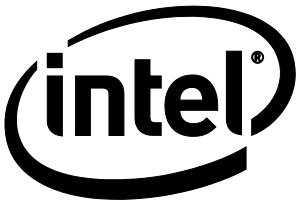

Intel® NUC Board NUC5i5MYBE

Technical Product Specification

June 2015

Order Number: H67541-004

Intel® NUC Board NUC5i5MYBE may contain design defects or errors known as errata that may cause the product to deviate from published specifications. Current characterized errata, if any, are documented in Intel NUC Board NUC5i5MYBE Specification Update.

Revision History

Revision	Revision History	Date
001	First release of the Intel NUC Board NUC5i5MYBE Technical Product Specification	January 2015
002	Specification Clarification and Specification Change	February 2015
003	Specification Clarification	May 2015
004	Specification Clarification	June 2015

Disclaimer

This product specification applies to only the standard Intel NUC Board with BIOS identifier MYHSWi5v.86A.

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Board Identification Information

Basic Intel® NUC Board NUC5i5MYBE Identification Information

AA Revision	BIOS Revision	Notes
H47797-202	MYBDWi5v.86A.0012	1,2

Notes:

1. The AA number is found on a small label on the component side of the board.
2. The Intel® Core™ i5-5300U processor is used on this AA revision consisting of the following component:

Device	Stepping	S-Spec Numbers
Intel Core i5-5300U	F0	SR23X

Specification Changes or Clarifications

The table below indicates the Specification Changes or Specification Clarifications that apply to the Intel NUC Board NUC5i5MYBE.

Specification Changes or Clarifications

Date	Type of Change	Description of Changes or Clarifications
February 2015	Spec Change	• Updated Figure 5 to show correct pin numbering for the Backlight Inverter Voltage Selection header. • Updated Figure 20 and added a Note to address the MEBX_Reset header non-conductive protective cap. • Added additional information regarding the Low Speed Custom Solutions Header.
May 2015	Spec Clarification	• Updated the Note under Table 22 to clarify the connector used. • Removed GPIO70 from Table 27 Pin 6 NFC connector. • Updated the 3rd Warning in Section 2.7 to correct the cross-reference from Section 2.8 to Section 2.9.
June 2015	Spec Clarification	• Updates made to the Note under Table 19, the Note under Table 22, and Section 2.2.4.7.

Errata

Current characterized errata, if any, are documented in a separate Specification Update. See http://www.intel.com/content/www/us/en/nuc/overview.html for the latest documentation.

Preface

This Technical Product Specification (TPS) specifies the board layout, components, connectors, power and environmental requirements, and the BIOS for Intel® NUC Board NUC5i5MYBE.

Intended Audience

The TPS is intended to provide detailed, technical information about Intel NUC Board NUC5i5MYBE and its components to the vendors, system integrators, and other engineers and technicians who need this level of information. It is specifically *not* intended for general audiences.

What This Document Contains

Chapter	Description
1	A description of the hardware used on Intel NUC Board NUC5i5MYBE
2	A map of the resources of the Intel NUC Board
3	The features supported by the BIOS Setup program
4	A description of the BIOS error messages, beep codes, and POST codes
5	Regulatory compliance and battery disposal information

Typographical Conventions

This section contains information about the conventions used in this specification. Not all of these symbols and abbreviations appear in all specifications of this type.

Notes, Cautions, and Warnings

NOTE

Notes call attention to important information.

CAUTION

Cautions are included to help you avoid damaging hardware or losing data.

Other Common Notation

#	Used after a signal name to identify an active-low signal (such as USBP0#)
GB	Gigabyte (1,073,741,824 bytes)
GB/s	Gigabytes per second
Gb/s	Gigabits per second
KB	Kilobyte (1024 bytes)
Kb	Kilobit (1024 bits)
kb/s	1000 bits per second
MB	Megabyte (1,048,576 bytes)
MB/s	Megabytes per second
Mb	Megabit (1,048,576 bits)
Mb/s	Megabits per second
TDP	Thermal Design Power
xxh	An address or data value ending with a lowercase h indicates a hexadecimal value.
x.x V	Volts. Voltages are DC unless otherwise specified.
*	This symbol is used to indicate third-party brands and names that are the property of their respective owners.

Contents

4 Error Messages and Blink Codes

5 Regulatory Compliance and Battery Disposal Information

Figures

Tables

1 Product Description

1.1 Overview

1.1.1 Feature Summary

Table 1 summarizes the major features of Intel® NUC Board NUC5i5MYBE.

Table 1. Feature Summary

Form Factor	4.0 inches by 4.0 inches (101.60 millimeters by 101.60 millimeters)
Processor	• Intel® NUC Board NUC5i5MYBE has a soldered-down 5th generation Intel® Core™ i5-5300U dual-core processor with up to 15 W TDP — Integrated graphics — Integrated memory controller — Integrated PCH
Memory	• Two 204-pin DDR3L SDRAM Small Outline Dual Inline Memory Module (SO-DIMM) sockets • Support for DDR3L 1600/1333 MHz SO-DIMMs • Support for 2 Gb and 4 Gb memory technology • Support for up to 16 GB of system memory with two SO-DIMMs using 4 Gb memory technology • Support for non-ECC memory • Support for 1.35 V low voltage JEDEC memory only
Graphics	• Integrated graphics support for processors with Intel® Graphics Technology: • Two Mini DisplayPort* back panel connectors • Flat panel displays via the internal Embedded DisplayPort* (eDP) connector
Audio	• Intel® High Definition (Intel® HD) Audio via the Mini DisplayPort 1.2 interfaces through the processor • Realtek HD Audio via a stereo microphone/headphone 3.5 mm jack on the front panel
Storage	• SATA ports: — One SATA 6.0 Gb/s port (blue) — One SATA 6.0 Gb/s port is reserved for an M.2 2280 Module • Note: Intel® NUC Board NUC5i5MYBE supports key type B (PCI Express x1/x2/SATA)
Peripheral Interfaces	• USB 3.0 ports: — Two ports are implemented with external front panel connectors (blue) — Two ports are implemented with external back panel connectors (blue) • USB 2.0 ports: — Two ports via one dual-port internal 1x8 1.25 mm pitch header (white) — One port is reserved for an M.2 2280 Module — One port is reserved for an M.2 2230 Module

continued

Table 1. Feature Summary (continued)

Expansion Capabilities	• One M.2 Module supporting M.2 2242 and M.2 2280 cards (key type B) • One M.2 Module supporting M.2 2230 cards (key type E)
BIOS	• Intel® BIOS resident in the Serial Peripheral Interface (SPI) Flash device • Support for Advanced Configuration and Power Interface (ACPI), Plug and Play, and System Management BIOS (SMBIOS)
Instantly Available PC Technology	• Support for PCI Express* • Suspend to RAM support • Wake on PCI Express, LAN, front panel, and USB ports
LAN Support	Gigabit (10/100/1000 Mb/s) LAN subsystem using the Intel® I218LM Gigabit Ethernet Controller
Hardware Monitor Subsystem	Hardware monitoring subsystem, based on a Nuvoton NCT5577D embedded controller, including: • Voltage sense to detect out of range power supply voltages • Thermal sense to detect out of range thermal values • One processor fan header • Fan sense input used to monitor fan activity • Fan speed control
Intel® vPro™ Technologies	• Intel® Active Management Technology (Intel® AMT) 10.0 • Intel® Virtualization (Intel® VT) • Intel® Virtualization for Directed I/O (Intel® VT-d) • Intel® Trusted Execution Technology (Intel® TXT) • Intel® Identity Protection Technology (Intel® IPT) • Trusted Platform Module (TPM) • Intel® Small Business Technology (Intel® SBT)

1.1.2 Board Layout (Top)

Figure 1 shows the location of the major components on the top-side of Intel NUC Board NUC5i5MYBE.

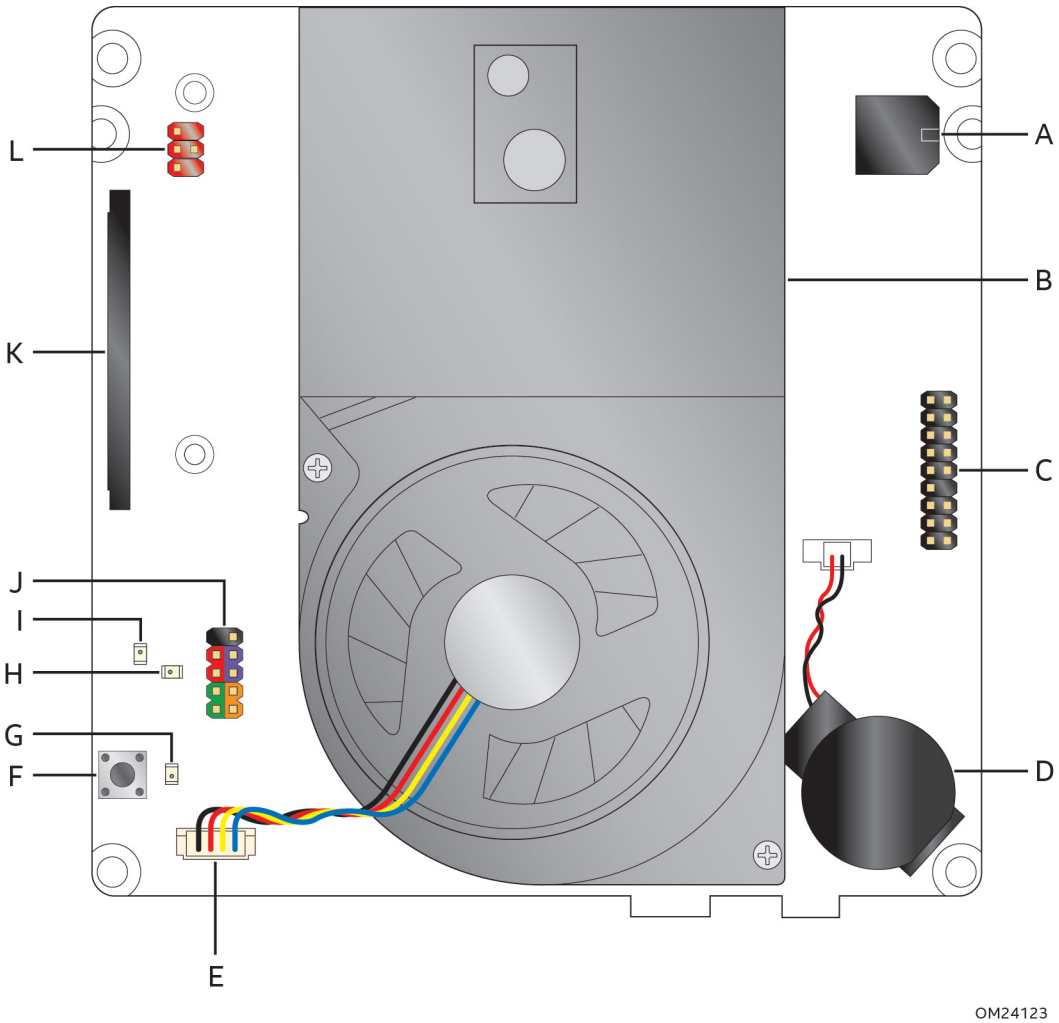


Figure 1. Major Board Components (Top)

Table 2 lists the components identified in Figure 1.

Table 2. Components Shown in Figure 1

Item from Figure 1	Description
A	Molex Micro-Fit 3.0* 2x2 power connector (3 mm pitch)
B	Thermal solution
C	Low Speed Custom Solutions Header
D	Battery
E	Processor fan header
F	Onboard power button
G	Power LED
H	Hard Disk Drive LED
I	Standby Power LED
J	Front panel header (2.0 mm pitch)
K	eDP connector
L	Flat panel voltage selection header

1.1.3 Board Layout (Bottom)

Figure 2 shows the location of the major components on the bottom-side of Intel NUC Board NUC5i5MYBE.

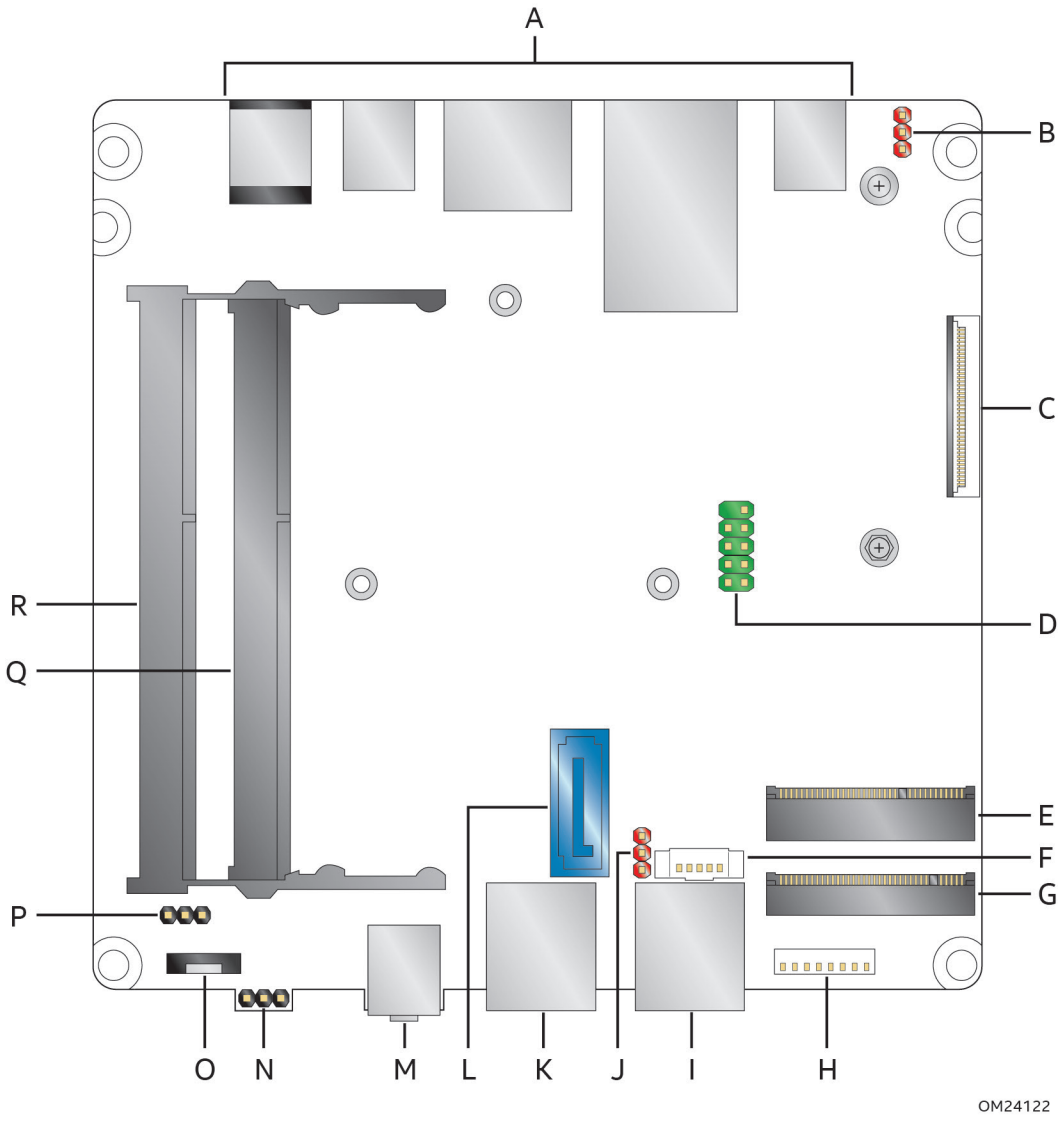


Figure 2. Major Board Components (Bottom)

Table 3. Components Shown in Figure 2

Item from Figure 2	Description
A	Back panel connectors
B	Backlight inverter voltage selection header
C	High Speed Custom Solutions connector (PCIe x4, SATA)
D	Serial port header
E	M.2 2230 Module connector
F	SATA power connector
G	M.2 2280 Module connector
H	Front panel dual-port USB 2.0 header (1.25 mm pitch)
I	Front panel USB 3.0 connector
J	SATA Disk-on-Module (DOM) voltage selection header
K	Front panel USB 3.0 connector
L	SATA 6.0 Gb/s connector
M	Front panel stereo microphone/headphone jack
N	BIOS security jumper
O	Near Field Communications (NFC) Vertical Flexible Printed Circuit connector (0.5 mm pitch)
P	Intel® Management Engine BIOS Extension (Intel® MEBX) Reset header
Q	DDR3L SO-DIMM 1 socket
R	DDR3L SO-DIMM 2 socket

1.1.4 Block Diagram

Figure 3 is a block diagram of the major functional areas of the board.

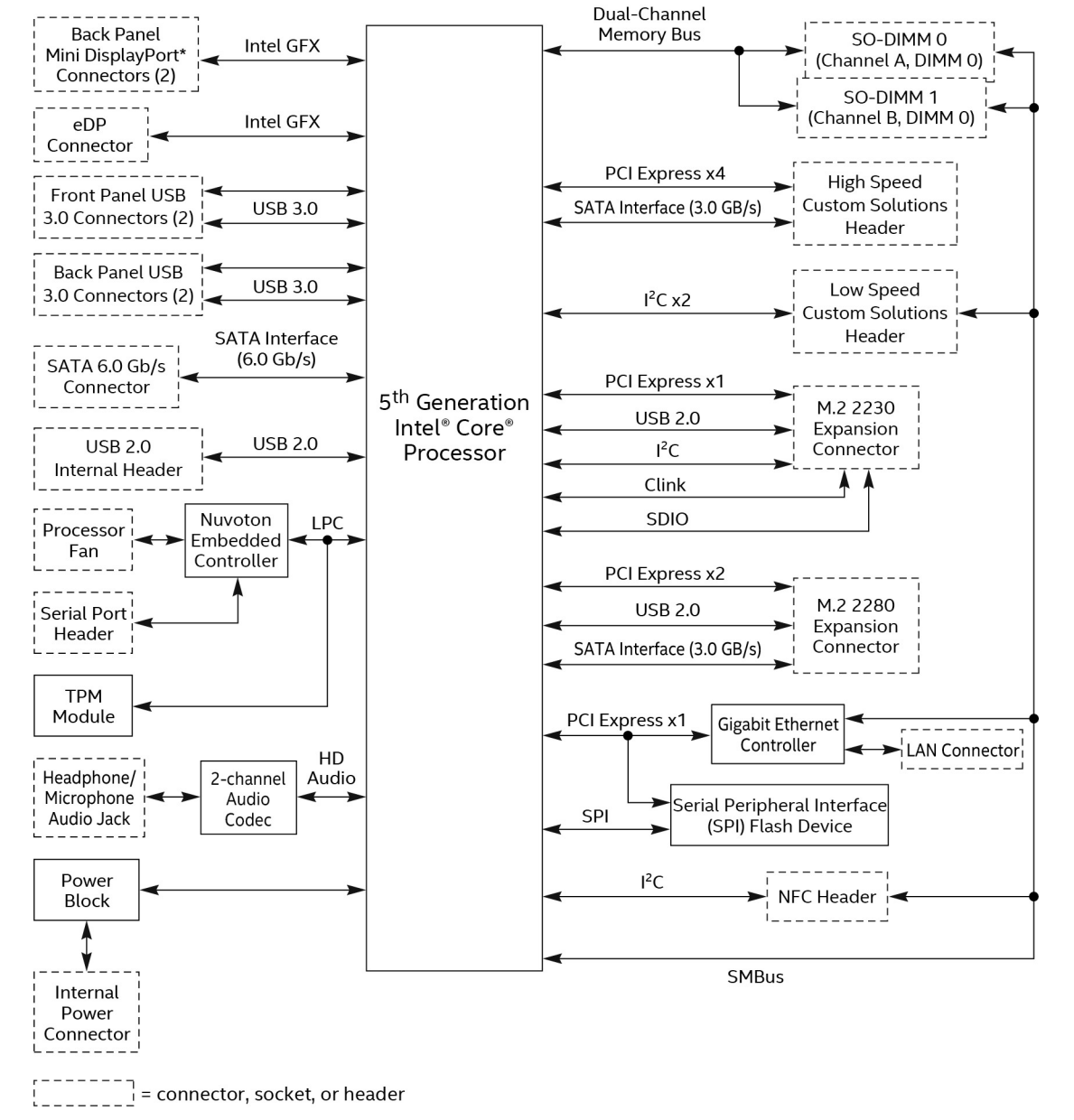


Figure 3. Block Diagram

1.2 Online Support

To find information about...	Visit this World Wide Web site:
Intel NUC Board NUC5i5MYBE	http://www.intel.com/NUC
Intel NUC Board Support	http://www.intel.com/NUCSupport
Available configurations for Intel NUC Board NUC5i5MYBE	http://ark.intel.com
BIOS and driver updates	http://downloadcenter.intel.com
Tested memory	http://www.intel.com/NUCSupport
Integration information	http://www.intel.com/NUCSupport
Processor datasheet	http://ark.intel.com

1.3 Processor

Intel NUC Board NUC5i5MYBE has a soldered-down 5th generation Intel Core i5-5300U dual-core processor with up to 15 W TDP:

- Integrated graphics
- Integrated memory controller
- Integrated PCH

NOTE

There are specific requirements for providing power to the processor. Refer to Section 2.5.1 on page 67 for information on power supply requirements.

1.4 System Memory

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

- 1.35 V DDR3L SDRAM SO-DIMMs with gold plated contacts
- Two independent memory channels with interleaved mode support
- Unbuffered, single-sided or double-sided SO-DIMMs
- 16 GB maximum total system memory (with 4 Gb memory technology). Refer to Section 2.1.1 on page 45 for information on the total amount of addressable memory.
- Minimum recommended total system memory: 1024 MB
- Non-ECC SO-DIMMs
- Serial Presence Detect
- DDR3L 1600/1333 MHz SDRAM SO-DIMMs

NOTE

To be fully compliant with all applicable DDR SDRAM memory specifications, the board should be populated with SO-DIMMs that support the Serial Presence Detect (SPD) data structure. This allows the BIOS to read the SPD data and program the chipset to accurately configure memory settings for optimum performance. If non-SPD memory is installed, the BIOS will attempt to correctly configure the memory settings, but performance and reliability may be impacted or the SO-DIMMs may not function under the determined frequency.

Table 4 lists the supported SO-DIMM configurations.

Table 4. Supported Memory Configurations

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

Note: "DS" refers to double-sided memory modules (containing two rows of SDRAM) and "SS" refers to single-sided memory modules (containing one row of SDRAM).

For information about...	Refer to:
Tested Memory	http://www.intel.com/NUCSupport

1.4.1 Memory Configurations

The processor supports the following types of memory organization:

- **Dual channel (Interleaved) mode**. This mode offers the highest throughput for real world applications. Dual channel mode is enabled when the installed memory capacities of both SO-DIMM channels are equal. Technology and device width can vary from one channel to the other but the installed memory capacity for each channel must be equal. If different speed SO-DIMMs are used between channels, the slowest memory timing will be used.
- **Single channel (Asymmetric) mode**. This mode is equivalent to single channel bandwidth operation for real world applications. This mode is used when only a single SO-DIMM is installed or the memory capacities are unequal. Technology and device width can vary from one channel to the other. If different speed SO-DIMMs are used between channels, the slowest memory timing will be used.

For information about...	Refer to:
Memory Configuration Examples	http://www.intel.com/NUCSupport

Figure 4 illustrates the memory channel and SO-DIMM configuration.

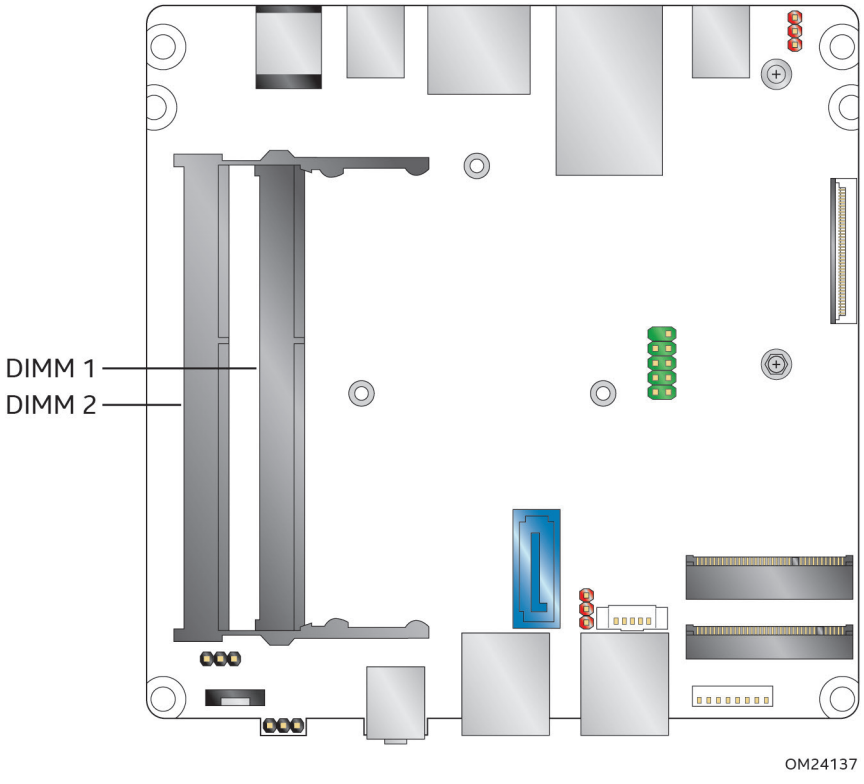


Figure 4. Memory Channel and SO-DIMM Configuration

1.5 Processor Graphics Subsystem

The board supports graphics through Intel HD Graphics 5500.

1.5.1 Integrated Graphics

The board supports integrated graphics via the processor.

1.5.1.1 Intel® High Definition (Intel® HD) Graphics

The Intel HD Graphics 5500 controller features the following:

- 3D Features
  - DirectX* 11 support
  - OpenGL* 4.0 support
- Video
  - Display
    - Supports eDP flat panel displays up to 2880 x 1800 at 60 Hz
    - Triple independent display support
  - Next Generation Intel® Clear Video Technology HD support is a collection of video playback and enhancement features that improve the end user's viewing experience
  - Encode/transcode HD content
  - Playback of high definition content including Blu-ray* disc
  - Superior image quality with sharper, more colorful images
  - DirectX* Video Acceleration (DXVA) support for accelerating video processing
  - Full AVC/VC1/MPEG2 HW Decode
  - Intel HD Graphics with Advanced Hardware Video Transcoding (Intel® Quick Sync Video)

NOTE

Intel Quick Sync Video is enabled by an appropriate software application.

1.5.1.2 Video Memory Allocation

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

1.5.1.3 Mini DisplayPort*

DisplayPort is a digital communication interface that utilizes differential signaling to achieve a high bandwidth bus interface designed to support connections between PCs and monitors, projectors, and TV displays. DisplayPort is suitable for display connections between consumer electronics devices such as high definition optical disc players, set top boxes, and TV displays. The maximum supported resolution is 3840 x 2160 @ 60 Hz, 24bpp. The Mini DisplayPort interfaces support the 1.2 specification.

DisplayPort output supports Multi-Stream Transport (MST) which allows for multiple independent video streams (daisy-chain connection with multiple monitors) over a single DisplayPort. This will require the use of displays that support DisplayPort 1.2 and allow for this feature.

For information about	Refer to
DisplayPort technology	http://www.displayport.org

1.5.1.3.1 DisplayPort 1.2 Multi-Stream Transport Daisy-Chaining

Table 5 lists the maximum resolutions available when using DisplayPort 1.2 Multi-Stream Transport.

Table 5. DisplayPort Multi-Streaming Resolutions

DisplayPort Usage Models	Monitor 1	Monitor 2	Monitor 3
3 Monitors	1920 x 1200 @ 60 Hz	1920 x 1080 @ 60 Hz	1920 x 1080 @ 60 Hz
2 Monitors	2560 x 1600 @ 60 Hz	2560 x 1600 @ 60 Hz	
3 Monitors (with DisplayPort 1.2 hub)	1920 x 1080 @ 60 Hz	1920 x 1080 @ 60 Hz	1920 x 1080 @ 60 Hz

1.5.1.4 Multiple DisplayPort Configurations

Multiple DisplayPort configurations feature the following:

- Three independent displays
- Dual DisplayPort 1.2 with 4K support
- Collage Display

Table 6. Multiple Display Configuration Maximum Resolutions

Display 1	Display 2	Display 3	Maximum Resolution Display 1	Maximum Resolution Display 2	Maximum Resolution Display 3
DP	DP	eDP	3840 x 2160 @ 60 Hz		2880 x 1800 @ 60 Hz

Note: In order to achieve higher resolutions and frequencies, cables and monitors must meet DisplayPort 1.2 specifications. Maximum resolution given is for HBR2 (High Bit Rate 2) Link Data Rate. Requires a monitor that supports HBR2.

For information about	Refer to
Multiple display maximum resolutions	https://www-ssl.intel.com/content/www/us/en/processors/core/CoreTechnicalResources.html (Generic link) TBD (Specific Link)

1.5.1.5 High-bandwidth Digital Content Protection (HDCP)

HDCP is the technology for protecting high definition content against unauthorized copy or interception between a source (computer, digital set top boxes, etc.) and the sink (panels, monitor, and TVs). The PCH supports HDCP 1.4a for content protection over wired displays (Mini DisplayPort).

1.5.1.6 Integrated Audio Provided by the Mini DisplayPort Interfaces

The Mini DisplayPort interfaces, from the PCH, support audio. The processor supports two High Definition audio streams on two digital ports simultaneously.

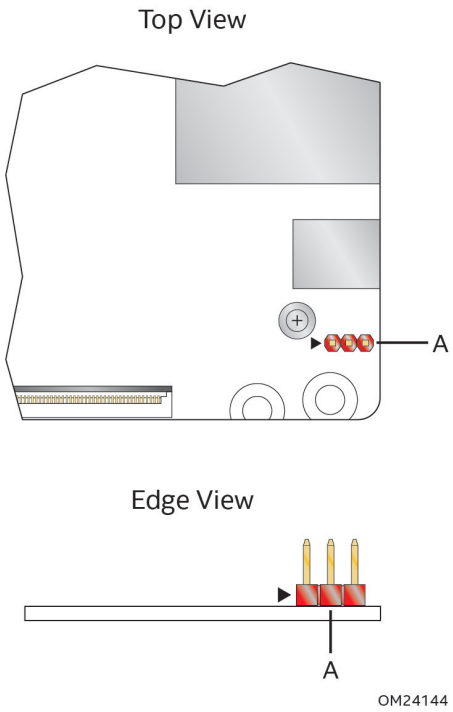
Table 7 shows the specific audio technologies supported by the PCH.

Table 7. Audio Formats Supported by the Mini DisplayPort Interfaces

Audio Formats	Mini DisplayPort
AC-3 – Dolby* Digital	Yes
Dolby Digital Plus	Yes
DTS-HD*	Yes
LPCM , 192 kHz/24 bit, 8 channel	Yes
Dolby True HD, DTS-HD Master Audio* (Lossless Blu-ray Disc Audio Format)	Yes

1.5.1.7 Flat Panel Display Interfaces

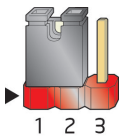
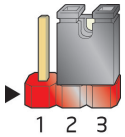
The board supports flat panel displays via the Embedded DisplayPort interface. Figure 5 shows the flat panel connector on the bottom-side of the board.



Item	Description
A	Backlight inverter voltage selection header

Figure 5. Flat Panel Connector on Bottom-side of the Board

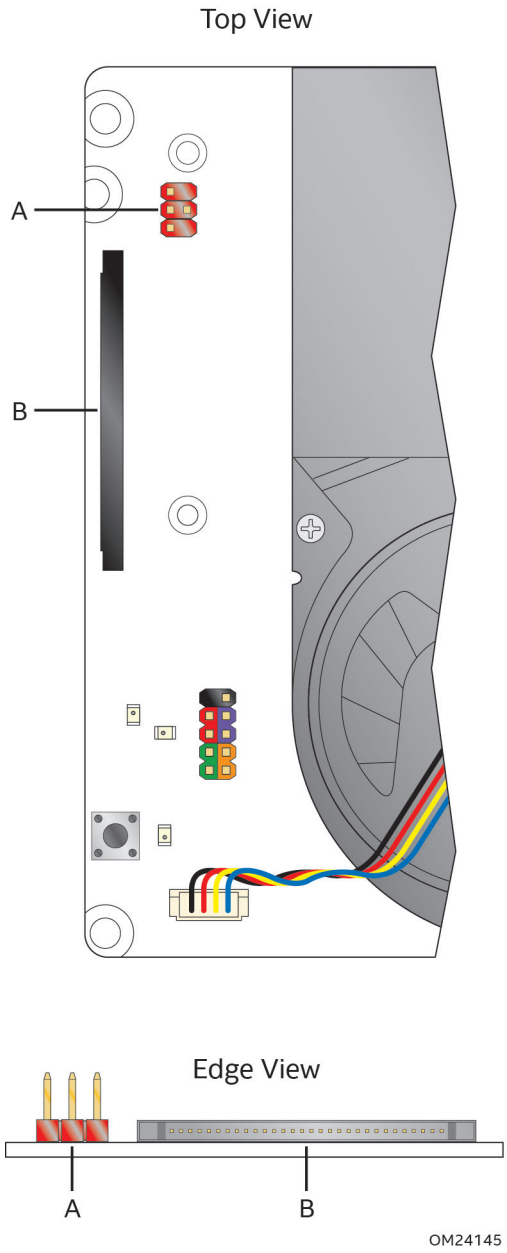
Table 8. Backlight Inverter Voltage Selection Header Jumper Positions

5 Vsby ± 5% (2.0A)	
(Vin) 19V ± 5% (2.0A)	

NOTE

Backlight inverter voltage option "Vin" refers to board input voltage as provided to board power input connector.

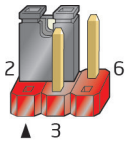
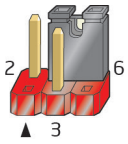
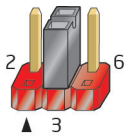
Figure 6 shows the flat panel connectors on the top-side of the board.



Item	Description
A	Flat panel voltage selection header
B	Embedded DisplayPort connector

Figure 6. Flat Panel Connectors on Top-side of the Board

Table 9. Flat Panel Voltage Selection Header Jumper Positions

3.3 Vsby ± 5% (1.3A)	
5 Vsby ± 5% (2.0A)	
(Vin) 19V ± 5% (2.0A)	

1.5.1.7.1 Embedded DisplayPort* (eDP) Interface

The Embedded DisplayPort (eDP) flat panel display interface supports the following:

- 2880 x 1800 @ 60 Hz resolution
- 1-lane and 2-lane bandwidth at 1.62 Gb/s or 2.7 Gb/s
- Multiple EDID data source capability (panel, predefined, and custom payloads)
- 3.3 V, 5 V, and 12 V flat panel display voltage flexibility, with up to 2 A current
- 5 V, 12 V, and Vin backlight inverter voltage flexibility, with up to 2 A current
- Backlight inverter signal redundancy on a dedicated header as well as on eDP connector (for discrete inverter or panel-integrated inverter support using a single cable)
- Connector used is JAE FI- X30SSLA-HF two-lane, 1x30 eDP connector

Table 10. eDP Resolutions for 2 Lane Counts

Link Data Rate	2 Lane Counts
RBR (Reduced Bit Rate)	1400 x 1050
HBR (High Bit Rate)	1920 x 1200
HBR2 (High Bit Rate 2)	2880 x 1800

1.5.1.7.2 Configuration Modes

Video mode configuration for eDP displays is supported as follows:

- Automatic panel identification via Extended Display Identification Data (EDID) for panels with onboard EDID support
- Panel selection from common predefined panel types (without onboard EDID)
- Custom EDID payload installation for ultimate parameter flexibility, allowing custom definition of EDID data on panels without onboard EDID

In addition, BIOS setup provides the following configuration parameters for internal flat panel displays:

- Color Depth: allows the system integrator to select whether the panel is 24 bpp with VESA or JEIDA color mapping, or 18 bpp.
- eDP Interface Type: allows the system integrator to select whether the eDP panel is a 1-lane or 2-lane display.
- eDP Data Rate: allows the system integrator to select whether the eDP panel runs at 1.62 Gb/s or 2.7 Gb/s.
- Inverter Frequency and Polarity: allows the system integrator to set the operating frequency and polarity of the panel inverter board.
- Maximum and Minimum Inverter Current Limit (%): allows the system integrator to set maximum PWM%, as appropriate, according to the power requirements of the internal flat panel display and the selected inverter board.
- Panel Power Sequencing: allows the system integrator to adjust panel power sequencing parameters, if necessary.

NOTE

Support for flat panel display configuration complies with the following:

1. *Internal flat panel display connectivity is disabled (and all parameters hidden) by default.*
2. *Internal flat panel display settings are not exposed through Intel® Integrator Toolkit or Intel® Integrator Assistant GUIs.*
3. *Internal flat panel display settings will not be overwritten by loading BIOS setup defaults.*
4. *Internal flat panel display settings will be preserved across BIOS updates.*
5. *Backlight inverter voltage option "Vin" refers to board input voltage as provided to board power input connector.*

1.6 USB

The board supports eight USB ports. All eight ports are high-speed, full-speed, and low-speed capable. The port arrangement is as follows:

- USB 3.0 ports:
  - Two front panel ports are implemented through an external connector (blue)
  - Two ports are implemented with vertical back panel connectors (blue)
- USB 2.0 ports:
  - Two ports via one dual-port internal 1x8 1.25 mm pitch header (white)
  - One port is reserved for the M.2 2280 Module
  - One port is reserved for the M.2 2230 Module

NOTE

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

For information about	Refer to
The location of the USB connectors on the back panel	Figure 9, page 46
The location of the front panel USB headers	Figure 2, page 15

1.7 SATA Interface

The board provides the following SATA interfaces:

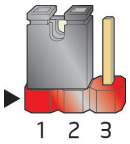
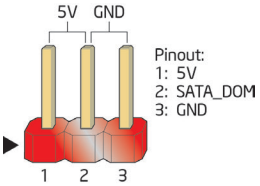
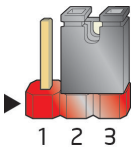
- One internal M.2 SATA port (Type 2242 and Type 2280 Modules) for SSD support
- One SATA 6.0 Gb/s port (blue)

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

1.7.1 SATA Disk-on-Module (DOM) Voltage Selection Header

The board provides support for SATA Disk-on-Module (DOM) via a user-selectable voltage level on SATA data pin 7. See Table 11 for more details.

Table 11. SATA DOM Voltage Selection Header

Pins 1 and 2 jumper position for 5 V		
Pins 3 and 2 jumper position for GND (default)		

1.7.2 AHCI Mode

The board supports AHCI storage mode.

NOTE

In order to use AHCI mode, AHCI must be enabled in the BIOS. Microsoft Windows* 7 and Windows 8.1 include the necessary AHCI drivers without the need to install separate AHCI drivers during the operating system installation process; however, it is always good practice to update the AHCI drivers to the latest available by Intel.*

1.7.3 Intel® Rapid Storage Technology / SATA RAID

The PCH supports Intel® Rapid Storage Technology, providing both AHCI and integrated RAID functionality. The RAID capability provides high-performance RAID 0 and 1 functionality on all SATA ports. Other RAID features include hot spare support, SMART alerting, and RAID 0 auto replace. Software components include an Option ROM for pre-boot configuration and boot functionality, a Microsoft Windows compatible driver, and a user interface for configuration and management of the RAID capability of the PCH.

NOTE

Intel Rapid Storage Technology / SATA RAID is only supported if an M.2 SATA SSD module is used with the onboard SATA interface. *RAID is not available with an M.2 PCIe SSD module and onboard SATA interface.*

1.7.4 Intel® Smart Response Technology

Intel® Smart Response Technology is a disk caching solution that can provide improved computer system performance with improved power savings. It allows configuration of a computer system with the advantage of having HDDs for maximum storage capacity with system performance at or near SSD performance levels.

For more information on Intel Smart Response Technology, go to http://www.intel.com/support/chipsets/sb/CS-032826.htm

NOTES

In order to use supported RAID and Intel Smart Response Technology features, you must first enable RAID in the BIOS.

As Intel Smart Response Technology depends upon RAID, it has the same hardware requirements. It is only supported when an M.2 SATA SSD module is used with the onboard SATA interface; M.2 PCIe SSD modules are not supported.

1.8 Real-Time Clock Subsystem

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

NOTE

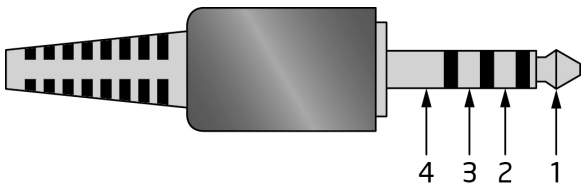
If the battery and AC power fail, date and time values will be reset and the user will be notified during the POST.

When the voltage drops below a certain level, the BIOS Setup program settings stored in CMOS RAM (for example, the date and time) might not be accurate. Replace the battery with an equivalent one. Figure 1 on page 13 shows the location of the battery.

1.9 Audio Subsystem

The audio subsystem supports the following features:

- Analog line-out/Analog Headphone/Analog Microphone (front panel jack)
- DMIC interface (custom solutions header), with support for mono and stereo digital microphones
- Support for 44.1 kHz/48 kHz/96 kHz/192 kHz sample rates on all analog outputs
- Support for 44.1 kHz/48 kHz/96 kHz sample rates on all analog inputs
- Front Panel Audio Jack Support (see Figure 7 for 3.5 mm audio jack pin out):
  - Speakers only (stereo)
  - Headphones only (stereo)
  - Microphone only (mono)
  - Combo Headphone (stereo)/Microphone (mono)



Pin Number	Pin Name	Description
1	Tip	Left Audio Out
2	Ring	Right Audio Out
3	Ring	Common/Ground
4	Sleeve	Audio In

Figure 7. 4-Pin 3.5 mm (1/8 inch) Audio Jack Pin Out

NOTE

The analog circuit of the front panel audio connector is designed to power headphones or amplified speakers only. Poor audio quality occurs if passive (nonamplified) speakers are connected to this output.

1.9.1 Audio Subsystem Software

Audio software and drivers are available from Intel's World Wide Web site.

For information about	Refer to
Obtaining Audio software and drivers	http://downloadcenter.intel.com

1.10 LAN Subsystem

The LAN subsystem consists of the following:

- Intel I218LM Gigabit Ethernet Controller (10/100/1000 Mb/s)
- RJ-45 LAN connector with integrated status LEDs

Additional features of the LAN subsystem include:

- CSMA/CD protocol engine
- LAN connect interface between the Processor and the LAN controller
- Power management capabilities
  - ACPI technology support
  - LAN wake capabilities
- LAN subsystem software

For information about	Refer to
LAN software and drivers	http://downloadcenter.intel.com

1.10.1 Intel® I218LM Gigabit Ethernet Controller

The Intel I218LM Gigabit Ethernet Controller supports the following features:

- Compliant with the 1 Gb/s Ethernet 802.3, 802.3u, 802.3z, 802.3ab specifications
- Multi-speed operation: 10/100/1000 Mb/s
- Full-duplex operation at 10/100/1000 Mb/s; Half-duplex operation at 10/100 Mb/s
- Flow control support compliant with the 802.3X specification as well as the specific operation of asymmetrical flow control defined by 802.3z
- VLAN support compliant with the 802.3q specification
- Supports Jumbo Frames (up to 9 kB)
  - IEEE 1588 supports (Precision Time protocol)
- MAC address filters: perfect match unicast filters, multicast hash filtering, broadcast filter, and promiscuous mode

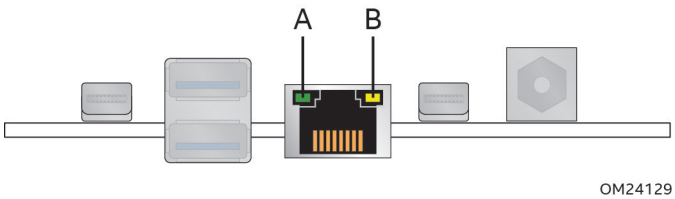
1.10.2 LAN Subsystem Software

LAN software and drivers are available from Intel's World Wide Web site.

For information about	Refer to
Obtaining LAN software and drivers	http://downloadcenter.intel.com

1.10.3 RJ-45 LAN Connector with Integrated LEDs

Two LEDs are built into the RJ-45 LAN connector (shown in Figure 8).



Item	Description
A	Link LED (Green)
B	Data Rate LED (Green/Yellow)

Figure 8. LAN Connector LED Locations

Table 12 describes the LED states when the board is powered up and the LAN subsystem is operating.

Table 12. LAN Connector LED States

LED	LED Color	LED State	Condition
Link	Green	Off	LAN link is not established.
		On	LAN link is established.
		Blinking	LAN activity is occurring.
Data Rate	Green/Yellow	Off	10 Mb/s data rate is selected.
		Green	100 Mb/s data rate is selected.
		Yellow	1000 Mb/s data rate is selected.

1.10.4 NFC Connector/Interface

The NFC connector is designed to work with an NFC reader/writer module via a 1x8 Flexible Printed Circuit connector (0.5 mm pitch).

1.11 Hardware Management Subsystem

The hardware management features enable the board to be compatible with the Wired for Management (WfM) specification. The board has several hardware management features, including thermal and voltage monitoring.

For information about	Refer to
Wired for Management (WfM) Specification	www.intel.com/design/archives/wfm/

1.11.1 Hardware Monitoring

The hardware monitoring and fan control subsystem is based on a Nuvoton NCT5577D embedded controller, which supports the following:

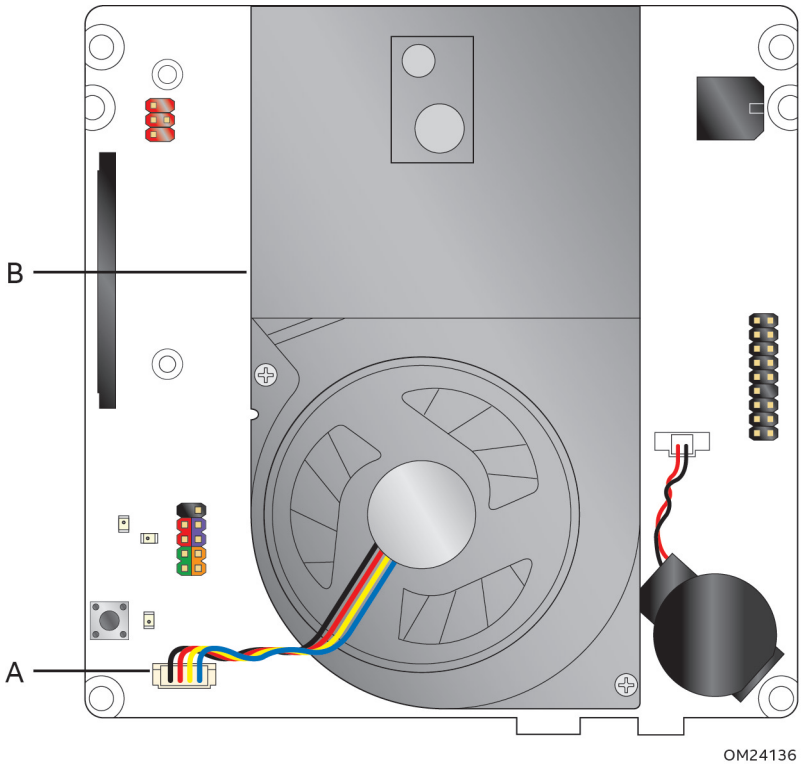
- Processor and system ambient temperature monitoring
- Chassis fan speed monitoring
- Voltage monitoring of +5 V, +3.3 V, Memory Vcc (V_SM), +Vccp,
- SMBus interface

1.11.2 Fan Monitoring

Fan monitoring can be implemented using third-party software.

1.11.3 Thermal Solution

Figure 9 shows the location of the thermal solution and processor fan header.



Item	Description
A	Processor fan header
B	Thermal solution

Figure 9. Thermal Solution and Fan Header

1.12 Power Management

Power management is implemented at several levels, including:

- Software support through Advanced Configuration and Power Interface (ACPI)
- Hardware support:
  - Power Input
  - Instantly Available PC technology
  - LAN wake capabilities
  - Wake from USB
  - WAKE# signal wake-up support
  - Wake from S5
  - +5 V Standby Power Indicator LED

1.12.1 ACPI

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

- Plug and Play (including bus and device enumeration)
- Power management control of individual devices, add-in boards (some add-in boards may require an ACPI-aware driver), video displays, and hard disk drives
- Methods for achieving less than 15-watt system operation in the power-on/standby sleeping state
- A Soft-off feature that enables the operating system to power-off the computer
- Support for multiple wake-up events (see Table 15 on page 37)
- Support for a front panel power and sleep mode switch

Table 13 lists the system states based on how long the power switch is pressed, depending on how ACPI is configured with an ACPI-aware operating system.

Table 13. Effects of Pressing the Power Switch

If the system is in this state...	...and the power switch is pressed for	...the system enters this state
Off (ACPI G2/G5 – Soft off)	Less than four seconds	Power-on (ACPI G0 – working state)
On (ACPI G0 – working state)	Less than four seconds	Soft-off/Standby (ACPI G1 – sleeping state) Note
On (ACPI G0 – working state)	More than six seconds	Fail safe power-off (ACPI G2/G5 – Soft off)
Sleep (ACPI G1 – sleeping state)	Less than four seconds	Wake-up (ACPI G0 – working state)
Sleep (ACPI G1 – sleeping state)	More than six seconds	Power-off (ACPI G2/G5 – Soft off)

Note: Depending on power management settings in the operating system.

1.12.1.1 System States and Power States

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

Table 14 lists the power states supported by the board along with the associated system power targets. See the ACPI specification for a complete description of the various system and power states.

Table 14. Power States and Targeted System Power

Global States	Sleeping States	Processor States	Device States	Targeted System Power (Note 1)
G0 – working state	S0 – working	C0 – working	D0 – working state.	Full power > 30 W
G1 – sleeping state	S3 – Suspend to RAM. Context saved to RAM.	No power	D3 – no power except for wake-up logic.	Power < 5 W (Note 2)
G1 – sleeping state	S4 – Suspend to disk. Context saved to disk.	No power	D3 – no power except for wake-up logic.	Power < 5 W (Note 2)
G2/S5	S5 – Soft off. Context not saved. Cold boot is required.	No power	D3 – no power except for wake-up logic.	Power < 5 W (Note 2)
G3 – mechanical off AC power is disconnected from the computer.	No power to the system.	No power	D3 – no power for wake-up logic, except when provided by battery or external source.	No power to the system. Service can be performed safely.

Notes:

1. Total system power is dependent on the system configuration, including add-in boards and peripherals powered by the system chassis' power supply.
2. Dependent on the standby power consumption of wake-up devices used in the system.

1.12.1.2 Wake-up Devices and Events

Table 15 lists the devices or specific events that can wake the computer from specific states.

Table 15. Wake-up Devices and Events

Devices/events that wake up the system...	...from this sleep state	Comments
Power switch	S3, S4, S5[1]	
RTC alarm	S3, S4, S5[1]	Monitor to remain in sleep state
LAN	S3, S4, S5[1, 3]	"S5 WOL after G3" must be supported; monitor to remain in sleep state
USB	S3, S4, S5[1, 2, 3]	Wake S4, S5 controlled by BIOS option (not after G3)
WAKE#	S3, S4, S5[1]	Via WAKE; monitor to remain in sleep state

Notes:

1. S4 implies operating system support only.
2. Will not wake from Deep S4/S5. USB S4/S5 Power is controlled by BIOS. USB S5 wake is controlled by BIOS. USB S4 wake is controlled by OS driver, not just BIOS option.
3. Windows 8.1 Fast startup will block wake from LAN and USB from S5.

NOTE

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

1.12.2 Hardware Support

The board provides several power management hardware features, including:

- Wake from Power Button signal
- Instantly Available PC technology
- LAN wake capabilities
- Wake from USB (not after G3)
- WAKE# signal wake-up support
- Wake from S5
- +5 V Standby Power Indicator LED

NOTE

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

1.12.2.1 Power Input

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

1.12.2.2 Instantly Available PC Technology

Instantly Available PC technology enables the board to enter the ACPI S3 (Suspend-to-RAM) sleep-state. While in the S3 sleep-state, the computer will appear to be off (the power supply is only supplying Standby power, and the front panel LED will be amber or secondary color if dual colored, or off if single colored.) When signaled by a wake-up device or event, the system quickly returns to its last known wake state. Table 15 on page 37 lists the devices and events that can wake the computer from the S3 state.

The use of Instantly Available PC technology requires operating system support and drivers for any installed M.2 add-in card.

1.12.2.3 LAN Wake Capabilities

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

1.12.2.4 Wake from USB

USB bus activity wakes the computer from an ACPI S3 state (not after G3).

NOTE

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

1.12.2.5 WAKE# Signal Wake-up Support

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

1.12.2.6 Wake from S5

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

1.12.2.7 +5 V Standby Power Indicator LED

The standby power indicator LED shows that power is still present even when the computer appears to be off. Figure 10 shows the location of the standby power LED.

CAUTION

If AC power has been switched off and the standby power indicator is still lit, disconnect the power cord before installing or removing any devices connected to the board. Failure to do so could damage the board and any attached devices.

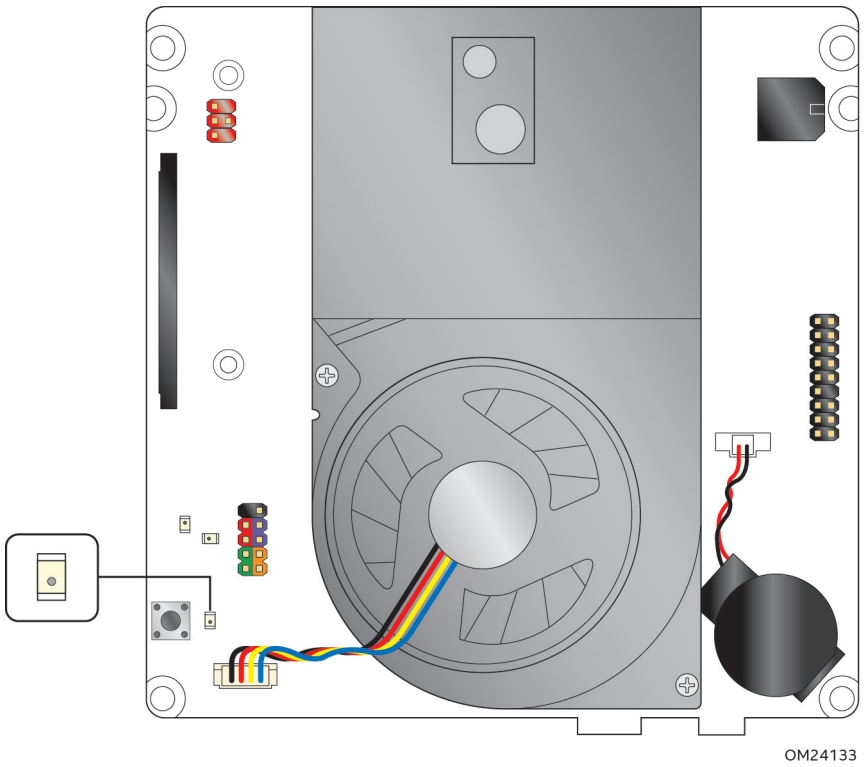


Figure 10. Location of the Standby Power LED

1.13 Intel® Security and Manageability Technologies

Intel® Security and Manageability Technologies provides tools and resources to help small business owners and IT organizations protect and manage their assets in a business or institutional environment.

NOTE

Software with security and/or manageability capability is required to take advantage of Intel platform security and/or management technologies.

1.13.1 Intel® vPro™ Technology

Intel® vPro™ Technology is a collection of platform capabilities that support enhanced manageability, security, virtualization and power efficiency. The key platform capabilities include:

- Intel® Active Management Technology (Intel® AMT) 10.0
- Intel® Virtualization (Intel® VT)
- Intel® Virtualization for Directed I/O (Intel® VT-d)
- Intel® Trusted Execution Technology (Intel® TXT)
- Intel® Identity Protection Technology (Intel® IPT)
- Trusted Platform Module (TPM)
- Intel® Small Business Technology (Intel® SBT)

For information about	Refer to
Intel vPro Technology	http://support.intel.com/support/vpro/

1.13.1.1 Intel® Active Management Technology 10.0

When used with third-party management and security applications, Intel Active Management Technology (Intel AMT) allows business owners and IT organizations to better discover, heal, and protect their networked computing assets.

Some of the features of Intel AMT include:

- Out-of-band (OOB) system access, to discover assets even while PCs are powered off
- Remote trouble-shooting and recovery, which allows remote diagnosis and recovery of systems after OS failures
- Hardware-based agent presence checking that automatically detects and alerts when critical software agents have been stopped or are missing
- Proactive network defense, which uses filters to block incoming threats while isolating infected clients before they impact the network
- Remote hardware and software asset tracking, helping to track computer assets and keep virus protection up-to-date
- Keyboard, video and mouse (KVM) remote control, which allows redirection of a managed system's video to a remote console which can then interact with it using the console's own mouse and keyboard

NOTE

Intel AMT requires the computer system to have an Intel AMT-enabled chipset, network hardware and software, as well as connection with a power source, a corporate network connection, and an Intel AMT-enabled remote management console. Setup requires additional configuration of the platform.

For information about	Refer to
Intel Active Management Technology	http://www.intel.com/technology/platform-technology/intel-amt/index.htm

1.13.1.2 Intel® Virtualization Technology

Intel Virtualization Technology (Intel VT) is a hardware-assisted technology that, when combined with software-based virtualization solutions, provides maximum system utilization by consolidating multiple environments into a single server or client.

NOTE

A processor with Intel VT does not guarantee that virtualization will work on your system. Intel VT requires a computer system with a chipset, BIOS, enabling software and/or operating system, device drivers, and applications designed for this feature.

For information about	Refer to
Intel Virtualization Technology	http://www.intel.com/technology/virtualization/technology.htm

1.13.1.3 Intel® Virtualization Technology for Directed I/O

Intel Virtualization Technology for Directed I/O (Intel VT-d) allows addresses in incoming I/O device memory transactions to be remapped to different host addresses. This provides Virtual Machine Monitor (VMM) software with:

- Improved reliability and security through device isolation using hardware assisted remapping.
- Improved I/O performance and availability by direct assignment of devices.

For information about	Refer to
Intel Virtualization Technology for Directed I/O	https://software.intel.com/en-us/node/139035?wapkw=vt+directed+io

1.13.1.4 Intel® Trusted Execution Technology

Intel Trusted Execution Technology (Intel TXT) is a hardware security solution that protects systems against software-based attacks by validating the behavior of key components at startup against a known good source. It requires that Intel VT be enabled and the presence of a TPM.

For information about	Refer to
Intel Trusted Execution Technology	http://www.intel.com/content/www/us/en/architecture-and-technology/trusted-execution-technology/malware-reduction-general-technology.html

1.13.1.5 Intel® Identity Protection Technology

Intel Identity Protection Technology (Intel IPT) provides a simple way for websites and enterprises to validate that a user is logging in from a trusted computer. This is accomplished by using the Intel Manageability Engine embedded in the chipset to generate a six-digit number that, when coupled with a user name and password, will generate a One-Time Password (OTP) when visiting Intel IPT-enabled websites. Intel IPT eliminates the need for the additional token or key fob required previously for two-factor authentication.

For information about	Refer to
Intel Identity Protection Technology	http://ipt.intel.com

1.13.1.6 Trusted Platform Module (TPM)

The TPM version 2.0 component is specifically designed to enhance platform security above-and-beyond the capabilities of today's software by providing a protected space for key operations and other security critical tasks. Using both hardware and software, the TPM protects encryption and signature keys at their most vulnerable stages—operations when the keys are being used unencrypted in plain-text form. The TPM shields unencrypted keys and platform authentication information from software-based attacks.

NOTE

Support for TPM version 2.0 requires a UEFI-enabled operating system.

For information about	Refer to
ST Micro ST33ZP24AR28PVTC TPM version 2.0	http://www.st.com
Infineon SLB9665TT2.0 TPM version 2.0	www.infineon.com/cms/en/product/channel.html?channel=db3a30433efacd9a013f10d3ded64daf

1.13.2 Intel® Small Business Technology

Intel Small Business Technology (Intel SBT) provides small businesses with security and productivity capabilities to help keep their PCs up-to-date, protected and running well. Intel SBT is the firmware component of Intel® Small Business Advantage (Intel® SBA) and includes this hardware functionality:

- Local Maintenance Timer – Enables applications to “wake-up” the host platform when it is powered down or in a sleep state.
- Local Software Monitor – Provides a common reporting mechanism to monitor applications running on the host operating system.

For information about	Refer to
Intel Small Business Advantage	http://www.intel.com/go/SBA

2 Technical Reference

2.1 Memory Resources

2.1.1 Addressable Memory

The board utilizes 16 GB of addressable system memory. Typically the address space that is allocated for PCI Conventional bus add-in cards, PCI Express configuration space, BIOS (SPI Flash device), and chipset overhead resides above the top of DRAM (total system memory). On a system that has 16 GB of system memory installed, it is not possible to use all of the installed memory due to system address space being allocated for other system critical functions. These functions include the following:

- BIOS/SPI Flash device (128 Mb)
- Local APIC (19 MB)
- Direct Media Interface (40 MB)
- PCI Express configuration space (256 MB)
- PCH base address registers PCI Express ports (up to 256 MB)
- Memory-mapped I/O that is dynamically allocated for M.2 add-in cards (256 MB)
- Integrated graphics shared memory (up to 512 MB; 64 MB by default)

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

2.2 Connectors and Headers

CAUTION

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

The other internal connectors and headers are not overcurrent protected and should connect only to devices inside the computer's chassis, such as fans and internal peripherals. Do not use these connectors or headers to power devices external to the computer's chassis. A fault in the load presented by the external devices could cause damage to the computer, the power cable, and the external devices themselves.

Furthermore, improper connection of USB header single wire connectors may eventually overload the overcurrent protection and cause damage to the board.

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

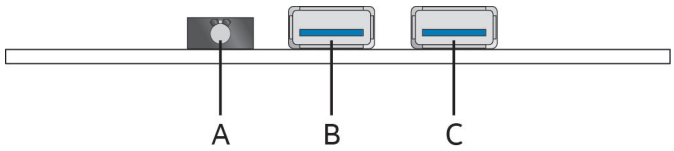
- Front panel I/O connectors
- Back panel I/O connectors
- On-board I/O connectors and headers (see pages 47 and 48)

NOTE

Unless otherwise noted, all 2.0 mm headers are dual-row, straight, surface mount with each two-pin section measuring 2.0 mm x 4.0 mm, with a pin height of 4.0 mm.

2.2.1 Front Panel Connectors

Figure 11 shows the location of the front panel connectors for the board.

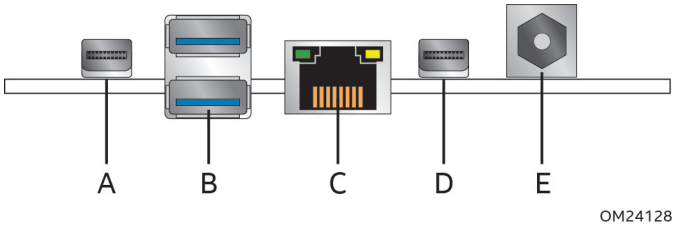


Item	Description
A	Front panel stereo microphone/ headphone jack
B	USB 3.0 port
C	USB 3.0 port

Figure 11. Front Panel Connectors

2.2.2 Back Panel Connectors

Figure 12 shows the location of the back panel connectors for the board.



Item	Description
A	Mini DisplayPort connector
B	USB 3.0 ports
C	LAN
D	Mini DisplayPort connector
E	12-19 V DC input jack

Figure 12. Back Panel Connectors

2.2.3 Headers (Top)

Figure 13 shows the location of the headers on the top-side of the board.

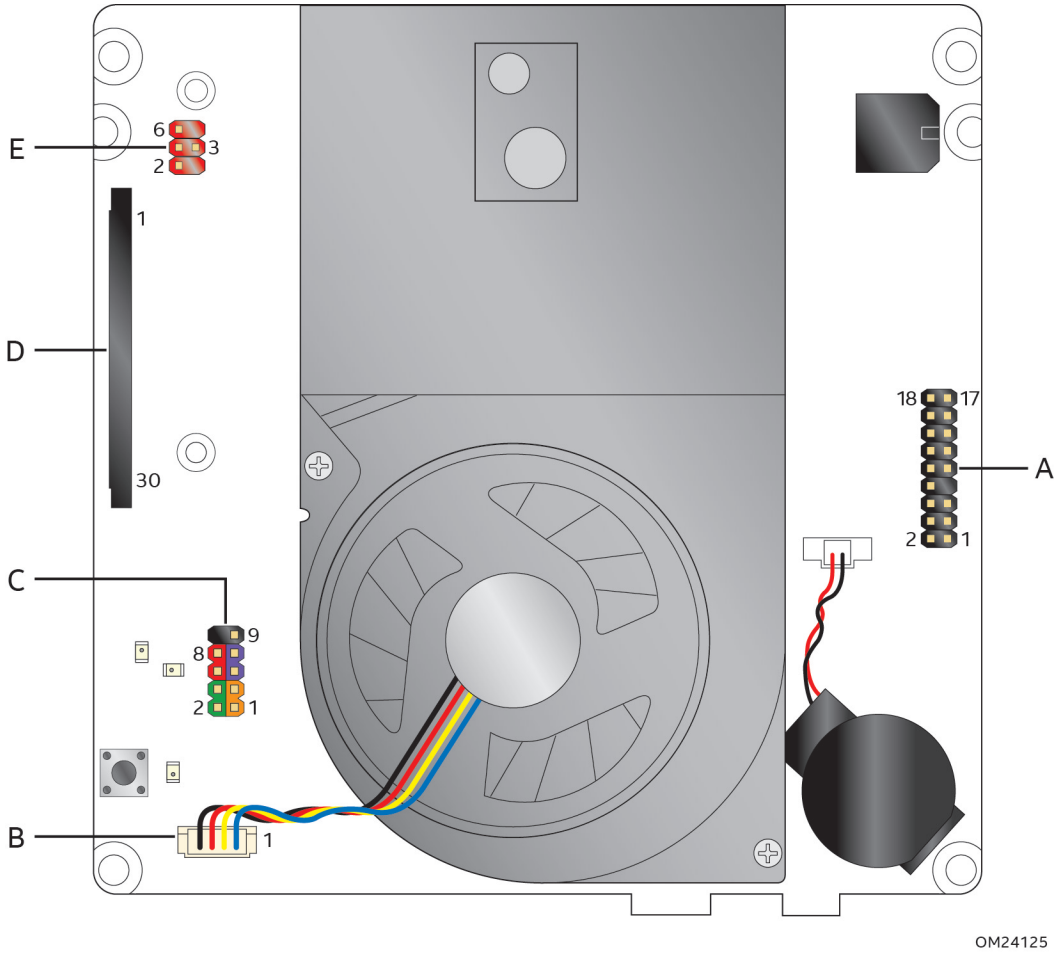


Figure 13. Headers (Top)

Table 16 lists the headers identified in Figure 13.

Table 16. Headers Shown in Figure 13

Item from Figure 14	Description
A	Low Speed Custom Solutions Header
B	Processor fan header
C	Front panel header (2.0 mm pitch)
D	eDP connector
E	Flat panel voltage selection header

2.2.4 Connectors and Headers (Bottom)

Figure 14 shows the locations of the connectors and headers on the bottom-side of the board.

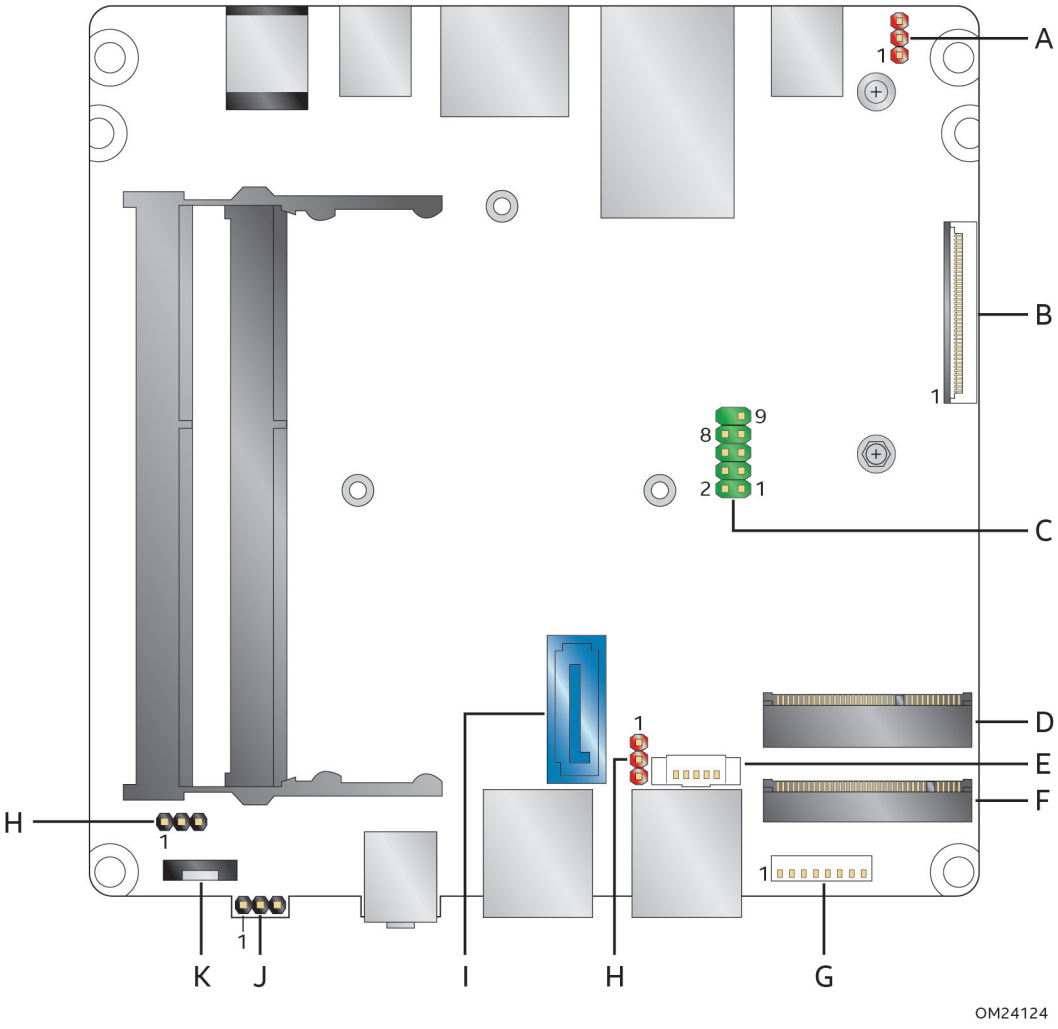


Figure 14. Connectors and Headers (Bottom)

Table 17 lists the connectors and headers identified in Figure 10.

Table 17. Connectors and Headers Shown in Figure 10

Item from Figure 10	Description
A	Backlight inverter voltage selection header
B	High Speed Custom Solutions connector (PCIe x4, SATA)
C	Serial port header
D	M.2 2230 Module connector
E	SATA power connector (1.25 mm pitch)
F	M.2 2280 Module connector
G	Front panel dual-port USB 2.0 header (1.25 mm pitch)
H	SATA Disk-on-Module (DOM) voltage selection header
I	SATA 6.0 Gb/s connector
J	BIOS security jumper
K	Near Field Communications (NFC) Vertical Flexible Printed Circuit connector (0.5 mm pitch)
L	Intel MEBX Reset header

2.2.4.1 Signal Tables for the Connectors and Headers

Table 18. SATA Power Header (1.25 mm pitch)

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

NOTE

Connector is Molex part number 53398-0571, 1.25mm Pitch PicoBlade Header, Surface Mount, Vertical, Lead-Free, 5 Circuits.*

Table 19. Dual-Port Internal USB 2.0 Header (1.25 mm pitch)

Pin	Signal Name	Pin	Signal Name
1	+5 V DC	2	Data (negative)
3	Data (positive)	4	Ground
5	Ground	6	Data (positive)
7	Data (negative)	8	+5 V DC

NOTE

Connector is Molex part number 53398-0871, 1.25mm Pitch PicoBlade Header, Surface Mount, Vertical, Lead-Free, 8 Circuits.

Table 20. M.2 2280 Module (Mechanical Key B) Connector

Pin	Signal Name	Pin	Signal Name
74	3.3V	75	CONFIG_2
72	3.3V	73	GND
70	3.3V	71	GND
68	SUSCLK(32kHz) (O)(0/3.3V)	69	CONFIG_1
66	N/C	67	N/C
64	N/C	65	N/C
62	N/C	63	N/C
60	N/C	61	N/C
58	N/C	59	N/C
56	N/C	57	GND

continued

Table 20. M.2 2280 Module (Mechanical Key B) (continued)

Pin	Signal Name	Pin	Signal Name
54	PEWAKE# (I/O)(0/3.3V)	55	REFCLKP
52	CLKREQ# (I/O)(0/3.3V)	53	REFCLKN
50	PERST# (O)(0/3.3V)	51	GND
48	N/C	49	PETp0/SATA-A+
46	N/C	47	PETn0/SATA-A-
44	N/C	45	GND
42	N/C	43	PERp0/SATA-B-
40	N/C	41	PERn0/SATA-B+
38	DEVSLP (O)	39	GND
36	N/C	37	PETp1
34	N/C	35	PETn1
32	N/C	33	GND
30	N/C	31	PERp1
28	N/C	29	PERn1
26	N/C	27	GND
24	N/C	25	N/C
22	N/C	23	N/C
20	N/C	21	CONFIG_0
18	Connector Key	19	Connector Key
16	Connector Key	17	Connector Key
14	Connector Key	15	Connector Key
12	Connector Key	13	Connector Key
10	DAS/DSS# (I/O)	11	GND
8	N/C	9	USB_D-
6	N/C	7	USB_D+
4	3.3V	5	GND
2	3.3V	3	GND
		1	CONFIG_3

Table 21. M.2 2230 Module (Mechanical Key E) Connector

Pin	Signal Name	Pin	Signal Name
74	3.3V	75	GND
72	3.3V	73	RESERVED
70	RESERVED	71	RESERVED
68	RESERVED	69	GND
66	RESERVED	67	RESERVED
64	RESERVED	65	RESERVED
62	ALERT# (I)(0/3.3)	63	GND

continued

Table 21. M.2 2230 Module (Mechanical Key E) Connector (continued)

Pin	Signal Name	Pin	Signal Name
60	I2C CLK (O)(0/3.3)	61	RESERVED
58	I2C DATA (I/O)(0/3.3)	59	RESERVED
56	W_DISABLE1# (O)(0/3.3V)	57	GND
54	W_DISABLE2# (O)(0/3.3V)	55	PEWAKE0# (I/O)(0/3.3V)
52	PERST0# (O)(0/3.3V)	53	CLKREQ0# (I/O)(0/3.3V)
50	SUSCLK(32kHz) (O)(0/3.3V)	51	GND
48	RESERVED	49	REFCLKN0
46	RESERVED	47	REFCLKP0
44	RESERVED	45	GND
42	C-Link CLK (I/O)	43	PERn0
40	C-Link DATA (I/O)	41	PERp0
38	C-Link RESET (I) (0/3.3V)	39	GND
36	RESERVED	37	PETn0
34	RESERVED	35	PETp0
32	RESERVED	33	GND
30	Connector Key	31	Connector Key
28	Connector Key	29	Connector Key
26	Connector Key	27	Connector Key
24	Connector Key	25	Connector Key
22	RESERVED	23	RESERVED
20	RESERVED	21	RESERVED
18	GND	19	RESERVED
16	RESERVED	17	RESERVED
14	RESERVED	15	RESERVED
12	RESERVED	13	RESERVED
10	RESERVED	11	RESERVED
8	RESERVED	9	RESERVED
6	RESERVED	7	GND
4	3.3V	5	USB_D-
2	3.3V	3	USB_D+
		1	GND

Table 22. 30-Pin eDP Connector

Pin	Signal Name	Pin	Signal Name
1	NC_Reserved	16	LCD_GND
2	High-speed_GND	17	HPD (DDPD_HPD)
3	Lane1_N (DDPD_[1]N)	18	BKLT_GND
4	Lane1_P (DDPD_[1]P)	19	BKLT_GND
5	High-speed_GND	20	BKLT_GND
6	Lane0_N (DDPD_[0]N)	21	BKLT_GND
7	Lane0_P (DDPD_[0]P)	22	BKLT_ENABLE
8	High-speed_GND	23	BKLT_PWM_DIM
9	AUX_CH_P (DDPD_AUXP)	24	NC_Reserved
10	AUX_CH_N (DDPD_AUXN)	25	NC_Reserved
11	High-speed_GND	26	BKLT_PWR
12	LCD_VCC	27	BKLT_PWR
13	LCD_VCC	28	BKLT_PWR
14	LCD_Self_Test-or-NC	29	BKLT_PWR
15	LCD_GND	30	NC_Reserved

NOTE

Connector used is JAE FI-X30SSLA-HF two-lane, 1x30 eDP connector.

Table 23. Flat Panel Voltage Selection Header

Pin	Signal Name
1	Key
2	3.3 Vsby ± 5% (1.3A)
3	(Vin) 19V ± 5% (2.0A)
4	LCD_VCC
5	Key
6	5 Vsby ± 5% (2.0A)

Table 24. Backlight Inverter Voltage Selection Header

Pin	Signal Name
1	5 V ± 5% (1.3A)
2	BKLT_PWR
3	(Vin) 19V ± 5% (2.0A)

Table 25. Low Speed Custom Solutions Header

Pin	Signal Name	Pin	Signal Name
1	Reserved	2	GND
3	Reserved	4	DMIC_CLK
5	3.3 Vsby ± 5% (1.3A)	6	DMIC_DATA
7	Key (no pin)	8	SMB_ALERT#/GPIO11
9	5 Vsby ± 5% (2.0A)	10	SCI_SMI_IO/PCH_GPIO44
11	PCH_GPIO24	12	DirectApp Launch/PCH_GPIO14
13	I2C0_SCL/SIO_GPIO5	14	I2C0_SDA/SIO_GPIO5
15	I2C1_SCL (shared w/M.2)/SIO_GPIO7	16	I2C1_SDA (shared w/M.2)/SIO_GPIO6
17	SMB_CLK	18	SMB_DATA

NOTE

To enable alternate GPIO functions, GPIO Lockdown *must first be disabled in the system BIOS.*

Table 26. High Speed Custom Solutions Connector (PCIe x 4, SATA)

Pin	Signal
1	SATA_RXP
2	SATA_RXN
3	GND
4	SATA_TXP
5	SATA_TXN
6	GND
7	SATA1GP/GPIO35
8	DEVSLP1/GPIO38
9	PERST# (O)(0/3.3V)
10	PEWAKE# (I/O)(0/3.3V)
11	CLKRBQ# (I/O)(0/3.3V)
12	Config#_1/PCH_GPIO58
13	Config#_0/PCH_GPIO57
14	GND
15	PERp5_L3
16	PERn5_L3
17	GND
18	PETp5_L3
19	PETn5_L3
20	GND
21	PERp5_L2
22	PERn5_L2
23	GND
24	PETp5_L2

continued

Table 26. High Speed Custom Solutions Connector (PCIe x 4, SATA)
(continued)

Pin	Signal
25	PETn5_L2
26	GND
27	PERp5_L1
28	PERn5_L1
29	GND
30	PETp5_L1
31	PETn5_L1
32	GND
33	PERp5_L0
34	PERn5_L0
35	GND
36	PETp5_L0
37	PETn5_L0
38	GND
39	REFCLK+
40	REFCLK-

NOTE

Connector used is the Kyocera Series 6885 0.4 mm pitch FPC connector, p/n 00 6885 640 000 846.

Table 27. NFC Connector

Pin	Signal Name	Descriptive Name
1	+3.3V	3.3V Supply
2	SMLink0_CLK	SMBUS Clock
3	SMLink0_DATA	SMBUS Data
4	GND	Ground
5	PCH_GPIO26	NFC Interrupt
6	PCH_GPIO17	NFC FW Update
7	PCH_GPIO28	NFC Reset
8	5V STBY	5V Standby Supply
9	GND	Ground
10	GND	Ground

NOTE

Connector used is the Joint Tech F0500WV-S-08P 0.5 mm pitch FPC

Table 28. Serial Port Header

Pin	Signal Name	Pin	Signal Name
1	DCD (Data Carrier Detect)	2	RXD# (Receive Data)
3	TXD# (Transmit Data)	4	DTR (Data Terminal Ready)
5	GND	6	DSR (Data Set Ready)
7	RTS (Request to Send)	8	CTS (Clear to Send)
9	RI (Ring Indicator)	10	Key (no pin)

2.2.4.2 Add-in Card Connectors

The board supports M.2 2230 (key type E) and 2280 (key type B) Modules; also supports M.2 2242 Modules

- Supports M.2 SSD SATA drives
- Maximum bandwidth is approximately 540 MB/s
- Supports M.2 SSD PCIe drives (PCIe x1 and x2)

2.2.4.3 Power Supply Connectors

The board has the following power supply connectors:

- **External Power Supply** – the board can be powered through a 12-19 V DC connector on the back panel. The back panel DC connector is compatible with a 5.5 mm/OD (outer diameter) and 2.5 mm/ID (inner diameter) plug, where the inner contact is +12-19 (±10%) V DC and the shell is GND. The maximum current rating is 10 A.

  NOTE

  External power voltage, 12-19 V DC, is dependent on the type of power brick used.

- **Internal Power Supply** – the board can alternatively be powered via the internal 12-24 V DC 2 x 2 power connector, where pins 1 and 2 are +12-24 (±10%) V DC and pins 3 and 4 are GND.

  The connector used is Molex Micro-Fit (3mm pitch), right-angled, 4-pos/dual row (2x2).

Table 29. 12-24 V Internal Power Supply Connector

Pins	Signal Name
1, 2	+12-24 V (±10%)
3, 4	Ground

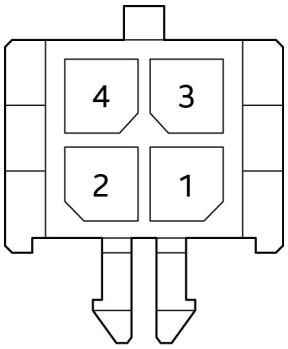


Figure 15. Connection Diagram for the Internal Power Supply Connector

2.2.4.3.1 Power Sensing Circuit

The board has a power sensing circuit that:

- manages CPU power usage to maintain system power consumption below 65 W
- is designed for use with 65 W AC-DC adapters

NOTE

It is recommended that you disable this feature (via BIOS option) when using an AC-DC adapter greater than 65 W.

For information about	Refer to
Power supply considerations	Section 2.5.1, page 67

2.2.4.4 Front Panel Header (2.0 mm Pitch)

This section describes the functions of the front panel header. Table 30 lists the signal names of the front panel header. Figure 16 is a connection diagram for the front panel header.

Table 30. Front Panel Header (2.0 mm Pitch)

Pin	Signal Name	Description	Pin	Signal Name	Description
1	HDD_POWER_LED	Pull-up resistor (750 Ω) to +5V	2	POWER_LED_MAIN	[Out] Front panel LED (main color)
3	HDD_LED#	[Out] Hard disk activity LED	4	POWER_LED_ALT	[Out] Front panel LED (alt color)
5	GROUND	Ground	6	POWER_SWITCH#	[In] Power switch
7	RESET_SWITCH#	[In] Reset switch	8	GROUND	Ground
9	+5V_DC	Power	10	Key	No pin

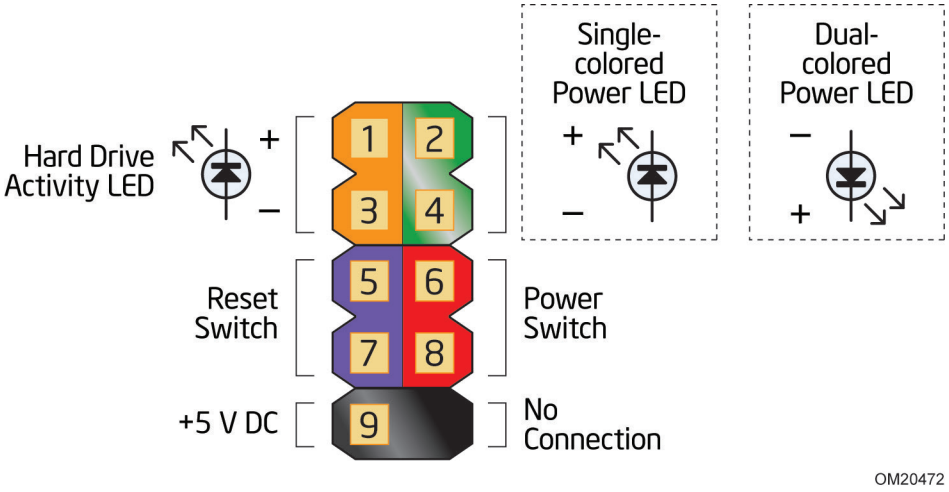


Figure 16. Connection Diagram for Front Panel Header (2.0 mm Pitch)

2.2.4.4.1 Hard Drive Activity LED Header

Pins 1 and 3 can be connected to an LED to provide a visual indicator that data is being read from or written to a hard drive. Proper LED function requires a SATA hard drive or optical drive connected to an onboard SATA connector.

2.2.4.4.2 Reset Switch Header

Pins 5 and 7 can be connected to a momentary single pole, single throw (SPST) type switch that is normally open. When the switch is closed, the board resets and runs the POST.

2.2.4.4.3 Power/Sleep LED Header

Pins 2 and 4 can be connected to a one- or two-color LED. Table 31 and Table 32 show the possible LED states.

Table 31. States for a One-Color Power LED

LED State	Description
Off	Power off
Blinking	Standby
Steady	Normal operation

Table 32. States for a Dual-Color Power LED

LED State	Description
Off	Power off
Secondary color blinking (amber)	Standby
Primary color steady (white)	Normal operation

NOTE

The LED behavior shown in Table 31 is default – other patterns may be set via BIOS setup.

2.2.4.4.4 Power Switch Header

Pins 6 and 8 can be connected to a front panel momentary-contact power switch. The switch must pull the SW_ON# pin to ground for at least 50 ms to signal the power supply to switch on or off. (The time requirement is due to internal debounce circuitry on the board.) At least two seconds must pass before the power supply will recognize another on/off signal.

2.2.4.5 Low Speed Custom Solutions Header (2.0 mm Pitch)

The Low Speed Customs Solution header is designed to expose access to platform-level signals, enabling custom development of solutions based on such signals.

- 3.3 Vstby and 5 Vstby: can be used to power custom solution (such as daughtercard, etc.) with up to 2 A of current rating capability per each of these voltages. Pins can also be used to monitor the presence of 3.3 V and 5 V standby power. Standby power is always on, even when board power is off.
- DMIC_CLK, DMIC_DATA: clock output and data I/O for digital microphone interface; allows connection of a Digital Microphone.
- SCI/SMI GPIO: input signal for direct connection to a signal (such as a front panel push-button) capable of triggering an OS-level command in Windows (formerly referred to by Microsoft as Direct Application Launch*). Voltage level I/O for this pin is 3.3 V. Refer to below URL for accompanying utility to map triggered event to Windows file.
  https://downloadcenter.intel.com/Detail_Desc.aspx?lang=eng&DwnldID=22035
- I2Cx_CLK, I2Cx_DATA: Inter-Integrated Circuit (I^2C) bus interface signals that allow connection of low-speed peripherals. Voltage level I/O for these pins is 3.3V. An I^2C bus specification and user manual may be found at http://www.nxp.com/documents/user_manual/UM10204.pdf.
- SMB_CLK, SMB_DATA, SMB_ALERT#: System Management Bus (SMBus) interface signals. Voltage level I/O for these pins is 3.3 V. General SMBus information can be found on the platform EDS and at http://smbus.org/specs/.

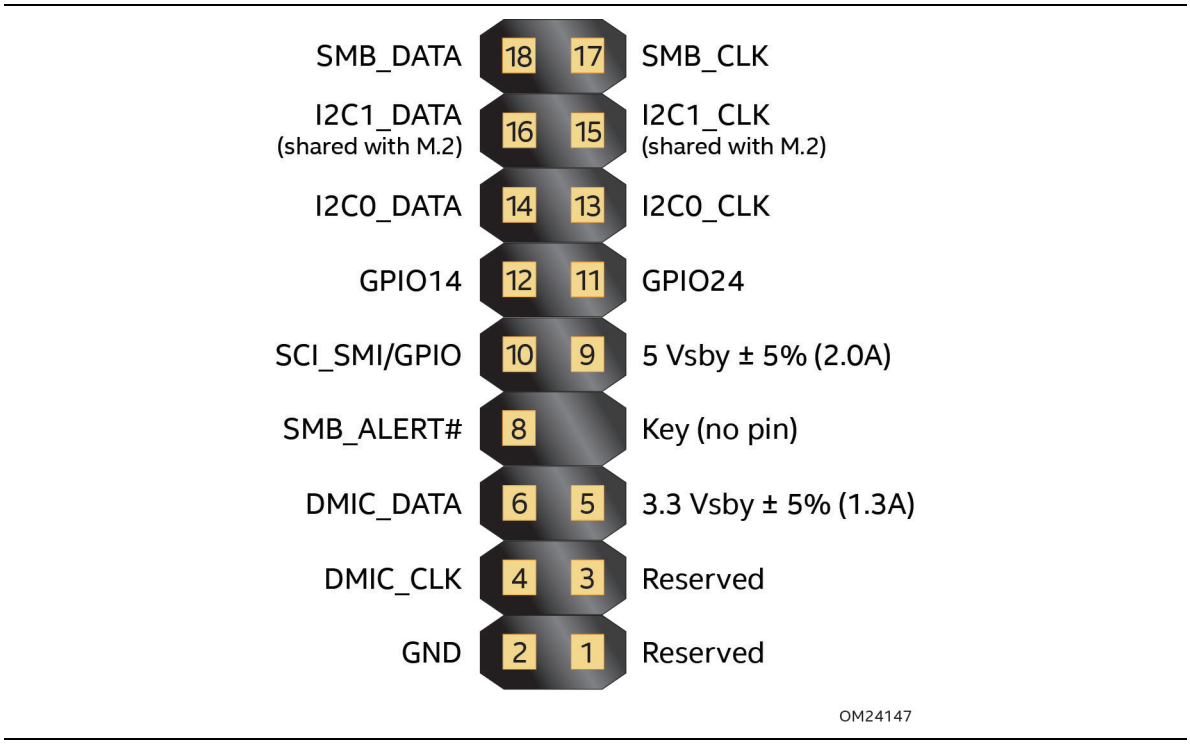


Figure 17. Low Speed Custom Solutions Header

2.2.4.6 High Speed Custom Solutions Connector (0.4 mm Pitch)

The High Speed Customs Solution connector is designed to provide access to additional high speed signals. It provides the equivalent of:

- One PCIe x4 port
- One 6.0 Gbps SATA port

The connector used is the Kyocera Series 6885 0.4 mm pitch FPC connector, p/n 00 6885 640 000 846.

2.2.4.7 Internal USB 2.0 Dual-Port Header (1.25 mm Pitch)

Figure 18 is a connection diagram for the internal USB header.

Connector is Molex part number 53398-0871, 1.25mm Pitch PicoBlade Header, Surface Mount, Vertical, Lead-Free, 8 Circuits.

NOTE

- *The +5 V DC power on the USB header is fused.*
- *Use only an internal USB connector that conforms to the USB 2.0 specification for high-speed USB devices.*

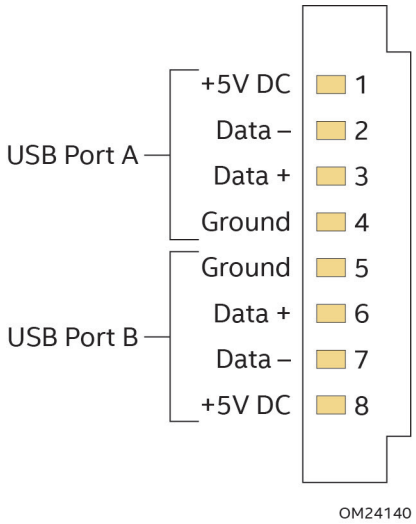


Figure 18. Connection Diagram for Internal USB 2.0 Dual-Port Header (1.25 mm Pitch)

2.3 BIOS Security Jumper

CAUTION

Do not move a jumper with the power on. Always turn off the power and unplug the power cord from the computer before changing a jumper setting. Otherwise, the board could be damaged.

Figure 19 shows the location of the BIOS Security Jumper. The 3-pin jumper determines the BIOS Security program's mode.

Table 33 describes the jumper settings for the three modes: normal, lockdown, and configuration.

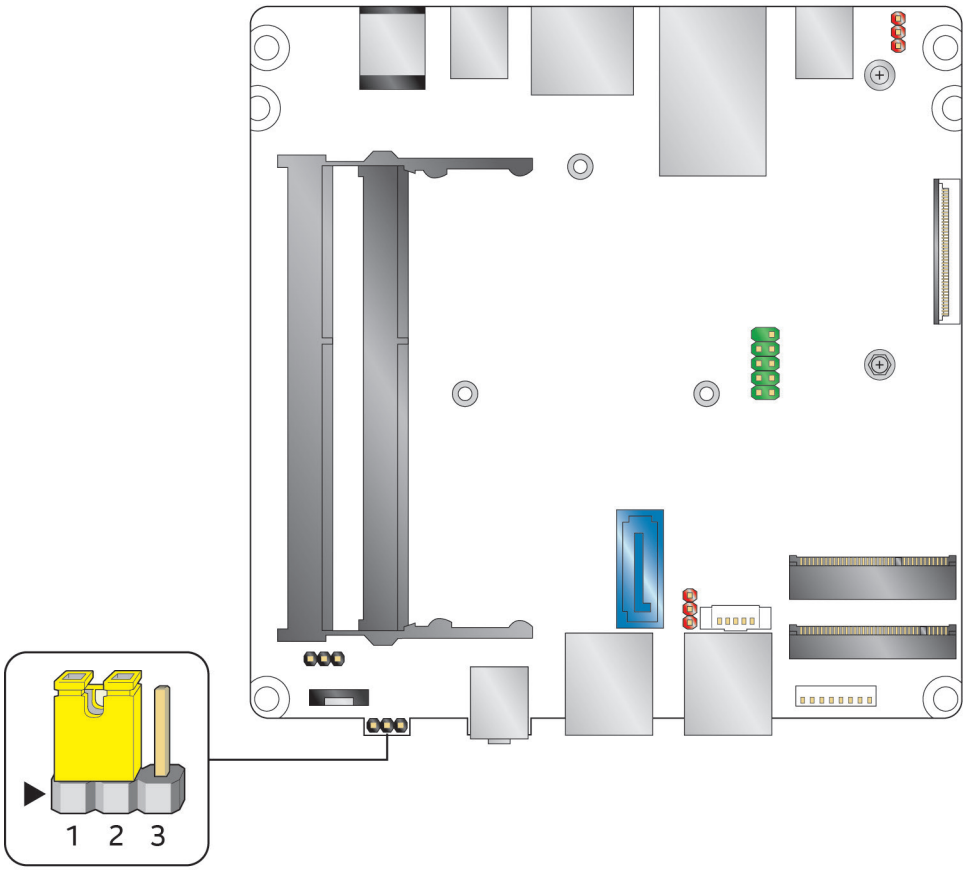


Figure 19. Location of the BIOS Security Jumper

Table 33 lists the settings for the jumper.

Table 33. BIOS Security Jumper Settings

Function/Mode	Jumper Setting	Configuration
Normal	1-2	The BIOS uses current configuration information and passwords for booting.
Lockdown	2-3	The BIOS uses current configuration information and passwords for booting, except: • All POST Hotkeys are suppressed (prompts are not displayed and keys are not accepted. For example, F2 for Setup, F10 for the Boot Menu). • Power Button Menu is not available (see Section 3.7.4 Power Button Menu). BIOS updates are not available except for automatic Recovery due to flash corruption.
Configuration	None	BIOS Recovery Update process if a matching *.bio file is found. Recovery Update can be cancelled by pressing the Esc key. If the Recovery Update was cancelled or a matching *.bio file was not found, a Config Menu will be displayed. The Config Menu consists of the following (followed by the Power Button Menu selections): [1] Suppress this menu until the BIOS Security Jumper is replaced. [2] Clear BIOS User and Supervisor Passwords. [3] Reset Intel® AMT to default factory settings. [4] Clear Trusted Platform Module. Warning: Data encrypted with the TPM will no longer be accessible if the TPM is cleared. [F2] Intel® Visual BIOS. [F4] BIOS Recovery. See Section 3.7.4 Power Button Menu.

2.4 Intel® Management Engine BIOS Extension (Intel® MEBX) Reset Header

The Intel® MEBX reset header (see Figure 20) allows you to reset the Intel ME configuration to the factory defaults. Momentarily shorting pins 1 and 2 with a jumper (not supplied) will accomplish the following:

- Return all Intel ME parameters to their default values.
- Reset the Intel MEBX password to the default value (admin).
- Unconfigure Intel AMT.

CAUTION

Always turn off the power and unplug the power cord from the computer before installing an MEBX reset jumper. The jumper must be removed before reapplying power. The system must be allowed to reach end of POST before reset is complete. Otherwise, the board could be damaged.

NOTE

After using the MEBX Reset, a "CMOS battery failure" warning will occur during the next POST. This is expected and does not indicate a component failure.

NOTE

The MEBX_RESET header has a non-conductive protective cap installed. This must be removed before installing the MEBX_RESET jumper, and reinstalled before reassembling the system. Failure to do so may result in inadvertent shorting of the bottom cover screw to the header during bottom cover reassembly (see Figure 20).

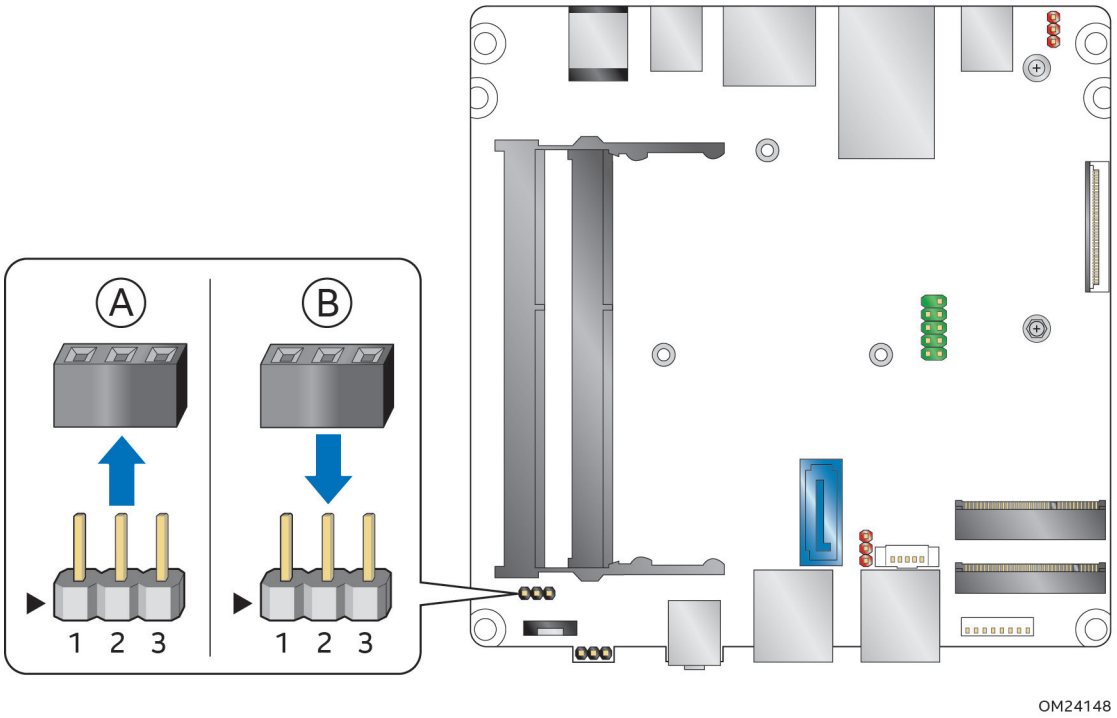


Figure 20. Intel MEBX Reset Header

Table 34. Intel MEBX Reset Header Signals

Pin	Function
1	RTCRST
2	Ground
3	No connection

2.5 Mechanical Considerations

2.5.1 Form Factor

The board is designed to fit into a custom chassis. Figure 21 illustrates the mechanical form factor for the board. Dimensions are given in inches [millimeters]. The outer dimensions are 4.0 inches by 4.0 inches [101.60 millimeters by 101.60 millimeters].

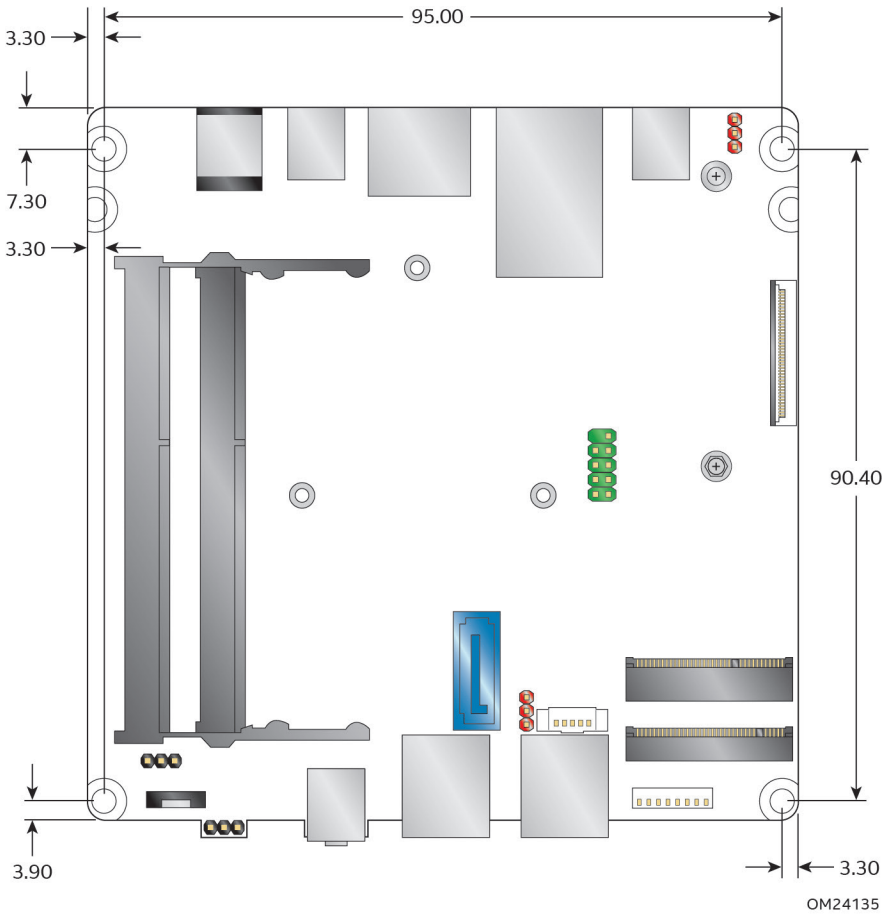


Figure 21. Board Dimensions

Figure 22 shows the height dimensions of the board.

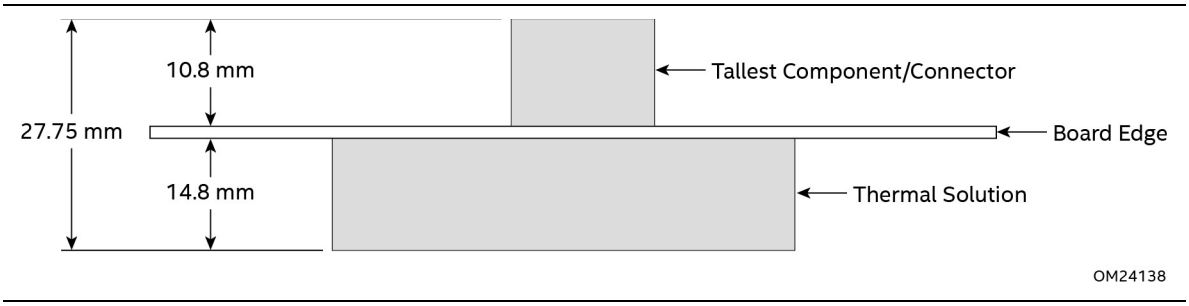


Figure 22. Board Height Dimensions

2.6 Electrical Considerations

2.6.1 Power Supply Considerations

System power requirements will depend on actual system configurations chosen by the integrator, as well as end user expansion preferences. It is the system integrator's responsibility to ensure an appropriate power budget for the system configuration is properly assessed based on the system-level components chosen. See Section 2.2.4.3 Power Supply Connector for more information.

- The back panel input range is 12-19 V DC
- The internal power connector input range is 12-24 V DC

CAUTION

The external 12-19 V DC jack is the primary power input connector of Intel NUC Board NUC5i5MYBE. However, the board also provides an internal 2 x 2 power connector that can be used in custom-developed systems that have an internal power supply. The internal 2 x 2 power connector is a Molex Micro-Fit (3mm pitch), right-angled, 4-pos/dual row connector.

There is no isolation circuitry between the external 12-19 V DC jack and the internal 2 x 2 power connector. It is the system integrator's responsibility to ensure no more than one power supply unit is or can be attached to the board at any time and to ensure the external 12-19 V DC jack is covered if the internal 2 x 2 power connector is to be used. Simultaneous connection of both external and internal power supply units could result in potential damage to the board, power supplies, or other hardware.

2.6.2 Fan Header Current Capability

Table 35 lists the current capability of the fan headers.

Table 35. Fan Header Current Capability

Fan Header	Maximum Available Current
Processor fan	.25 A

2.7 Thermal Considerations

CAUTION

A chassis with a maximum internal ambient temperature of 50 °C at the processor fan inlet is recommended. If the internal ambient temperature exceeds 50 °C, further thermal testing is required to ensure components do not exceed their maximum case temperature.

CAUTION

Failure to ensure appropriate airflow may result in reduced performance of both the processor and/or voltage regulator or, in some instances, damage to the board.

All responsibility for determining the adequacy of any thermal or system design remains solely with the system integrator. Intel makes no warranties or representations that merely following the instructions presented in this document will result in a system with adequate thermal performance.

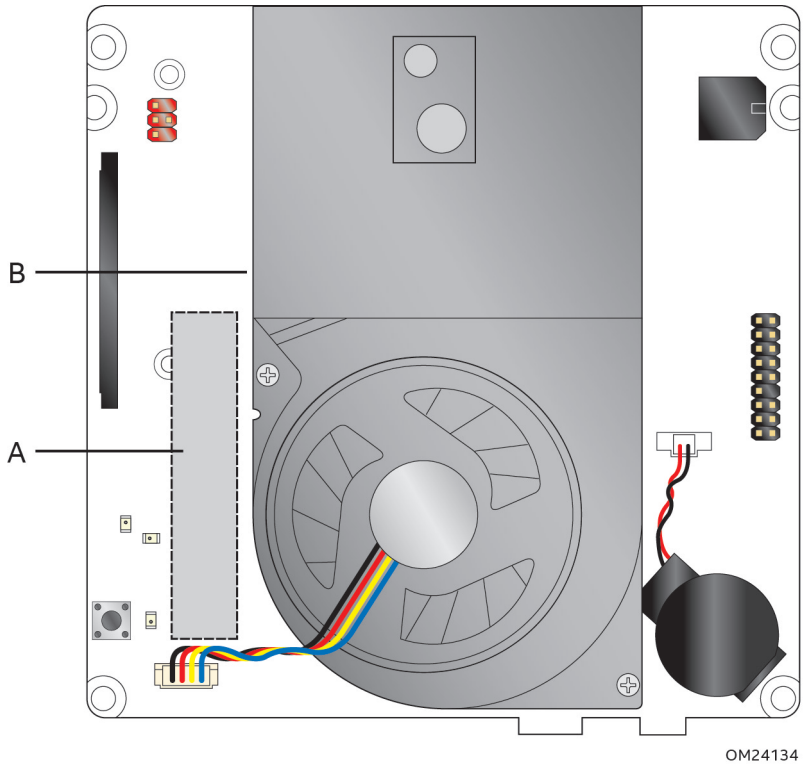
CAUTION

Ensure that the ambient temperature does not exceed the board's maximum operating temperature. Failure to do so could cause components to exceed their maximum case temperature and malfunction. For information about the maximum operating temperature, see the environmental specifications in Section 2.9.

CAUTION

Ensure that proper airflow is maintained in the processor voltage regulator circuit. Failure to do so may result in shorter than expected product lifetime.

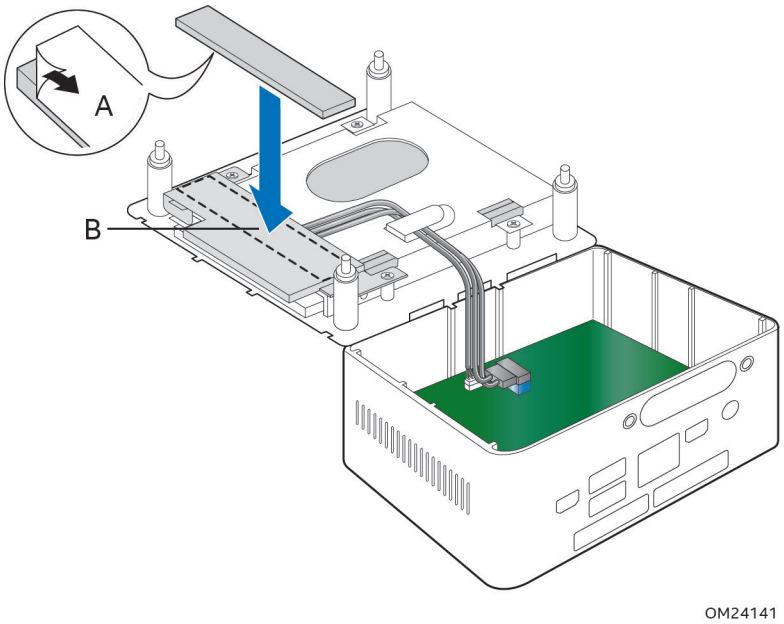
Figure 23 shows the locations of the localized high temperature zones.



Item	Description
A	Processor voltage regulator area
B	Thermal solution

Figure 23. Localized High Temperature Zones

A thermal pad has been installed for the bottom of the chassis to improve the thermal performance when using M.2 devices that operate at higher temperatures. If the thermal pad ever needs to be replaced, Figure 23 shows the installation area of the thermal pad.



Item	Description
A	Thermal Pad
B	Thermal Pad Installation Area

Figure 24. Installation Area of the Thermal Pad

Table 36 provides maximum case temperatures for the components that are sensitive to thermal changes. The operating temperature, current load, or operating frequency could affect case temperatures. Maximum case temperatures are important when considering proper airflow to cool the board.

Table 36. Thermal Considerations for Components

Component	Maximum Case Temperature
Processor	For processor case temperature, see processor datasheets and processor specification updates

To ensure functionality and reliability, the component is specified for proper operation when Case Temperature is maintained at or below the maximum temperature listed in Table 37. This is a requirement for sustained power dissipation equal to Thermal Design Power (TDP is specified as the maximum sustainable power to be dissipated by the components). When the component is dissipating less than TDP, the case temperature should be below the Maximum Case Temperature. The surface temperature at the geometric center of the component corresponds to Case Temperature.

It is important to note that the temperature measurement in the system BIOS is a value reported by embedded thermal sensors in the components and does not directly correspond to the Maximum Case Temperature. The upper operating limit when monitoring this thermal sensor is Tcontrol.

Table 37. Tcontrol Values for Components

Component	Tcontrol
Processor	For processor case temperature, see processor datasheets and processor specification updates

For information about	Refer to
Processor datasheets and specification updates	Section 1.2, page 18

2.8 Reliability

The Mean Time Between Failures (MTBF) prediction is calculated using component and subassembly random failure rates. The calculation is based on the Telcordia SR-332 Issue 2, Method I, Case 3, 55 ºC ambient. The MTBF prediction is used to estimate repair rates and spare parts requirements. The MTBF for Intel NUC Board NUC5i5MYBE is 61,825 hours.

2.9 Environmental

Table 38 lists the environmental specifications for the board.

Table 38. Environmental Specifications

Parameter	Specification		
Temperature			
Non-Operating	-40 °C to +60 °C		
Operating	0 °C to +50 °C The operating temperature of the board may be determined by measuring the air temperature from the junction of the heatsink fins and fan, next to the attachment screw, in a closed chassis, while the system is in operation.		
Shock			
Unpackaged	50 g trapezoidal waveform		
	Velocity change of 170 inches/s²		
Packaged	Half sine 2 millisecond		
	Product Weight (pounds)	Free Fall (inches)	Velocity Change (inches/s²)
	<20	36	167
	21-40	30	152
	41-80	24	136
	81-100	18	118
Vibration			
Unpackaged	5 Hz to 20 Hz: 0.01 g² Hz sloping up to 0.02 g² Hz		
	20 Hz to 500 Hz: 0.02 g² Hz (flat)		
Packaged	5 Hz to 40 Hz: 0.015 g² Hz (flat)		
	40 Hz to 500 Hz: 0.015 g² Hz sloping down to 0.00015 g² Hz		

Note: Before attempting to operate this board, the overall temperature of the board must be above the minimum operating temperature specified. It is recommended that the board temperature be at least room temperature before attempting to power on the board. The operating and non-operating environment must avoid condensing humidity.

3 Overview of BIOS Features

3.1 Introduction

The board uses Intel Visual BIOS that is stored in the Serial Peripheral Interface Flash Memory (SPI Flash) and can be updated using a disk-based program. The SPI Flash contains the Visual BIOS Setup program, POST, the PCI auto-configuration utility, LAN EEPROM information, and Plug and Play support.

The BIOS displays a message during POST identifying the type of BIOS and a revision code. The initial production BIOSs are identified as MYHSWi5v.86A.

The Visual BIOS Setup program can be used to view and change the BIOS settings for the computer. The BIOS Setup program is accessed by pressing the <F2> key after the Power-On Self-Test (POST) memory test begins and before the operating system boot begins.

NOTE

The maintenance menu is displayed only when the board is in configure mode. Section 2.3 on page 62 shows how to put the board in configure mode.

3.2 BIOS Flash Memory Organization

The Serial Peripheral Interface Flash Memory (SPI Flash) includes a 128 Mb flash memory device.

3.3 System Management BIOS (SMBIOS)

SMBIOS is a Desktop Management Interface (DMI) compliant method for managing computers in a managed network.

The main component of SMBIOS is the Management Information Format (MIF) database, which contains information about the computing system and its components. Using SMBIOS, a system administrator can obtain the system types, capabilities, operational status, and installation dates for system components. The MIF database defines the data and provides the method for accessing this information. The BIOS enables applications such as third-party management software to use SMBIOS. The BIOS stores and reports the following SMBIOS information:

- BIOS data, such as the BIOS revision level
- Fixed-system data, such as peripherals, serial numbers, and asset tags
- Resource data, such as memory size, cache size, and processor speed
- Dynamic data, such as event detection and error logging

Non-Plug and Play operating systems require an additional interface for obtaining the SMBIOS information. The BIOS supports an SMBIOS table interface for such operating systems. Using this support, an SMBIOS service-level application running on a non-Plug and Play operating system can obtain the SMBIOS information. Additional board information can be found in the BIOS under the Additional Information header under the Main BIOS page.

3.4 Legacy USB Support

Legacy USB support enables USB devices to be used even when the operating system's USB drivers are not yet available. Legacy USB support is used to access the BIOS Setup program, and to install an operating system that supports USB. By default, Legacy USB support is set to Enabled.

Legacy USB support operates as follows:

1. When you apply power to the computer, legacy support is disabled.
2. POST begins.
3. Legacy USB support is enabled by the BIOS allowing you to use a USB keyboard to enter and configure the BIOS Setup program and the maintenance menu.
4. POST completes.
5. The operating system loads. While the operating system is loading, USB keyboards and mice are recognized and may be used to configure the operating system. (Keyboards and mice are not recognized during this period if Legacy USB support was set to Disabled in the BIOS Setup program.)
6. After the operating system loads the USB drivers, all legacy and non-legacy USB devices are recognized by the operating system, and Legacy USB support from the BIOS is no longer used.
7. Additional USB legacy feature options can be access by using Intel® Integrator Toolkit.

To install an operating system that supports USB, verify that Legacy USB support in the BIOS Setup program is set to Enabled and follow the operating system's installation instructions.

3.5 BIOS Updates

The BIOS can be updated using one of the following methods:

- Intel® Express BIOS Update utility, which enables automated updating while in the Windows environment. Using this utility, the BIOS can be updated from a file on a hard disk, a USB drive (a flash drive or a USB hard drive), or a CD-ROM, or from the file location on the Web.
- Intel® Flash Memory Update Utility, which requires booting from DOS. Using this utility, the BIOS can be updated from a file on a hard disk, a USB drive (a flash drive or a USB hard drive), or a CD-ROM.
- Intel® F7 switch during POST allows a user to select where the BIOS .bio file is located and perform the update from that location/device. Similar to performing a BIOS Recovery without removing the BIOS configuration jumper.
- Intel® Visual BIOS has an option to update the BIOS from a valid .bio file located on a hard disk or USB drive. Enter Intel Visual BIOS by pressing <F2> during POST.

Both utilities verify that the updated BIOS matches the target system to prevent accidentally installing an incompatible BIOS.

NOTE

Review the instructions distributed with the upgrade utility before attempting a BIOS update.

For information about	Refer to
BIOS update utilities	http://support.intel.com/support/motherboards/desktop/sb/CS-034499.htm

3.5.1 Language Support

The BIOS Setup program and help messages are supported in US English. Check the Intel web site for support.

3.5.2 Custom Splash Screen

During POST, an Intel® splash screen is displayed by default. This splash screen can be augmented with a custom splash screen. The Intel Integrator's Toolkit that is available from Intel can be used to create a custom splash screen.

NOTE

If you add a custom splash screen, it will share space with the Intel branded logo.

For information about	Refer to
Intel Integrator Toolkit	http://developer.intel.com/design/motherbd/software/itk/
Additional Intel® software tools	http://developer.intel.com/design/motherbd/software.htm

3.6 BIOS Recovery

It is unlikely that anything will interrupt a BIOS update; however, if an interruption occurs, the BIOS could be damaged. Table 39 lists the drives and media types that can and cannot be used for BIOS recovery. The BIOS recovery media does not need to be made bootable.

Table 39. Acceptable Drives/Media Types for BIOS Recovery

Media Type (Note)	Can be used for BIOS recovery?
Hard disk drive (connected to SATA or USB)	Yes
CD/DVD drive (connected to SATA or USB)	Yes
USB flash drive	Yes
USB diskette drive (with a 1.4 MB diskette)	No (BIOS update file is bigger than 1.4 MB size limit)

NOTE

Supported file systems for BIOS recovery:

- *NTFS (sparse, compressed, or encrypted files are not supported)*
- *FAT32*
- *FAT16*
- *FAT12*
- *ISO 9660*

For information about	Refer to
BIOS recovery	http://www.intel.com/support/motherboards/desktop/sb/cs-034524.htm

3.7 Boot Options

In the BIOS Setup program, the user can choose to boot from a hard drive, optical drive, removable drive, or the network. The default setting is for the optical drive to be the first boot device, the hard drive second, removable drive third, and the network fourth.

3.7.1 Network Boot

The network can be selected as a boot device. This selection allows booting from the onboard LAN or a network add-in card with a remote boot ROM installed.

Pressing the <F12> key during POST automatically forces booting from the LAN. To use this key during POST, the User Access Level in the BIOS Setup program's Security menu must be set to Full.

3.7.2 Booting Without Attached Devices

For use in embedded applications, the BIOS has been designed so that after passing the POST, the operating system loader is invoked even if the following devices are not present:

- Video adapter
- Keyboard
- Mouse

3.7.3 Changing the Default Boot Device During POST

Pressing the <F10> key during POST causes a boot device menu to be displayed. This menu displays the list of available boot devices. Table 40 lists the boot device menu options.

Table 40. Boot Device Menu Options

Boot Device Menu Function Keys	Description
<↑> or <↓>	Selects a default boot device
<Enter>	Exits the menu, and boots from the selected device
<Esc>	Exits the menu and boots according to the boot priority defined through BIOS setup

3.7.4 Power Button Menu

As an alternative to Back-to-BIOS Mode or normal POST Hotkeys, the user can use the power button to access a menu. The Power Button Menu is accessible via the following sequence:

1. System is in S4/S5 (Not G3)
2. User pushes the power button and holds it down for 3 seconds
3. The system will emit three short beeps from the Front Panel (FP) audio port, then stop to signal the user to release the power button. The FP power button LED will also change from White to Amber when the user can release the power button.
4. User releases the power button before the 4-second shutdown override

If this boot path is taken, the BIOS will use default settings, ignoring settings in VPD where possible.

At the point where Setup Entry/Boot would be in the normal boot path, the BIOS will display the following prompt and wait for a keystroke:

[ESC] Normal Boot
[F2] Intel Visual BIOS
[F3] Disable Fast Boot
[F4] BIOS Recovery
[F7] Update BIOS
[F9] Remote Assistance
[F10] Enter Boot Menu
[F12] Network Boot

[F2] Enter Setup is displayed instead if Visual BIOS is not supported.

[F3] Disable Fast Boot is only displayed if at least one Fast Boot optimization is enabled.

[F9] Remote Assistance is only displayed if Remote Assistance is supported.

If an unrecognized key is hit, then the BIOS will beep and wait for another keystroke. If one of the listed hotkeys is hit, the BIOS will follow the indicated boot path. Password requirements must still be honored.

If Disable Fast Boot is selected, the BIOS will disable all Fast Boot optimizations and reset the system.

3.8 Hard Disk Drive Password Security Feature

The Hard Disk Drive Password Security feature blocks read and write accesses to the hard disk drive until the correct password is given. Hard Disk Drive Passwords are set in BIOS SETUP and are prompted for during BIOS POST. For convenient support of S3 resume, the system BIOS will automatically unlock drives on resume from S3. Valid password characters are A-Z, a-z, and 0-9. Passwords may be up to 19 characters in length.

The User hard disk drive password, when installed, will be required upon each power-cycle until the Master Key or User hard disk drive password is submitted.

The Master Key hard disk drive password, when installed, will not lock the drive. The Master Key hard disk drive password exists as an unlock override in the event that the User hard disk drive password is forgotten. Only the installation of the User hard disk drive password will cause a hard disk to be locked upon a system power-cycle.

Table 41 shows the effects of setting the Hard Disk Drive Passwords.

Table 41. Master Key and User Hard Drive Password Functions

Password Set	Password During Boot
Neither	None
Master only	None
User only	User only
Master and User Set	Master or User

During every POST, if a User hard disk drive password is set, POST execution will pause with the following prompt to force the user to enter the Master Key or User hard disk drive password:

Enter Hard Disk Drive Password:

Upon successful entry of the Master Key or User hard disk drive password, the system will continue with normal POST.

If the hard disk drive password is not correctly entered, the system will go back to the above prompt. The user will have three attempts to correctly enter the hard disk drive password. After the third unsuccessful hard disk drive password attempt, the system will halt with the message:

Hard Disk Drive Password Entry Error

A manual power cycle will be required to resume system operation.

NOTE

As implemented on Intel NUC Board NUC5i5MYBE, Hard Disk Drive Password Security is only supported on either SATA Port 0 (M.2) or SATA Port 1 (onboard SATA connector). The passwords are stored on the hard disk drive so if the drive is relocated to another computer that does not support Hard Disk Drive Password Security feature, the drive will not be accessible.

3.9 BIOS Security Features

The BIOS includes security features that restrict access to the BIOS Setup program and who can boot the computer. A supervisor password and a user password can be set for the BIOS Setup program and for booting the computer, with the following restrictions:

- The supervisor password gives unrestricted access to view and change all the Setup options in the BIOS Setup program. This is the supervisor mode.
- The user password gives restricted access to view and change Setup options in the BIOS Setup program. This is the user mode.
- If only the supervisor password is set, pressing the <Enter> key at the password prompt of the BIOS Setup program allows the user restricted access to Setup.
- If both the supervisor and user passwords are set, users can enter either the supervisor password or the user password to access Setup. Users have access to Setup respective to which password is entered.
- Setting the user password restricts who can boot the computer. The password prompt will be displayed before the computer is booted. If only the supervisor password is set, the computer boots without asking for a password. If both passwords are set, the user can enter either password to boot the computer.
- For enhanced security, use different passwords for the supervisor and user passwords.
- Valid password characters are A-Z, a-z, and 0-9. Passwords may be up to 16 characters in length.
- To clear a set password, enter a blank password after entering the existing password.

Table 42 shows the effects of setting the supervisor password and user password. This table is for reference only and is not displayed on the screen.

Table 42. Supervisor and User Password Functions

Password Set	Supervisor Mode	User Mode	Setup Options	Password to Enter Setup	Password During Boot
Neither	Can change all options (Note)	Can change all options (Note)	None	None	None
Supervisor only	Can change all options	Can change a limited number of options	Supervisor Password	Supervisor	None
User only	N/A	Can change all options	Enter Password Clear User Password	User	User
Supervisor and user set	Can change all options	Can change a limited number of options	Supervisor Password Enter Password	Supervisor or user	Supervisor or user

Note: If no password is set, any user can change all Setup options.

4 Error Messages and Blink Codes

4.1 Front-panel Power LED Blink Codes

Whenever a recoverable error occurs during POST, the BIOS causes the board's front panel power LED to blink an error message describing the problem (see Table 43).

Table 43. Front-panel Power LED Blink Codes

Type	Pattern	Note
BIOS update in progress	Off when the update begins, then on for 0.5 seconds, then off for 0.5 seconds. The pattern repeats until the BIOS update is complete.	
Video error (Note)	On-off (1.0 second each) two times, then 2.5-second pause (off), entire pattern repeats (blink and pause) until the system is powered off.	When no VGA option ROM is found.
Memory error	On-off (1.0 second each) three times, then 2.5-second pause (off), entire pattern repeats (blinks and pause) until the system is powered off.	
Thermal trip warning	Each beep will be accompanied by the following blink pattern: .25 seconds on, .25 seconds off, .25 seconds on, .25 seconds off. This will result in a total of 16 blinks.	

Note: Disabled per default BIOS setup option.

4.2 BIOS Error Messages

Table 44 lists the error messages and provides a brief description of each.

Table 44. BIOS Error Messages

Error Message	Explanation
CMOS Battery Low	The battery may be losing power. Replace the battery soon.
CMOS Checksum Bad	The CMOS checksum is incorrect. CMOS memory may have been corrupted. Run Setup to reset values.
Memory Size Decreased	Memory size has decreased since the last boot. If no memory was removed, then memory may be bad.
No Boot Device Available	System did not find a device to boot.

5 Regulatory Compliance and Battery Disposal Information

5.1 Regulatory Compliance

This section contains the following regulatory compliance information for Intel NUC Board NUC5i5MYBE:

- Safety standards
- European Union Declaration of Conformity statement
- Product Ecology statements
- Electromagnetic Compatibility (EMC) standards
- Product certification markings

5.1.1 Safety Standards

Intel NUC Board NUC5i5MYBE complies with the safety standards stated in Table 45 when correctly installed in a compatible host system.

Table 45. Safety Standards

Standard	Title
CSA/UL 60950-1	Information Technology Equipment – Safety - Part 1: General Requirements (USA and Canada)
EN 60950-1	Information Technology Equipment – Safety - Part 1: General Requirements (European Union)
IEC 60950-1	Information Technology Equipment – Safety - Part 1: General Requirements (International)

5.1.2 European Union Declaration of Conformity Statement

We, Intel Corporation, declare under our sole responsibility that the products Intel® NUC Board NUC5i5MYBE is in conformity with all applicable essential requirements necessary for CE marking, following the provisions of the European Council Directive 2004/108/EC (EMC Directive), 2006/95/EC (Low Voltage Directive), and 2011/65/EU (ROHS Directive).

The product is properly CE marked demonstrating this conformity and is for distribution within all member states of the EU with no restrictions.

This product follows the provisions of the European Directives 2004/108/EC, 2006/95/EC, and 2011/65/EU.

Čeština Tento výrobek odpovídá požadavkům evropských směrnic 2004/108/EC, 2006/95/EC a 2002/95/EC.

Dansk Dette produkt er i overensstemmelse med det europæiske direktiv 2004/108/EC, 2006/95/EC & 2002/95/EC.

Dutch Dit product is in navolging van de bepalingen van Europees Directief 2004/108/EC, 2006/95/EC & 2002/95/EC.

Eesti Antud toode vastab Euroopa direktiivides 2004/108/EC, ja 2006/95/EC ja 2002/95/EC kehtestatud nõuetele.

Suomi Tämä tuote noudattaa EU-direktiivin 2004/108/EC, 2006/95/EC & 2002/95/EC määräyksiä.

Français Ce produit est conforme aux exigences de la Directive Européenne 2004/108/EC, 2006/95/EC & 2002/95/EC.

Deutsch Dieses Produkt entspricht den Bestimmungen der Europäischen Richtlinie 2004/108/EC, 2006/95/EC & 2002/95/EC.

Ελληνικά Το παρόν προϊόν ακολουθεί τις διατάξεις των Ευρωπαϊκών Οδηγιών 2004/108/EC, 2006/95/EC και 2002/95/EC.

Magyar E termék megfelel a 2004/108/EC, 2006/95/EC és 2002/95/EC Európai Irányelv előírásainak.

Icelandic Þessi vara stenst reglugerð Evrópska Efnahags Bandalagsins númer 2004/108/EC, 2006/95/EC, & 2002/95/EC.

Italiano Questo prodotto è conforme alla Direttiva Europea 2004/108/EC, 2006/95/EC & 2002/95/EC.

Latviešu Šis produkts atbilst Eiropas Direktīvu 2004/108/EC, 2006/95/EC un 2002/95/EC noteikumiem.

Lietuvių Šis produktas atitinka Europos direktyvų 2004/108/EC, 2006/95/EC, ir 2002/95/EC nuostatas.

Malti Dan il-prodott hu konformi mal-provvedimenti tad-Direttivi Ewropej 2004/108/EC, 2006/95/EC u 2002/95/EC.

Norsk Dette produktet er i henhold til bestemmelsene i det europeiske direktivet 2004/108/EC, 2006/95/EC & 2002/95/EC.

Polski Niniejszy produkt jest zgodny z postanowieniami Dyrektyw Unii Europejskiej 2004/108/EC, 206/95/EC i 2002/95/EC.

Portuguese Este produto cumpre com as normas da Diretiva Européia 2004/108/EC, 2006/95/EC & 2002/95/EC.

Español Este producto cumple con las normas del Directivo Europeo 2004/108/EC, 2006/95/EC & 2002/95/EC.

Slovensky Tento produkt je v súlade s ustanoveniami európskych direktív 2004/108/EC, 2006/95/EC a 2002/95/EC.

Slovenščina Izdelek je skladen z določbami evropskih direktiv 2004/108/EC, 2006/95/EC in 2002/95/EC.

Svenska Denna produkt har tillverkats i enlighet med EG-direktiv 2004/108/EC, 2006/95/EC & 2002/95/EC.

Türkçe Bu ürün, Avrupa Birliği'nin 2004/108/EC, 2006/95/EC ve 2002/95/EC yönergelerine uyar.

5.1.3 EMC Regulations

Intel NUC Board NUC5i5MYBE complies with the EMC regulations stated in Table 46 when correctly installed in a compatible host system.

Table 46. EMC Regulations

Regulation	Title
FCC 47 CFR Part 15, Subpart B	Title 47 of the Code of Federal Regulations, Part 15, Subpart B, Radio Frequency Devices. (USA)
ICES-003	Interference-Causing Equipment Standard, Digital Apparatus. (Canada)
EN55022	Limits and methods of measurement of Radio Interference Characteristics of Information Technology Equipment. (European Union)
EN55024	Information Technology Equipment – Immunity Characteristics Limits and methods of measurement. (European Union)
EN55022	Australian Communications Authority, Standard for Electromagnetic Compatibility. (Australia and New Zealand)
CISPR 22	Limits and methods of measurement of Radio Disturbance Characteristics of Information Technology Equipment. (International)
CISPR 24	Information Technology Equipment – Immunity Characteristics – Limits and Methods of Measurement. (International)
VCCI V-3, V-4	Voluntary Control for Interference by Information Technology Equipment. (Japan)
KN-22, KN-24	Korean Communications Commission – Framework Act on Telecommunications and Radio Waves Act (South Korea)
CNS 13438	Bureau of Standards, Metrology, and Inspection (Taiwan)

FCC Declaration of Conformity

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

For questions related to the EMC performance of this product, contact:

Intel Corporation, 5200 N.E. Elam Young Parkway, Hillsboro, OR 97124
1-800-628-8686

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment to an outlet on a circuit other than the one to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Any changes or modifications to the equipment not expressly approved by Intel Corporation could void the user's authority to operate the equipment.

Tested to comply with FCC standards for home or office use.

Canadian Department of Communications Compliance Statement

This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le présent appareil numerique német pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe B prescrites dans le Réglement sur le broullage radioélectrique édicté par le ministére des Communications du Canada.

Japan VCCI Statement

Japan VCCI Statement translation: This is a Class B product based on the standard of the Voluntary Control Council for Interference from Information Technology Equipment (VCCI). If this is used near a radio or television receiver in a domestic environment, it may cause radio interference. Install and use the equipment according to the instruction manual.

この装置は、情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）の基準に基づくクラスＢ情報技術装置です。この装置は、家庭環境で使用することを目的としていますが、この装置がラジオやテレビジョン受信機に近接して使用されると、受信障害を引き起こすことがあります。
取扱説明書に従って正しい取り扱いをして下さい。

Korea Class B Statement

Korea Class B Statement translation: This equipment is for home use, and has acquired electromagnetic conformity registration, so it can be used not only in residential areas, but also other areas.

이 기기는 가정용(B급) 전자파적합기기로서 주 로 가정에서 사용하는 것을 목적으로 하며, 모 든 지역에서 사용할 수 있습니다.

5.1.4 e-Standby and ErP Compliance

Intel NUC Board NUC5i5MYBE meets the following program requirements in an adequate system configuration, including appropriate selection of an efficient power supply:

- EPEAT*
- Korea e-Standby
- European Union Energy-related Products Directive 2013 (ErP) Lot 6

For information about	Refer to
Electronic Product Environmental Assessment Tool (EPEAT)	http://www.epeat.net/
Korea e-Standby Program	http://www.kemco.or.kr/new_eng/pg02/pg02100300.asp
European Union Energy-related Products Directive 2009 (ErP)	http://ec.europa.eu/enterprise/policies/sustainable-business/sustainable-product-policy/ecodesign/index_en.htm

5.1.5 Regulatory Compliance Marks (Board Level)

Intel NUC Board NUC5i5MYBE has the regulatory compliance marks shown in Table 47.

Table 47. Regulatory Compliance Marks

Description	Mark
UL joint US/Canada Recognized Component mark. Includes adjacent UL file number for Intel NUC: E210882.	
FCC Declaration of Conformity logo mark for Class B equipment.	
CE mark. Declaring compliance to the European Union (EU) EMC directive, Low Voltage directive, and RoHS directive. For CE Mark-Related Questions: Intel Corporation Attn: Corporate Quality 2200 Mission College Blvd. Santa Clara, CA 95054-1549 USA	
Australian Communications Authority (ACA) and New Zealand Radio Spectrum Management (NZ RSM) C-tick mark. Includes adjacent Intel supplier code number, N-232.	
Japan VCCI (Voluntary Control Council for Interference) mark.	
Korea Certification mark. Includes an adjacent MSIP (Ministry of Science, ICT & Future Planning) certification number: MSIP-REM-CPU-NUC5i5MYBE	
Taiwan BSMI (Bureau of Standards, Metrology and Inspections) mark. Includes adjacent Intel company number, D33025.	
Printed wiring board manufacturer's recognition mark. Consists of a unique UL recognized manufacturer's logo, along with a flammability rating (solder side).	V-0
China RoHS/Environmentally Friendly Use Period Logo: This is an example of the symbol used on Intel NUC and associated collateral. The color of the mark may vary depending upon the application. The Environmental Friendly Usage Period (EFUP) for Intel NUC has been determined to be 10 years.	

5.2 Battery Disposal Information

CAUTION

Risk of explosion if the battery is replaced with an incorrect type. Batteries should be recycled where possible. Disposal of used batteries must be in accordance with local environmental regulations.

PRÉCAUTION

Risque d'explosion si la pile usagée est remplacée par une pile de type incorrect. Les piles usagées doivent être recyclées dans la mesure du possible. La mise au rebut des piles usagées doit respecter les réglementations locales en vigueur en matière de protection de l'environnement.

FORHOLDSREGEL

Eksplosionsfare, hvis batteriet erstattes med et batteri af en forkert type. Batterier bør om muligt genbruges. Bortskaffelse af brugte batterier bør foregå i overensstemmelse med gældende miljølovgivning.

OBS!

Det kan oppstå eksplosjonsfare hvis batteriet skiftes ut med feil type. Brukte batterier bør kastes i henhold til gjeldende miljølovgivning.

VIKTIGT!

Risk för explosion om batteriet ersätts med felaktig batterityp. Batterier ska kasseras enligt de lokala miljövårdsbestämmelserna.

VARO

Räjähdysvaara, jos pariston tyyppi on väärä. Paristot on kierrätettävä, jos se on mahdollista. Käytetyt paristot on hävitettävä paikallisten ympäristömääräysten mukaisesti.

VORSICHT

Bei falschem Einsetzen einer neuen Batterie besteht Explosionsgefahr. Die Batterie darf nur durch denselben oder einen entsprechenden, vom Hersteller empfohlenen Batterietyp ersetzt werden. Entsorgen Sie verbrauchte Batterien den Anweisungen des Herstellers entsprechend.

AVVERTIMENTO

Esiste il pericolo di un esplosione se la pila non viene sostituita in modo corretto. Utilizzare solo pile uguali o di tipo equivalente a quelle consigliate dal produttore. Per disfarsi delle pile usate, seguire le istruzioni del produttore.

PRECAUCIÓN

Existe peligro de explosión si la pila no se cambia de forma adecuada. Utilice solamente pilas iguales o del mismo tipo que las recomendadas por el fabricante del equipo. Para deshacerse de las pilas usadas, siga igualmente las instrucciones del fabricante.

WAARSCHUWING

Er bestaat ontploffingsgevaar als de batterij wordt vervangen door een onjuist type batterij. Batterijen moeten zoveel mogelijk worden gerecycled. Houd u bij het weggooien van gebruikte batterijen aan de plaatselijke milieuwetgeving.

ATENÇÃO

Haverá risco de explosão se a bateria for substituída por um tipo de bateria incorreto. As baterias devem ser recicladas nos locais apropriados. A eliminação de baterias usadas deve ser feita de acordo com as regulamentações ambientais da região.

AŚCIAROŽZNAŚĆ

Існуе рызыка выбуху, калі заменены акумулятар неправільнага тыпу. Акумулятары павінны, па магчымасці, перепрацоўвацца. Пазбаўляцца ад старых акумулятараў патрэбна згодна з мясцовым заканадаўствам па экалогіі.

UPOZORNÌNÍ

V případě výměny baterie za nesprávný druh může dojít k výbuchu. Je-li to možné, baterie by měly být recyklovány. Baterie je třeba zlikvidovat v souladu s místními předpisy o životním prostředí.

Προσοχή

Υπάρχει κίνδυνος για έκρηξη σε περίπτωση που η μπαταρία αντικατασταθεί από μία λανθασμένου τύπου. Οι μπαταρίες θα πρέπει να ανακυκλώνονται όταν κάτι τέτοιο είναι δυνατό. Η απόρριψη των χρησιμοποιημένων μπαταριών πρέπει να γίνεται σύμφωνα με τους κατά τόπο περιβαλλοντικούς κανονισμούς.

VIGYÁZAT

Ha a telepet nem a megfelelő típusú telepre cseréli, az felrobbanhat. A telepeket lehetőség szerint újra kell hasznosítani. A használt telepeket a helyi környezetvédelmi előírásoknak megfelelően kell kiselejtezni.

注意

異なる種類の電池を使用すると、爆発の危険があります。リサイクルが可能な地域であれば、電池をリサイクルしてください。使用後の電池を破棄する際には、地域の環境規制に従ってください。

AWAS

Risiko letupan wujud jika bateri digantikan dengan jenis yang tidak betul. Bateri sepatutnya dikitar semula jika boleh. Pelupusan bateri terpakai mestilah mematuhi peraturan alam sekitar tempatan.

OSTRZEŻENIE

Istnieje niebezpieczeństwo wybuchu w przypadku zastosowania niewłaściwego typu baterii. Zużyte baterie należy w miarę możliwości utylizować zgodnie z odpowiednimi przepisami ochrony środowiska.

PRECAUŢIE

Risc de explozie, dacă bateria este înlocuită cu un tip de baterie necorespunzător. Bateriile trebuie reciclate, dacă este posibil. Depozitarea bateriilor uzate trebuie să respecte reglementările locale privind protecţia mediului.

ВНИМАНИЕ

При использовании батареи несоответствующего типа существует риск ее взрыва. Батареи должны быть утилизированы по возможности. Утилизация батарей должна проводится по правилам, соответствующим местным требованиям.

UPOZORNENIE

Ak batériu vymeníte za nesprávny typ, hrozí nebezpečenstvo jej výbuchu.
Batérie by sa mali podľa možnosti vždy recyklovať. Likvidácia použitých batérií sa musí vykonávať v súlade s miestnymi predpismi na ochranu životného prostredia.

POZOR

Zamenjava baterije z baterijo drugačnega tipa lahko povzroči eksplozijo.
Če je mogoče, baterije reciklirajte. Rabljene baterije zavrzite v skladu z lokalnimi okoljevarstvenimi predpisi.

คำเตือน

ระวังการระเบิดที่เกิดจากเปลี่ยนแบตเตอรี่ผิดประเภท หากเป็นไปได้ ควรนำแบตเตอรี่ไปรีไซเคิล การทิ้งแบตเตอรี่ใช้แล้วต้องเป็นไปตามกฎข้อบังคับด้านสิ่งแวดล้อมของท้องถิ่น.

UYARI

Yanlış türde pil takıldığında patlama riski vardır. Piller mümkün olduğunda geri dönüştürülmelidir. Kullanılmış piller, yerel çevre yasalarına uygun olarak atılmalıdır.

ОСТОРОГА

Використовуйте батареї правильного типу, інакше існуватиме ризик вибуху.
Якщо можливо, використані батареї слід утилізувати. Утилізація використаних батарей має бути виконана згідно місцевих норм, що регулюють охорону довкілля.

UPOZORNĚNÍ

V případě výměny baterie za nesprávný druh může dojít k výbuchu. Je-li to možné, baterie by měly být recyklovány. Baterie je třeba zlikvidovat v souladu s místními předpisy o životním prostředí.

ETTEVAATUST

Kui patarei asendatakse uue ebasobivat tüüpi patareiga, võib tekkida plahvatusoht. Tühjad patareid tuleb võimaluse korral viia vastavasse kogumispunkti. Tühjade patareide äraviskamisel tuleb järgida kohalikke keskkonnakaitse alaseid reegleid.

FIGYELMEZTETÉS

Ha az elemet nem a megfelelő típusúra cseréli, felrobbanhat. Az elemeket lehetőség szerint újra kell hasznosítani. A használt elemeket a helyi környezetvédelmi előírásoknak megfelelően kell kiselejtezni.

UZMANĪBU

Pastāv eksplozijas risks, ja baterijas tiek nomainītas ar nepareiza veida baterijām. Ja iespējams, baterijas vajadzētu nodot attiecīgos pieņemšanas punktos. Bateriju izmešanai atkritumos jānotiek saskaņā ar vietējiem vides aizsardzības noteikumiem.

DĖMESIO

Naudojant netinkamo tipo baterijas įrenginys gali sprogti. Kai tik įmanoma, baterijas reikia naudoti pakartotinai. Panaudotas baterijas išmesti būtina pagal vietinius aplinkos apsaugos nuostatus.

ATTENZJONI

Riskju ta' splużjoni jekk il-batterija tinbidel b'tip ta' batterija mhux korrett. Il-batteriji għandhom jiġu riċiklati fejn hu possibbli. Ir-rimi ta' batteriji użati għandu jsir skond ir-regolamenti ambjentali lokali.

OSTRZEŻENIE

Ryzyko wybuchu w przypadku wymiany na baterie niewłaściwego typu. W miarę możliwości baterie należy poddać recyklingowi. Zużytych baterii należy pozbywać się zgodnie z lokalnie obowiązującymi przepisami w zakresie ochrony środowiska.