	GP_P3V3_GP2	8	GP_P3V3_GP6
9	GP_P3V3_GP3	10	GP_P3V3_GP7

Bettery Connector

BT1 is a two-pin connector for an external CMOS battery. This connector is also used to clear the CMOS. To clear the CMOS, remove the battery, short pins 1-2 for more than 10 seconds and then install the battery.
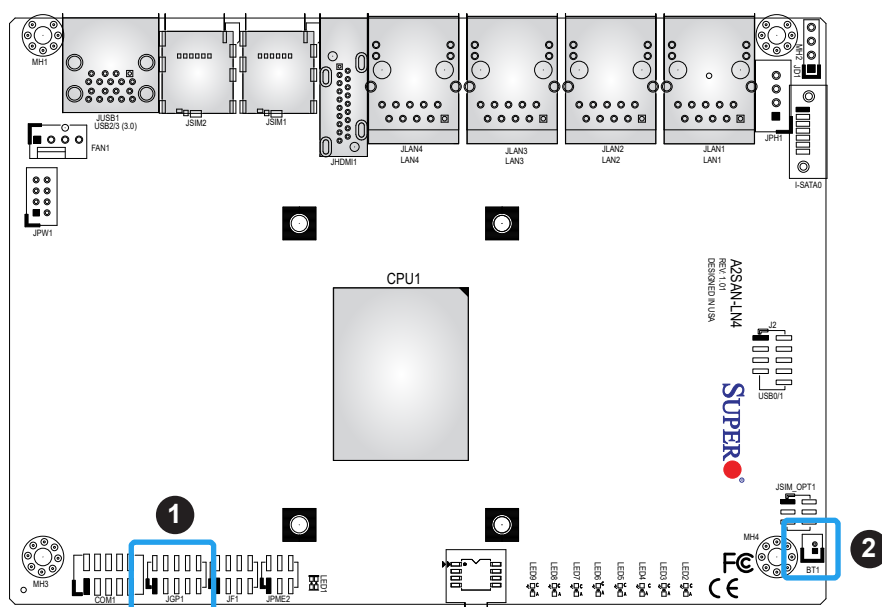
1. General Purpose Header

2. Battery Connector

COM Header

The motherboard has one COM header (COM1) that supports RS-232.

COM Header (COM1)			
Pin Definitions			
Pin#	Description	Pin#	Description
1	DCD	6	DSR
2	RXD	7	RTS
3	TXD	8	CTS
4	DTR	9	RI
5	Ground	10	N/A

SATA Port

The A2SAN-LN4-E/-C motherboard has one I-SATA 3.0 port. SATA ports provide serial-link signal connections, which are faster than the connections of Parallel ATA. Refer to the table below for pin definitions.

SATA 3.0 Port	
Pin Definitions	
Pin#	Signal
1	Ground
2	SATA_TXP
3	SATA_TXN
4	Ground
5	SATA_RXN
6	SATA_RXP
7	Ground

1. COM Header

2. I-SATA0

M.2 Slots

The A2SAN-LN4-E/-C motherboard has four M.2 slots. M.2 was formerly known as Next Generation Form Factor (NGFF). M.2 allows for a variety of card sizes, increased functionality, and spatial efficiency. The M.2 slots at JMD1, JMD2 and JMD3 support B-Key (USB2.0/3.0 with Nano SIM for LTE/3G) modules in a 2242/3042 form factor. JDM1 supports SATA upon request. The M.2 slot at JMD4 supports E-Key (PCIe x1/USB2.0 with WiFi + BT) modules in a 2230 form factor. Refer to pages 43 to 46 for M.2 pin definition tables.

Bottom Layout
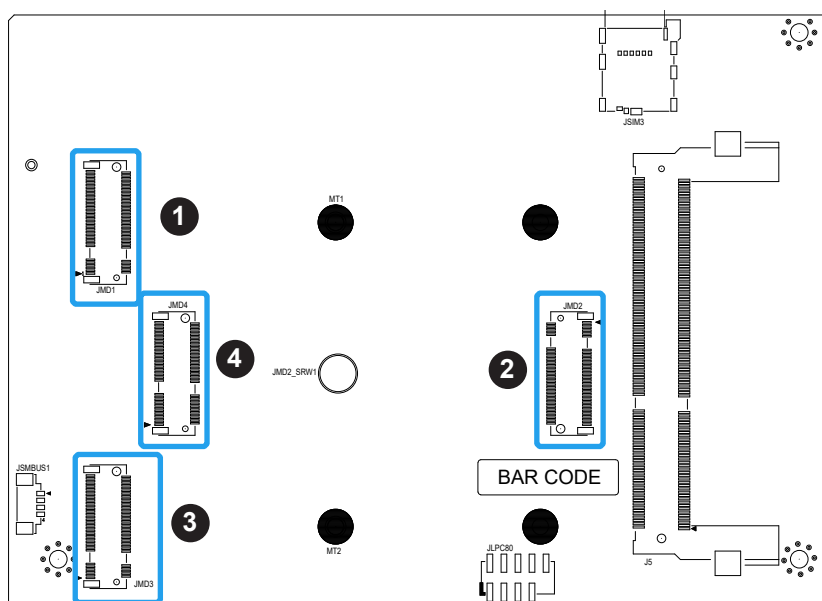
1. JMD1
2. JMD2
3. JMD3
4. JMD4

M.2 Slot Pin Definition for JMD1

M.2 Pin Definition (JMD1)			
Pin#	Definition	Pin#	Definition
1	N/C	2	P3V3SB
3	GND	4	P3V3SB
5	GND	6	FULL_CARD_POWER_OFF#(PU to P1V8SB only)
7	USB_D-	8	W_DISABLE1#(PU to P3V3SB only)
9	USB_D+	10	LED (ACTIVE LOW)
11	GND	12	KEY B
13	KEY B	14	KEY B
15	KEY B	16	KEY B
17	KEY B	18	KEY B
19	KEY B	20	N/C
21	N/C	22	N/C
23	WAKE_ON_WWAN#(PU to P1V8SB only)	24	N/C
25	N/C	26	RF_KILL_GPS#(PU to P1V8SB only)
27	GND	28	N/C
29	USB3.0-Rx-	30	UIM-RESET
31	USB3.0-Rx+	32	UIM-CLK
33	GND	34	UIM-DATA
35	USB3.0-Tx-	36	UIM-PWR
37	USB3.0-Tx+	38	N/C
39	GND	40	SMB_SCL (PU to P1V8SB only)
41	SATA-B+	42	SMB_SDA (PU to P1V8SB only)
43	SATA-B-	44	Alert# (PU to P1V8SB only)
45	GND	46	N/C
47	SATA-A-	48	N/C
49	SATA-A+	50	N/C
51	GND	52	N/C
53	N/C	54	N/C
55	N/C	56	N/C
57	GND	58	N/C
59	N/C	60	N/C
61	N/C	62	N/C
63	N/C	64	N/C
65	N/C	66	SIM_DETECT
67	Reset# (From PCH GPIO)	68	N/C
69	N/C	70	P3V3SB
71	GND	72	P3V3SB
73	GND	74	P3V3SB
75	N/C		

M.2 Slot Pin Definition for JMD2

Pin#	Definition	Pin#	Definition
	M.2 Pin Definition (JMD2)		
1	N/C	2	P3V3SB
3	GND	4	P3V3SB
5	GND	6	FULL_CARD_POWER_OFF#(PU to P1V8SB only)
7	USB_D-	8	W_DISABLE1#(PU to P3V3SB only)
9	USB_D+	10	LED (ACTIVE LOW)
11	GND	12	KEY B
13	KEY B	14	KEY B
15	KEY B	16	KEY B
17	KEY B	18	KEY B
19	KEY B	20	N/C
21	N/C	22	N/C
23	WAKE_ON_WWAN#(PU to P1V8SB only)	24	N/C
25	N/C	26	RF_KILL_GPS#(PU to P1V8SB only)
27	GND	28	N/C
29	USB3.0-Rx-	30	UIM-RESET
31	USB3.0-Rx+	32	UIM-CLK
33	GND	34	UIM-DATA
35	USB3.0-Tx-	36	UIM-PWR
37	USB3.0-Tx+	38	N/C
39	GND	40	SMB_SCL (PU to P1V8SB only)
41	N/C	42	SMB_SDA (PU to P1V8SB only)
43	N/C	44	Alert# (PU to P1V8SB only)
45	GND	46	N/C
47	N/C	48	N/C
49	N/C	50	N/C
51	GND	52	N/C
53	N/C	54	N/C
55	N/C	56	N/C
57	GND	58	N/C
59	N/C	60	N/C
61	N/C	62	N/C
63	N/C	64	N/C
65	N/C	66	SIM_DETECT
67	Reset# (From PCH GPIO)	68	N/C
69	N/C	70	P3V3SB
71	GND	72	P3V3SB
73	GND	74	P3V3SB
75	N/C		

M.2 Slot Pin Definition for JMD3

	M.2 Pin Definition (JMD3)		
Pin#	Definition	Pin#	Definition
1	N/C	2	P3V3SB
3	GND	4	P3V3SB
5	GND	6	FULL_CARD_POWER_OFF#(PU to P1V8SB only)
7	USB_D-	8	W_DISABLE1#(PU to P3V3SB only)
9	USB_D+	10	LED (ACTIVE LOW)
11	GND	12	KEY B
13	KEY B	14	KEY B
15	KEY B	16	KEY B
17	KEY B	18	KEY B
19	KEY B	20	N/C
21	N/C	22	N/C
23	WAKE_ON_WWAN#(PU to P1V8SB only)	24	N/C
25	N/C	26	RF_KILL_GPS#(PU to P1V8SB only)
27	GND	28	N/C
29	USB3.0-Rx-	30	UIM-RESET
31	USB3.0-Rx+	32	UIM-CLK
33	GND	34	UIM-DATA
35	USB3.0-Tx-	36	UIM-PWR
37	USB3.0-Tx+	38	N/C
39	GND	40	SMB_SCL (PU to P1V8SB only)
41	N/C	42	SMB_SDA (PU to P1V8SB only)
43	N/C	44	Alert# (PU to P1V8SB only)
45	GND	46	N/C
47	N/C	48	N/C
49	N/C	50	N/C
51	GND	52	N/C
53	N/C	54	N/C
55	N/C	56	N/C
57	GND	58	N/C
59	N/C	60	N/C
61	N/C	62	N/C
63	N/C	64	N/C
65	N/C	66	SIM_DETECT
67	Reset# (From PCH GPIO)	68	N/C
69	N/C	70	P3V3SB
71	GND	72	P3V3SB
73	GND	74	P3V3SB
75	N/C		

M.2 Slot Pin Definition for JMD4

M.2 Pin Definition (JMD4)			
Pin#	Definition	Pin#	Definition
1	GND	2	P3V3SB
3	USB_D+	4	P3V3SB
5	USB_D-	6	NGFF_WIFI_LED (ACTIVE LOW)
7	GND	8	N/C
9	N/C	10	N/C
11	N/C	12	N/C
13	N/C	14	N/C
15	N/C	16	N/C
17	N/C	18	GND
19	GND	20	NGFF_CONN_UART_WAKE_N (PU to P3V3SB only)
21	N/C	22	N/C
23	N/C	24	KEY E
25	KEY E	26	KEY E
27	KEY E	28	KEY E
29	KEY E	30	KEY E
31	KEY E	32	N/C
33	GND	34	N/C
35	PETp0	36	N/C
37	PETn0	38	N/C
39	GND	40	N/C
41	PERp0	42	N/C
43	PERn0	44	N/C
45	GND	46	N/C
47	REFCLKp0	48	N/C
49	REFCLKn0	50	N/C
51	GND	52	PERST0#
53	N/C	54	NGFF_3P3_KILL_BT_N (PU to P3V3SB only)
55	PEWAKE0#	56	WIFI_DISABLE2#
57	GND	58	N/C
59	N/C	60	N/C
61	N/C	62	N/C
63	GND	64	N/C
65	N/C	66	N/C
67	N/C	68	N/C
69	GND	70	N/C
71	N/C	72	P3V3SB
73	N/C	74	P3V3SB
75	GND		

System Management Bus Header

A System Management Bus header for additional slave devices or sensors is located at JSMBUS1. Refer to the table below for pin definitions.

SMBus Header Pin Definitions	
Pin#	Definition
1	Data
2	Ground
3	Clock
4	NC

Bottom Layout

1. SMBus Header
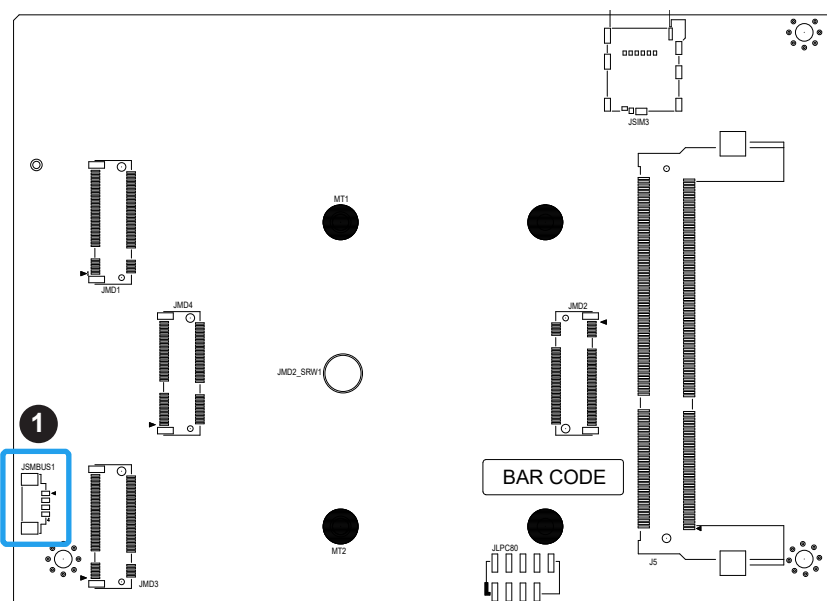
2.8 Jumper Settings

How Jumpers Work

To modify the operation of the motherboard, jumpers can be used to choose between optional settings. Jumpers create shorts between two pins to change the function of the connector. Pin 1 is identified with a square solder pad on the printed circuit board. See the diagram below for an example of jumping pins 1 and 2. Refer to the motherboard layout page for jumper locations.

Note: On two-pin jumpers, "Closed" means the jumper is on and "Open" means the jumper is off the pins.

Connector Pins
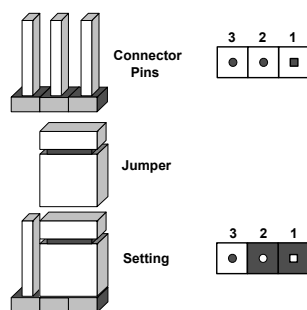
Jumper

Setting

ME Manufacturing Mode and Power Force On

The JPME2 jumper has two functions: Manufacturing Mode and Power Force On. Refer to the table below for the jumper settings for each function. The asterisk represents the default setting.

Manufacturing Mode/Power Force On Jumper Settings	
Jumper Setting	**Definition**
Pins 1-3	Manufacturing Mode
Pins 3-5	Normal*
Pins 2-4	Power Force On*
Pins 4-6	PWR Button Power On

SIM Card Detection

JSIM_OPT1 is the SIM card detection jumper. The default setting is Closed: Low Active. Refer to the table below the set the correct jumper setting for JSIM1, JSIM2, and JSIM3.

SIM Card Detection Jumper Settings	
Jumper Setting	**Definition**
Pins 1-2 (JSIM1)	Open: High Active Closed: Low Active
Pins 3-4 (JSIM2)	
Pins 5-6 (JSIM3)	
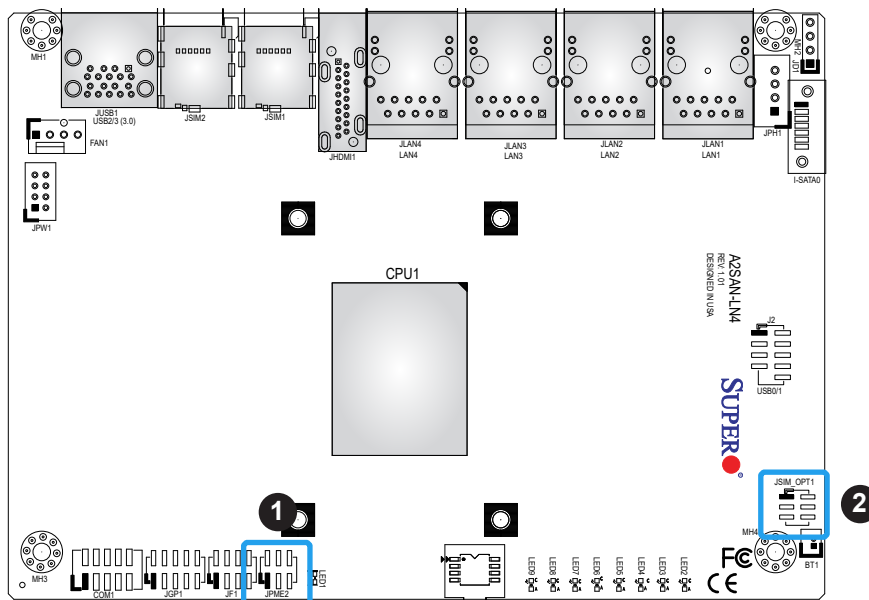
1. Manufacturing Mode
2. SIM Card Detection

2.9 LED Indicators

LAN LEDs

Four LAN ports (LAN 1 and LAN 2) are located on the I/O back panel of the motherboard. Each LAN port has two LEDs. The green LED indicates activity, while the other Link LED may be green, amber, or off to indicate the speed of the connection. Refer to the tables below for more information.

LAN Activity LED (Right)		
LED State		
Color	Status	Definition
Amber	Flashing	Active

LAN Link LED (Left)	
LED State	
LED Color	Definition
Green	100Mbps
Yellow/Amber	1Gbps
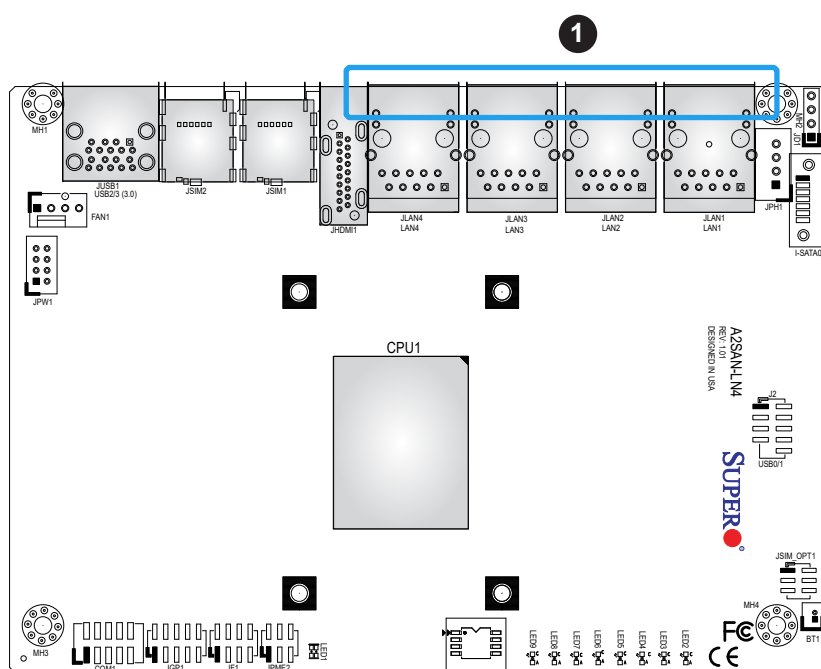
1. LAN LEDs

Power LED

LED1 is the Power GOOD LED. Refer to the table below for LED definitions.

Power Good LED Indicator	
LED Color	**Definition**
Green	All power is good
Red	Issue with power output

M.2 Active LED

LED2, LED3, LED4, and LED5 are the M.2 activity LEDs. The LED activity behavior depends on the module.

M.2 Active LED Indicator	
LED Color	**Definition**
Depends on the Module	M.2 Module Active
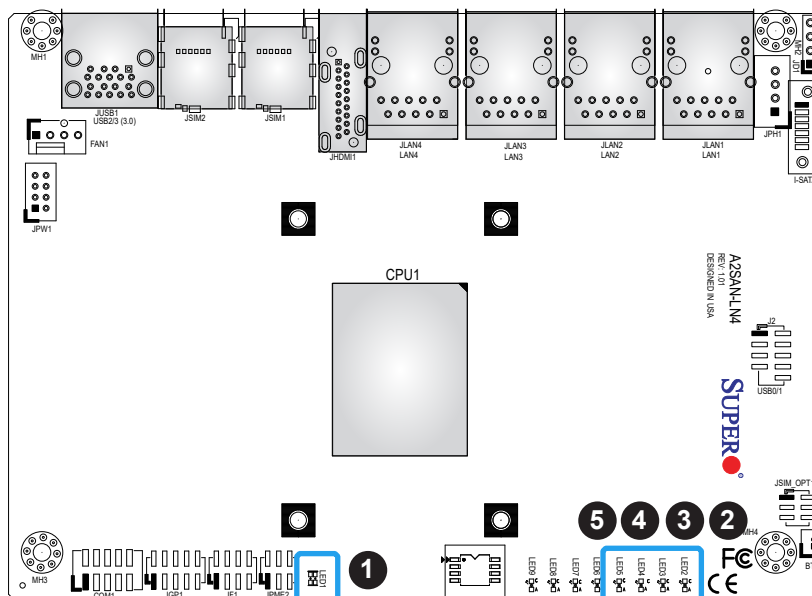
1. Power Good LED
2. LED2
3. LED3
4. LED4
5. LED5

LAN Activity LED

LED6, LED7, LED8, and LED9 are the GbE LAN activity LEDs. When the LED is blinking amber, there is activity in the LAN port(s).

GbE LAN Active LED Indicator	
LED Color	**Definition**
Blinking Amber	LAN Active
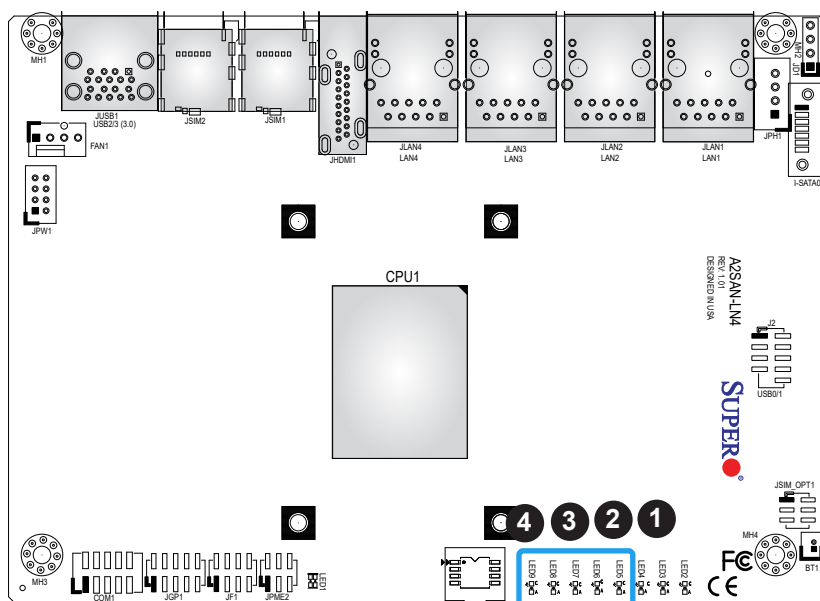
1. LED6
2. LED7
3. LED8
4. LED9

Chapter 3

Troubleshooting

3.1 Troubleshooting Procedures

Use the following procedures to troubleshoot your system. If you have followed all of the procedures below and still need assistance, refer to the 'Technical Support Procedures' and/ or 'Returning Merchandise for Service' section(s) in this chapter. Always disconnect the AC power cord before adding, changing or installing any non hot-swap hardware components.

Before Power On

1. Make sure that there are no short circuits between the motherboard and chassis.

2. Disconnect all ribbon/wire cables from the motherboard, including those for the keyboard and mouse.

3. Remove all add-on cards.

4. Install the CPU (making sure it is fully seated) and connect the front panel connectors to the motherboard.

No Power

1. Make sure that there are no short circuits between the motherboard and the chassis.

2. Make sure that the ATX power connectors are properly connected.

3. Check that the 115V/230V switch, if available, on the power supply is properly set.

4. Turn the power switch on and off to test the system, if applicable.

5. The battery on your motherboard may be old. Check to verify that it still supplies ~3VDC. If it does not, replace it with a new one.

No Video

1. If the power is on, but you have no video, remove all add-on cards and cables.

2. Use the speaker to determine if any beep codes are present. Refer to Appendix A for details on beep codes.

3. Remove all memory modules and turn on the system (if the alarm is on, check the specs of memory modules, reset the memory or try a different one).

System Boot Failure

If the system does not display POST (Power-On-Self-Test) or does not respond after the power is turned on, check the following:

1. Check for any error beeps from an external speaker connected at JD1.

- If there is no error beep, try to turn on the system without DIMM modules installed. If there is still no error beep, replace the motherboard.

- If there are error beeps, clear the CMOS settings by unplugging the power cord and re-move the external CMOS battery at J18, short pins 1-2 for more than 10 seconds, and then install the battery. Refer to page 38 for more information on the external CMOS battery.

2. Remove all components from the motherboard, especially the DIMM modules. Make sure that system power is on and that memory error beeps are activated.

3. Turn on the system with only one DIMM module installed. If the system boots, check for bad DIMM modules or slots by following the Memory Errors Troubleshooting procedure in this chapter.

Memory Errors

When a no-memory beep code is issued by the system, check the following:

1. Make sure that the memory modules are compatible with the system and are properly installed. See Chapter 2 for installation instructions. (For memory compatibility, refer to the "Tested Memory List" link on the motherboard's product page to see a list of supported memory.)

2. Check if different speeds of DIMMs have been installed. It is strongly recommended that you use the same RAM type and speed for all DIMMs in the system.

3. Make sure that you are using DDR3L memory at 1.35V power level.

4. Check for bad DIMM modules or slots by swapping a single module among all memory slots and check the results.

Losing the System's Setup Configuration

1. Make sure that you are using a high-quality power supply. A poor-quality power supply may cause the system to lose the CMOS setup information. Refer to Chapter 2 for details on recommended power supplies.

2. The battery on your motherboard may be old. Check to verify that it still supplies ~3VDC. If it does not, replace it with a new one.

3. If the above steps do not fix the setup configuration problem, contact your vendor for repairs.

When the System Becomes Unstable

A. If the system becomes unstable during or after OS installation, check the following:

1. CPU/BIOS support: Make sure that your CPU is supported and that you have the latest BIOS installed in your system.

2. Memory support: Make sure that the memory modules are supported by testing the modules using memtest86 or a similar utility.

   Note: Click on the "Tested Memory List" link on the motherboard's product page to see a list of supported memory.

3. HDD support: Make sure that all hard disk drives (HDDs) work properly. Replace the bad HDDs with good ones.

4. System cooling: Check the system cooling to make sure that all heatsink fans and CPU/ system fans, etc., work properly. Check the hardware monitoring settings in the IPMI to make sure that the CPU and system temperatures are within the normal range. Also check the front panel Overheat LED and make sure that it is not on.

5. Adequate power supply: Make sure that the power supply provides adequate power to the system. Make sure that all power connectors are connected. Please refer to our website for more information on the minimum power requirements.

6. Proper software support: Make sure that the correct drivers are used.

B. If the system becomes unstable before or during OS installation, check the following:

1. Source of installation: Make sure that the devices used for installation are working properly, including boot devices such as CD/DVD.

2. Cable connection: Check to make sure that all cables are connected and working properly.

3. Using the minimum configuration for troubleshooting: Remove all unnecessary components (starting with add-on cards first), and use the minimum configuration (but with the CPU and a memory module installed) to identify the trouble areas. Refer to the steps listed in Section A above for proper troubleshooting procedures.

4. Identifying bad components by isolating them: If necessary, remove a component in question from the chassis, and test it in isolation to make sure that it works properly. Replace a bad component with a good one.

5. Check and change one component at a time instead of changing several items at the same time. This will help isolate and identify the problem.

6. To find out if a component is good, swap this component with a new one to see if the system will work properly. If so, then the old component is bad. You can also install the component in question in another system. If the new system works, the component is good and the old system has problems.

3.2 Technical Support Procedures

Before contacting Technical Support, please take the following steps. Also, please note that as a motherboard manufacturer, Supermicro also sells motherboards through its channels, so it is best to first check with your distributor or reseller for troubleshooting services. They should know of any possible problems with the specific system configuration that was sold to you.

1. Please go through the Troubleshooting Procedures and Frequently Asked Questions (FAQ) sections in this chapter or see the FAQs on our website (http://www.supermicro.com/FAQ/index.php) before contacting Technical Support.

2. BIOS upgrades can be downloaded from our website (http://www.supermicro.com/ResourceApps/BIOS_IPMI_Intel.html).

3. If you still cannot resolve the problem, include the following information when contacting Supermicro for technical support:

- Motherboard model and PCB revision number

- BIOS release date/version (This can be seen on the initial display when your system first boots up.)

- System configuration

4. An example of a Technical Support form is on our website at http://www.supermicro.com/RmaForm/.

5. Distributors: For immediate assistance, please have your account number ready when placing a call to our Technical Support department. We can be reached by email at support@supermicro.com.

3.3 Frequently Asked Questions

Question: What type of memory does my motherboard support?

Answer: The motherboard supports up to 8GB DDR3L 1866MHz Non-ECC SO-DIMM modules. To enhance memory performance, do not mix memory modules of different speeds and sizes. Please follow all memory installation instructions given on Section 2-4 in Chapter 2.

Question: How do I update my BIOS?

Answer: It is recommended that you do not upgrade your BIOS if you are not experiencing any problems with your system. Updated BIOS files are located on our website at http://www.supermicro.com/ResourceApps/BIOS_IPMI_Intel.html. Please check our BIOS warning message and the information on how to update your BIOS on our website. Select your motherboard model and download the BIOS file to your computer. Also, check the current BIOS revision to make sure that it is newer than your BIOS before downloading. Please unzip the BIOS file onto a bootable USB device. Run the batch file using the format FLASH. BAT filename.rom from your bootable USB device to flash the BIOS. Then, your system will automatically reboot.

Warning: Do not shut down or reset the system while updating the BIOS to prevent possible system boot failure!

Note: The SPI BIOS chip used on this motherboard cannot be removed. Send your motherboard back to our RMA Department at Supermicro for repair. For BIOS Recovery instructions, please refer to the AMI BIOS Recovery Instructions posted at http://www.supermicro.com/support/manuals/.

3.4 Battery Removal and Installation

Battery Removal

To remove the battery, follow the steps below:

1. Power off your system and unplug your power cable.

2. Remove the battery cable at the BT1 connector on the board.

3. Remove the battery.

Proper Battery Disposal

Warning: Please handle used batteries carefully. Do not damage the battery in any way; a damaged battery may release hazardous materials into the environment. Do not discard a used battery in the garbage or a public landfill. Please comply with the regulations set up by your local hazardous waste management agency to dispose of your used battery properly.

Battery Installation

1. Unplug the power cord.

4. Connect the battery cable into the battery connector (BT1) and push it down until you hear a click to ensure that the cable is securely locked.

5. Use the foam tape on the back side of the battery to secure the battery to a flat surface on the bottom of the motherboard or a proper location in the system. DO NOT place the battery on the heatsink.
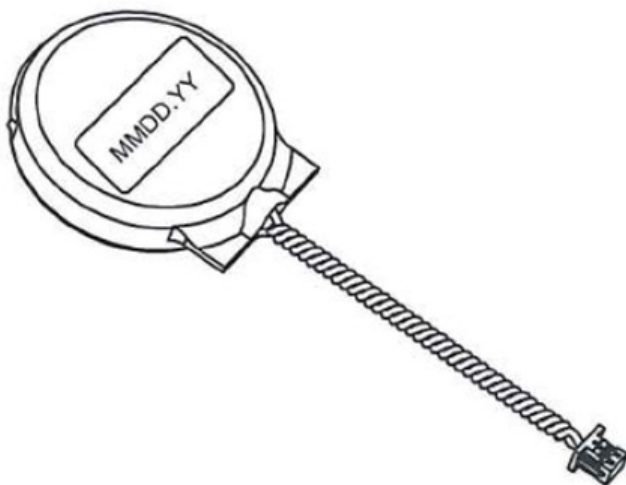
3.5 Returning Merchandise for Service

A receipt or copy of your invoice marked with the date of purchase is required before any warranty service will be rendered. You can obtain service by calling your vendor for a Returned Merchandise Authorization (RMA) number. When returning the motherboard to the manufacturer, the RMA number should be prominently displayed on the outside of the shipping carton, and the shipping package is mailed prepaid or hand-carried. Shipping and handling charges will be applied for all orders that must be mailed when service is complete. For faster service, you can also request a RMA authorization online (http://www.supermicro. com/RmaForm/).

This warranty only covers normal consumer use and does not cover damages incurred in shipping or from failure due to the alternation, misuse, abuse or improper maintenance of products.

During the warranty period, contact your distributor first for any product problems.

Chapter 4

BIOS

4.1 Introduction

This chapter describes the AMIBIOS™ Setup utility for the A2SAN-LN4-C motherboard. The BIOS is stored on a chip and can be easily upgraded using a flash program.

> **Note:** Due to periodic changes to the BIOS, some settings may have been added or deleted and might not yet be recorded in this manual. Please refer to the Manual Download area of our website for any changes to BIOS that may not be reflected in this manual.

Starting the Setup Utility

To enter the BIOS Setup Utility, hit the <Delete> key while the system is booting-up. (In most cases, the <Delete> key is used to invoke the BIOS setup screen. There are a few cases when other keys are used, such as <F1>, <F2>, etc.) Each main BIOS menu option is described in this manual.

The Main BIOS screen has two main frames. The left frame displays all the options that can be configured. "Grayed-out" options cannot be configured. The right frame displays the key legend. Above the key legend is an area reserved for a text message. When an option is selected in the left frame, it is highlighted in white. Often a text message will accompany it. (Note that BIOS has default text messages built in. We retain the option to include, omit, or change any of these text messages.) Settings printed in **Bold** are the default values.

A " ▶" indicates a submenu. Highlighting such an item and pressing the <Enter> key will open the list of settings within that submenu.

The BIOS setup utility uses a key-based navigation system called hot keys. Most of these hot keys (<F1>, <F10>, <Enter>, <ESC>, <Arrow> keys, etc.) can be used at any time during the setup navigation process.

4.2 Main

When you first enter the AMI BIOS setup utility, you will enter the Main setup screen. You can always return to the Main setup screen by selecting the Main tab on the top of the screen. The Main BIOS setup screen is shown below.

```
            Aptio Setup Utility - Copyright (C) 2021 American Megatrends, Inc.
   Main  Advanced  Security  Boot  Save & Exit

                                                        Set the Date. Use Tab to
                                                        switch between Date
                                                        elements.
   System Date                   [Wed 07/21/2021]       Default Ranges:
   System Time                   [06:46:55]             Year: 2005-2099
                                                        Months: 1-12
   Supermicro A2SAN-LN4-C                                Days: dependent on month
   BIOS Version                  1.6
   Build Date                    07/13/2021

   Memory Information
   Total Memory                  4096 MB
   Memory Speed                  1600 MHz

   MRC Version                   0.56.89.27
   TXE FW                        3.1.80.2400
   GOP                           10.0.1035

                                                        →←: Select Screen
                                                        ↑↓: Select Item
                                                        Enter: Select
                                                        +/-: Change Opt.
                                                        F1: General Help
                                                        F2: Previous Values
                                                        F3: Optimized Defaults
                                                        F4: Save & Exit
                                                        ESC: Exit

            Version 2.18.1263. Copyright (C) 2021 American Megatrends, Inc.
```

System Date/System Time

Use this option to change the system date and time. Highlight *System Date* or *System Time* using the arrow keys. Enter new values using the keyboard. Press the <Tab> key or the arrow keys to move between fields. The date must be entered in MM/DD/YYYY format. The time is entered in HH:MM:SS format.

Note: The time is in the 24-hour format. For example, 5:30 P.M. appears as 17:30:00.

Supermicro A2SAN-LN4-C

BIOS Version

Build Date

Memory Information

Total Memory

Memory Speed

MRC Version

TXE FW

GOP

4.3 Advanced

Use this menu to configure Advanced settings.

```
              Aptio Setup Utility - Copyright (C) 2021 American Megatrends, Inc.
        Main  Advanced  Security  Boot  Save & Exit

    ▶ Boot Feature                                         Boot Feature Configuration
    ▶ CPU Configuration                                    Page
    ▶ Chipset Configuration
    ▶ SATA Configuration
    ▶ ACPI Settings
    ▶ Super IO Configuration
    ▶ Hardware Monitor
    ▶ PCIe/PCI/PnP Configuration
    ▶ Intel(R) I211 Gigabit  Network Connection - 3C:EC:EF:87:BE:B0
    ▶ Intel(R) I211 Gigabit  Network Connection - 3C:EC:EF:87:BE:B1
    ▶ Intel(R) I211 Gigabit  Network Connection - 3C:EC:EF:87:BE:B2
    ▶ Intel(R) I211 Gigabit  Network Connection - 3C:EC:EF:87:BE:B3


                                                           ↔: Select Screen
                                                           ↑↓: Select Item
                                                           Enter: Select
                                                           +/-: Change Opt.
                                                           F1: General Help
                                                           F2: Previous Values
                                                           F3: Optimized Defaults
                                                           F4: Save & Exit
                                                           ESC: Exit

              Version 2.18.1263. Copyright (C) 2021 American Megatrends, Inc.
```

Warning: Take caution when changing the Advanced settings. An incorrect value, a very high DRAM frequency, or an incorrect BIOS timing setting may cause the system to malfunction. When this occurs, restore the setting to the manufacture default setting.

▶Boot Feature

Quiet Boot

Use this feature to select the screen to display between POST messages or the OEM logo at bootup. Select Disabled to display the POST messages. Select Enabled to display the OEM logo instead of the normal POST messages. The options are Disabled and **Enabled**.

AddOn ROM Display Mode

This feature sets the display mode for the Option ROM. Select Keep Current to use the current AddOn ROM display setting. Select Force BIOS to use the Option ROM display mode set by the system BIOS. The options are **Force BIOS** and Keep Current.

Bootup NumLock State

This feature selects the power-on state for the Numlock key. The options are Off and **On**.

Wait For "F1" If Error

This feature forces the system to wait until the F1 key is pressed if an error occurs. The options are **Disabled** and Enabled.

INT19 Trap Response

Interrupt 19 is the software interrupt that handles the boot disk function. When this feature is set to Immediate, the ROM BIOS of the host adaptors will "capture" Interrupt 19 at bootup immediately and allow the drives that are attached to these host adaptors to function as bootable disks. If this feature is set to Postponed, the ROM BIOS of the host adaptors will not capture Interrupt 19 immediately and allow the drives attached to these adaptors to function as bootable devices at bootup. The options are **Immediate** and Postponed.

Re-try Boot

If this feature is enabled, the BIOS will automatically reboot the system from a specified boot device after its initial boot failure. The options are **Disabled**, Legacy Boot, and EFI Boot.

Power Configuration

DeepSx Power Policies

Use this feature to configure the Advanced Configuration and Power Interface (ACPI) settings for the system. Enable S5 to power off the whole system except the power supply unit (PSU) and keep the power button alive so that you can wake up the system by using a USB keyboard or mouse. The options are **Disabled** and Enabled.

Watch Dog Function

If this feature is enabled, the Watch Dog timer will allow the system to reboot when it is inactive for more than five minutes. The options are **Disabled** and Enabled.

Power Button Function

This feature controls how the system shuts down when the power button is pressed. Select 4 Seconds Override to power off the system after pressing and holding the power button for 4 seconds or longer. Select Instant Off to instantly power off the system as soon as you press the power button. The options are **Instant Off** and 4 Seconds Override.

Restore on AC Power Loss

Use this feature to set the power state after a power outage. Select Power Off for the system power to remain off after a power loss. Select Power On for the system power to be turned on after a power loss. Select Last State to allow the system to resume its last power state before a power loss. The options are Stay Off, Power on**,** and **Last State**.

*This feature is not available when DeepSX Power Policies is Enabled.

▶CPU Configuration

The following CPU information will display:

- CPU model

- CPU Signature

- Microcode Patch

- Max CPU Speed

- Min CPU Speed

- Processor Cores

- Intel HT Technology

- Intel VT-x Technology

- L1 Data Cache

- L1 Code Cache

- L2 Cache

- L3 Cache

- Speed

- 64-bit

▶CPU Power Management

EIST

Enhanced Intel SpeedStep Technology (EIST) allows the system to automatically adjust processor voltage and core frequency to reduce power consumption and heat dissipation. The options are Disabled and **Enabled.**

Turbo Mode

Select Enabled for processor cores to run faster than the frequency specified by the manufacturer. The options are Disabled and **Enabled**.

*This feature is available when EIST is Enabled.

Boot performance mode

This feature allows you to select the performance state that the BIOS will set before the operating system handoff. The options are **Max Performance** and Max Power Saving.

Power Limit 1 Enable

Use this feature to set the power limit for the CPU. The options are Disabled and **Enabled**.

*This feature is available when EIST is set to Enabled.

Power Limit 1

Power Limit 1 Clamp Mode

Use this feature to set the PL1 clamp bit. The options are Disabled and **Enabled**.

Power Limit 1 Power

Use this feature to configure the value for Power Limit 1. The value is in milli watts and the step size is 125mW. Use the number keys on your keyboard to enter the value. The options are **Auto**, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, and 25.

Power Limit 1 Time Window

Use this feature to indicate the time window over which the TDP value should be maintained. The default value is Auto. The options are **Auto**, 1, 2, 3, 4, 5, 6, 7, 8, 10, 12, 14, 16, 20, 24, 28, 32, 40, 48, 56, 64, 80, 96, 112, and 128.

Active Processor Cores

This feature determines how many CPU cores will be activated for each CPU. When Enabled is selected, all cores in the CPU will be activated. Please refer to Intel's website for more information. The options are **Disabled** and Enabled.

*If Active Processor Cores is set to Enabled, Core 0 - Core 3 will be available for configuration:

Core 0

This feature is set to Enabled.

Core 1 - Core 3

Use this feature to enable or disable the CPU core. The options are Disabled and **Enabled**.

Intel Virtualization Technology

Select Enable to use Intel Virtualization Technology to allow one platform to run multiple operating systems and applications in independent partitions, creating multiple virtual systems in one physical computer. The options are Disabled and **Enabled**.

VT-d

Select Enabled to enable Intel Virtualization Technology support for Direct I/O (VT-d) by reporting the I/O device assignments to VMM through the DMAR ACPI Tables. This feature offers fully-protected I/O resource-sharing across the Intel platforms, providing you with greater reliability, security, and availability in networking and data-sharing. The options are **Disabled** and Enabled.

Monitor Mwait

Select Enabled to enable the Monitor/Mwait instructions. The Monitor instructions monitors a region of memory for writes, and MWait instructions instruct the CPU to stop until the monitored region begins to write. The options are **Disabled** and Enabled.

P-STATE Coordination

This feature allows you to change the P-State (Power-Performance State) coordination type. P-State is also known as "SpeedStep" for Intel processors. Select HW_ALL to change the P-State coordination type for hardware components only. Select SW_ALL to change the P-State coordination type for all software installed in the system. Select SW_ANY to change the P-State coordination type for a software program in the system. The options are **HW_All**, SW_ALL, and SW_ANY.

▶Chipset Configuration

Warning: Setting the wrong values in the following sections may cause the system to malfunction.

▶North Bridge

The following memory information will be displayed:

- Memory Slot 0

▶Graphics Configuration

GOP Configuration

GOP Driver

The Graphics Output Protocol (GOP) driver is a replacement for legacy video BIOS that accesses UEFI protocols. The options are **Enable** and Disable.

IGD Configuration

Integrated Graphics Device

When enabled, the onboard graphics device will be used as the primary video display. The options are Disable and **Enable**.

Primary Display

Use this feature to select the primary video display. The options are **IGD** and PCIe.

RC6 (Render Standby)

Select Enabled to enable render standby support. This is a power saving feature for the onboard display that reduces power consumption. The options are Disable and **Enable**.

GTT Size

Use this feature to set the memory size to be used by the graphics translation table (GTT). The options are 2MB, 4MB, and **8MB**.

Aperture Size

Use this feature to set the Aperture size, which is the size of system memory reserved by the BIOS for graphics device use. The options are 128MB, **256MB,** and 512 MB.

DVMT Pre-Allocated

Dynamic Video Memory Technology (DVMT) allows dynamic allocation of system memory to be used for video devices to ensure best use of available system memory based on the DVMT 5.0 platform. The options are **64M**, 96M, 128M, 160M, 192M, 224M, 256M, 288M, 320M, 352M, 384M, 416M, 448M, 480M, and 512M.

DVMT Total Gfx Mem

Use this feature to set the total memory size to be used by internal graphics devices based on the DVMT 5.0 platform. The options are 128MB, **256MB,** and MAX.

GT PM Support

Use this feature to enable the IGFX Power Management function. The options are **Enable** and Disable.

PAVP Enable

Protected Audio Video Path (PAVP) decodes Intel integrated graphics encrypted video. The options are **Enable** and Disable.

Max TOLUD

This feature sets the maximum TOLUD value, which specifies the "Top of Low Usable DRAM" memory space to be used by internal graphics devices, GTT Stolen Memory, and TSEG, respectively, if these devices are enabled. The options are **2 GB**, 2.25 GB, 2.5 GB, 2.75 GB, and 3 GB.

▶South Bridge

▶PCI Express Configuration

Advanced Erorr Reporting

Select Enabled to enable the ACPI OS to manage PCI Advanced Error Reporting. The options are **Disable** and Enable.

▶Intel I211 Gigabit LAN 1

ASPM

Use this feature to set the Active State Power Management (ASPM) level for a PCIe device. Select Auto for the system BIOS to automatically set the ASPM level based on the system configuration. Select Disabled to disable ASPM support. The options are Disable, L0s, L1, L0sL1, and **Auto**.

PCIe Speed

Use this feature to select the PCI speed for the device installed in the slot. The options are **Auto**, Gen1, and Gen2.

▶Intel I211 Gigabit LAN 2

ASPM

Use this feature to set the Active State Power Management (ASPM) level for a PCIe device. Select Auto for the system BIOS to automatically set the ASPM level based on the system configuration. Select Disabled to disable ASPM support. The options are Disable, L0s, L1, L0sL1, and **Auto**.

PCIe Speed

Use this feature to select the PCI speed for the device installed in the slot. The options are **Auto**, Gen1, and Gen2.

▶M.2 E-Key

ASPM

Use this feature to set the Active State Power Management (ASPM) level for a PCIe device. Select Auto for the system BIOS to automatically set the ASPM level based on the system configuration. Select Disabled to disable ASPM support. The options are Disable, L0s, L1, L0sL1, and **Auto**.

PCIe Speed

Use this feature to select the PCI speed for the device installed in the M.2 slot. The options are **Auto**, Gen1, and Gen2.

▶**Intel I211 Gigabit LAN 3/Intel I211 Gigabit LAN 4**

ASPM

Use this feature to set the Active State Power Management (ASPM) level for a PCIe device. Select Auto for the system BIOS to automatically set the ASPM level based on the system configuration. Select Disabled to disable ASPM support. The options are **Disable**, L0s, L1, L0sL1, and Auto.

PCIe Speed

Use this feature to select the PCI speed for the device installed in the slot. The options are **Auto**, Gen1, and Gen2.

▶**USB Configuration**

USB3.0 Support

Select Enable for USB 3.0 support. The options are **Enable** and Disable.

XHCI Pre-Boot Driver

Select Enabled to enable Extensible Host Controller Interface (XHCI) support on a specified pre-boot drive. The options are Enable and **Disable**.

XHCI Hand-Off

This is a work-around solution for operating systems that do not support Extensible Host Controller Interface (XHCI) hand-off. The XHCI ownership change should be claimed by the XHCI driver. The settings are **Enabled** and Disabled.

USB Rear I/O USB3.0

Select Enabled for rear I/O USB 3.0 support. The options are **Enabled** and Disabled.

USB Mass Storage Driver Support

Select Enabled for USB mass storage device support. The options are Disabled and **Enabled**.

▶**SATA Configuration**

Chipset SATA

Use this feature to enable or disable the onboard SATA controller supported by the SoC. The options are **Enable** and Disable.

Aggressive LPM Support

When this feature is set to Enabled, the SATA AHCI controller manages the power usage of the SATA link. The controller will put the link in a low power mode during extended periods of I/O inactivity, and will return the link to an active state when I/O activity resumes. The options are Disabled and **Enabled**.

SATA Frozen

Use this feature to enable the HDD Security Frozen Mode. The options are **Disabled** and Enabled.

SATA Port 0

Port

Use this feature to enable of disable the specified SATA port. The options are Disabled and **Enabled**.

SATA Port Hot Plug

This feature designates the SATA port specified for hot plugging. Set this feature to Enabled for hot-plugging support, which will allow you to replace a SATA disk drive without shutting down the system. The options are **Enabled** and Disabled.

Spin Up Device

When the value of an edge detect or the value of an image binary (pixel) of a device is from 0 to 1, select Enabled to allow the PCH to start a COMRESET initialization sequence on this device. The options are Enabled and **Disabled**.

SATA Device Type

Use this feature to specify if the specified SATA port should be connected to a Solid State drive or a Hard Disk Drive. The options are **Hard Disk Drive** and Solid State Drive.

SATA Port DevSlp

DEVSLP is a signal that is sent to a SATA disk drive to tell it to enter a very low power state. The options are **Disabled** and Enabled.

▶ACPI Settings

ACPI Sleep State

Use this feature to select which sleep state mode the system will enter when the Suspend button is pressed. The options are Suspend Disabled and **S3 (Suspend to RAM)**.

High Precision Timer

Select Enabled to activate the High Precision Event Timer (HPET) that produces periodic interrupts at a much higher frequency than a Real-time Clock (RTC) does in synchronizing multimedia streams, providing smooth playback, and reducing the dependency on other timestamp calculation devices, such as an x86 RDTSC Instruction embedded in the CPU. The High Precision Event Timer is used to replace the 8254 Programmable Interval Timer. The options are Disabled and **Enabled**.

Headless Support

Enable this feature for the system to function without a keyboard, monitor, or mouse attached. The options are **Disabled** and Enabled.

▶Super IO Configuration

Super IO Chip NCT5523D

▶Serial Port 1 Configuration

Serial Port

Select Enabled to enable the onboard serial port. The options are Disabled and **Enabled**.

Device Settings

This feature displays the base I/O port address and the Interrupt Request address of the specified serial port.

Change Settings

This feature specifies the base I/O port address and the Interrupt Request address of Serial Port 1. Select Auto to allow the BIOS to automatically assign the base I/O and IRQ address to a serial port specified. The options are **Auto**, (IO=3F8h; IRQ=4); (IO=3F8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12); (IO=2F8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12); (IO=3E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12); and (IO=2E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12).

Baud Rate from different PRE-DIVIDER

Use this feature to select the Baud rate frequency. The options are **PRE-DIV: 13, 1.8461M Hz**, PRE-DIV: 12, 2M Hz, PRE-DIV: 1, 24M Hz, and PRE-DIV: 1.625, 14.769M Hz.

▶Hardware Monitor

The following PC Health Status information will be displayed:

- Peripheral temperature

- System temperature

Fan Speed Control Mode

Use this feature to select the fan speed control mode. The options are **Standard,** Heavy I/O, and Full Speed.

- VCORE

- VDIMM

- 3VCC

- 3VSB

- VBAT

- AVSB

▶PCIe/PCI/PnP Configuration

PCI Bus Driver Version A5.01.08

PCI Devices Common Settings:

Above 4G Decoding

Select Enabled for 64-bit devices to be decoded above the 4GB address space, if 64bit PCI decoding is supported by the system. The options are **Disabled** and Enabled.

NVMe Firmware Source

Use this feature to select the NVMe firmware source. The options are V**endor Defined Firmware** and AMI Native Support.

JMD4 M.2-0 OPROM

Use this feature to select which firmware type to be loaded for the add-on card in this slot. The options are Disabled, Legacy, and **EFI**.

Onboard LAN Option ROM

Use this feature to select which firmware type to be loaded for the add-on card in this slot. The options are Disabled, Legacy, and **EFI**.

If Onboard LAN Option ROM Type is set to Lagacy, Onboard LAN1 - LAN4 Option ROM will become available for configuration:

Onboard LAN1 Option ROM

Use this feature to select which LAN1 firmware type to be loaded. The options are **Disabled** and PXE.

Onboard LAN2 Option ROM

Use this feature to select which LAN2 firmware type to be loaded. The options are **Disabled** and PXE.

Onboard LAN3 Option ROM

Use this feature to select which LAN3 firmware type to be loaded. The options are **Disabled** and PXE.

Onboard LAN4 Option ROM

Use this feature to select which LAN4 firmware type to be loaded. The options are **Disabled** and PXE.

Onboard Video Option ROM

Use this feature to select which onboard video firmware type to be loaded. The options are Disabled, Legacy, and **EFI**.

Network Stack

Select Enabled to enable PXE (Preboot Execution Environment) or UEFI (Unified Extensible Firmware Interface) for network stack support. The options are Disabled and **Enabled**.

If Network Stack is Enabled, the following four features will become available for configuration:

Ipv4 PXE Support

Select Enabled to enable Ipv4 PXE (Preboot Execution Environment) for boot support. If this feature is set to Disabled, Ipv4 PXE boot option will not be supported. The options are Disabled and **Enabled**.

Ipv6 PXE Support

Select Enabled to enable Ipv6 PXE (Preboot Execution Environment) for boot support. If this feature is set to Disabled, Ipv6 PXE boot option will not be supported. The options are **Disabled** and Enabled.

PXE boot wait time

Use this option to specify the wait time to press the ESC key to abort the PXE boot. Press "+" or "-" on your keyboard to change the value. The default setting is **0**.

Media detect count

Use this option to specify the number of times media will be checked. Press "+" or "-" on your keyboard to change the value. The default setting is **1**.

▶**Intel® I211 Gigabit Network Connection - 3C:EC:EF:87:BE:B0**
▶**Intel® I211 Gigabit Network Connection - 3C:EC:EF:87:BE:B1**
▶**Intel® I211 Gigabit Network Connection - 3C:EC:EF:87:BE:B2**
▶**Intel® I211 Gigabit Network Connection - 3C:EC:EF:87:BE:B3**

▶**NIC Configuration**

Link Speed

This feature allows you to specify the port speed used for the selected boot protocol. The options are **Auto Negotiated**, 10 Mbps Half, 10 Mbps Full, 100 Mbps Half, and 100 Mbps Full.

Wake On LAN

Select Enabled for Wake On LAN support, which will allow the system to wake up when an onboard device receives an incoming signal. The options are Disabled and **Enabled**.

Blink LEDs

Use this feature to identify the physical network port by blinking the associated LED. Use the keyboard to select a value.

UEFI Driver

This feature displays the UEFI driver version.

Adapter PBA

This feature displays the Processor Bus Adapter (PBA) model number. The PBA number is a nine digit number (i.e., 010B00-000) located near the serial number.

Device Name

This feature displays the adapter device name.

Chip Type

This feature displays the network adapter chipset name.

PCI Device ID

This feature displays the device ID number.

PCI Address

This feature displays the PCI address for this computer. PCI addresses are three two-digit hexadecimal numbers.

Link Status

This feature displays the connection status.

MAC Address

This feature displays the MAC address for this computer. Mac addresses are six two-digit hexadecimal numbers.

4.4 Security

Use this menu to configure Security settings.

```
           Aptio Setup Utility - Copyright (C) 2021 American Megatrends, Inc.
     Main  Advanced  Security  Boot  Save & Exit

  Setup Administrator Password          Not Installed       Setup: Check password while
  User Password                         Not Installed       invoking setup. Always:
                                                            Check password while
  Password Description                                      invoking setup as well as
                                                            on each boot.
  If the Administrator's / User's password is set,
  then this only limits access to Setup and is
  asked for when entering Setup.
  Please set Administrator's password first in order
  to set User's password, if clear Administrator's
  password, the User's password will be cleared as well.

  The password length must be
  in the following range:
  Minimum length                        3
  Maximum length                        20

  Password Check                        [Setup]             →←: Select Screen
  Setup Administrator Password                              ↑↓: Select Item
                                                            Enter: Select
► Secure Boot                                               +/-: Change Opt.
                                                            F1: General Help
                                                            F2: Previous Values
                                                            F3: Optimized Defaults
                                                            F4: Save & Exit
                                                            ESC: Exit

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```

Password Check

Use this feature to determine when a password entry is required. Select Setup to require the password only when entering setup. Select Always to require the password when entering setup and at each bootup. The options are **Setup** and Always.

Setup Administrator Password

Use this feature to set the administrator password, which is required to enter the BIOS setup utility. The length of the password should be from three characters to 20 characters long.

►Secure Boot

Secure Mode

Secure Boot

Vendor Keys

Secure Boot Support

Select Enable for secure boot support to ensure system security at boot up. The options are **Disabled** and Enabled.

Secure Boot Mode

This feature allows you to select the desired secure boot mode for the system. The options are Standard and **Custom**.

*If Secure Boot Mode is set to Custom, Key Management features will be available for configuration.

CSM Support

This feature is for manufacturing debugging purposes only.

▶**Key Management**

This submenu allows you to configure the following Key Management settings.

Provision Factory Default Keys

Select Enabled to install the default Secure Boot keys set by the manufacturer. The options are **Disabled** and Enabled.

*If the feature above is set to Enabled, the next four features are available for configuration:

▶**Restore Factory Keys**

Select Yes to restore all factory keys to the default settings. The options are Yes and No.

▶**Enroll Efi Image**

Use this feature to allow the image to run in Secure Boot mode. Enroll SHA256 Hash certificate of the Image into Authorized Signature Database.

▶**Save All Secure Boot Variables**

This feature allows you to decide if all secure boot variables should be saved.

Secure Boot variable

▶**Platform Key (PK)**

This feature allows you to configure the settings of the platform keys.

Set New Var

Select Yes to set the new platform keys (PK) from the manufacturer's defaults. Select No to set the platform keys from a file. The options are **Yes** and No.

▶**Key Exchange Keys (KEK)**

Set New Var

Select Yes to set the new key exchange keys (KEK) from the manufacturer's defaults. Select No to set the platform keys from a file. The options are **Yes** and No.

Append Key

Select Yes to add the KEK from the manufacturer's defaults list to the existing KEK database. Select No to load the KEK from a file. The options are Yes and No.

▶**Authorized Signatures**

Set New Var

Select Yes to load the db from the manufacturer's defaults. Select No to load the db from a file. The options are Yes and No.

Append Key

Select Yes to add the db from the manufacturer's defaults list to the existing db database. Select No to load the db from a file. The options are Yes and No.

▶**Forbidden Signatures**

Set New Var

Select Yes to load the dbx from the manufacturer's defaults. Select No to load the dbx from a file. The options are Yes and No.

Append Key

Select Yes to add the dbx from the manufacturer's defaults list to the existing dbx database. Select No to load the dbx from a file. The options are Yes and No.

▶**Authorized TimeStamps**

Set New Var

Select Yes to load the dbt from the manufacturer's defaults. Select No to load the dbt from a file. The options are Yes and No.

Append Key

Select Yes to add the dbt from the manufacturer's defaults list to the existing dbt database. Select No to load the dbt from a file. The options are Yes and No.

▶**OsRecovery Signature**

Set New Var

Select Yes to load the dbr from the manufacturer's defaults. Select No to load the dbr from a file. The options are Yes and No.

Append Key

Select Yes to add the dbr from the manufacturer's defaults list to the existing dbr database. Select No to load the dbr from a file. The options are Yes and No.

4.5 Boot

Use this menu to configure Boot settings:

```
          Aptio Setup Utility - Copyright (C) 2021 American Megatrends, Inc.
    Main  Advanced  Security  Boot  Save & Exit

  Boot mode select                    [UEFI]                 Select boot mode LEGACY/UEFI

  FIXED BOOT ORDER Priorities
  Boot Option #1                      [UEFI Hard Disk]
  Boot Option #2                      [UEFI AP:UEFI:Buil...]
  Boot Option #3                      [UEFI CD/DVD]
  Boot Option #4                      [UEFI USB Hard Disk]
  Boot Option #5                      [UEFI USB CD/DVD]
  Boot Option #6                      [UEFI USB Key]
  Boot Option #7                      [UEFI USB Floppy]
  Boot Option #8                      [UEFI USB Lan]
  Boot Option #9                      [UEFI Network:UEFI...]


  ▶ UEFI Application Boot Priorities
  ▶ UEFI NETWORK Drive BBS Priorities

  ▶ Delete Boot Option                                       →←: Select Screen
                                                             ↑↓: Select Item
                                                             Enter: Select
                                                             +/-: Change Opt.
                                                             F1: General Help
                                                             F2: Previous Values
                                                             F3: Optimized Defaults
                                                             F4: Save & Exit
                                                             ESC: Exit

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```

Boot mode select

Use this feature to select the boot mode. The options are LEGACY, **UEFI**, and DUAL.

Fixed Boot Order Priorities

This option prioritizes the order of bootable devices that the system can boot from. Press <Enter> on each entry from top to bottom to select devices.

- Boot Option #1

- Boot Option #2

- Boot Option #3

- Boot Option #4

- Boot Option #5

- Boot Option #6

- Boot Option #7

- Boot Option #8

- Boot Option #9

▶**UEFI Application Boot Priorities**

This feature allows you to specify which UEFI devices are boot devices.

- Boot Option #1

▶**UEFI NETWORK Drive BBS Priorities**

This feature allows you to specify which UEFI network drive devices are boot devices.

- Boot Option #1

- Boot Option #2

▶**Delete Boot Option**

Use this feature to remove a pre-defined boot device from which the system will boot during startup.

The settings are [any pre-defined boot device].

4.6 Save & Exit

Use this menu to save settings and exit the BIOS.

```
           Aptio Setup Utility - Copyright (C) 2021 American Megatrends, Inc.
     Main  Advanced  Security  Boot  Save & Exit

  Save Options                                        Exit system setup without
                                                      saving any changes.
  Discard Changes and Exit
  Save Changes and Reset

  Save Changes
  Discard Changes

  Default Options
  Restore Defaults
  Save as User Defaults
  Restore User Defaults

  Boot Override
  UEFI:Built-in EFI Shell
  UEFI:IP4 Intel(R) I211 Gigabit  Network Connection-3cecef87beb0
  UEFI:IP4 Intel(R) I211 Gigabit  Network Connection-3cecef87beb1
  UEFI:IP4 Intel(R) I211 Gigabit  Network Connection-3cecef87beb2  ↦: Select Screen
  UEFI:IP4 Intel(R) I211 Gigabit  Network Connection-3cecef87beb3  ↑↓: Select Item
                                                      Enter: Select
                                                      +/-: Change Opt.
                                                      F1: General Help
                                                      F2: Previous Values
                                                      F3: Optimized Defaults
                                                      F4: Save & Exit
                                                      ESC: Exit

           Version 2.18.1263. Copyright (C) 2021 American Megatrends, Inc.
```

Save Options

Discard Changes and Exit

Select this option to quit the BIOS Setup without making any permanent changes to the system configuration and reboot the computer. Select Discard Changes and Exit from the Exit menu and press <Enter>.

Save Changes and Reset

When you have completed the system configuration changes, select this option to save all changes made and reset the system.

Save Changes

When you have completed the system configuration changes, select this option to save all changes made. This will not reset (reboot) the system.

Discard Changes

Select this option and press <Enter> to discard all the changes and return to the AMI BIOS Utility Program.

Default Options

Restore Defaults

To set this feature, select Restore Defaults from the Exit menu and press <Enter>. These are factory settings designed for maximum system performance but not for maximum stability.

Save as User Defaults

To set this feature, select Save as User Defaults from the Exit menu and press <Enter>. This enables you to save any changes to the BIOS setup for future use.

Restore User Defaults

To set this feature, select Restore User Defaults from the Exit menu and press <Enter>. Use this feature to retrieve user-defined settings that were saved previously.

Boot Override

This feature allows you to override the Boot Option Priorities sequence in the Boot menu, and immediately boot the system with another device. This is a one-time override.

UEFI: Built-in EFI Shell

UEFI: IP4 Intel® I211 Gigabit Network Connection-3cecef87beb0

UEFI: IP4 Intel® I211 Gigabit Network Connection-3cecef87beb1

UEFI: IP4 Intel® I211 Gigabit Network Connection-3cecef87beb2

UEFI: IP4 Intel® I211 Gigabit Network Connection-3cecef87beb3

Appendix A

BIOS Codes

A.1 BIOS Error POST (Beep) Codes

During the POST (Power-On Self-Test) routines, which are performed each time the system is powered on, errors may occur.

Non-fatal errors are those which, in most cases, allow the system to continue the boot-up process. The error messages normally appear on the screen.

Fatal errors are those which will not allow the system to continue the boot-up procedure. If a fatal error occurs, you should consult with your system manufacturer for possible repairs.

These fatal errors are usually communicated through a series of audible beeps. The table shown below lists some common errors and their corresponding beep codes encountered by users.

BIOS Beep (POST) Codes		
Beep Code	**Error Message**	**Description**
1 beep	Refresh	Circuits have been reset (Ready to power up)
5 short, 1 long	Memory error	No memory detected in system
5 long, 2 short	Display memory read/write error	Video adapter missing or with faulty memory
1 long continuous	System OH	System overheat condition

A.2 Additional BIOS POST Codes

The AMI BIOS supplies additional checkpoint codes, which are documented online at http://www.supermicro.com/support/manuals/ ("AMI BIOS POST Codes User's Guide").

When BIOS performs the Power On Self Test, it writes checkpoint codes to I/O port 0080h. If the computer cannot complete the boot process, a diagnostic card can be attached to the computer to read I/O port 0080h (Supermicro p/n AOC-LPC80-20).

For information on AMI updates, please refer to http://www.ami.com/products/.

Appendix B

Software Installation

B.1 Installing Software Programs

The Supermicro website that contains drivers and utilities for your system is at https://www.supermicro.com/wftp/driver. Some of these must be installed, such as the chipset driver.

After accessing the website, go into the CDR_Images (in the parent directory of the above link) and locate the ISO file for your motherboard. Download this file to create a DVD of the drivers and utilities it contains. (You may also use a utility to extract the ISO file if preferred.)

After creating a CD/DVD with the ISO files, insert the disk into the CD/DVD drive on your system and the display shown in Figure B-1 should appear.

Another option is to go to the Supermicro website at http://www.supermicro.com/products/. Find the product page for your motherboard here, where you may download individual drivers and utilities to your hard drive or a USB flash drive and install from there.

Note: To install the Windows OS, please refer to the instructions posted on our website at http://www.supermicro.com/support/manuals/.

Figure B-1. Driver/Tool Installation Display Screen

Click the icons showing a hand writing on the paper to view the readme files for each item. Click a computer icon to the right of an item to install an item (from top to bottom) one at a time. After installing each item, you must reboot the system before proceeding with the next item on the list. The bottom icon with a CD on it allows you to view the entire contents of the CD.
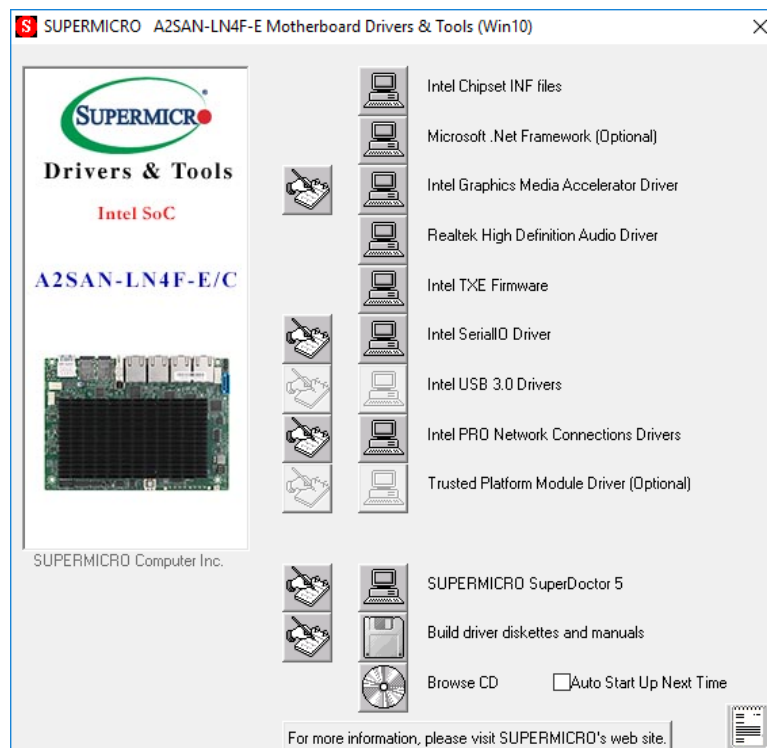
When making a storage driver disk by booting into a driver CD, please set the SATA Configuration to "Compatible Mode" and configure SATA as IDE in the BIOS Setup. After making the driver disk, be sure to change the SATA settings back to your original settings.

B.2 SuperDoctor® 5

The Supermicro SuperDoctor 5 is a hardware monitoring program that functions in a command-line or web-based interface in Windows and Linux operating systems. The program monitors system health information such as CPU temperature, system voltages, system power consumption, fan speed, and provides alerts via email or Simple Network Management Protocol (SNMP).

SuperDoctor 5 comes in local and remote management versions and can be used with Nagios to maximize your system monitoring needs. With SuperDoctor 5 Management Server (SSM Server), you can remotely control power on/off and reset chassis intrusion for multiple systems with SuperDoctor 5 or IPMI. SD5 Management Server monitors HTTP, FTP, and SMTP services to optimize the efficiency of your operation.

Note: The default Username and Password for SuperDoctor 5 is admin / admin.

Figure B-2. SuperDoctor 5 Interface Display Screen (Health Information)

Note: The SuperDoctor 5 program and user's manual can be downloaded from the Supermicro website at http://www.supermicro.com/products/nfo/sms_sd5.cfm.

Appendix C

Standardized Warning Statements

The following statements are industry standard warnings, provided to warn the user of situations which have the potential for bodily injury. Should you have questions or experience difficulty, contact Supermicro's Technical Support department for assistance. Only certified technicians should attempt to install or configure components.

Read this section in its entirety before installing or configuring components.

These warnings may also be found on our website at http://www.supermicro.com/about/policies/safety_information.cfm.

Battery Handling

Warning! There is the danger of explosion if the battery is replaced incorrectly. Replace the battery only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions

電池の取り扱い

電池交換が正しく行われなかった場合、破裂の危険性があります。交換する電池はメーカーが推奨する型、または同等のものを使用下さい。使用済電池は製造元の指示に従って処分して下さい。

警告

电池更换不当会有爆炸危险。请只使用同类电池或制造商推荐的功能相当的电池更换原有电池。请按制造商的说明处理废旧电池。

警告

電池更換不當會有爆炸危險。請使用製造商建議之相同或功能相當的電池更換原有電池。請按照製造商的說明指示處理廢棄舊電池。

Warnung

Bei Einsetzen einer falschen Batterie besteht Explosionsgefahr. Ersetzen Sie die Batterie nur durch den gleichen oder vom Hersteller empfohlenen Batterietyp. Entsorgen Sie die benutzten Batterien nach den Anweisungen des Herstellers.

Attention

Danger d'explosion si la pile n'est pas remplacée correctement. Ne la remplacer que par une pile de type semblable ou équivalent, recommandée par le fabricant. Jeter les piles usagées conformément aux instructions du fabricant.

¡Advertencia!

Existe peligro de explosión si la batería se reemplaza de manera incorrecta. Reemplazar la batería exclusivamente con el mismo tipo o el equivalente recomendado por el fabricante. Desechar las baterías gastadas según las instrucciones del fabricante.

אזהרה!

קיימת סכנת פיצוץ של הסוללה במידה והוחלפה בדרך לא תקינה. יש להחליף

את הסוללה בסוג התואם מחברת יצרן מומלצת.

סילוק הסוללות המשומשות יש לבצע לפי הוראות היצרן.

هناك خطر من انفجار في حالة اسحبذال البطارية بطريقة غير صحيحة فعليل

اسحبذال البطارية

فقط بنفس النع أو ما يعادلها مما أوصث به الشرمة المصنعة

جخلص من البطاريات المسحعملة وفقا لحعليمات الشرمة الصانعة

경고!

배터리가 올바르게 교체되지 않으면 폭발의 위험이 있습니다. 기존 배터리와 동일하거나 제조사에서 권장하는 동등한 종류의 배터리로만 교체해야 합니다. 제조사의 안내에 따라 사용된 배터리를 처리하여 주십시오.

Waarschuwing

Er is ontploffingsgevaar indien de batterij verkeerd vervangen wordt. Vervang de batterij slechts met hetzelfde of een equivalent type die door de fabrikant aanbevolen wordt. Gebruikte batterijen dienen overeenkomstig fabrieksvoorschriften afgevoerd te worden.

Product Disposal

 Warning! Ultimate disposal of this product should be handled according to all national laws and regulations.

製品の廃棄

この製品を廃棄処分する場合、国の関係する全ての法律・条例に従い処理する必要があります。

警告

本产品的废弃处理应根据所有国家的法律和规章进行。

警告

本產品的廢棄處理應根據所有國家的法律和規章進行。

Warnung

Die Entsorgung dieses Produkts sollte gemäß allen Bestimmungen und Gesetzen des Landes erfolgen.

¡Advertencia!

Al deshacerse por completo de este producto debe seguir todas las leyes y reglamentos nacionales.

Attention

La mise au rebut ou le recyclage de ce produit sont généralement soumis à des lois et/ou directives de respect de l'environnement. Renseignez-vous auprès de l'organisme compétent.

סילוק המוצר

אזהרה!

סילוק סופי של מוצר זה חייב להיות בהתאם להנחיות וחוקי המדינה.

عند التخلص النهائي من هذا المنتج ينبغي التعامل معه وفقا لجميع القانين واللائح البطنية

경고!

이 제품은 해당 국가의 관련 법규 및 규정에 따라 폐기되어야 합니다.

Waarschuwing

De uiteindelijke verwijdering van dit product dient te geschieden in overeenstemming met alle nationale wetten en reglementen.

Appendix D

UEFI BIOS Recovery

Warning: Do not upgrade the BIOS unless your system has a BIOS-related issue. Flashing the wrong BIOS can cause irreparable damage to the system. In no event shall Supermicro be liable for direct, indirect, special, incidental, or consequential damages arising from a BIOS update. If you need to update the BIOS, do not shut down or reset the system while the BIOS is updating to avoid possible boot failure.

D.1 Overview

The Unified Extensible Firmware Interface (UEFI) provides a software-based interface between the operating system and the platform firmware in the pre-boot environment. The UEFI specification supports an architecture-independent mechanism that will allow the UEFI OS loader stored in an add-on card to boot the system. The UEFI offers clean, hands-off management to a computer during system boot.

D.2 Recovering the UEFI BIOS Image

A UEFI BIOS flash chip consists of a recovery BIOS block and a main BIOS block (a main BIOS image). The recovery block contains critical BIOS codes, including memory detection and recovery codes for the user to flash a healthy BIOS image if the original main BIOS image is corrupted. When the system power is first turned on, the boot block codes execute first. Once this process is completed, the main BIOS code will continue with system initialization and the remaining POST (Power-On Self-Test) routines.

Note 1: Follow the BIOS recovery instructions below for BIOS recovery when the main BIOS block crashes.

Note 2: When the BIOS recovery block crashes, you will need to follow the procedures to make a Returned Merchandise Authorization (RMA) request. (For a RMA request, please see section 3.5 for more information). Also, you may use the Supermicro Update Manager (SUM) Out-of-Band (OOB) (https://www.supermicro.com.tw/products/nfo/SMS_SUM.cfm) to reflash the BIOS.

D.3 Recovering the BIOS Block with a USB Device

This feature allows the user to recover the main BIOS image using a USB-attached device without additional utilities used. A USB flash device such as a USB Flash Drive, or a USB CD/DVD ROM/RW device can be used for this purpose. However, a USB Hard Disk drive cannot be used for BIOS recovery at this time.

The file system supported by the recovery block is FAT (including FAT12, FAT16, and FAT32), which is installed on a bootable or non-bootable USB-attached device. However, the BIOS might need several minutes to locate the SUPER.ROM file if the media size becomes too large due to the huge volumes of folders and files stored in the device.

To perform UEFI BIOS recovery using a USB-attached device, follow the instructions below:

1. Using a different machine, copy the "Super.ROM" binary image file into the disc Root "\" directory of a USB device or a writable CD/DVD.

   Note 1: If you cannot locate the "Super.ROM" file in your driver disk, visit our website at www.supermicro.com to download the BIOS package. Extract the BIOS binary image into a USB flash device and rename it "Super.ROM" for the BIOS recovery use.

   Note 2: Before recovering the main BIOS image, confirm that the "Super.ROM" binary image file you download is the same version or a close version meant for your motherboard.

2. Insert the USB device that contains the new BIOS image ("Super.ROM") into your USB port and reset the system until the following screen appears:

3. After locating the new BIOS binary image, the system will enter the BIOS Recovery menu as shown below:

```
                    Aptio Setup Utility – Copyright (C) 2017 American Megatrends, Inc.
        Main  Advanced  Event Logs  IPMI  Recovery  Security  Boot  Save & Exit

    Please select blocks you want to update            Set this option to reset
    Reset NVRAM                          [Enabled]      NVRAM to default values
    Boot Block Update                    [Enabled]

    ▶ Proceed with flash update




                                                       →←: Select Screen
                                                       ↑↓: Select Item
                                                       Enter: Select
                                                       +/-: Change Opt.
                                                       F1: General Help
                                                       F2: Previous Values
                                                       F3: Optimized Defaults
                                                       F4: Save & Exit
                                                       ESC: Exit

                    Version 2.19.1266. Copyright (C) 2017 American Megatrends, Inc.
```

> ✎ **Note**: At this point, you may decide if you want to start the BIOS recovery. If you decide to proceed with BIOS recovery, follow the procedures below.

4. When the screen as shown above displays, use the arrow keys to select the item "Proceed with flash update" and press the <Enter> key. You will see the BIOS recovery progress as shown in the screen below:

> ✎ **Note:** *Do not interrupt the BIOS flashing process until it has completed*.

```
                    Aptio Setup Utility – Copyright (C) 2017 American Megatrends, Inc.
                                       Recovery

    WARNING! System firmware is being updated.
    Keyboard is locked.
    DO NOT TURN THE POWER OFF !!!
    Once firmware update is completed
    press any key to reboot the system



                        ┌──────── Program new data ────────┐
                        │                                   │
                        │        Write new boot block...    │
                        │                                   │
                        │─────────────17%──────────────     │
                        │ ████                              │
                        └───────────────────────────────────┘
                                                       →←: Select Screen
                                                       ↑↓: Select Item
                                                       Enter: Select
                                                       +/-: Change Opt.
                                                       F1: General Help
                                                       F2: Previous Values
                                                       F3: Optimized Defaults
                                                       F4: Save & Exit
                                                       ESC: Exit

                    Version 2.19.1266. Copyright (C) 2017 American Megatrends, Inc.
```
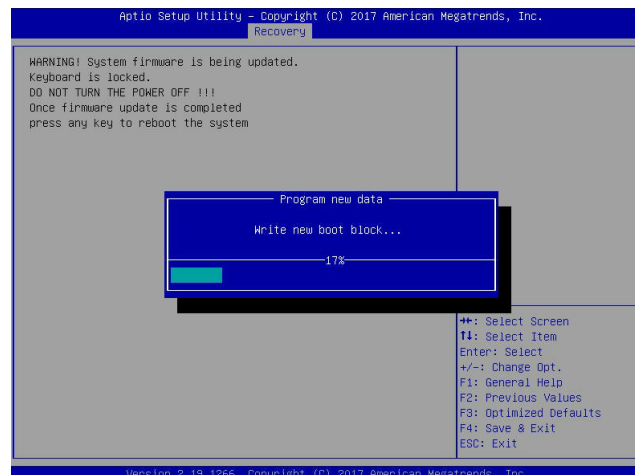
5. After the BIOS recovery process is completed, press any key to reboot the system.

6. Using a different system, extract the BIOS package into a USB flash drive.
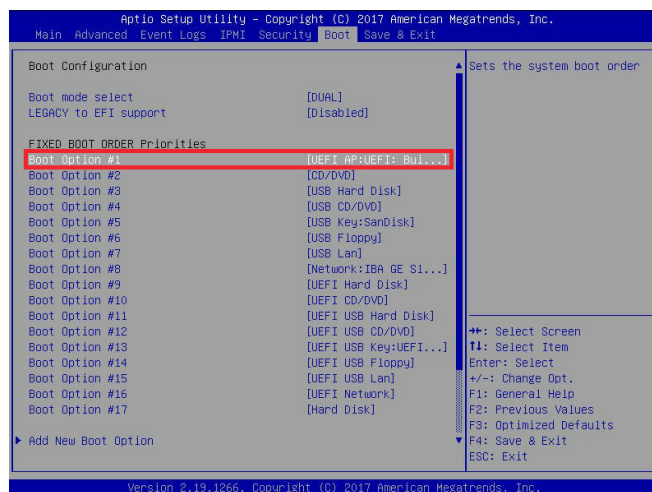
```
Aptio Setup Utility – Copyright (C) 2017 American Megatrends, Inc.
                              Recovery

WARNING! System firmware is being updated.
Keyboard is locked.
DO NOT TURN THE POWER OFF !!!
Once firmware update is completed
press any key to reboot the system




            ┌──────────── Flash update ────────────┐
            │                                      │
            │  Flash update completed. Press any key to │
            │           reset the system           │
            │                                      │
            └──────────────────────────────────────┘



                                    →←: Select Screen
                                    ↑↓: Select Item
                                    Enter: Select
                                    +/-: Change Opt.
                                    F1: General Help
                                    F2: Previous Values
                                    F3: Optimized Defaults
                                    F4: Save & Exit
                                    ESC: Exit

          Version 2.19.1266. Copyright (C) 2017 American Megatrends, Inc.
```

7. Press <Del> during system boot to enter the BIOS Setup utility. From the top of the tool bar, select Boot to enter the submenu. From the submenu list, select Boot Option #1 as shown below. Then, set Boot Option #1 to [UEFI AP:UEFI: Built-in EFI Shell]. Press <F4> to save the settings and exit the BIOS Setup utility.

8. When the UEFI Shell prompt appears, type fs# to change the device directory path. Go to the directory that contains the BIOS package you extracted earlier from Step 6. Enter flash.nsh BIOSname.### at the prompt to start the BIOS update process.

   Note: *Do not interrupt this process* until the BIOS flashing is complete.

```
Aptio Setup Utility – Copyright (C) 2017 American Megatrends, Inc.
  Main  Advanced  Event Logs  IPMI  Security  Boot  Save & Exit

Boot Configuration                              Sets the system boot order

Boot mode select               [DUAL]
LEGACY to EFI support          [Disabled]

FIXED BOOT ORDER Priorities
Boot Option #1                 [UEFI AP:UEFI: Bui...]
Boot Option #2                 [CD/DVD]
Boot Option #3                 [USB Hard Disk]
Boot Option #4                 [USB CD/DVD]
Boot Option #5                 [USB Key:SanDisk]
Boot Option #6                 [USB Floppy]
Boot Option #7                 [USB Lan]
Boot Option #8                 [Network:IBA GE S1...]
Boot Option #9                 [UEFI Hard Disk]
Boot Option #10                [UEFI CD/DVD]
Boot Option #11                [UEFI USB Hard Disk]
Boot Option #12                [UEFI USB CD/DVD]        →←: Select Screen
Boot Option #13                [UEFI USB Key:UEFI...]   ↑↓: Select Item
Boot Option #14                [UEFI USB Floppy]        Enter: Select
Boot Option #15                [UEFI USB Lan]           +/-: Change Opt.
Boot Option #16                [UEFI Network]           F1: General Help
Boot Option #17                [Hard Disk]              F2: Previous Values
                                                        F3: Optimized Defaults
► Add New Boot Option                                   F4: Save & Exit
                                                        ESC: Exit

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```

9. The screen above indicates that the BIOS update process is complete. When you see the screen above, unplug the AC power cable from the power supply, clear CMOS, and plug the AC power cable in the power supply again to power on the system.

10. Press <Del> to enter the BIOS Setup utility.

11. Press <F3> to load the default settings.

12. After loading the default settings, press <F4> to save the settings and exit the BIOS Setup utility.