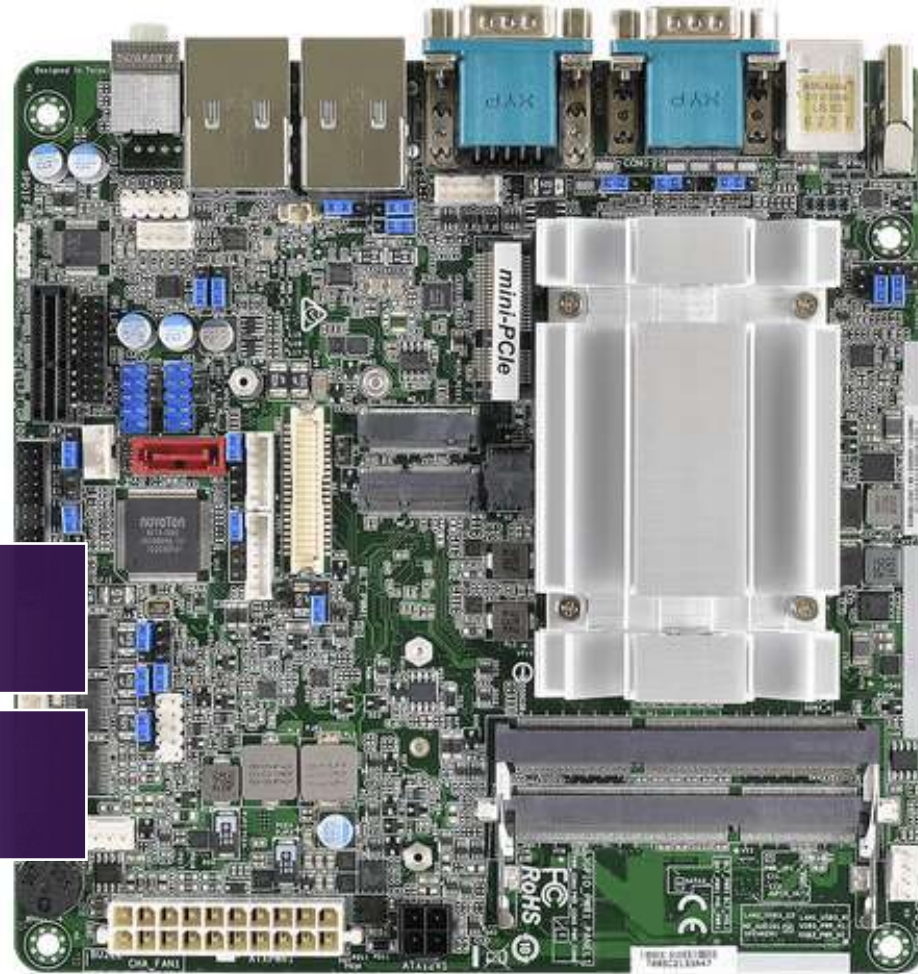


WADE-8172

WADE-8172

Industrial Mini-ITX Board

Version 1.7



Revision History

R1.0	Preliminary
R1.1	Update USB_2_4_5 & USB_2_6_7 jumper setting
R1.2	Update USB Port5 _S_MPCIE slot USB Port7 _S_M.2_2 slot
R1.3	Remove Extra AddOn ROM Display item
R1.4	Remove support PET item
R1.5	Remove support PBT(Portwell BIOS web Tool) information
R1.6	Update memory information
R1.7	Update Operating temperature information

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Preface

This user's guide provides information about the components, features, connectors and BIOS Setup menus available on the WADE-8172. This document should be referred to when designing Mini-ITX application. The other reference documents that should be used include the following:

- ✧ Intel Apollo Lake Design Guide
- ✧ Intel Apollo Lake I Specification

Please contact Portwell Sales Representative for above documents.

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1 Introduction

The WADE-8172, designed with Apollo Lake Intel Atom processor E3900 series or N3350 / N4200 processor , features two DDR3L 1333/1600/1866 MHz SO-DIMM socket equipped with up to 8GB DDR3L memory.

Atom solution is still popular in the market of Kiosk, Panel PC, Digital Security and Digital Signage which can fulfill most of these applications; therefore, with high performance and high-end specifications, Apollo Lake SoC is our first generation Atom chip architecture on Mini-ITX line.

2 Specifications

Main Processor	◆Intel® Apollo lake SoC Processors
System BIOS	◆AMI UEFI BIOS
Main Memory	◆Up to 8GB in 2 slots DDR3L SO-DIMM sockets. Supports dual channel DDR3L 1867 MHz SDRAM
Graphics	<ul style="list-style-type: none"> ◆Controller: Intel® HD Graphics 50X series ◆VGA: Supports VGA up to resolution 1920 x 1200 ◆LVDS: Supports Dual Channel 24bit up to resolution 1920 x 1200 ◆HDMI: Supports HDMI up to resolution 4096x 2160@ 24Hz
Expansion Interface	<ul style="list-style-type: none"> ◆One Mini-PCle socket ◆Two M.2 socket(Key M & Key E)
SATA Interface	◆One SATA ports(SATA 6Gb/s)
Input/Output	<ul style="list-style-type: none"> ◆Serial Ports: 3 x RS-232 on board & 3 x RS-232/422/485 on Rear I/O ◆Support Keyboard and PS/2 mouse connector (Rear I/O) ◆USB Port: 4 x USB 3.0 & 4 x USB 2.0 ◆Audio Interface: Connector for Mic-In and Line-Out
Ethernet	◆Supports dual 10/100/1000 Mbps Ethernet port (s) via PCI Express x1 bus which provides 500 MB/s data transmission rate
High Drive GPIO	◆One pin-header for GPIO(8bit in & 8bit out)

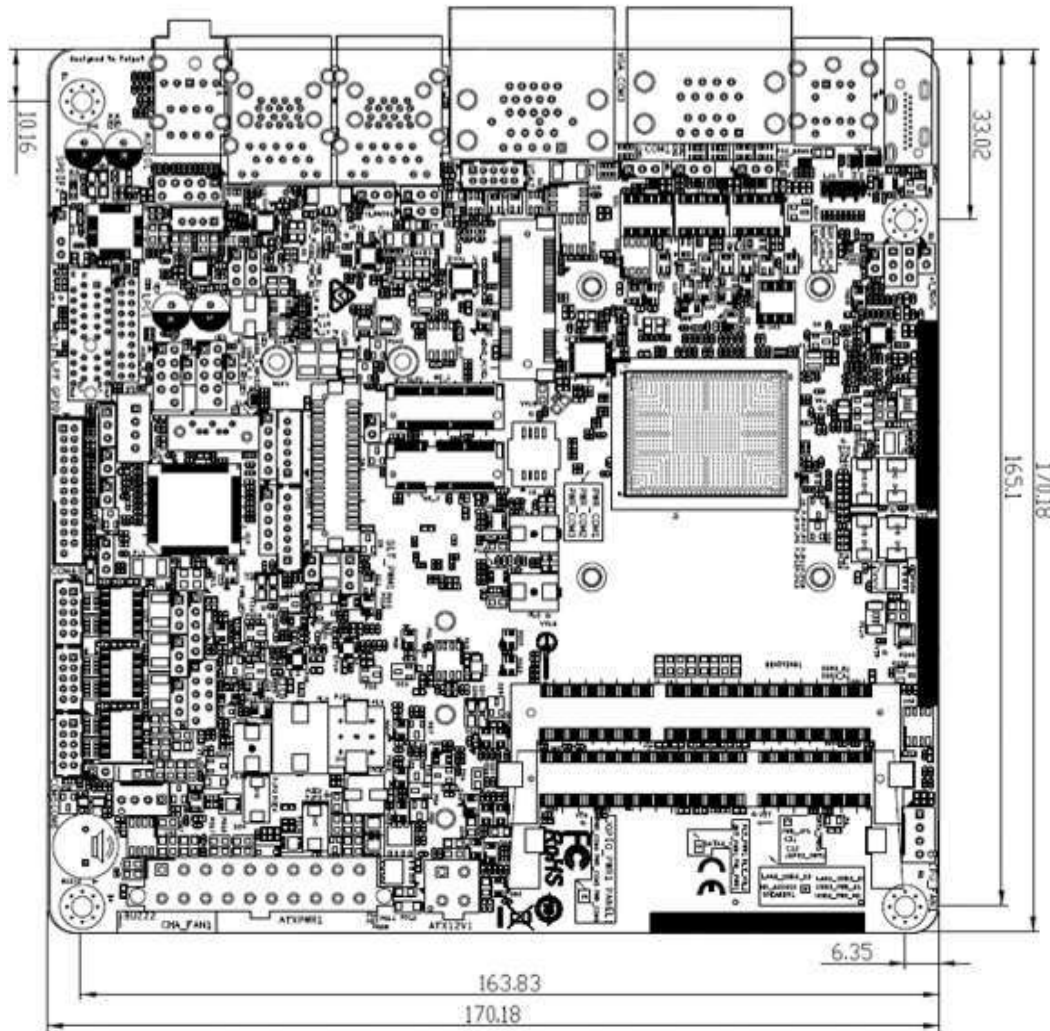
Mechanical and environmental specifications	<ul style="list-style-type: none">◆ Operating temperature: 0 ~ 60° C◆ Storage temperature: -20 ~ 80° C◆ Humidity: 5 ~ 90% non-condensing◆ Board size: 170mm x 170 mm
--	---

2.1 Supported Operating Systems

The WADE-8172 supports the following operating systems.

- ✧ Windows 10* (64 bit), IoT Core(32/64bit)
- ✧ Wind River* 8.0 Linux Distribution(64 bit)
- ✧ Yocto* Tool-based Embedded Linux Distribution (64 bit)
- ✧ Android* 6.0(64bit)
- ✧ VxWorks*7.0 (RTOS) (64 bit)

2.2 Mechanical Dimensions



2.3 Power Consumption

Test Configuration	
CPU Type	Intel® Celeron® CPU N3350 @ 1.10GHz
SBC BIOS	WADE-8172 R1.00.E0
Memory	DDR3 L So DIMM 1866 8GB Transcend (6HP47D9SGQ)*2
VGA Card	Intel® HD Graphic 500
VGA Driver	Intel® Display Driver; 21.20.16.4534
LAN Card	Realtek 8111 PCI-E Gigabit Ethernet
LAN Driver	Realtek driver version:9.1.404.2015
LAN Card	Realtek 8111 PCI-E Gigabit Ethernet
LAN Driver	Realtek driver version:9.1.404.2015
Audio Card	Realtek ALC887
Audio Driver	Realtek High Definition Audio 10.0.14393.0
Chip Driver	Intel® Chipset Device Software Version: 10.1.1
USB3.0 Driver	Intel® USB 3.0 eXtensible Host Controller : 10.0.14393.0
Power Supply	PLUTO-D3501PJ
CPU Type	Intel® Celeron® CPU N3350 @ 1.10GHz
SBC BIOS	WADE-8172 R1.00.E0

Power consumption		
ATX:		
ATX RAIDER 550W	Power Consumption (W)	Power Consumption (W)
	N3350	N4200
S0 and short idle(5mins after OS boot)	22.1	22.7
S0 and long idle(15mins after OS boot)	23	23.7
Full Loading(Run Prime95 small FFT's item)	27.5	28.6
S1(Monitor Auto Off)	N/A	N/A
S3(Sleep mode) <5Watt	1.84	1.92
S4(Hibernate)	1.81	1.87
S5(Shut down)	1.53	1.58
Deep S5(Shut down)	1.16	1.18
USB2.0 Loading Test	5.05 V / 560 mA	
USB3.0 Loading Test	5.01 V / 1090 mA	

2.4 Environmental Specifications

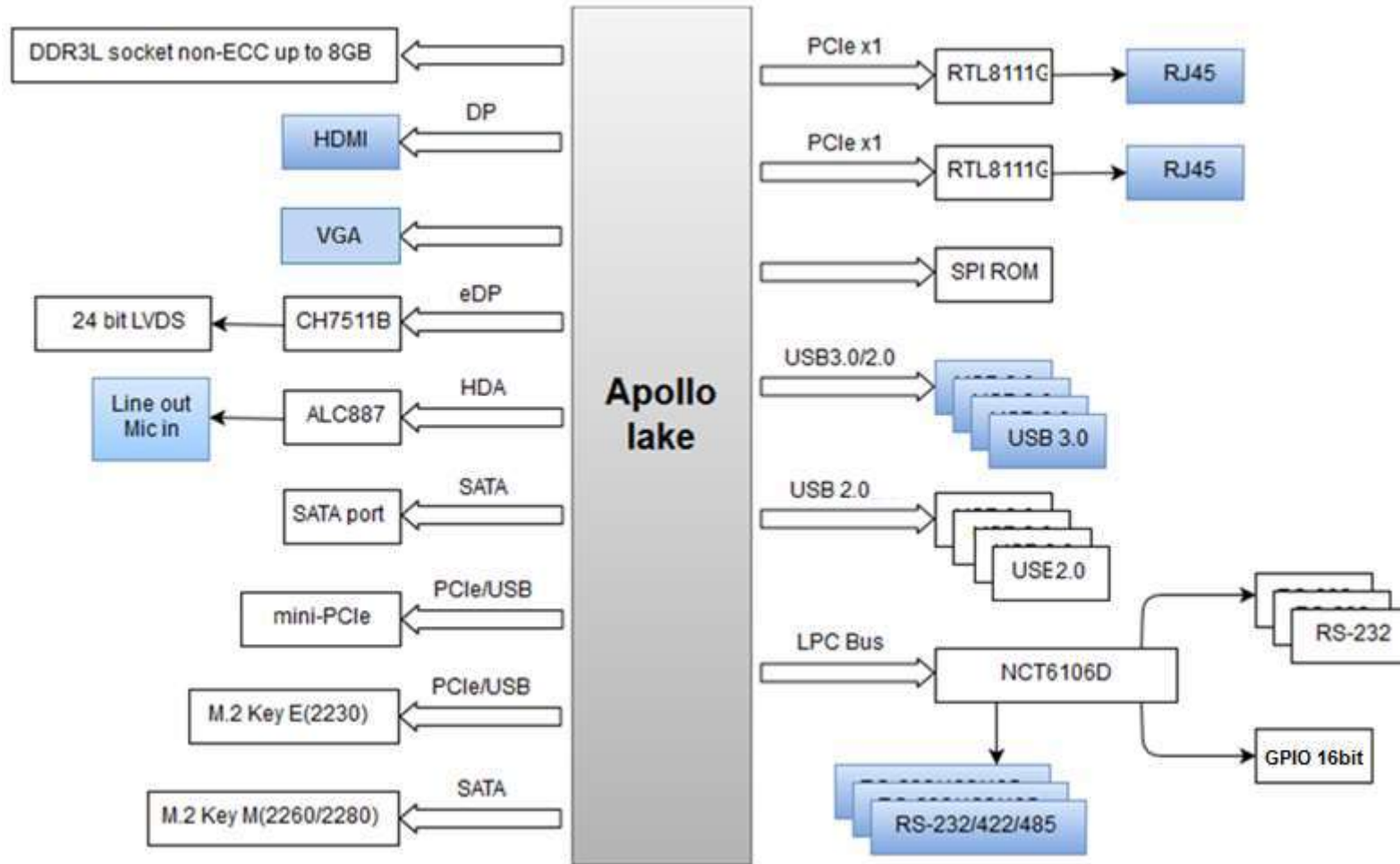
Storage Temperature : -20~80°C

Operation Temperature : 0~60°C

Storage Humidity : 5~90%

Operation Humidity: 10~90%

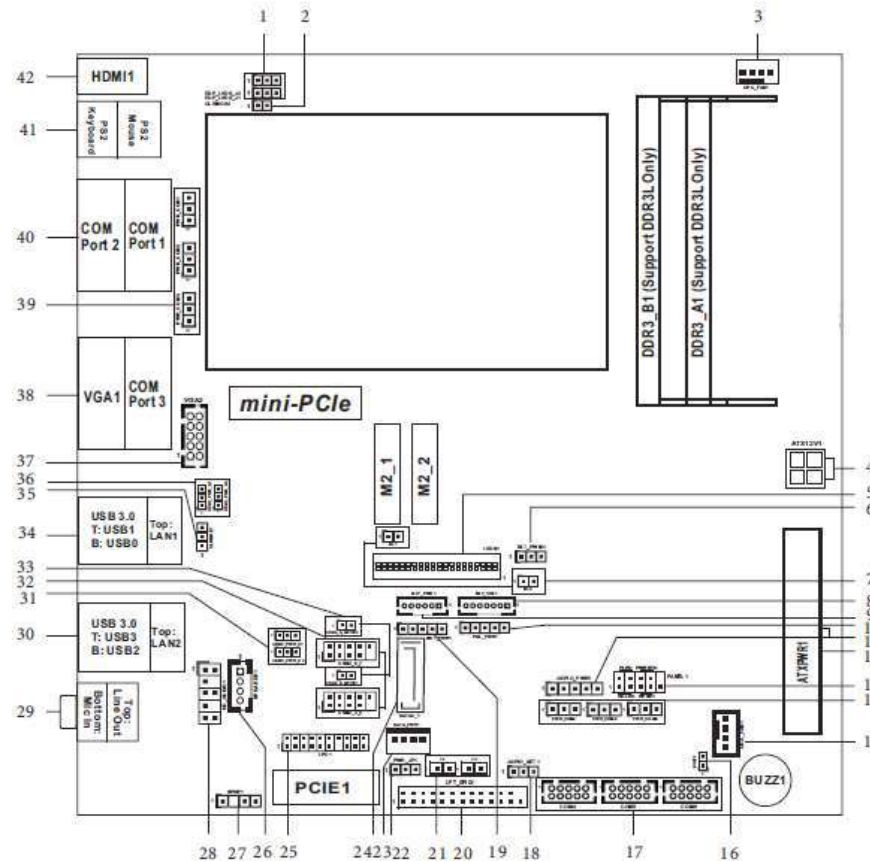
3 Block Diagram



4 Hardware Configuration

4.1 Jumpers and Connector

This chapter indicates jumpers', headers' and connectors' locations. Users may find useful information related to hardware settings in this chapter.



※ If you install one memory module only, please install it on DDR3_A1.

4.2 Jumpers Setting

For users to customize WADE-8172's features. In the following sections, Short means covering a jumper cap over jumperpins; Open or N/C (Not Connected) means removing a jumper cap from jumper pins. Users can refer to Figure 1 for the Jumper allocations.

Jumper Table

The jumper settings are schematically depicted in this manual as follows:

Jumper Function List	
1	EDP_LVDS Jumpers
2	Clear CMOS Jumper
3	4-pin CPU Fan Connector
4	ATX Power Connector(Input 12V-24V)
5	LVDS Panel Connector
6	BLT PWM1
7	BL1,BL2
8	Backlight Volume Control(BLT_Vol1)
9	Backlight Power Connector(BLT_PWR1)
10	Panel Power Select(LCD_VCC)
11	Digital Input / Output Power Select
12	20-pin ATX Power input Connector
13	System Panel Header
14	COM Port PWR Setting Jumpers

15	4-Pin Chassis FAN Connector(+12V)
16	2-Pin Buzzer Header
17	COM4, 5, 6 Headers(RS232)
18	Digital Input / Output Default Value Setting(JGPIO_SET1)
19	Backlight Power Select(LCD_BLT_VCC)(BKT_PWR1)
20	Printer Port / GPIO Header(LPT_GPIO1)
21	Chassis Intrusion Headers
22	ATX/AT Mode Select(PWR JP1)
23	SATA Power Output Connector
24	SATA3 Connector (SATA3_1)
25	LPC Header
26	3W Audio AMP Output Wafer
27	SPDIF Header
28	Front Panel Audio Header
29	Audio Output
30	Top:RJ45 LAN port(LAN2) Bottom:USB 3.0 Ports(USB3_2_3)
31	USB2 Power Setting Jumper(USB2_PWR_H1, USB2_PWR_H2)
32	USB2.0 Connector(USB2_4_5,USB2_6_7)
33	USB6_S_MPCIE1 & 2
34	Top:RJ45 LAN port(LAN1) Bottom:USB 3.0 Ports(USB3_0_1)

35	Clear CMOS Header
36	USB Power Setting Jumper(USB3_PWR_H1, USB3_PWR_H2)
37	VGA Header
38	TOP:COM Port 3 (RS232/422/485) Bottom: VGA/D-Sub Port
39	COM port PWR Setting Jumpers
40	Top: COM Port 1(RS232/422/485)* Bottom: COM Port 2(RS232/422/485)*
41	PS/2 Mouse/Keyboard Port
42	HDMI Port

1 : EDP_LVDS Jumpers

EDP_LVDS_J1:

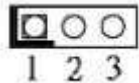
1-2: eDP

2-3: LVDS

EDP_LVDS_J2:

1-2: eDP

2-3: LVDS



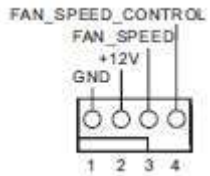
2 : Clear CMOS Jumper

Open: Normal

Short: Clear CMOS



3 : 4-Pin CPU FAN Connector (+12V)

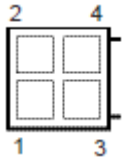


4 : ATX Power Connector

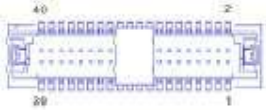
(Input 12V-24V)

1-2: GND

3-4: DC Input



5 : LVDS Panel Connector

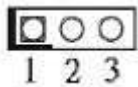


PIN	Signal Name	PIN	Signal Name
2	LCD_VCC	1	LCD_VCC
4	LDDC_CLK	3	+3.3V
6	LVDS_A_DATA0#	5	LDDC_DATA
8	GND	7	LVDS_A_DATA0
10	LVDS_A_DATA1	9	LVDS_A_DATA1#
12	LVDS_A_DATA2#	11	GND
14	GND	13	LVDS_A_DATA2
16	LVDS_A_DATA3	15	LVDS_A_DATA3#
18	LVDS_A_CLK#	17	GND
20	GND	19	LVDS_A_CLK
22	LVDS_B_DATA0	21	LVDS_B_DATA0#
24	LVDS_B_DATA1#	23	GND
26	GND	25	LVDS_B_DATA1
28	LVDS_B_DATA2	27	LVDS_B_DATA2#
30	LVDS_B_DATA3#	29	DPLVDD_EN
32	GND	31	LVDS_B_DATA3
34	LVDS_B_CLK	33	LVDS_B_CLK#
36	CON_LBKLT_EN	35	GND
38	LCD_BLT_VCC	37	CON_LBKLT_CTL
40	LCD_BLT_VCC	39	LCD_BLT_VCC

6 : BLT_PWM1

1-2: +3V Level

2-3: +5V Level



7 : BL1, BL2



8 : Backlight Volume Control (BLT_VOL1)

PIN	Signal Name
1	GPIO_VOL_UP
2	GPIO_VOL_DW
3	PWRDN
4	LVDS1 BLUP
5	LVDS1 BLDW
6	GND
7	GND



9 : Backlight Power Connector (BLT_PWR1)

PIN	Signal Name
1	GND
2	GND
3	BL CTL
4	BL EN
5	LCD_BLT_VCC
6	LCD_BLT_VCC



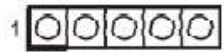
10 : Panel Power Select (LCD_VCC)

(PNL_PWR1)

1-2: LVDD: +3V

2-3: LVDD: +5V

4-5: LVDD: +12V



11 : Digital Input / Output Power Select

(JGPIO_PWR1)

1-2: +12V

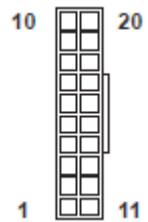
2-3: +5V

3-4: +5V

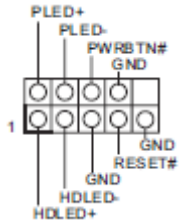
4-5: GND



12 : 20-pin ATX Power Input Connector



13 : System Panel Header



14 : COM Port PWR Setting Jumpers

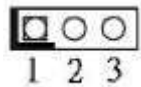
PWR_COM4 (For COM Port4)

PWR_COM5 (For COM Port5)

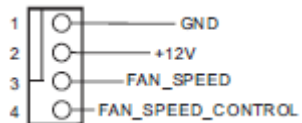
PWR_COM6 (For COM Port6)

1-2: +5V

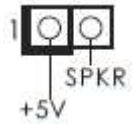
2-3: +12V



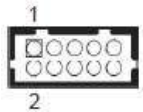
15 : 4-Pin Chassis FAN Connector (+12V)



16 : 2-Pin Buzzer Header



17 : COM4, 5, 6 Headers (RS232)

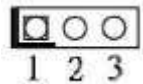


PIN	Signal Name	PIN	Signal Name	PIN	Signal Name	PIN	Signal Name	PIN	Signal Name
1	DDCD#	3	TTXD	5	GND	7	RRTS#	9	+5V
2	RRXD	4	DDTR#	6	DDSR#	8	OCTS#	10	+12V

18 : Digital Input / Output Default Value Setting (JGPIO_SET1)

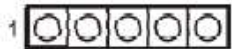
1-2: Pull-High

2-3: Pull-Low



19 : Backlight Power Select (LCD_BLT_VCC) (BKT_PWR1)

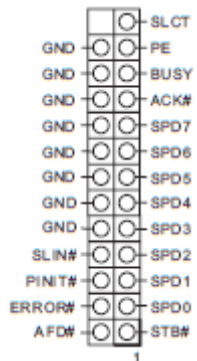
- 1-2: LCD_BLT_VCC: +5V
- 2-3: LCD_BLT_VCC: +12V
- 4-5: LCD_BLT_VCC: DC_IN



20 : Printer Port / GPIO Header (LPT_GPIO1)

Printer Port:

GPIO:



PIN	Signal Name	PIN	Signal Name
26	NC	25	NA
24	GND	23	SIO_GP30
22	GND	21	SIO_GP31
20	GND	19	SIO_GP32
18	GND	17	SIO_GP33
16	GND	15	SIO_GP34
14	GND	13	SIO_GP35
12	JGPIOPWR	11	SIO_GP36
10	JGPIOPWR	9	SIO_GP37
8	SIO_GP43	7	SIO_GP40
6	SIO_GP44	5	SIO_GP41
4	SIO_GP45	3	SIO_GP42
2	SIO_GP46	1	SIO_GP47

* If you want to use the printer port function, please short pin4 and pin5 on Digital Input / Output Power Select (JGPIO_PWR1).

21 : Chassis Intrusion Headers

CI1:

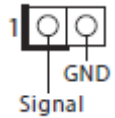
Close: Active Case Open

Open: Normal

CI2:

Close: Normal

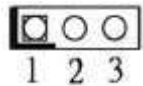
Open: Active Case Open



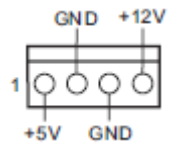
22 : ATX/AT Mode Select (PWR_JP1)

1-2: AT Mode

2-3: ATX Mode

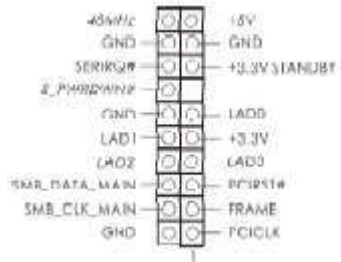


23 : SATA Power Output Connector



24 : SATA3 Connector (SATA3_1)

25 : LPC Header

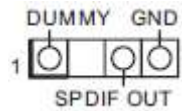


26 : 3W Audio AMP Output Wafer

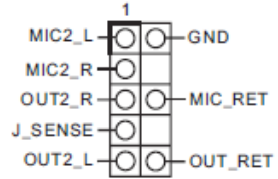
PIN	Signal Name
1	OUTLN
2	OUTLP
3	OUTRP
4	OUTRN



27 : SPDIF Header



28 : Front Panel Audio Header



29 : Audio Output

Green - Line out

Pink - Mic in

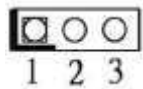
30 : Top: RJ45 LAN Port (LAN2)

Bottom: USB3.0 Ports (USB3_2_3)

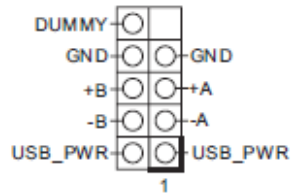
31 : USB Power Setting Jumpers (USB2_PWR_H1, USB2_PWR_H2)

1-2: +5V

2-3: +5VSB



32 : USB2.0 Connectors (USB2_4_5, USB2_6_7)



33 : USB Port5 _S_ MPCIE slot

Open : USB2.0 Connector

Short : Mini-PCle Function



USB Port7 _S_ M.2_2 slot

Open : USB2.0 Connector

Short : M.2_2 Function



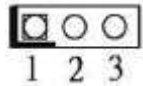
34 : Top: RJ45 LAN Port (LAN1)

Bottom: USB3.0 Ports (USB3_0_1)

35 : Clear CMOS Header

1-2: Normal

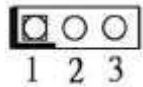
2-3: Clear CMOS



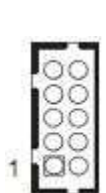
36 : USB Power Setting Jumpers (USB3_PWR_H1, USB3_PWR_H2)

1-2: +5V

2-3: +5VSB



37 : VGA Header



PIN	Signal Name	PIN	Signal Name
9	DDC_CLK	10	DDC_DATA
7	HSYNC	8	VSYNC
5	BLUE	6	GND
3	GREEN	4	GND
1	RED	2	GND

38 : Top: COM Port 3 (RS232/422/485)*

Bottom: VGA/D-Sub Port

* This motherboard supports RS232/422/485 on COM1~3 ports. Please refer to below table for the definition. In addition, COM1~3 ports(RS-232/422/485) can be adjusted in BIOS setup utility > Advanced > Screen > Super IO Configuration. You may refer to our manual for details.

39 : COM Port PWR Setting Jumpers

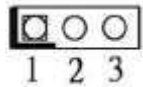
PWR_COM1 (For COM Port1)

PWR_COM2 (For COM Port2)

PWR_COM3 (For COM Port3)

1-2: +5V

2-3: +12V



40 : Top: COM Port 1 (RS232/422/485)*

Bottom: COM Port 2 (RS232/422/485)*

* This motherboard supports RS232/422/485 on COM1~3 ports. Please refer to below table for the definition. In addition, COM1~3 ports(RS-232/422/485) can be adjusted in BIOS setup utility > Advanced > Screen > Super IO Configuration. You may refer to our manual for details.

COM1-3 Ports Pin Definition

PIN	RS232	RS422	RS485
1	DCD	TX-	RTX-
2	RXD	RX+	N/A
3	TXD	TX+	RTX+
4	DTR	RX-	N/A
5	GND	GND	GND
6	DSR	N/A	N/A
7	RTS	N/A	N/A
8	CTS	N/A	N/A
9	COM1: +5V/+12V/+5VSB COM2, 3: +5V/+12V	COM1: +5V/+12V/+5VSB COM2, 3: +5V/+12V	COM1: +5V/+12V/+5VSB COM2, 3: +5V/+12V

41 : Top (Green) - PS/2 Mouse Port

Bottom (Purple) - PS/2 Keyboard Port

42 : HDMI Port

5 Signal Descriptions

5.1 Watch Dog Signal

WatchDog program sample

WatchDog program sample

O 2E 87

O 2E 87

O 2E 07

O 2F 08 Select Logical Device 8.

O 2E 30

O 2F (BIT0) (0):WDT is inactive.(1):WDT is active.

O 2E F1

O 2F (XX) (XX):Watchdog Timer Counter Register(0x00~0xFF)

O 2E AA

5.2 GPIO Signal

GPI program sample

O 2E 87

O 2E 87

O 2E 07

O 2F 07 Select Logical Device 7

O 2E 30
O 2F 08 Active GPIO3(BIT3)
O 2E EC
O 2F FF GPIO3 pins are programmed as input pins
O 2E ED GPIO status 1:high, 0: low
I 2F yy yy = GPIO status 1:high, 0: low
O 2E AA

GPO program sample

O 2E 87
O 2E 87
O 2E 07
O 2F 07 Select Logical Device 7
O 2E 30
O 2F 10 Active GPIO4 (BIT4)
O 2E F0 GP4x pins are programmed as output pins
O 2F 00 GP4x pins are programmed as output pins
O 2E F1 GPIO status 1:high, 0: low
O 2F yy xx = GPIO status 1:high, 0: low
O 2E AA

6 System Resources

6.1 Intel® Apollo Lake SoC

Intel® Atom™ x7-E3950 Processor(2M Cache, up to 2.00 GHz)

Intel® Atom™ x5-E3940 Processor(2M Cache, up to 1.80 GHz)

Intel® Atom™ x5-E3930 Processor(2M Cache, up to 1.80 GHz)

Intel® Atom™ Pentium® N4200 Processor(2M Cache, up to 2.5 GHz)

Intel® Atom™ Celeron® N3350 Processor(2M Cache, up to 2.4 GHz)

6.2 Main Memory

WADE-8172 provides 2 x 204-pin SO-DIMM sockets which supports DDR3L non-ECC memory. The maximum memory can be up to 8GB. Memory clock and related settings can be detected by BIOS via SPD interface.

Watch out the contact and lock integrity of memory module with socket, it will impact on the system reliability. Follow normal procedures to install memory module into memory socket. Before locking, make sure that all modules have been fully inserted into the card slots.

6.3 Installing the Single Board Computer

To install your WADE-8172 into standard chassis or proprietary environment, please perform the following:

Step 1 : Check all jumpers setting on proper position

Step 2 : Install and configure memory module on right position

Step 3 : Place WADE-8172 into the dedicated position in the system

Step 4 : Attach cables to existing peripheral devices and secure it

WARNING

Please ensure that motherboard is properly inserted and fixed by mechanism.

6.3.1 Chipset Component Driver

The WADE-8172 build with Intel® Atom™ processor E3900 series including E3950 / E3940 / E3939 sku or Pentium® N4200 / Celeron® N3350 Processor. It's a new chipset that some old operating systems might not be able to recognize. To overcome this compatibility issue, for Windows Operating Systems such as Windows 10, please install its INF before any of other Drivers are installed. You can find very easily this chipset component driver in WADE-8172 CD-title

6.3.2 Intel® HD Graphics 50X

WADE-8172 has integrated Intel® HD Graphics 50X(E3950 / N4200_ Intel® HD Graphics 505, E3940 / E3930 / N3350_ Intel® HD Graphics 500) Processor Graphics indicates graphics processing circuitry integrated into the processor, providing the graphics, compute, media, and display capabilities. Intel® HD Graphics, Iris™ Graphics, Iris Plus Graphics, and Iris Pro Graphics deliver enhanced media conversion, fast frame rates, and 4K Ultra HD (UHD) video WADE-8172 supports LVDS, VGA, HDMI display output. This combination makes WADE-8172 an excellent performance hardware.

Drivers Support

Please find the Graphic driver in the WADE-8172 CD-title. The driver supports Windows 10.

6.3.3 Realtek RTL8111G Gigabit Ethernet Controller

- RTL8111G Gigabit Ethernet controller and 2x RJ45 connectors on rear I/O

Drivers Support

Please find Realtek RTL8111G LAN driver in Ethernet directory of WADE-8172 CD/DVD-title. The driver supports Windows 10.

7 BIOS Setup Items

7.1 Introduction

The following section describes the BIOS setup program. The BIOS setup program can be used to view and change the BIOS settings for the module. Only experienced users should change the default BIOS settings.

7.2 BIOS Setup

Power on the computer and the system will start POST (Power on Self Test) process. When the message below appears on the screen, press <Delete> or <F2> key will enter BIOS setup screen.

Press<Delete> or <F2> to enter SETUP

If the message disappears before responding and still wish to enter Setup, please restart the system by turning it OFF and On or pressing the RESET button. It can be also restarted by pressing <Ctrl>, <Alt>, and <Delete> keys on keyboard simultaneously.

Press <F1> to Run General Help or Resume

The BIOS setup program provides a General Help screen. The menu can be easily called up from any menu by pressing <F1>. The Help screen lists all the possible keys to use and the selections for the highlighted item. Press <Esc> to exit the Help Screen.

```
General Help
↔:      Select Screen
↑↓:     Select Item
+/-:    Change Option
Tab:    Switch Function
Enter:  Select
PGDN:   Next Page
PGUP:   Previous Page
HOME:   Go to Top of Screen
END:    Go to Bottom of Screen
F1:     General Help
F7:     Discard Changes
F9:     Load UEFI Defaults
F10:    Save and Exit
F12:    Print Screen
ESC:    Exit

Ok
```

7.2.1 Main

Use this menu for basic system configurations, such as time, date etc.

```
Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
Main Advanced H/W Monitor Security Boot Exit

System Date [Fri 05/19/2017]
System Time [15:00:17]
Set the Time. Use Tab to
switch between Time elements.

UEFI Version: WADE-8172 R1.00.E0
Processor Type: Intel(R) Celeron(R) CPU N3350 @ 1.10GHZ
Processor Speed: 1100MHz
Cache Size: 1MB

Total Memory: 4GB with 512MB Shared Memory
Single-Channel Memory Mode

DDR3_A1: None
DDR3_B1: 4GB (DDR3-1600)

LVDS Rom Version : Default

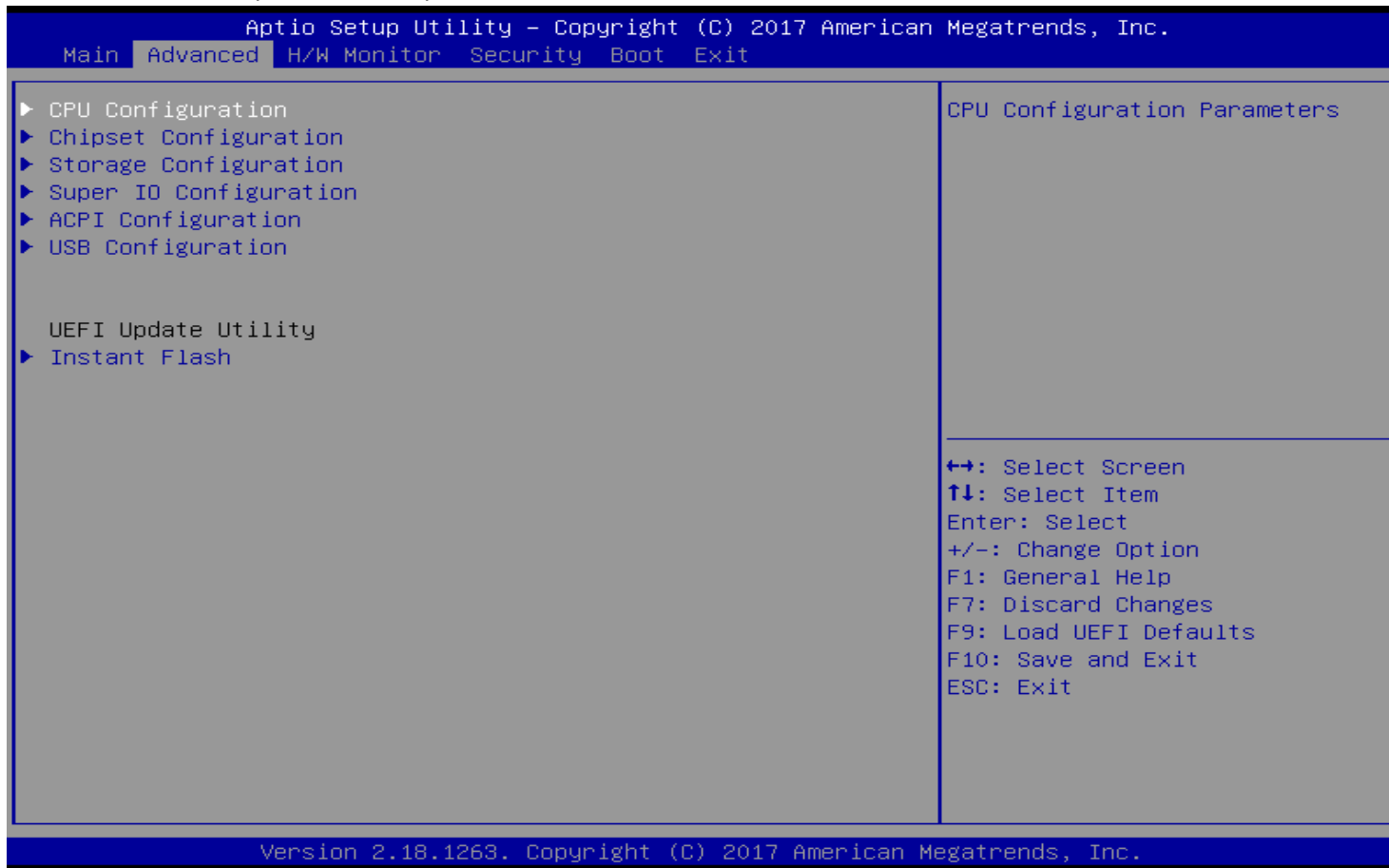
↔: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Option
F1: General Help
F7: Discard Changes
F9: Load UEFI Defaults
F10: Save and Exit
ESC: Exit

Version 2.18.1263. Copyright (C) 2017 American Megatrends, Inc.
```

Feature	Description	Options
System Date	The date format is <Day>, <Month> <Date> <Year>. Use [+] or [-] to configure system Date.	
System Time	The time format is <Hour> <Minute> <Second>. Use [+] or [-] to configure system Time.	

7.2.2 Advanced

Use this menu to set up the items of special enhanced features



CPU Configuration

CPU Configuration Parameters

```

Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
  Advanced
-----
Intel(R) Celeron(R) CPU N3350 @ 1.10GHz
Microcode Revision                28
Max CPU Speed                     1100 MHz
Min CPU Speed                     800 MHz
Processor Cores                   2
Intel VT-x Technology             Supported
64-bit                            Supported

Intel SpeedStep Technology        [Enabled]
CPU C States Support             [C10]
Enhanced Halt State(C1E)        [Enabled]

Intel Virtualization Technology   [Enabled]
VT-d                             [Disabled]

Intel SpeedStep technology
allows processors to switch
between multiple frequencies
and voltage points for better
power saving and heat
dissipation.

←→: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Option
F1: General Help
F7: Discard Changes
F9: Load UEFI Defaults
F10: Save and Exit
ESC: Exit

Version 2.18.1263. Copyright (C) 2017 American Megatrends, Inc.
    
```

Feature	Description	Options
Intel SpeedStep Technology	Intel SpeedStep technology allows processors to switch between multiple frequencies and voltage points for better power saving and heat dissipation.	★Enabled, Disabled
CPU C States Support	Enable CPU C States Support for power saving. It is recommended to keep C1, C6, C7, C8 , C9 and C10 all enabled for better power saving .	★C10, C9,C8,C7,C6, C1,Disabled
Enhanced Halt State(C1E)	Enable Enhanced Halt State(C1E) for lower power consumption	★Enabled, Disabled
Intel Virtualization Technology	Intel Virtualization Technology allows a platform to run multiple operating systems and applications in independent partitions, so that one computer system can function as multiple virtual systems.	★Enabled, Disabled
VT-d	Enable/Disable CPU VT-d.	★Disabled, Enabled

Chipset Configuration

Configuration Chipset feature

```

Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
  Advanced
-----
TXE FW Version          3.0.13.1144
DRAM Frequency          [Auto]
Primary Graphics Adapter [Onboard]
Share Memory            [Auto]

Active LFP              [eDP]
Primary IGFX Boot Display [VBIOS Default]

Onboard HD Audio        [Auto]
  Front Panel           [HD]

Onboard LAN1            [Enabled]
Onboard LAN2            [Enabled]
PCIE1 Link Speed        [Auto]

Deep S5                 [Disabled]

DRAM Frequency

-----
←→: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Option
F1: General Help
F7: Discard Changes
F9: Load UEFI Defaults
F10: Save and Exit
ESC: Exit

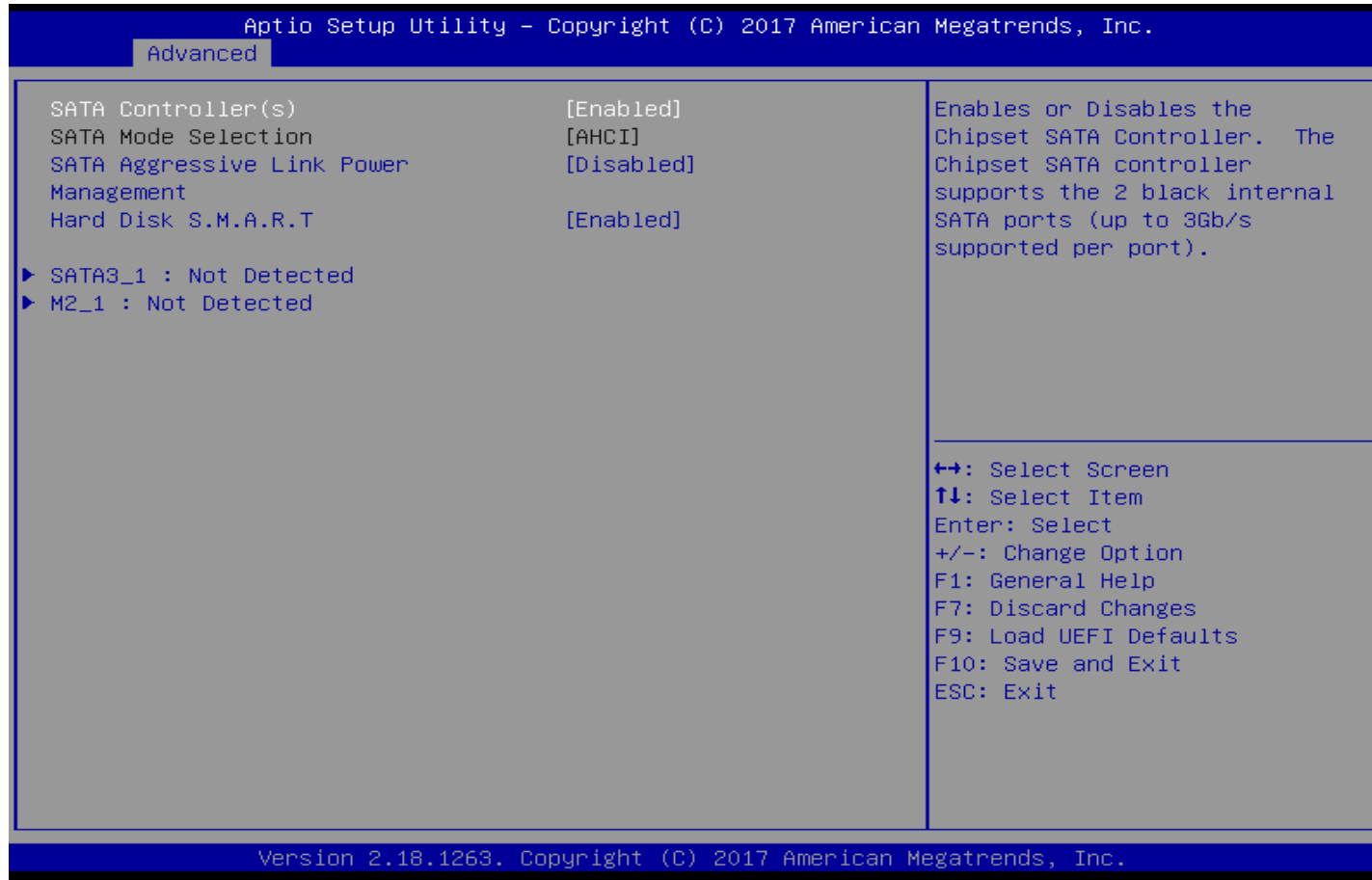
Version 2.18.1263. Copyright (C) 2017 American Megatrends, Inc.
  
```

Feature	Description	Options
DRAM Frequency	DRAM Frequency	★Auto, DDR3-1333 , DDR3-1600, DDR3-1866
Primary Graphics Adapter	Select a primary VGA	★Onboard,PCI Express
Share Memory	Select DVMT 5.0 Pre-Allocated(Fixed) Graphics Memory size used by the Internal Graphics Device	★Auto, 64M,128M, 256M,512M
Active LFP	Select eDP or LVDS to Display	★eDP , LVDS
Panel Type Selection(Select LVDS)		★1440x900/24-bit/2-ch/LED 1366x768/18-bit/1-ch/LED 800x600/18-bit/1-ch/CCFL 1024x768/24-bit/1-ch/CCFL 1280x1024/24-bit/2-ch/CCFL 1366x768/24-bit/1-ch/CCFL 1440x900/24-bit/2-ch/CCFL 1024x600/18-bit/1-ch/LED 1280x1024/24-bit/2-ch/LED 1024x768/24-bit/1-ch/LED 1600x900/18-bit/2-ch/LED 1366x768/24-bit/1-ch/LED 1920x1080/24-bit/2-ch/LED 800x600/24-bit/1-ch/LED

		640x480/24-bit/1-ch/LED 1024x768/18-bit/1-ch/LED
Primary IGFX Boot Display	Select the Video Device which will be activated during POST. This has no effect if external graphics present. Secondary boot display selection will appear based on your selection. VGA modes will be supported only on primary display.	★VBIOS Default, HDMI,LFP,CRT
Onboard HD Audio	Auto/enable/disable onboard HD audio. Set to Auto to enable onboard HD audio and automatically disable it when a sound card is installed.	★Auto ,Enabled, Disabled
Front Panel	Select Front Panel Type.	★HD , AC 97
Onboard Lan1	Enable or disable the onboard Lan1 network interface controller	★Enabled, Disabled
Onboard Lan2	Enable or disable the onboard Lan2 network interface controller	★Enabled, Disabled
PCIE1 Link Speed	Configure PCIE1 Slot Link Speed.	★Auto, Gen1 , Gen2
Deep S5	Select system deep S5 configuration. 'Auto' will disable the deep S5 configuration if RTC/LAN/USB device power on settings enabled.	★Disabled ,Auto

Storage Configuration

SATA Settings



Feature	Description	Options
SATA Controller(s)	Enable or disable the chipset SATA Controller. The Chipset SATA controller supports the 2 black internal SATA ports (up to 3Gb/s supported per port)	★Enabled, Disabled
SATA Aggressive Link Power Management	SATA Aggressive Link Power Management allows SATA devices to enter a low power state during periods of inactivity to save power. It is only supported by AHCI mode	★Disabled, Enabled
Hard Disk S.M.A.R.T	S.M.A.R.T stands for Self-Monitoring, Analysis, and Reporting Technology. It is a monitoring system for computer hard disk drives to detect and report on various indicators of reliability.	★Enabled, Disabled

SATA3_1 : Not Detected

Feature	Description	Options
External SATA	Enable SATA safe removal notifications. Please note that the SATA device will be downgraded to SATA2.	★Disabled, Enabled
Hot Plug	Enable or disable Hot Plug for this port.	★Disabled, Enabled

M2_1 : Not Detected

Feature	Description	Options
External SATA	Enable SATA safe removal notifications. Please note that the SATA device will be downgraded to SATA2.	★Disabled, Enabled
Hot Plug	Enable or disable Hot Plug for this port.	★Disabled, Enabled

Super IO Configuration

COM Port Configuration

```

Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
  Advanced
COM1           [Enabled]           Set COM port IRQ mode
  Type Select  [RS232]
COM2           [Enabled]
  Type Select  [RS232]
COM3           [Enabled]
  Type Select  [RS232]
COM4           [Enabled]
COM5           [Enabled]
COM6           [Enabled]
COM Port IRQ Mode [Auto]

Parallel Port  [Enabled]
  Device Mode  [ECP and EPP 1.9 Mode]
  Change Settings [Auto]

WDT Timeout Reset [Disabled]

↔: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Option
F1: General Help
F7: Discard Changes
F9: Load UEFI Defaults
F10: Save and Exit
ESC: Exit

Version 2.18.1263. Copyright (C) 2017 American Megatrends, Inc.
    
```

Feature	Description	Options
COM 1	Enable or Disable COM1 IO=3F8h; IRQ=4;	★Enabled, Disabled
Type Select	Set COM Type	★RS232,RS422,RS485
COM 2	Enable or Disable COM2 IO=2F8h; IRQ=3;	★Enabled, Disabled
Type Select	Set COM Type	★RS232,RS422,RS485
COM 3	Enable or Disable COM3 IO=3E8h; IRQ=7;	★Enabled, Disabled
Type Select	Set COM Type	★RS232,RS422,RS485
COM 4	Enable or Disable COM4 IO=2E8h; IRQ=7;	★Enabled, Disabled
COM 5	Enable or Disable COM5 IO=2E0h; IRQ=10;	★Enabled, Disabled
COM 6	Enable or Disable COM6 IO=2F0h; IRQ=10;	★Enabled, Disabled
Serial Port IRQ Mode	Set COM Port IRQ mode	★Auto, Linux/DOS, Windows
Parallel Port	Select Parallel Port(LPT/LPTE) or GPIO. Enabled:LPT Disabled:GPIO	★Enabled, Disabled
Device Mode	Change the Printer Port mode.	★ECP and EPP 1.9 Mode, Normal, Bi-Directional, ECP and EPP 1.7 Mode
Change Settings	Select an optimal settings for Super IO Device	★Auto, IO=378h;IRQ=5;DMA=3; IO=378h;IRQ=5,6,7,9,10,11,12; DMA=1,3; IO=278h;IRQ=5,6,7,9,10,11,12 ;DMA=1,3;
WDT Timeout Reset	Enable/Disable Watch Dog Timer timeout to reset system.	★Disabled, Enabled
WDT Initial Value (Sec.)	Watch Dog Timer Initial Value to count down.	Range:1~255

ACPI Configuration

```

Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
  Advanced
-----
Suspend to RAM                [Auto]
ACPI HPET Table                [Enabled]

PS/2 Keyboard Power On        [Disabled]
PCIE Devices Power On         [Disabled]
RTC Alarm Power On            [Enabled]
  RTC Alarm Date               [Every Day]
  RTC Alarm Hour               [0]
  RTC Alarm Minute             [0]
  RTC Alarm Second             [0]

Allow the system to be waked up by the real time clock alarm. Set it to By OS to let it be handled by your operating system.

↔: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Option
F1: General Help
F7: Discard Changes
F9: Load UEFI Defaults
F10: Save and Exit
ESC: Exit

Version 2.18.1263. Copyright (C) 2017 American Megatrends, Inc.
    
```

Feature	Description	Options
Suspend to RAM	It is recommended to select auto for ACPI S3 power saving.	★Auto, Disabled
ACPI HPET Table	Enable the High Precision Event Timer for better performance.	★Enable, Disabled
PS/2 Keyboard Power On	Allow the system to be waked up by a PS/2 Keyboard.	★Disabled,Any Key
PCIE Devices Power On	Allow the system to be waked up by a PCIE device and enable wake on LAN	★Disabled, Enabled
RTC Alarm Power On (Enabled)	Allow the system to be waked up by the real time clock alarm.Set it to By OS to let It be handled by your operating system.	★By OS,Disabled,Enabled
RTC Alarm Date	Set Date of RTC power on feature.	★Every Day,1~31
RTC Alarm Hour	Set Hour of RTC power on feature.	0~23
RTC Alarm Minute	Set Minute of RTC power on feature.	0~59
RTC Alarm Second	Set Second of RTC power on feature.	0~59

USB Configuration

USB Configuration Parameters.

The screenshot shows the Aptio Setup Utility interface. At the top, it reads "Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc." Below this is a blue bar with the word "Advanced" highlighted. The main area is a grey box containing the following text:

Legacy USB Support	[Enabled]	Enables Legacy USB support. AUTO option disables legacy support if no USB devices are connected. DISABLE option will keep USB devices available only for EFI applications.
--------------------	-----------	--

Below the description, a list of navigation keys is provided:

- ←→: Select Screen
- ↑↓: Select Item
- Enter: Select
- +/-: Change Option
- F1: General Help
- F7: Discard Changes
- F9: Load UEFI Defaults
- F10: Save and Exit
- ESC: Exit

At the bottom of the grey box, it reads "Version 2.18.1263. Copyright (C) 2017 American Megatrends, Inc."

Feature	Description	Options
Legacy USB Support	Enables Legacy USB support. AUTO option disables legacy support if no USB devices are connected. DISABLE option will keep USB devices available only for EFI applications.	★Enabled, Disabled, UEFI Setup Only

Instant Flash

Save UEFI files in your USB storage device and run Instant Flash to update your UEFI. Please note that your USB storage device must be FAT32 / 16 / 12 file system.

7.2.3 H/W Monitor

Monitor hardware status

```

Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
Main  Advanced  H/W Monitor  Security  Boot  Exit

Hardware Health Event Monitoring

CPU Temperature           : +44.5 °C
M/B Temperature          : +41.5 °C

CPU_FAN1 Speed           : N/A
CHA_FAN1 Speed           : N/A

VCORE                     : +0.744 V
+ VIN                     : +12.160 V
+ 3.30V                   : +3.376 V
+ 5.00V                   : +5.136 V

CPU_FAN1 Setting          [Automatic mode]
  Target CPU Temperature  [50 °C/122 °F]
  Target Fan Speed        [Level 9]
CHA_FAN1 Setting          [Automatic mode]
  Target CPU Temperature  [50 °C/122 °F]
  Target Fan Speed        [Level 9]
Case Open Feature         [Disabled]

Quiet Fan Function Control

↔: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Option
F1: General Help
F7: Discard Changes
F9: Load UEFI Defaults
F10: Save and Exit
ESC: Exit

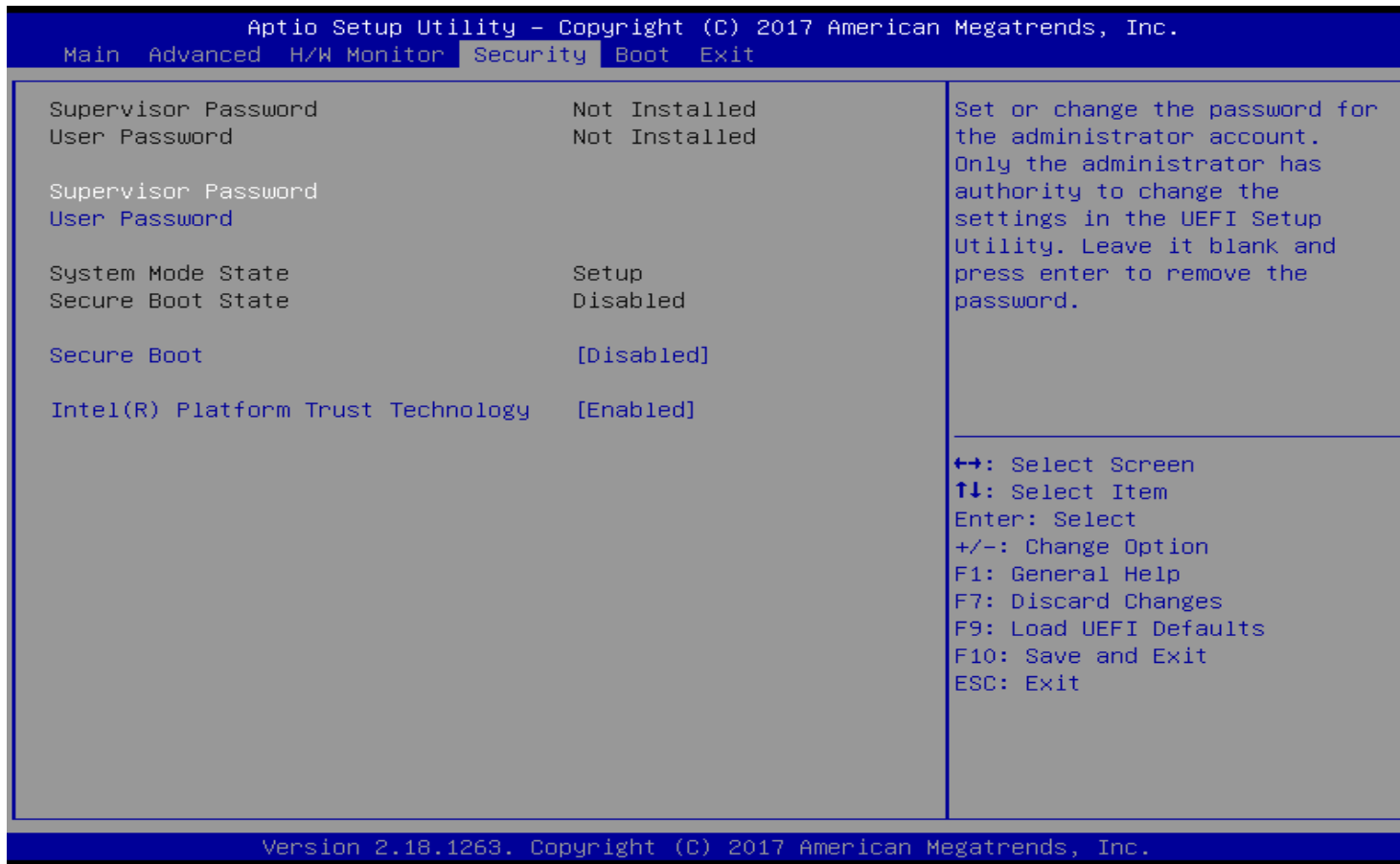
Version 2.18.1263. Copyright (C) 2017 American Megatrends, Inc.
    
```

Feature	Description	Options
CPU FAN1 Setting (Automatic mode)	Quiet Fan Function Control	★Full on, Automatic mode
Target CPU Temperature	Target CPU Temperature Value	★50°C/122°F 45°C/113°F ,46°C/114°F 47°C/116°F ,48°C/118°F 49°C/120°F,51°C/123°F 52°C/125°F,53°C/127°F 54°C/129°F,55°C/131°F 56°C/132°F,57°C/134°F 58°C/136°F,59°C/138°F 60°C/140°F,61°C/141°F 62°C/143°F,63°C/145°F 64°C/147°F,65°C/149°F
Target Fan Speed	The higher the level, the higher the fan speed.	★Level 9 Level 1,Level 2,Level 3, Level 4,Level 5,Level 6, Level 7,Level 8
CHA FAN1 Setting (Automatic mode)	Quiet Fan Function Control	★Full on, Automatic mode
Target CPU Temperature	Target CPU Temperature Value	★50°C/122°F

		<p>45°C/113°F ,46°C/114°F 47°C/116°F ,48°C/118°F 49°C/120°F,51°C/123°F 52°C/125°F,53°C/127°F 54°C/129°F,55°C/131°F 56°C/132°F,57°C/134°F 58°C/136°F,59°C/138°F 60°C/140°F,61°C/141°F 62°C/143°F,63°C/145°F 64°C/147°F,65°C/149°F</p>
Target Fan Speed	The higher the level, the higher the fan speed.	<p>★Level 9 Level 1,Level 2,Level 3, Level 4,Level 5,Level 6, Level 7,Level 8</p>
Case Open Feature	Enable or disable the feature of Case Open	★Disabled, Enabled

7.2.4 Security

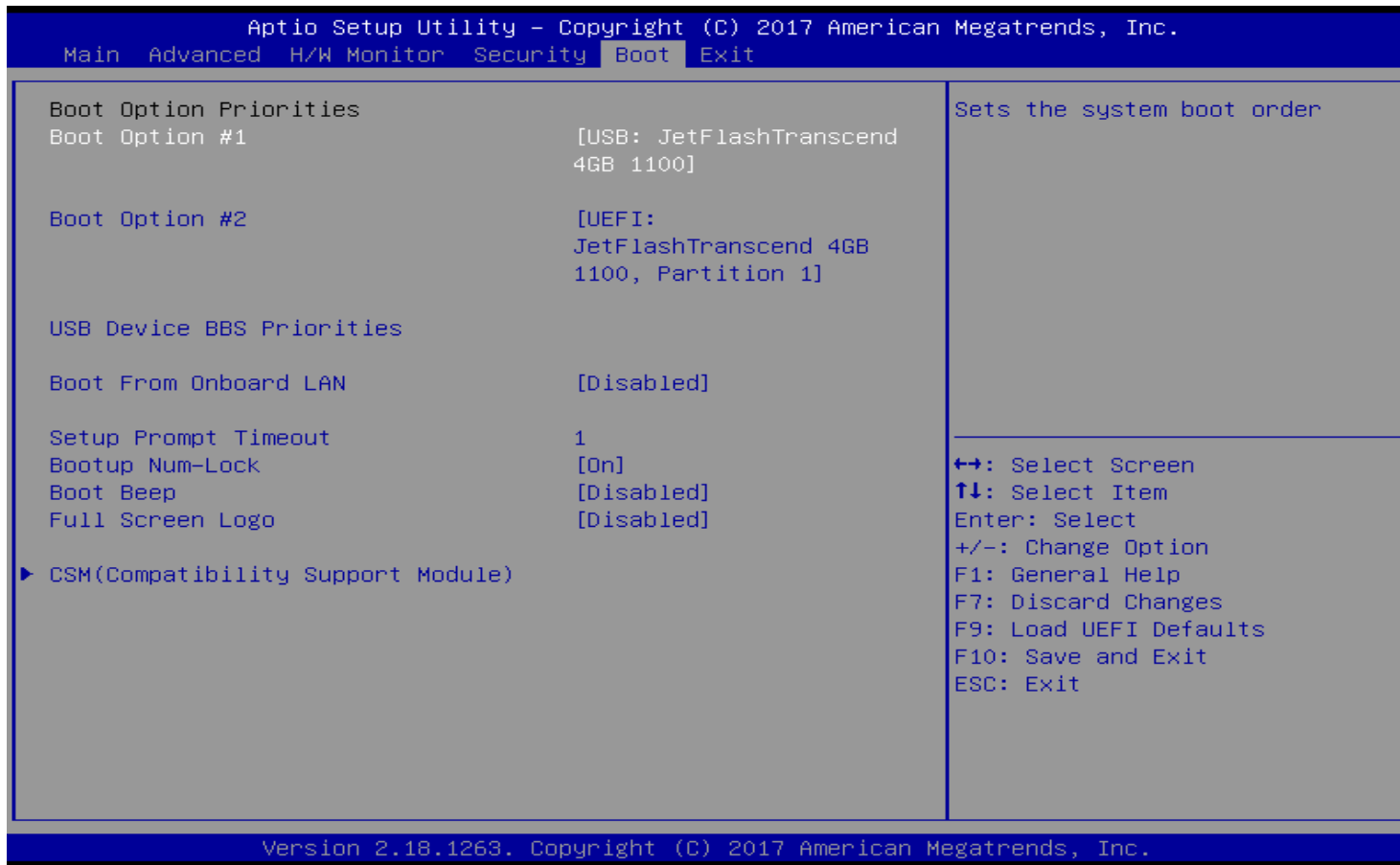
This section lets you set security passwords to control access to the system at boot time and/or when entering the BIOS setup program.



Feature	Description	Options
Supervisor Password	Set or change the password for the administrator account. Only the administrator has authority to change the settings in the UEFI Setup Utility. Leave it blank and press enter to remove the password.	Create New Password
User Password	Set or change the password for the user account. Users are unable to change the settings in the UEFI Setup Utility. Leave it blank and press enter to remove the password.	Create New Password
Secure Boot	Enable to support Windows 8 Secure Boot.	★Disabled, Enabled
Intel(R) Platform Trust Technology	Enabled/Disabled Intel PTT function, Enabled:Enable Intel PTT in ME, Disabled: Disable Intel PTT in ME, Use discrete TPM Module.	★Enabled, Disabled

7.2.5 Boot

Use this menu to specify the priority of boot devices.



Feature	Description	Options
Boot Option #1 (with storage device)	Sets the system boot order	★Disabled, storage device
Hard Drive BBS Priorities	Set the order of the legacy devices in this group	Select storage Device
Boot From Onboard LAN	Boot From Onboard LAN	★Disabled, Enabled
Setup Prompt Timeout	Configure the number of seconds to wait for the UEFI setup utility.	★1
Bootup Num-Lock	Select whether Num Lock should be turned on or off when the system boots up.	★On, Off
Boot Beep	Select whether the Boot Beep should be turned on or off when the system boots up. Please note that a buzzer is needed.	★Disabled, Enabled
Full Screen Logo (Enabled)	Enable to display the boot logo or disable to show normal POST messages.	★Disabled, Enabled

CSM(Compatibility Support Module)

Feature	Description	Options
CSM (Enabled)	Enable to launch the Compatibility Support Module. If you are using Windows 8 64-bit UEFI and all of your devices support UEFI , you may also disable CSM for faster boot speed.	★Disabled,Enabled
Launch PXE OpROM Policy	Select UEFI only to run those that support UEFI option ROM only. Select Legacy only to run those that support legacy option ROM only. Select Do not launch to not execute both legacy and UEFI option ROM.	★Legacy only, Do not launch, UEFI only

<p>Launch Storage OpROM Policy</p>	<p>Select UEFI only to run those that support UEFI option ROM only. Select Legacy only to run those that support legacy option ROM only. Select Do not launch to not execute both legacy and UEFI option ROM.</p>	<p>★Legacy only, Do not launch, UEFI only</p>
<p>Launch Video OpROM Policy</p>	<p>Select UEFI only to run those that support UEFI option ROM only. Select Legacy only to run those that support legacy option ROM only. Select Do not launch to not execute both legacy and UEFI option ROM.</p>	<p>★Legacy only, Do not launch, UEFI only</p>

7.2.6 Exit



Feature	Description	Options
Save Changes and Exit	Exit system setup after saving the changes. F10 key can be used for this operation.	
Discard Changes and Exit	Exit system setup without saving any changes. Esc key can be used for this operation.	
Discard Changes	Discard Changes done so far to any of the setup options. F7 key can be used for this operation.	
Load UEFI Defaults	Load UEFI Default values for all the setup questions. F9 key can be used for this operation.	
Launch EFI Shell from filesystem device	Attempts to Launch EFI Shell application (Shell.efi) from one of the available filesystem devices.	

8 Troubleshooting

This chapter provides a few useful tips to quickly get WADE-8172 running with success. As basic hardware installation has been addressed in Chapter 2, this chapter will focus on system integration issues, in terms of BIOS setting, and OS diagnostics.

8.1 Hardware Quick Installation

ATX Power Setting

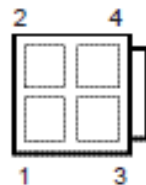
There are two methods to connect the power of WADE-8172 which are Connector 12(20 Pin ATX input) or Connector 4(4 Pin 12V-24V) . It's able to be chosen either one to let WADE-8172 power on.

4 : ATX Power Connector

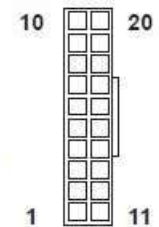
(Input 12V-24V)

1-2: GND

3-4: DC Input



12 : 20-pin ATX Power Input Connector



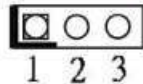
ATX Power emulation AT mode

You can adjust the connector 23(3 pin jumper) to 1-2 short to emulation the AT mode.

23 : ATX/AT Mode Select (PWR_JP1)

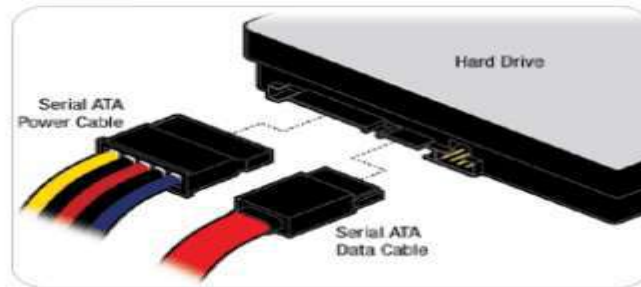
1-2: AT Mode

2-3: ATX Mode

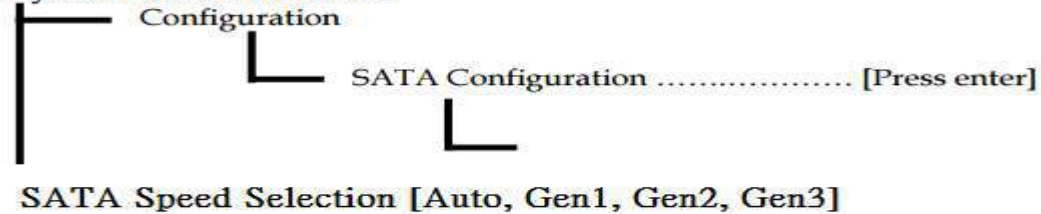


Serial ATA Hard Disk Setting for SATA Speed Selection

Serial ATA Hard Disk Setting for SATA Speed Selection



System BIOS Main Menu



8.2 BIOS Setting

It is assumed that users have correctly adopted modules and connected all the devices cables required before turning on ATX .

204-pin DDR3L SO-DIMM Memory, keyboard, mouse, SATA hard disk, VGA connector, device power cables, ATX accessories are good examples that deserve attention. With no assurance of properly and correctly accommodating these modules and devices, it is very possible to encounter system failures that result in malfunction of any device.

To make sure that you have a successful start with WADE-8172, it is recommended, when going with the boot-up sequence, to hit “Del” key And enter the BIOS setup menu to tune up a stable BIOS configuration so that you can wake up your system far well.

Loading the default optimal setting


When prompted with the main setup menu, please scroll down to “**Load UEFI Defaults**”, press “**Enter**” and select “**Yes**” to load default optimal BIOS setup. This will force your BIOS setting back to the initial factory configurations. It is recommended to do this so you can be sure the system is running with the BIOS setting that Portwell has highly endorsed. As a matter of fact, users can load the default BIOS setting at any time when system appears to be unstable in boot up sequence.

8.3 FAQ

Information & Support

Question: I forgot my password of system BIOS, what am I supposed to do?

Answer: You can switch off your power supply then find the connector“2” on the WADE-8172 to set Pin 1-2 to short and wait 10 seconds to clean your password then set it back to open to switch on your power supply.

2 : Clear CMOS Jumper 
Open: Normal
Short: Clear CMOS

Question: How to update the BIOS file of WADE-8172?

Answer:

Solution 1:

1. Please visit web site of **Portwell download center** as below hyperlink

http://www.portwell.com.tw/support/download_center.php

Registering an account in advance is a must. **(The E-Mail box should be an existing Company email address that you check regularly.)**

<http://www.portwell.com.tw/member/newmember.php>

2. Type in your User name and password and log in the download center.

3. Select **“Search download”** and type the keyword **“WADE-8172”**.

4. Find the **“BIOS”** page and download the ROM file and flash utility.

5. Unzip file to bootable USB flash drive which can boot to dos mode. Then execute the **“update.bat”**. It will start to update BIOS.



```
Microsoft(R) Windows 98  
(C)Copyright Microsoft Corp 1981-1999.  
C:\>update_
```

6. When you see the “FPT Operation Passed” message, which means the BIOS update processes finished. Please cut the AC power off and **wait for 10 seconds** before powering on.

```
- Erasing Flash Block [0x0E3000] - 100% complete.
- Programming Flash [0x0E3000] 4KB of 4KB - 100% complete.
- Erasing Flash Block [0xA07000] - 100% complete.
- Programming Flash [0xA07000] 28KB of 28KB - 100% complete.
- Erasing Flash Block [0xA26000] - 100% complete.
- Programming Flash [0xA26000] 20KB of 20KB - 100% complete.
- Erasing Flash Block [0xA40000] - 100% complete.
- Programming Flash [0xA40000] 4KB of 4KB - 100% complete.
- Erasing Flash Block [0xC5E000] - 100% complete.
- Programming Flash [0xC5E000] 1940KB of 1940KB - 100% complete.
- Erasing Flash Block [0xFB7000] - 100% complete.
- Programming Flash [0xFB7000] 88KB of 88KB - 100% complete.
- Erasing Flash Block [0xFD9000] - 100% complete.
- Programming Flash [0xFD9000] 4KB of 4KB - 100% complete.
- Verifying Flash [0x1000000] 16384KB of 16384KB - 100% complete.
RESULT: The data is identical.

FPT Operation Passed

C:\>_FLASH>
```

7. Press “DEL” key into the BIOS setup menu and switch to “Exit” page then select “Load UEFI Defaults” Option and press “Yes” then select “Save Changes and Exit” to finish all BIOS update processes.



Solution 2:

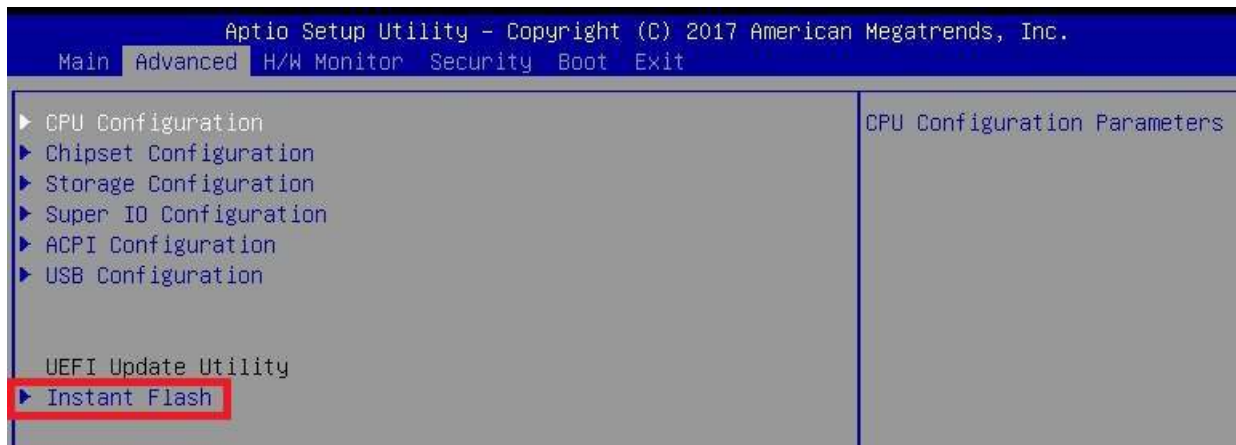
1. Please visit web site of **Portwell download center** as below hyperlink

http://www.portwell.com.tw/support/download_center.php

Registering an account in advance is a must. **(The E-Mail box should be an existing Company email address that you check regularly.)**

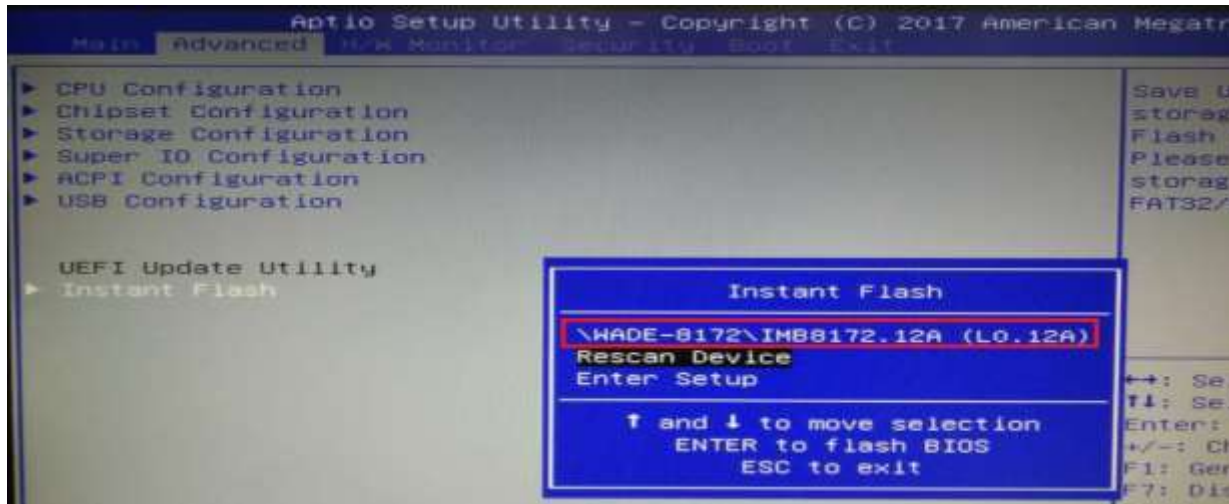
<http://www.portwell.com.tw/member/newmember.php>

2. Type in your User name and password and log in the download center.
3. Select **“Search download”** and type the keyword **“WADE-8172”**.
4. Find the **“BIOS”** page and download the ROM file and unzip file to USB flash drive(FAT 32 / 16 format).
5. Boot into BIOS and switch to **“Advanced”** page then select **“Instant Flash”**.

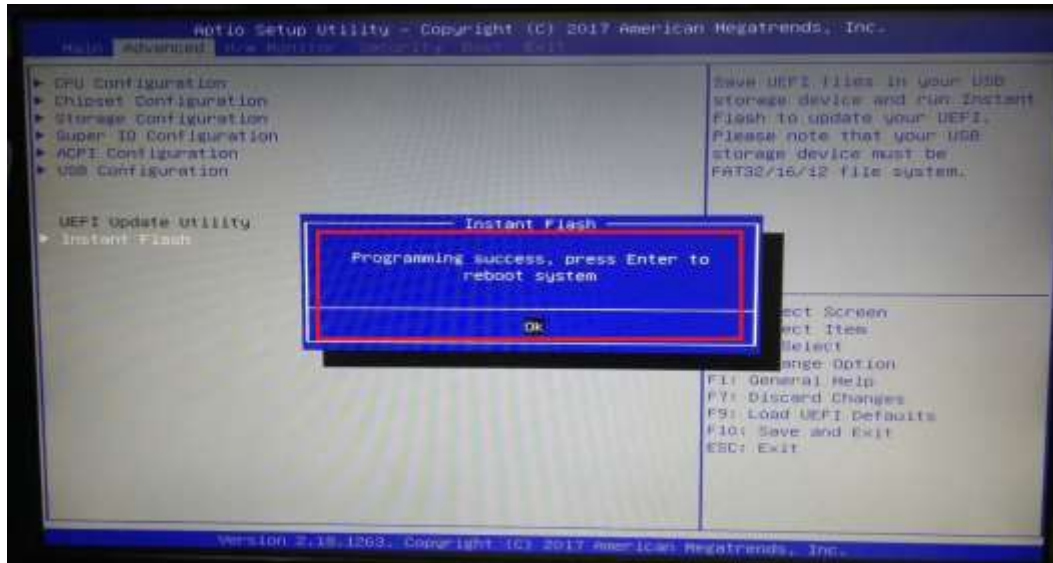


WADE-8172

6. Select "xxxx.12A" file then start update BIOS.



7. When you see the “Programming success” message, which means the BIOS update processes finished. Please cut the AC power off and **wait for 10 seconds** before powering on.



8. Press “DEL” key into the BIOS setup menu and switch to “Exit” page then select “Load UEFI Defaults” Option and press “Yes” then select “Save Changes and Exit” to finish all BIOS update processes.



Note:

Please visit our Download Center to get the Catalog , User Manual ,BIOS and driver files.

http://www.portwell.com.tw/support/download_center.php

If you have other additional technical information or request which is not covered in this manual, please fill in the technical request form as below hyperlink.

http://www.portwell.com.tw/support/problem_report.php

We will do our best to provide a suggestion or solution for you.

Thanks

9 Portwell Software Service

Portwell EC Auto Test Tool (PECAT)

The Portwell EC Auto Test Tool (PECAT) is a brand new utility which innovated by Portwell. PECAT now is available for Portwell's premiere customers, who are able to [Test Embedded Controller Function](#) in UEFI Mode. Please contact Portwell for more information.

10 Industry Specifications

The list below provides links to industry specifications that apply to Portwell modules.

Low Pin Count Interface Specification, Revision 1.0 (LPC) <http://www.intel.com/design/chipsets/industry/lpc.htm>

Universal Serial Bus (USB) Specification, Revision 2.0 <http://www.usb.org/home>

PCI Specification, Revision 2.3 <https://www.pcisig.com/specifications>

Serial ATA Specification, Revision 3.0 <http://www.serialata.org/>

PCI Express Base Specification, Revision 2.0 <https://www.pcisig.com/specifications>