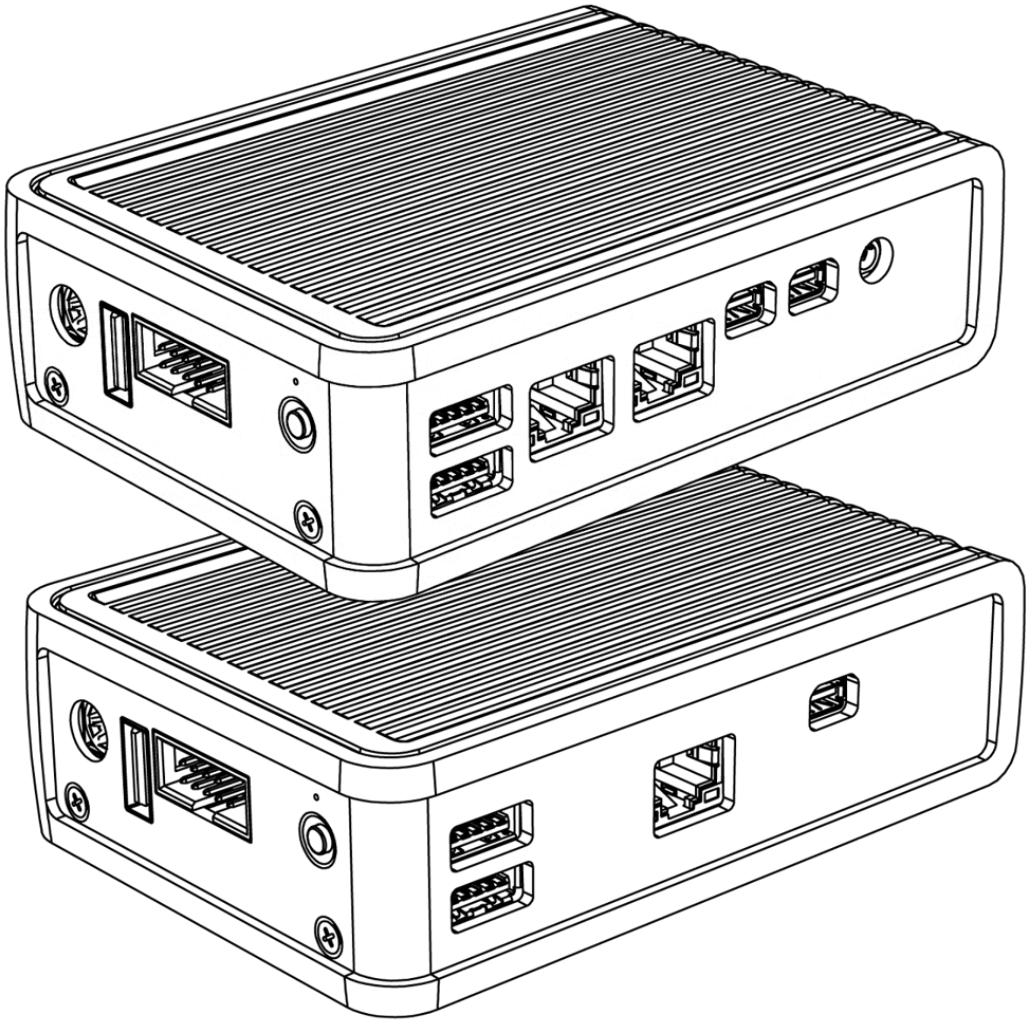
CL250 / CL210 / CL200

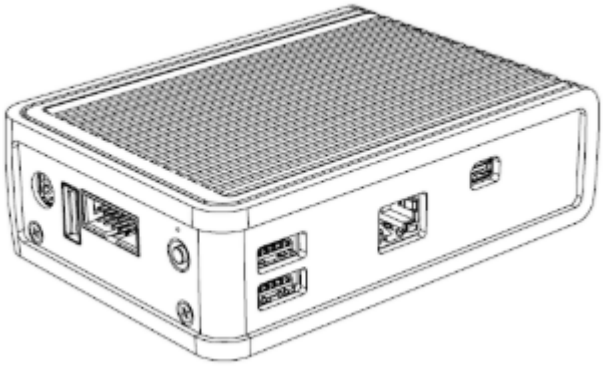
CL2X0 Series



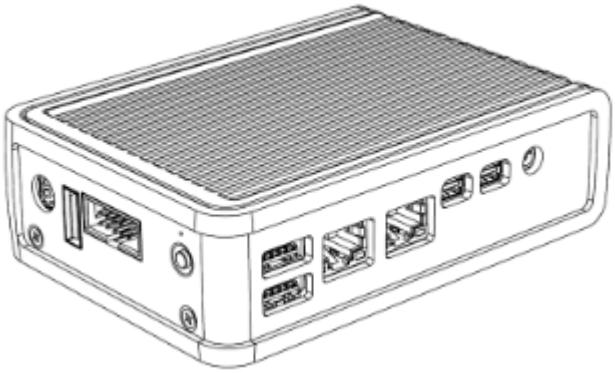
1- Product Overview

Ultra-small form factor computers that are designed to be reliable and feature-rich, with a fanless and ventless design for durability and effective cooling. The CL200 series are IoT-ready with configurable options for 4G LTE, Wi-Fi/Bluetooth, and advanced functionalities like Movidius and multi-CEC. Measuring just 34 mm x 115 mm x 82 mm, the CL200 can be installed in compact spaces while maintaining connectivity.

1.1- Box Contents & Accessories



CL200 Assembly



CL210 & CL250 Assembly

Accessories

- Power Adapter
- Thermal Pads

Thermal Pads are used to assist with cooling expansion mSATA and mPCIe cards. If you purchased your system with expansion cards pre-installed, the thermal pads will already be installed inside the system. If you purchased additional items such as mounting brackets, power supplies, or antennas, they will be located in the system box or within the outer shipping carton.

1.2- System Specifications

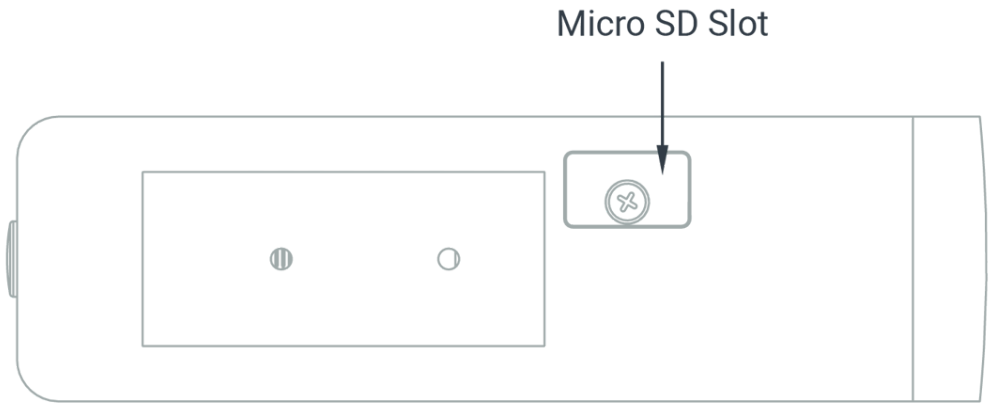
Feature	CL200 (Standard-Basic)	CL210 (Standard-Advanced)	CL250
Form Factor	Pico ITX (100mm x 72mm)	Pico ITX (100mm x 72mm)	Pico ITX (100mm x 72mm)
Processor	Intel® Celeron® N3350	Intel® Celeron® N3350	Intel® Celeron® J3455
System Memory	2GB LPDDR4 onboard	4GB LPDDR4 onboard	8GB LPDDR4 onboard
Graphics	Intel® HD Graphics 500	Intel® HD Graphics 500	Intel® HD Graphics 500
Audio	Realtek ALC233	Realtek ALC233	Realtek ALC233
Super I/O	Nuvoton NCT 5524	Nuvoton NCT 5524	Nuvoton NCT 5524
LAN (1 & 2)	Realtek RTL8111H	Realtek RTL8111H	Realtek RTL8111H
Expansion 1	Full-length mPCIe slot (PCIe/USB/mSATA signal)	Full-length mPCIe slot (PCIe/USB/mSATA signal)	Full-length mPCIe slot (PCIe/USB/mSATA signal)
Expansion 2	Half-length mPCIe slot (PCIe/USB signal)	Half-length mPCIe slot (PCIe/USB signal)	Half-length mPCIe slot (PCIe/USB signal)
WiFi Antenna	4 x Antenna holes	4 x Antenna holes	4 x Antenna holes
Onboard Storage	8GB eMMC	32GB eMMC	None
Rear I/O	Micro SD slot	Micro SD slot	Micro SD slot
Front I/O: Audio	Jack (Mic-in/Line-out)	Jack (Mic-in/Line-out)	Jack (Mic-in/Line-out)
Front I/O: mDP	1 x mini-Display Port	2 x mini-Display Port	2 x mini-Display Port
Front I/O: LAN	1 x Gb LAN port	2 x Gb LAN port	2 x Gb LAN port
Front I/O: USB	2 x USB 3.0	2 x USB 3.0	2 x USB 3.0

Bottom I/O	1 x Power button 1 x LED (on the backside of PCB) 1 x USB2.0 vertical type 1 x 12V DC-in barrel RS 232 Box Header Connector	1 x Power button 1 x LED (on the backside of PCB) 1 x USB2.0 vertical type 1 x 12V DC-in barrel RS 232 Box Header Connector	1 x Power button 1 x LED (on the backside of PCB) 1 x USB2.0 vertical type 1 x 12V DC-in barrel RS 232 Box Header Connector
Onboard Headers and Connectors	1 x RTC battery header 1 x CEC header (module population is optional) 1 x clear CMOS, AT/ATX Jumper	1 x RTC battery header 1 x CEC header (module population is optional) 1 x clear CMOS, AT/ATX Jumper	1 x RTC battery header 1 x CEC header (module population is optional) 1 x clear CMOS, AT/ATX Jumper

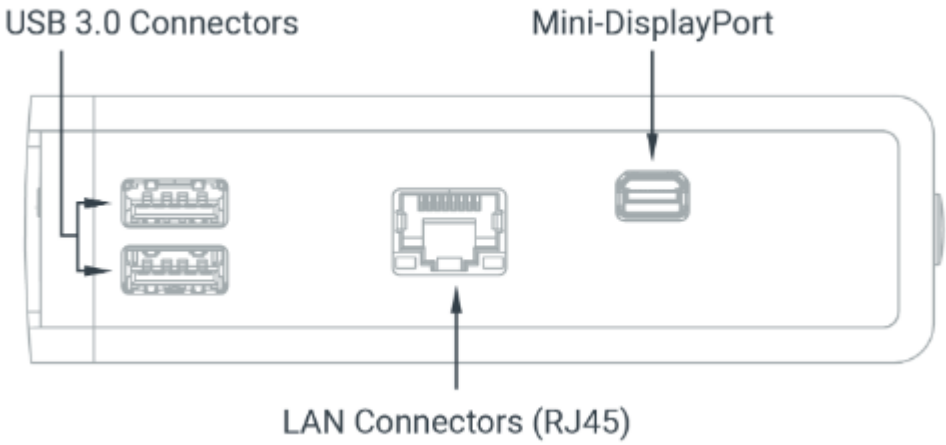
2- Technical Specifications

2.1- External Features

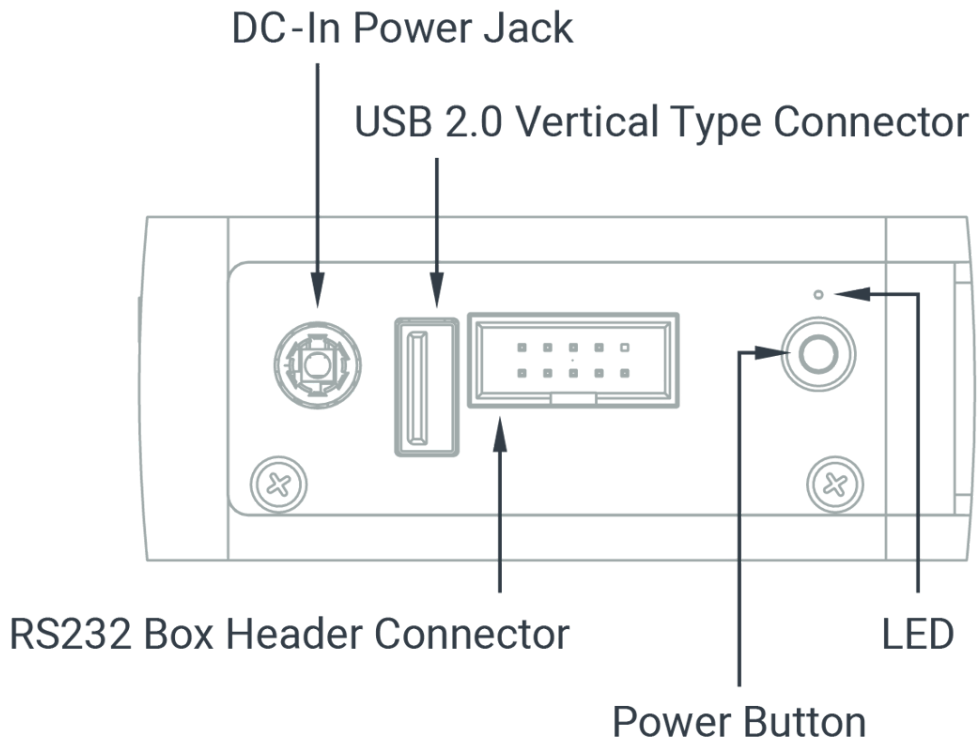
CL200 Exterior



CL200 Back

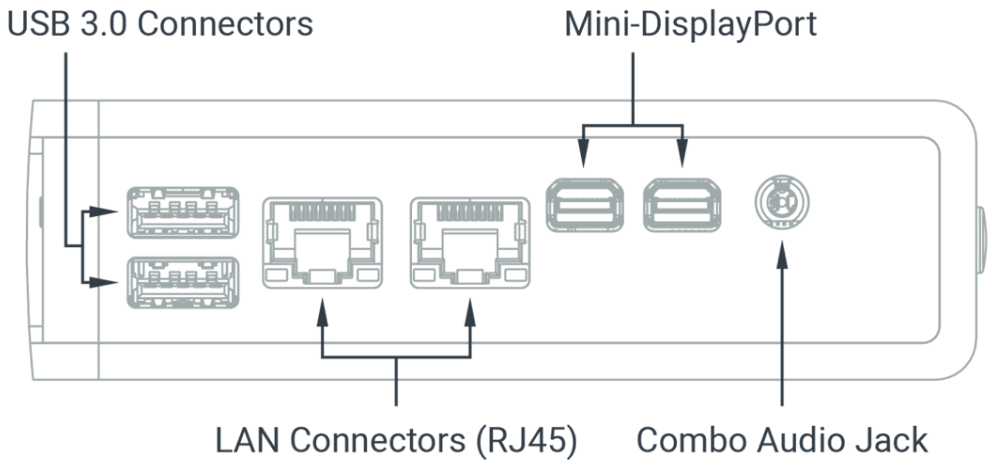


CL200 Front

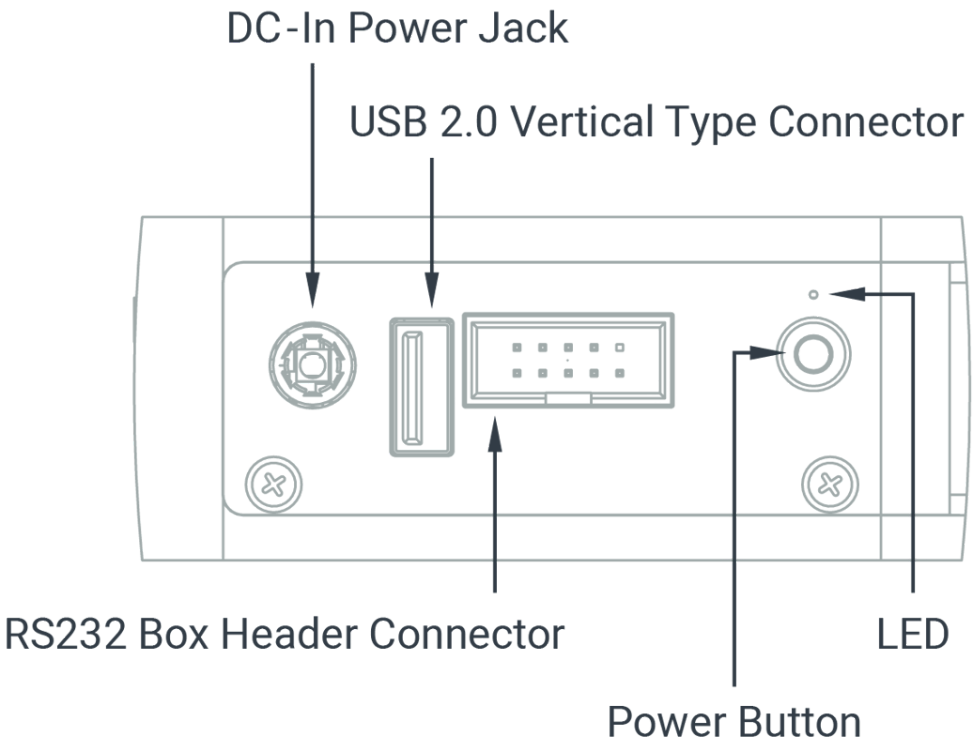


CL200 Side

CL210 & CL250 Exterior



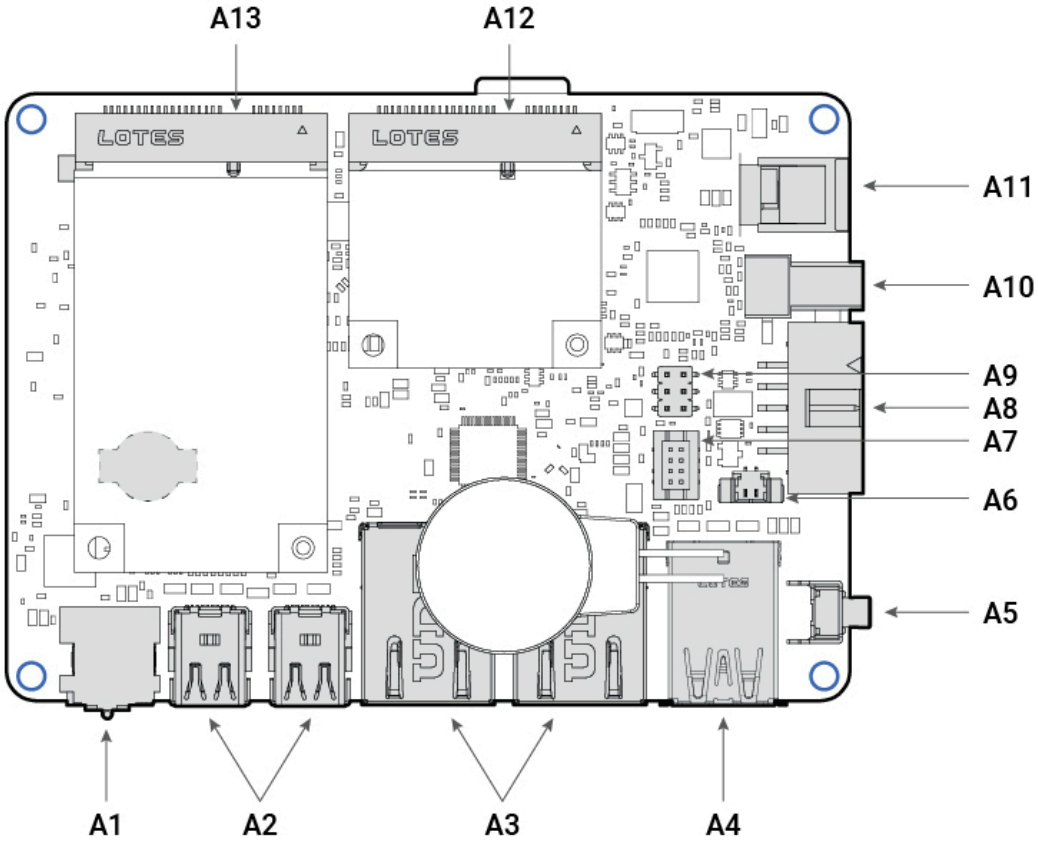
CL210 & CL250 Front



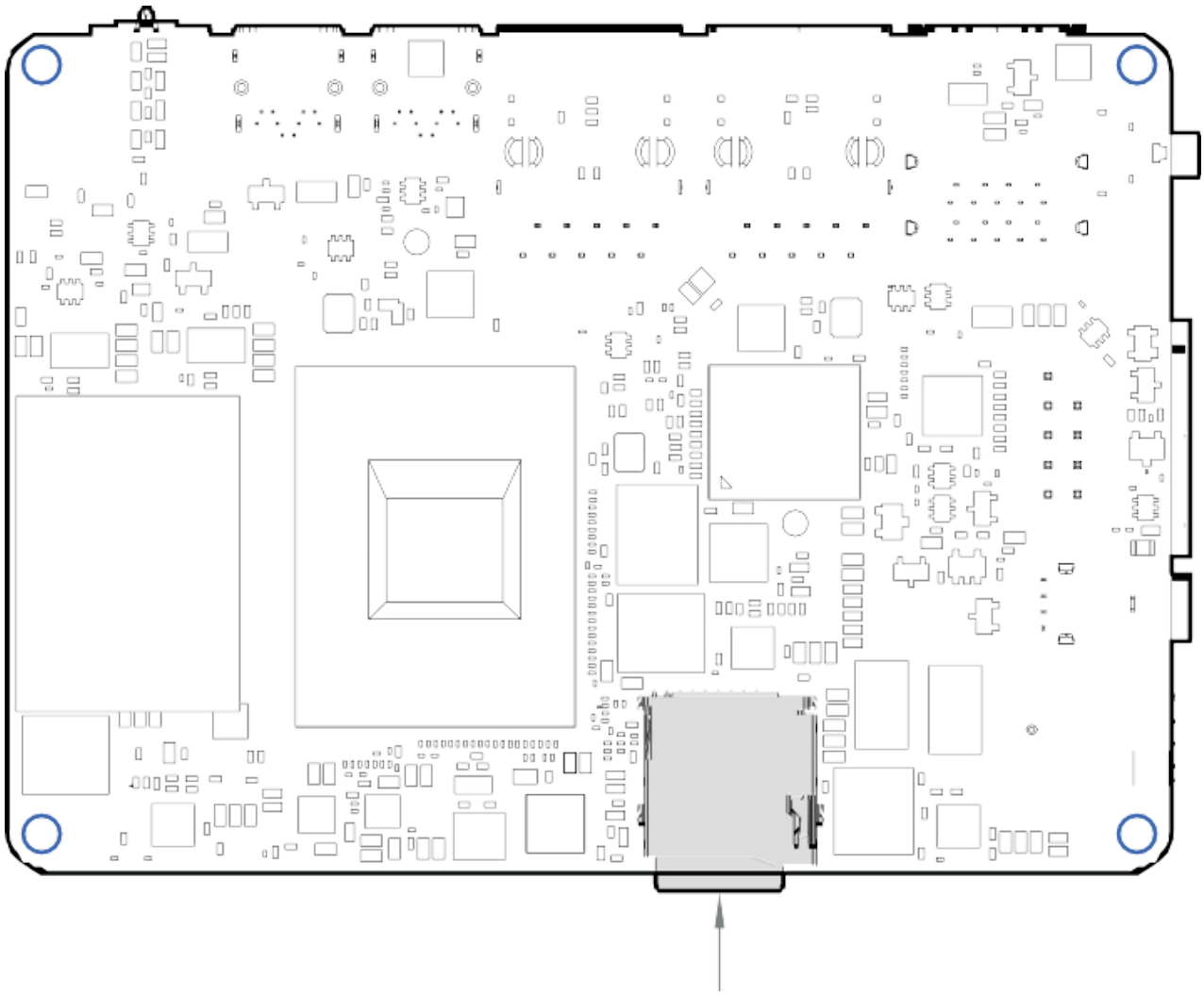
CL210 & CL250 Side

2.2- Motherboard Overview

Core Design - Motherboard


A13
A12
LOTES
LOTES
A11
A10
A9
A8
A7
A6
A5
A1
A2
A3
A4

Item	Functional Description
A1	Combo Audio JACK connector (optional)
A2	miniDisplay Port connector - J54-DDI0 1st display miniDisplay Port connector - J55-DDI1 2nd display (optional)
A3	RJ45 LAN connector - J_Lan_1 RJ45 LAN connector - J_Lan_2 (optional)
A4	Dual USB3.0 connector
A5	Power Button
A6	Battery Header
A7	HDMI CEC Header (Optional)
A8	RS-232 COM Box Header
A9	Clear CMOS + AT/ATX Mode Header
A10	USB2.0 Verticle Type Connector
A11	DC-IN Power Jack
A12	Half-Height mPCIE Slot
A13	mPCIE Slot/mSATA Slot



Item	Functional Description
B1	Micro SD Connector

Memory & Storage

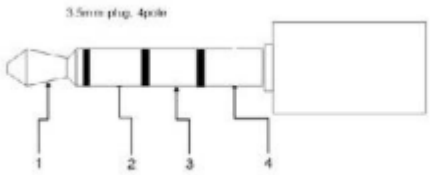
Memory and storage are soldered on the motherboard for the CL200 Series computers. Memory for both systems are LPDDR4 dual channel RAM. Both systems use industrial-grade eMMC onboard storage. Manufacturers and part numbers are subject to change, so please check the system pages for updates. Additional storage is available using the uSD card Revision 3.01 (SDXC) supporting up to 2TB.

System	Storage	Manufacturer	Part Number	Size
CL200G-10	eMMC	San Disk	SD1NBDG4-8G	8 GB
CL210G-10	eMMC	Samsung	KLMG2JETD-B041	32 GB

System	Memory	Manufacturer	Part Number	Size
CL200G-10	LPDDR4	Samsung	K4F8E304HB-MGCH	1 GB x 2
CL210G-10	LPDDR4	Samsung	K4F6E304HB-MGCJ	2 GB x 2

Combo Audio Jack

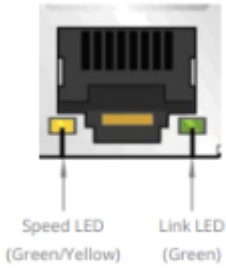
The audio jack is implemented using the Realtek ALC233-VB2 and supports Nokia and Apple headset connectors.



CL200 Series Combo Audio Jack

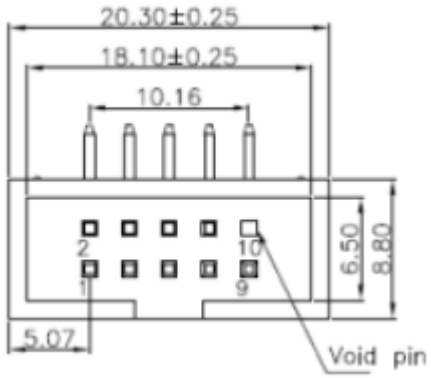
Pin	Nokia Headset Connector	Standard Connector
1	Left	Left
2	Right	Right
3	Mic	Ground
4	Ground	Mic

LAN Port



Serial Port

The serial port header is 2x5, 2.54 mm pitch, colored black and keyed at pin 10.



Pin	Name	Signal
1	COM3_P1_40mils	DCD (Data Carrier Detect)
2	NRX3	RXD# (Receive Data)
3	NTX3	TXD# (Transmit Data)
4	NDTR3	DTR (Data Terminal Ready)
5	GND	Ground
6	NDSR3	DSR (Data Set Ready)
7	NRTS3	RTS (Request To Send)
8	NCTS3	CTS (Clear To Send)
9	COM3_P9_40mils	RI (Ring Indicator)
10	Key	Key (no pin)

Mini-PCI Express Expansion Slots

Standard pin-out supports half-height PCIe/USB and full-height PCIe/USB/mSATA signal.

2.3- Jumpers and Headers

Jumper Set Up

The following illustration shows how to use jumpers.

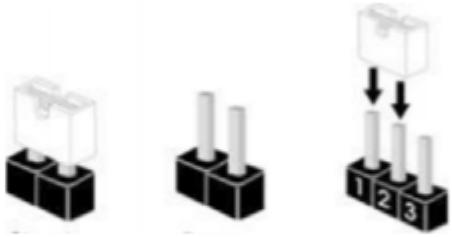


Figure 15. Jumper Short or Open

“Short” pins together by placing the jumper shunt on pins. Pins not capped with jumpers are “open”. With the illustrated 3-pin jumper, the shunt shorts pins 1 and 2. Check the corresponding header pin attributes to see what functionality is supported by shorting different pin pairs.

AT/ATX, CMOS Jumper

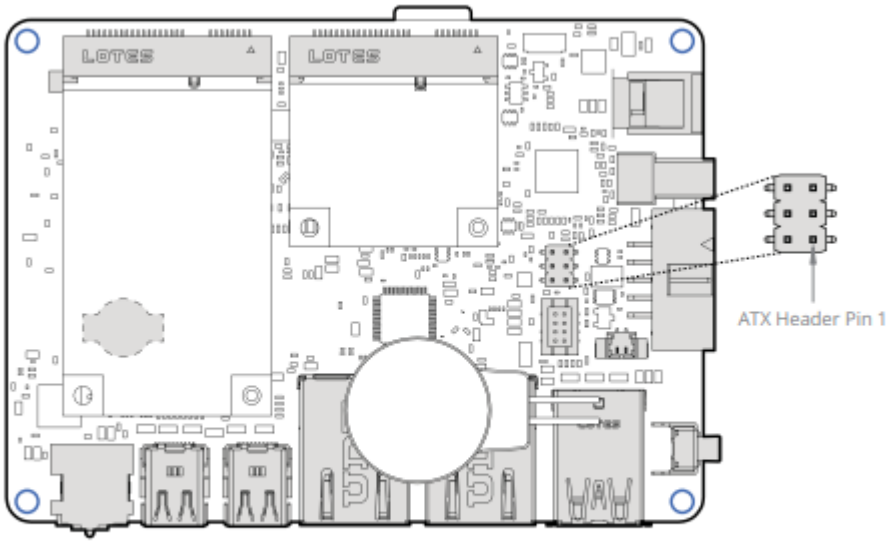
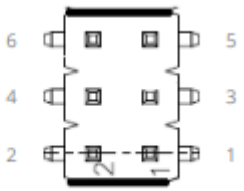
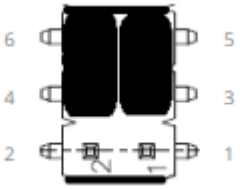


Figure 16. ATX Header Pin 1 on Motherboard

The following illustration shows the header without any jumpers.



This illustration shows jumpers in the default 6-4 and 5-3 positions.



Function	Setting
Clear CMOS	2-4
Normal (default)	4-6
AT Mode	1-3
ATX Mode (default)	3-5

Clearing the CMOS

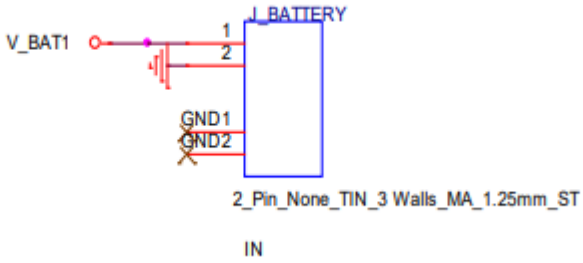
Setting the jumper with the Clear CMOS jumper shunt allows you to clear the data in the CMOS. **NOTE:** Do not clear the CMOS right after updating the BIOS. You must boot up the system first and then shut it down before clearing the CMOS. **NOTE:** The password, date, time user default profile will be cleared only if the CMOS battery is removed.

To clear and reset system parameters to the default setup, follow these steps:

1. Turn off the computer and unplug the power cord from the power supply.
2. Wait 15 seconds.
3. Remove the jumper shunt from pins 6 and 4 and use it to short pins 2 and 4 on the header for 5 seconds.
4. Remove the jumper shunt and return it to short pins 6 and 4.

2-Pin Battery Cable Header

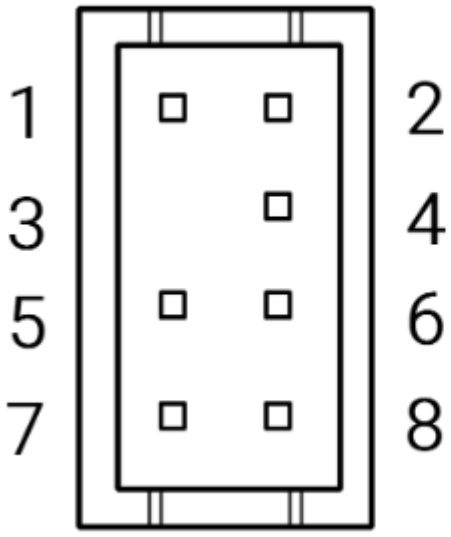
The 3V Battery coin cell cable header is clearly labeled:



Function	Setting
3V Power	Pin 1
GND	Pin 2

HDMI CEC Header

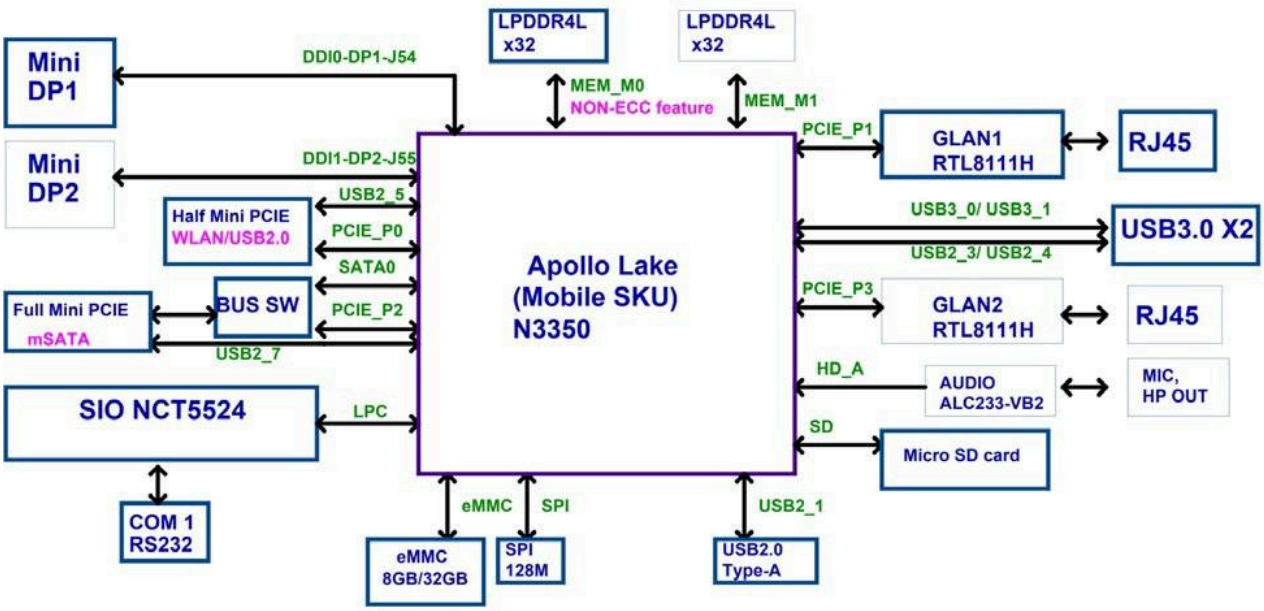
If it was selected and configured in the build, the chip will be populated. CEC functionality will work with an HDMI adapter. Please see series pages for additional information.



Pin	Function
1	DP2_CEC
2	DP1_CEC
3	Key
4	5MBus DATA
5	3.3V
6	5MBus Clock
7	Power BTN
8	GND

2.4- Processor

Processor Core Design



Processor Graphics

Onboard Intel HD Graphics 500 processing circuitry is integrated into the processor. Single Display supports a maximum resolution of up to 3840x2160 (4K) @ 60 Hz. Dual independent displays are achieved through the optional second Mini-Display Port. Up to three mirrored displays are achieved via Display Port v1.2 daisy chaining.

2.5- Power Management

The CL200 Series supports multiple power states. These states can be configured on the motherboard. This section describes the power management functions you can perform.

Unexpected Shutdown Function

An unexpected shutdown does not necessarily cause a loss of data, but it can make access to some of your data difficult. To remedy this possibility, follow this procedure to power up the system again after the system power has been off for more than 4 seconds:

- If the SOC BIOS mode is set to AT mode, press the Power button once to power on the system.
- If the SOC BIOS mode is set to ATX mode, press the Power button twice to power on the system.

Wake-Up Events

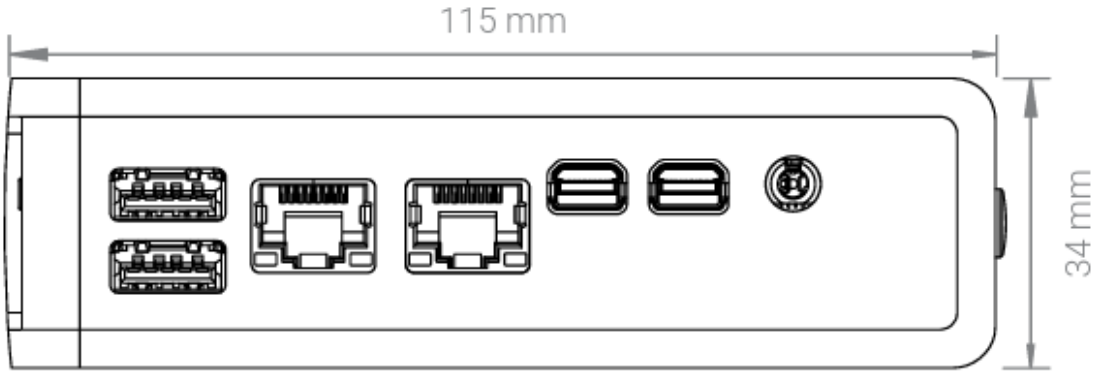
The motherboard supports the following wake-up events.

Wake-Up Event	From ACPI State	Comments
Power Button	S3, S4, S5	
RTC Alarm	S3, S4, S5	monitor to remain in sleep state
LAN	S3, S4, S5	
USB	S3	
PCIe	S3, S4, S5	via WAKE; monitor to remain in sleep state

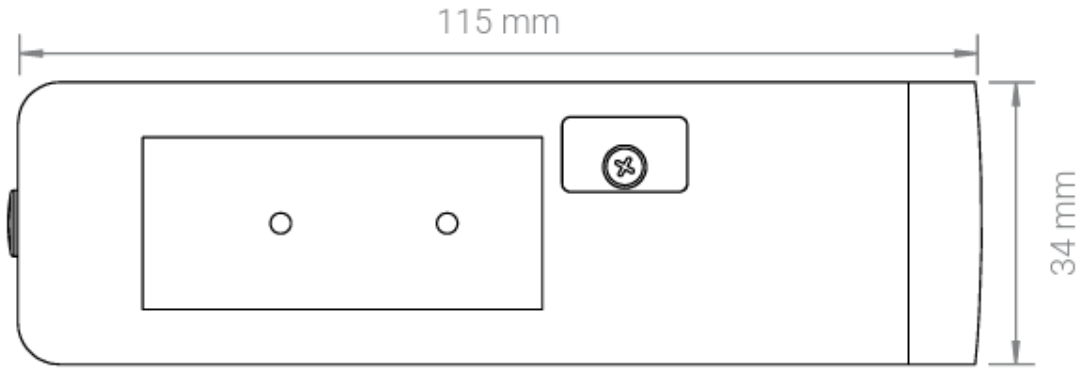
Notes: S4 implies OS support only. USB ports must be turned off during S4/S5 states.

3- Installation & Mechanical

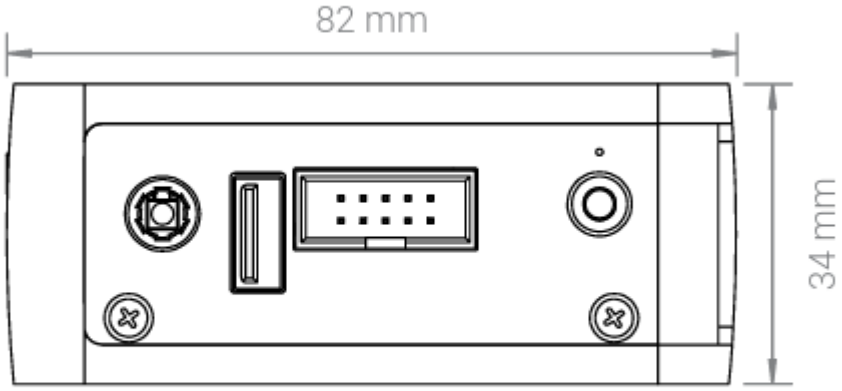
3.1- Dimensions



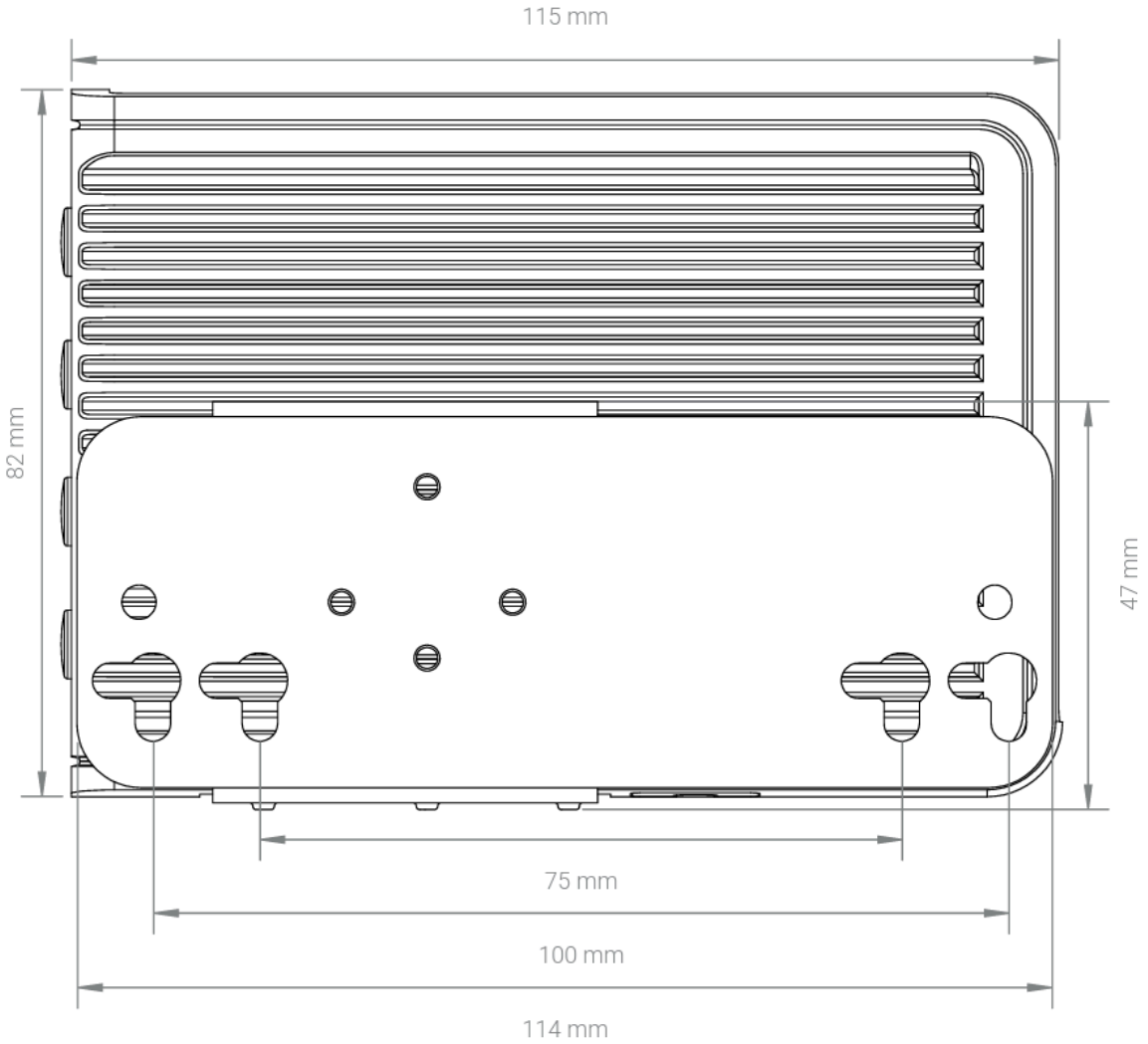
CL250 FRONT



BACK



SIDE

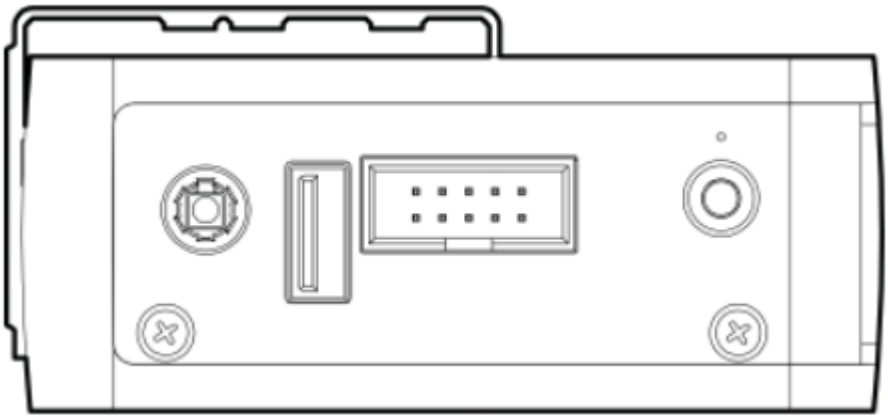


TOP

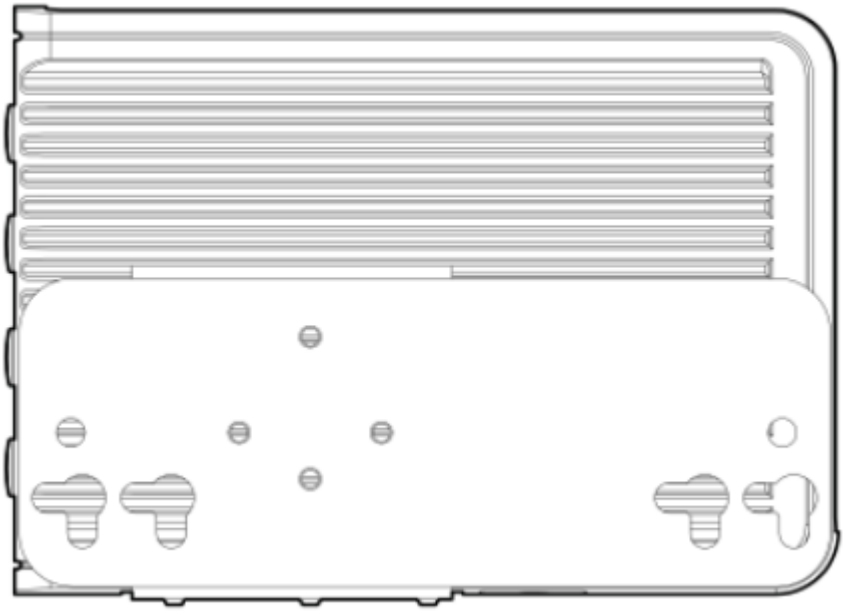
3.2- Mounting

Clip Installation & Wall Mounting

1. **Step 1:** Mark and prep holes in surface for mounting.
2. **Step 2:** Attach wall mount brackets to chassis.
3. **Step 3:** Fasten system to surface.



CL200 Mounting Plate Side



CL200 Mounting Plate Back

DIN Rail Mounting

1. **Step 1:** Attach DIN Rail mounting brackets to the chassis.
2. **Step 2:** Clip system to the DIN Rail.

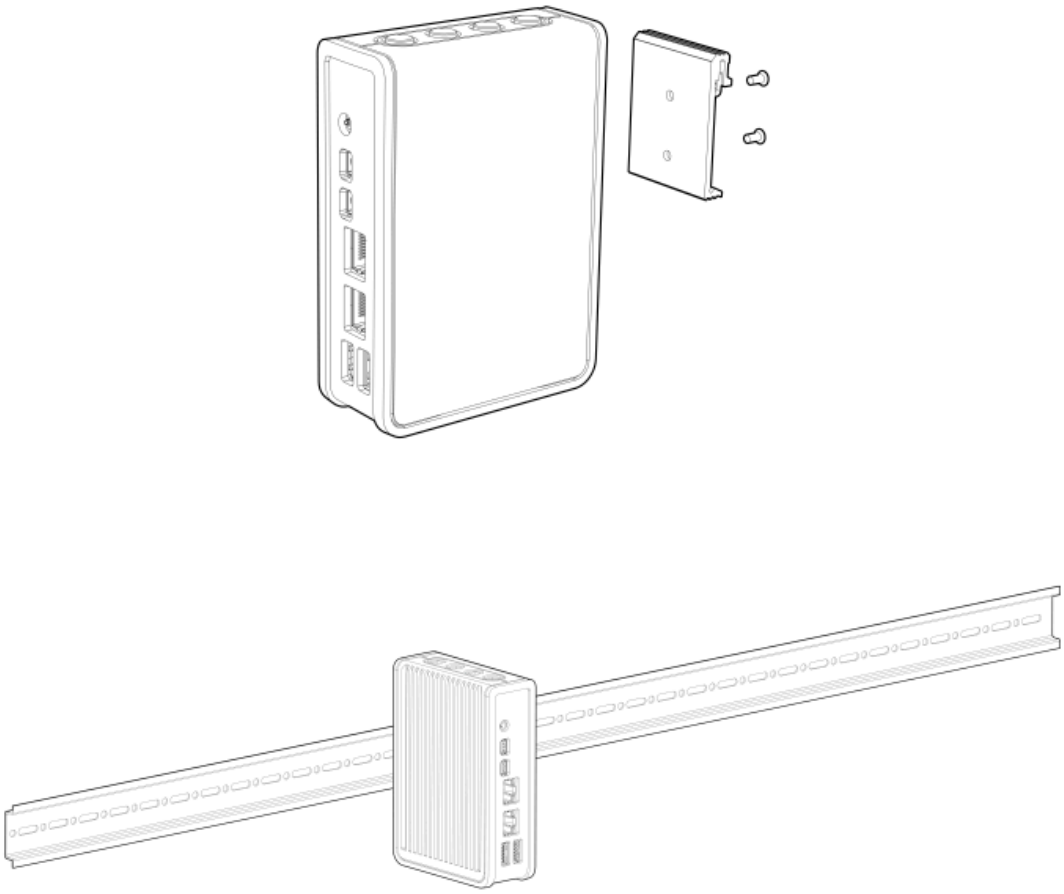
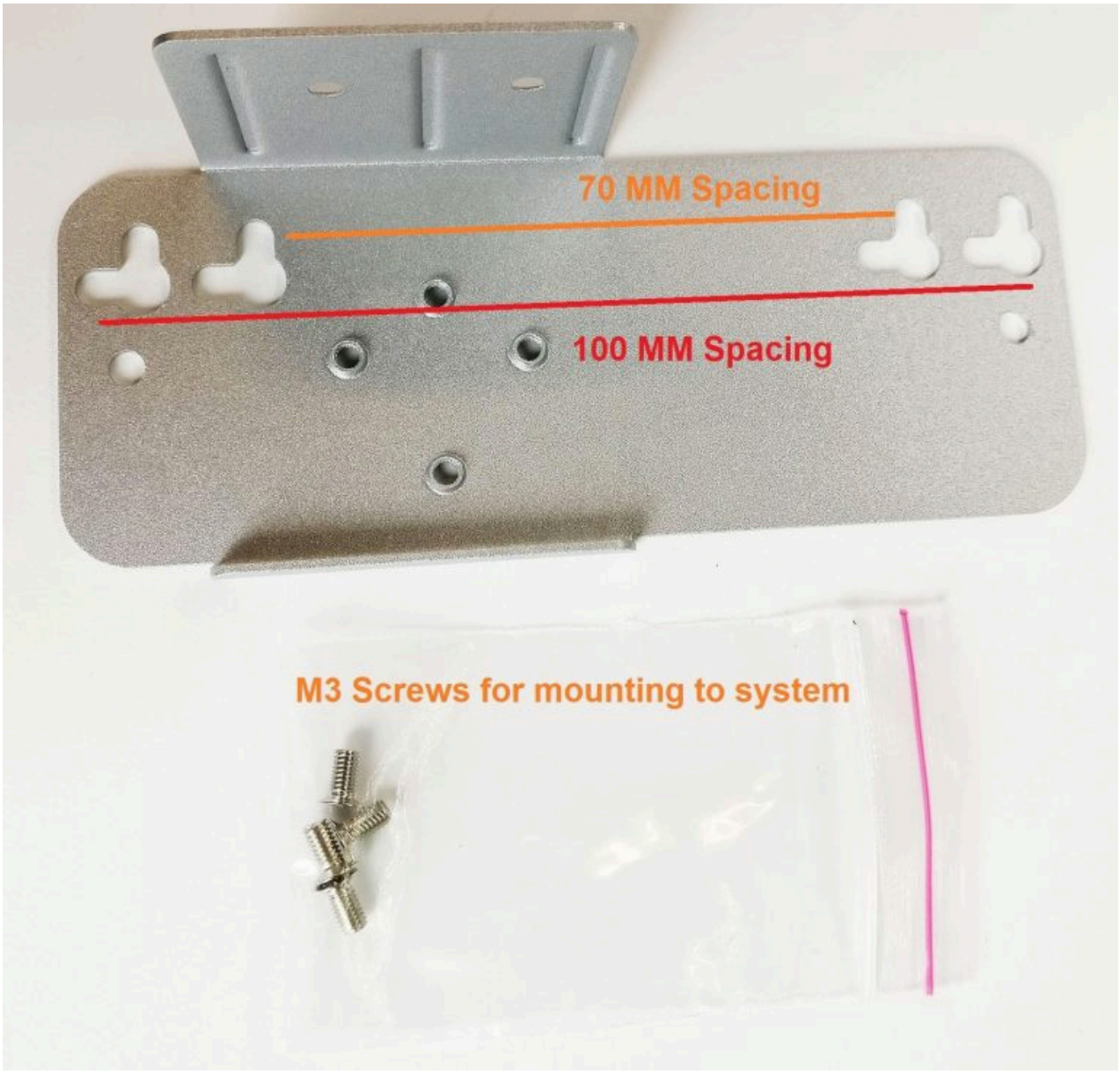


Figure 21. CL200 DIN Rail Mounting



3.3- Internal Access

Pre-Installation Precautions

It is important to read the following precautions before installing expansion cards into the motherboard:

- Wear a grounding strap attached to a grounded device to avoid damage from static electricity.
- Before opening the system, discharge static electricity by touching the metal case to a grounded object.

- Leave components in the static-proof bags they came in until they can be installed.
- Hold all circuit boards by the edges.
- Do not bend circuit boards.

Internal Access

- Remove the two silver Phillips screws
- Use a flathead screwdriver or similar tool to gently lever the bottom cover off

Reassembly

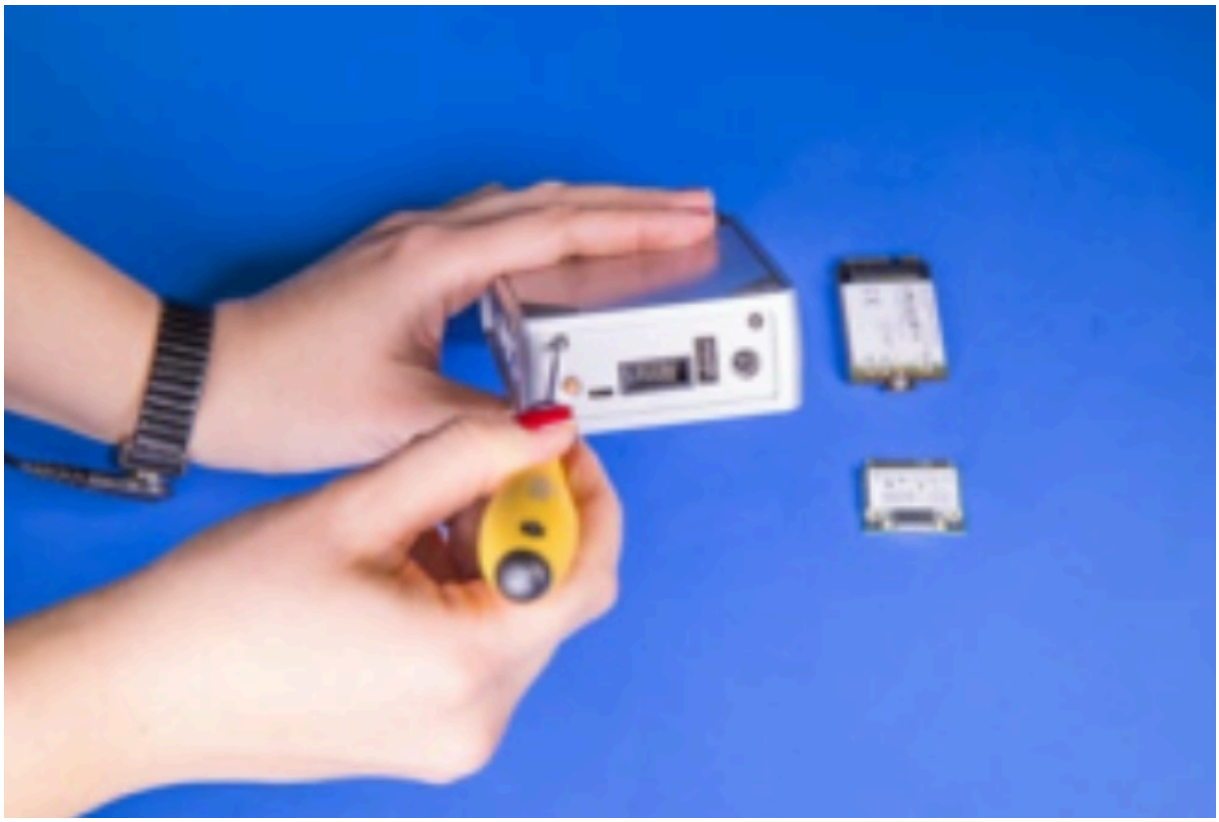
- Hinge the bottom plate back onto the system by aligning the tabs
- Reinstall the silver Phillips screws

Building CL200 Series with Wi-Fi

To add Wi-Fi to the CL200 Series, follow this procedure.

1. Before starting, ensure that you have read and understand the installation precautions listed above in the "Pre-Installation Precautions" section. \

2. Remove both screws from the front of the case. Retain screws. \



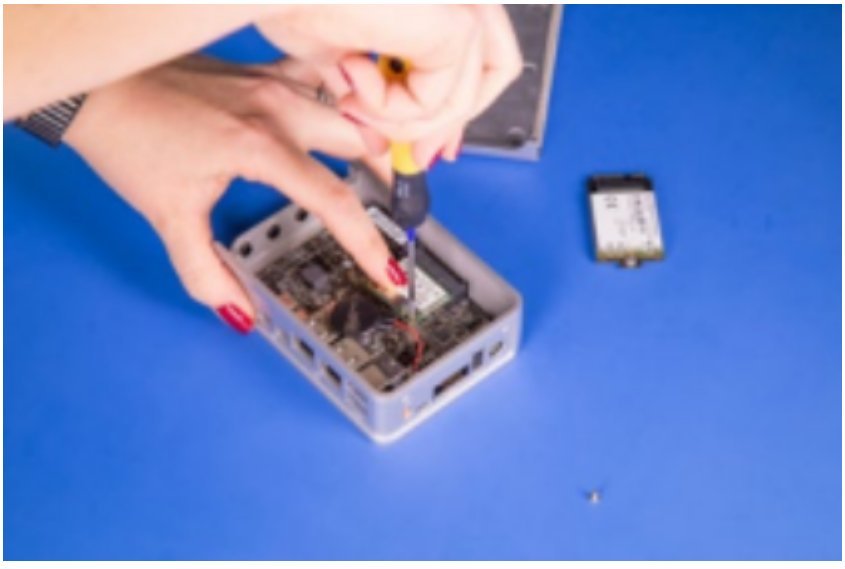
3. Remove the cover of the unit by sliding it toward the rear. \

4. Remove rubber port blockers to install SMA connector through antenna holes. Remove nut first and line up the key. Install nut on the outside to hold connector in place. \

5. Unscrew the screw on the standoff for the card length required. Retain screw. \

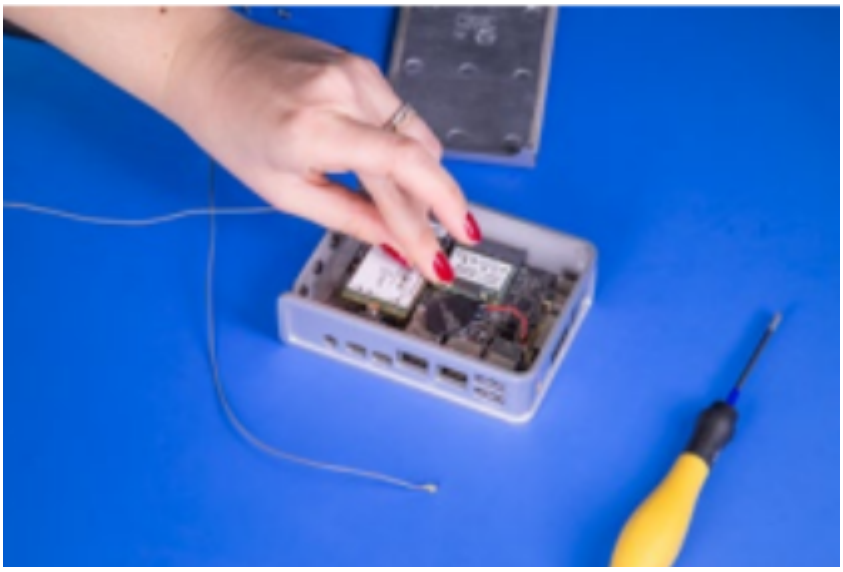
6. Insert card at a 45 degree angle into the mPCIe slot until it snaps in. \

7. Press down on the card's edge and screw down using retained screw into standoff. \



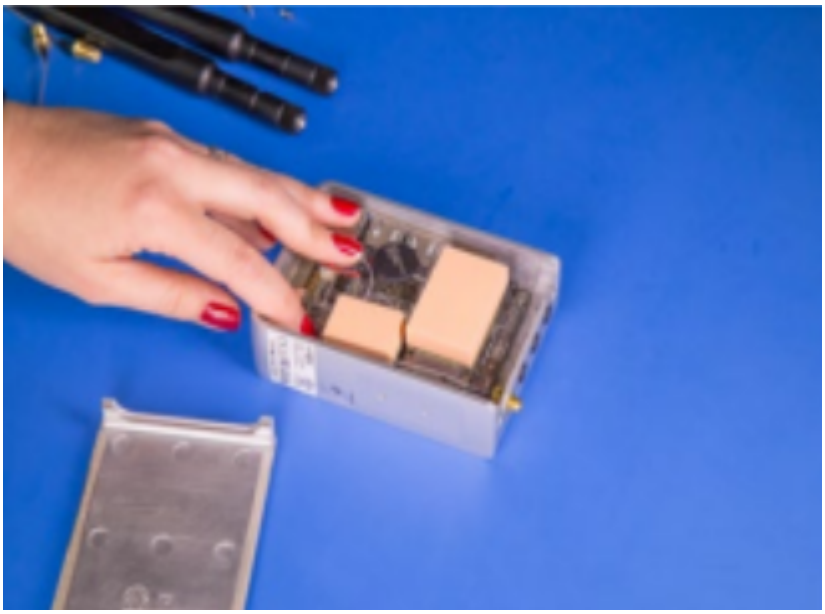
8. Install second card as needed following the same instructions as above. \

9. If installing broadcast modules, install MHF4 pigtail cable to the module. Make sure the MHF4 cable maps to the correct port. \



10. Remove clear sticker backing from thermal pads to attach to installed modules. \

11. Install thermal pads onto installed modules, making sure to keep all wires free from pads and other ports.



12. Install cover onto the unit using retained screws. \

13. Install antennas to exposed SMA connector. \

3.4- CAD & Drawings

11MB	CL250 All Mounting.zip archive	Download Open

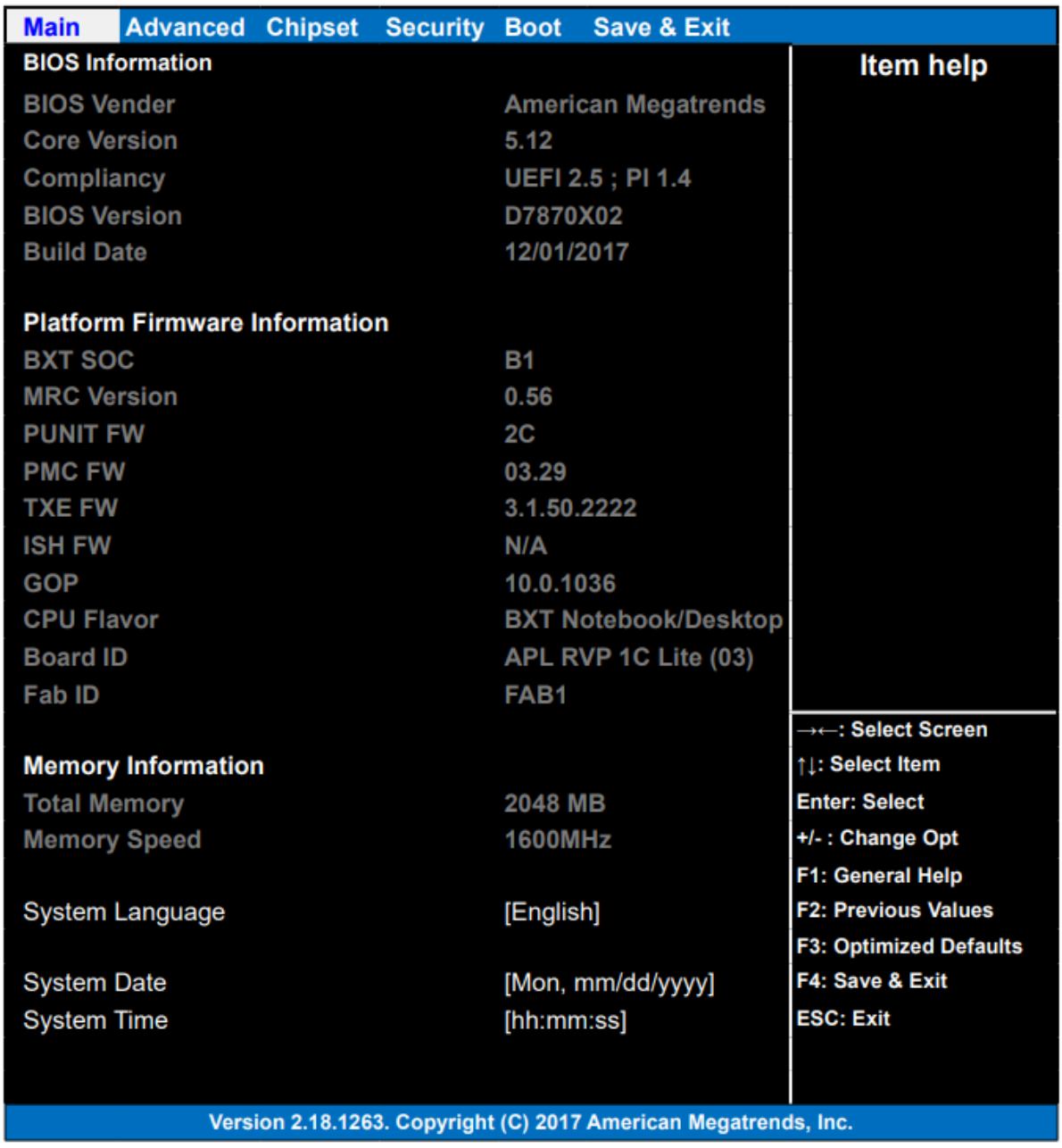
4- Software & Firmware

4.1- BIOS

UEFI Overview

The following section describes the CL200 Series UEFI. It shows each screen menu with a table describing the various fields and values.

Main Page


Main
Advanced
Chipset
Security
Boot
Save & Exit
BIOS Information
BIOS Vender
American Megatrends
Core Version
5.12
Compliancy
UEFI 2.5 ; PI 1.4
BIOS Version
D7870X02
Build Date
12/01/2017
Platform Firmware Information
BXT SOC
B1
MRC Version
0.56
PUNIT FW
2C
PMC FW
03.29
TXE FW
3.1.50.2222
ISH FW
N/A
GOP
10.0.1036
CPU Flavor
BXT Notebook/Desktop
Board ID
APL RVP 1C Lite (03)
Fab ID
FAB1
Memory Information
Total Memory
2048 MB
Memory Speed
1600MHz
System Language
[English]
System Date
[Mon, mm/dd/yyyy]
System Time
[hh:mm:ss]
Item help
→←: Select Screen
↑↓: Select Item
Enter: Select
+/- : Change Opt
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.18.1263. Copyright (C) 2017 American Megatrends, Inc.

Field Name	BIOS Vender
Default Value	AMI Megatrends
Comment	This field is not selectable. There is no help text associated with it.

Field Name	Core Version
Default Value	5.12
Comment	This field is not selectable. There is no help text associated with it.

Field Name	Compliancy
Default Value	UEFI 2.4; PI 1.4
Comment	This field is not selectable. There is no help text associated with it.

Field Name	BIOS Version
Default Value	Display the version of the BIOS
Comment	This field is not selectable. There is no help text associated with it.

Field Name	Build Date
Default Value	Display build time of the BIOS
Comment	This field is not selectable. There is no help text associated with it.

Field Name	Access Level
Default Value	Display the access level.
Comment	This field is not selectable. There is no help text associated with it.

Field Name	BXT SOC
Default Value	Display the SOC version.
Comment	This field is not selectable. There is no help text associated with it.

Field Name	MRC version
Default Value	Display the MRC version
Comment	This field is not selectable. There is no help text associated with it.

Field Name	PUNIT FW
Default Value	Display the PUNIT FW version.
Comment	This field is not selectable. There is no help text associated with it.

Field Name	PMC FW
Default Value	Display the PMC FW version.
Comment	This field is not selectable. There is no help text associated with it.

Field Name	TXE FW
Default Value	Display the TXE FW version.
Comment	This field is not selectable. There is no help text associated with it.

Field Name	ISH FW
Default Value	Display the ISH FW version.
Comment	This field is not selectable. There is no help text associated with it.

Field Name	GOP
Default Value	Display the GOP version
Comment	This field is not selectable. There is no help text associated with it.

Field Name	CPU Flavor
Default Value	Display the CPU flavor.
Comment	This field is not selectable. There is no help text associated with it.

Field Name	Board ID
Default Value	Display the board ID.
Comment	This field is not selectable. There is no help text associated with it.

Field Name	Fab ID
Default Value	Display the fab ID.
Comment	This field is not selectable. There is no help text associated with it.

Field Name	Total Memory
Value	Display the installed memory size.
Comment	This field is not selectable. There is no help text associated with it.

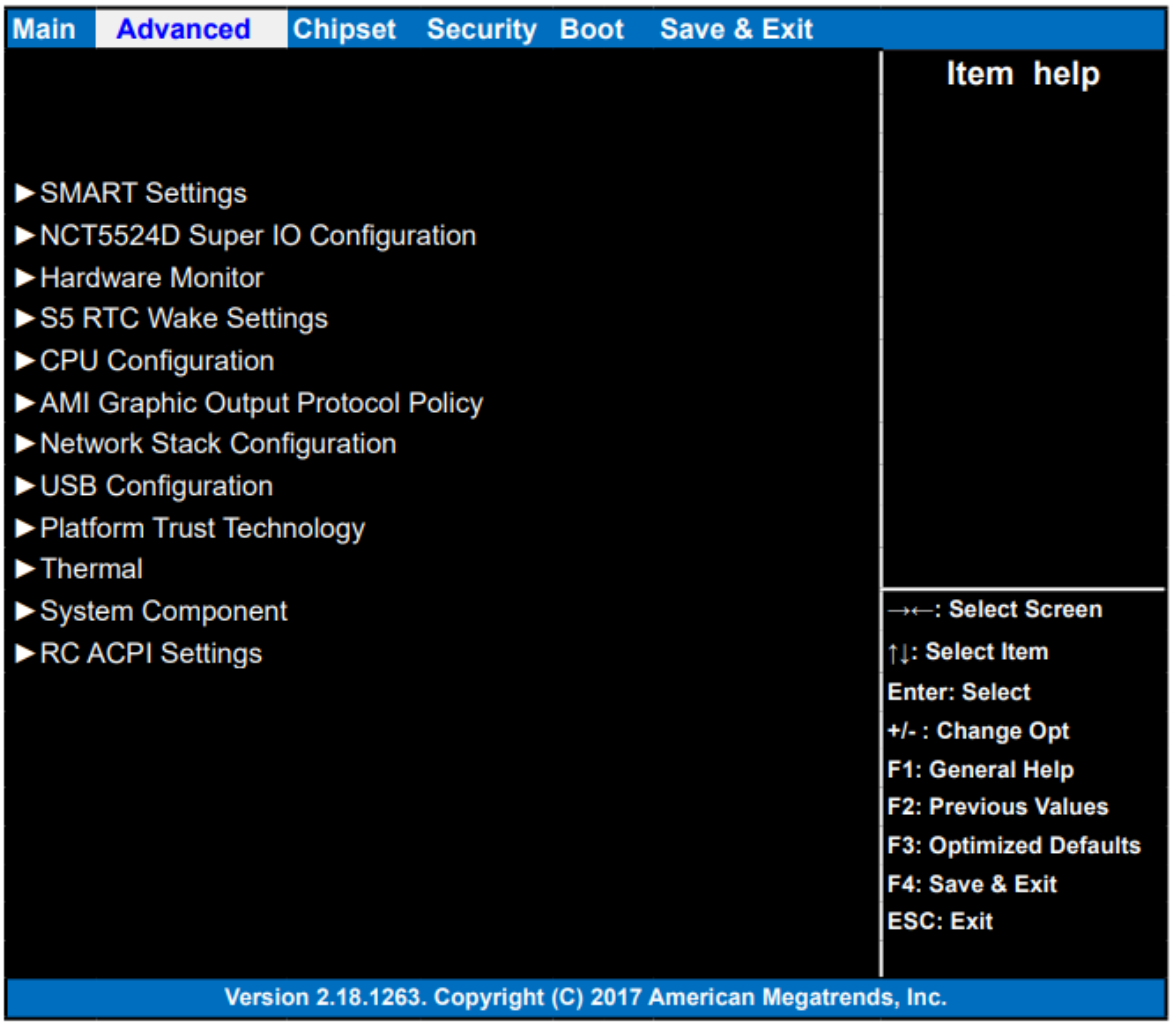
Field Name	Memory Speed
Value	Display the installed memory speed.
Comment	This field is not selectable. There is no help text associated with it.

Field Name	System Language
Default Value	[English]
Comment	Choose the system default language.

Field Name	System Date
Default Value	[xxx mm/dd/yyyy]
Help	Set the Date. Use Tab to switch between Date elements.

Field Name	System Time
Default Value	[hh :mm :ss]
Help	Set the Time. Use Tab to switch between Time elements.

Advanced Page



Field Name	SMART Settings
Help	System SMART Settings.
Comment	Press Enter when selected to go into the associated Sub-Menu.

Field Name	NCT5524D Super IO Configuration
Help	System Super IO Chip Parameters.
Comment	Press Enter when selected to go into the associated Sub-Menu.

Field Name	Hardware Monitor
Help	Monitor hardware status.
Comment	Press Enter when selected to go into the associated Sub-Menu.

Field Name	S5 RTC Wake Settings
Help	Enable system to wake from S5 using RTC alarm.
Comment	Press Enter when selected to go into the associated Sub-Menu.

Field Name	CPU Configuration
Help	CPU Configuration Parameters.
Comment	Press Enter when selected to go into the associated Sub-Menu.

Field Name	AMI Graphic Output Protocol Policy
Help	User Select Monitor Output by Graphic Output Protocol.
Comment	Press Enter when selected to go into the associated Sub-Menu.

Field Name	Network Stack Configuration
Help	Network Stack Settings.
Comment	Press Enter when selected to go into the associated Sub-Menu.

Field Name	USB Configuration
Help	USB Configuration Parameters.
Comment	Press Enter when selected to go into the associated Sub-Menu.

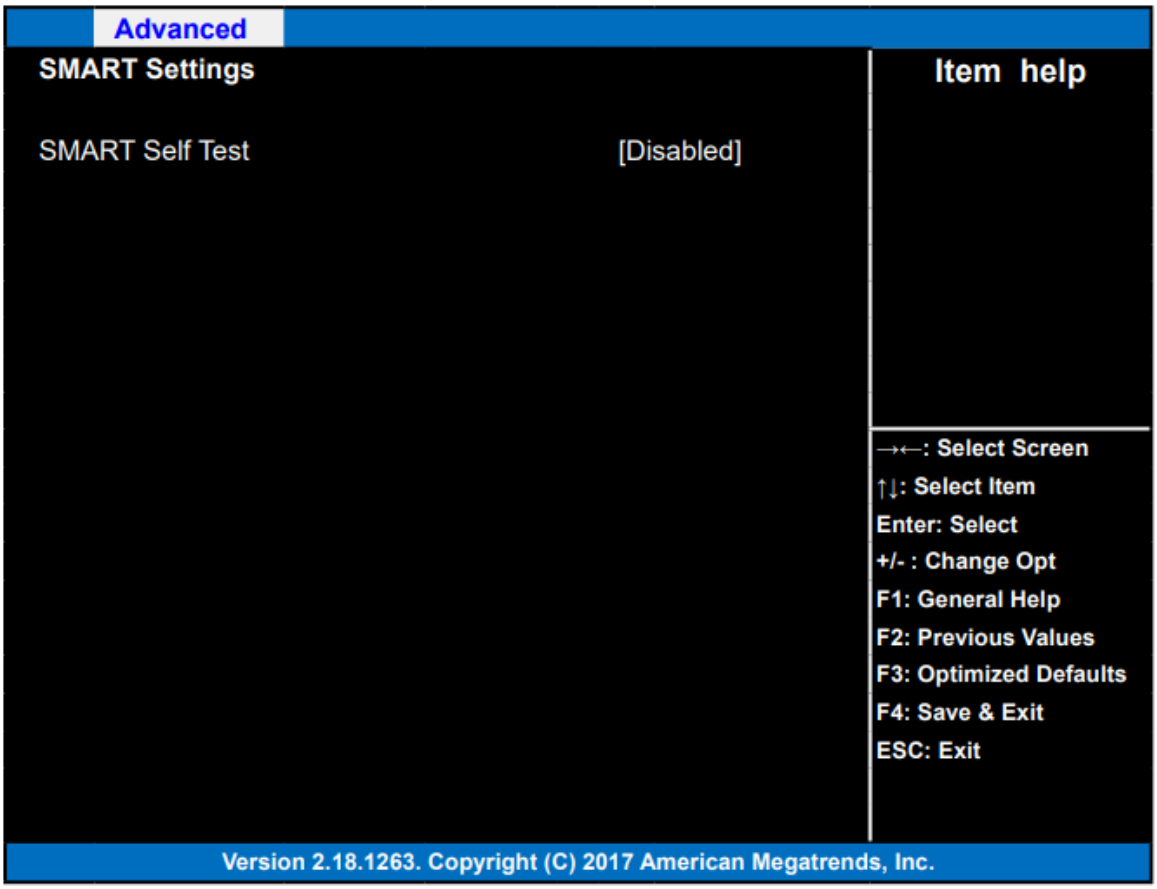
Field Name	Platform Trust Technology
Help	Platform Trust Technology.
Comment	Press Enter when selected to go into the associated Sub-Menu.

Field Name	Thermal
Help	Thermal.
Comment	Press Enter when selected to go into the associated Sub-Menu.

Field Name	System Component
Help	System Component.
Comment	Press Enter when selected to go into the associated Sub-Menu.

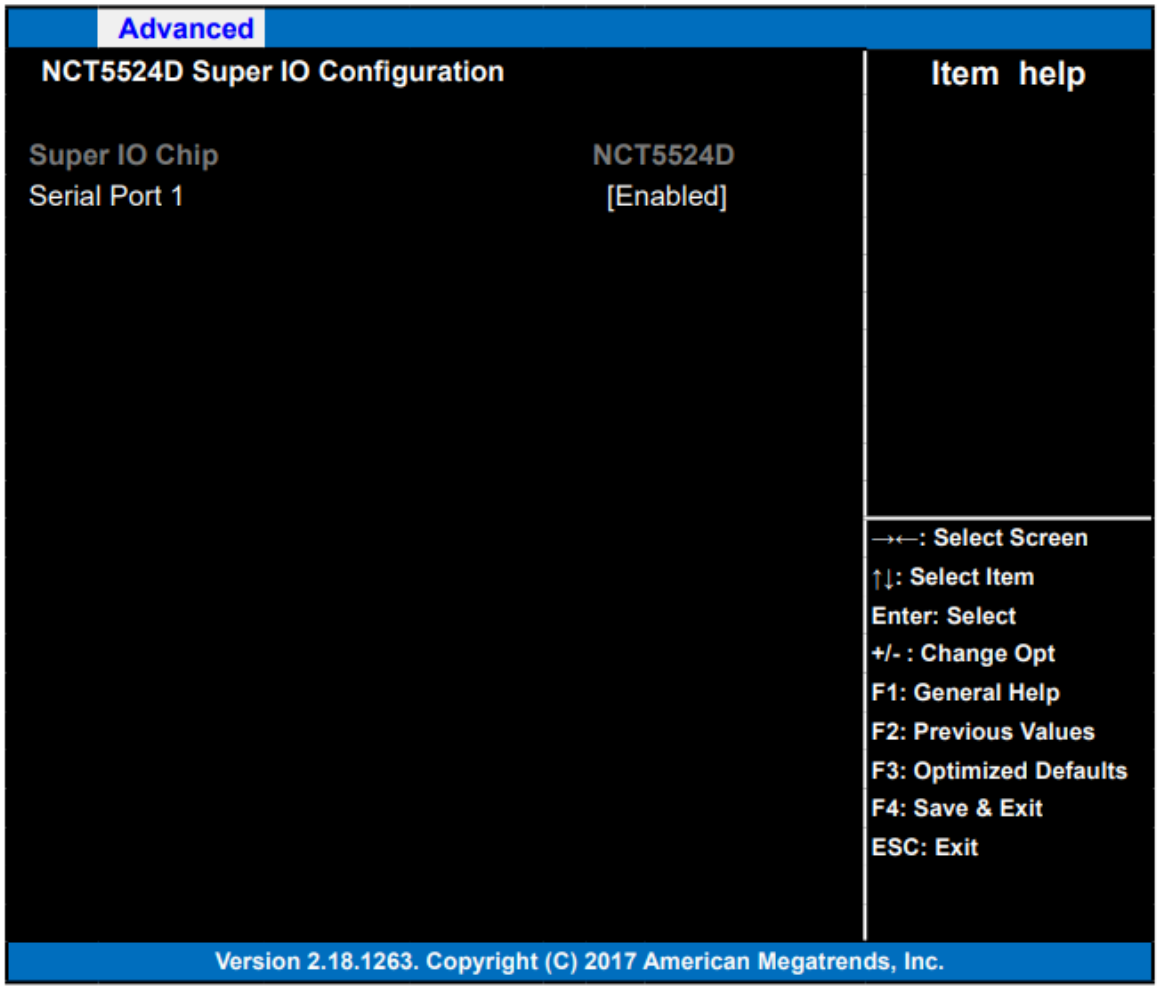
Field Name	RC ACPI Settings
Help	RC ACPI Settings.
Comment	Press Enter when selected to go into the associated Sub-Menu.

SMART Settings



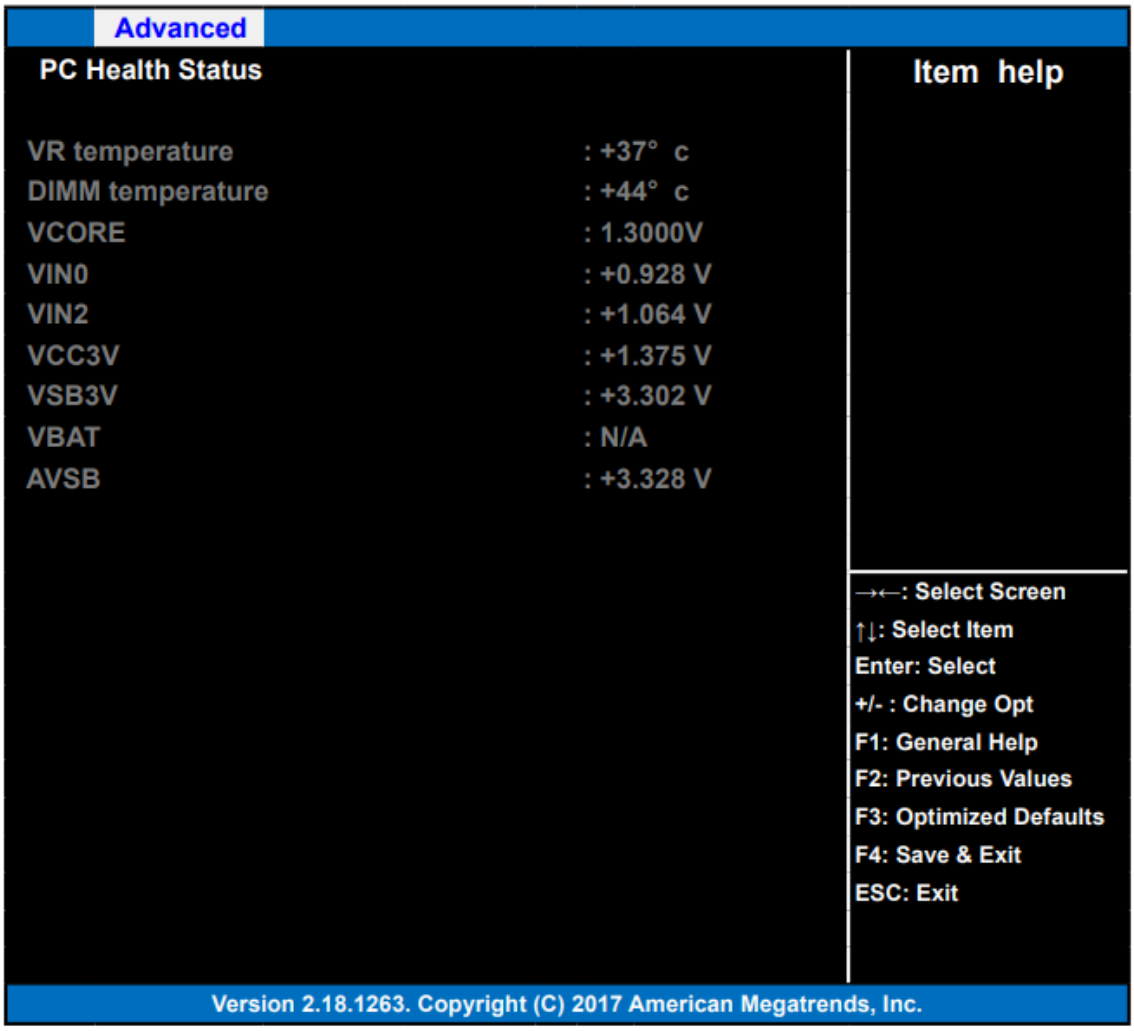
Field Name	SMART Self Test
Default Value	[Disabled]
Possible Value	Disabled / Enabled
Help	Run SMART Self Test on all HDDs during POST.

NCT5524D Super IO Configuration



Field Name	Serial Port 1
Default Value	[Enabled]
Possible Value	Disabled / Enabled
Help	Enable or Disable Serial Port (COM).

Hardware Monitor



Field Name	VR temperature
Default Value	Display the temperature of the VR
Comment	This field is not selectable. There is no help text associated with it.

Field Name	DIMM temperature
Default Value	Display the temperature of the DIMM
Comment	This field is not selectable. There is no help text associated with it.

Field Name	VCORE
Default Value	Display the voltage of the VCORE.
Comment	This field is not selectable. There is no help text associated with it.

Field Name	VIN0
Default Value	Display the voltage of the VIN0.
Comment	This field is not selectable. There is no help text associated with it.

Field Name	VIN2
Default Value	Display the voltage of the VIN2
Comment	This field is not selectable. There is no help text associated with it.

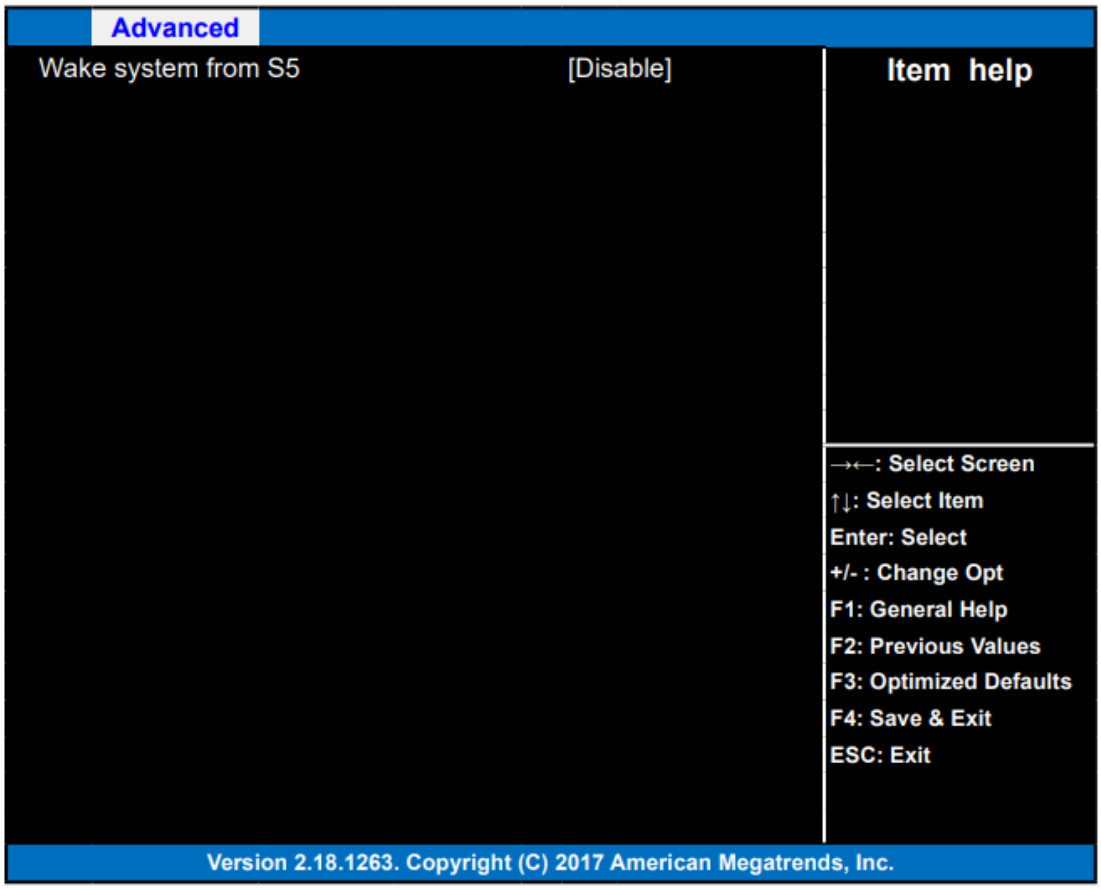
Field Name	VCC3V
Default Value	Display the voltage of the VCC3V
Comment	This field is not selectable. There is no help text associated with it.

Field Name	VSB3V
Default Value	Display the voltage of the VSB3V
Comment	This field is not selectable. There is no help text associated with it.

Field Name	VBAT
Default Value	Display the voltage of the VBAT
Comment	This field is not selectable. There is no help text associated with it.

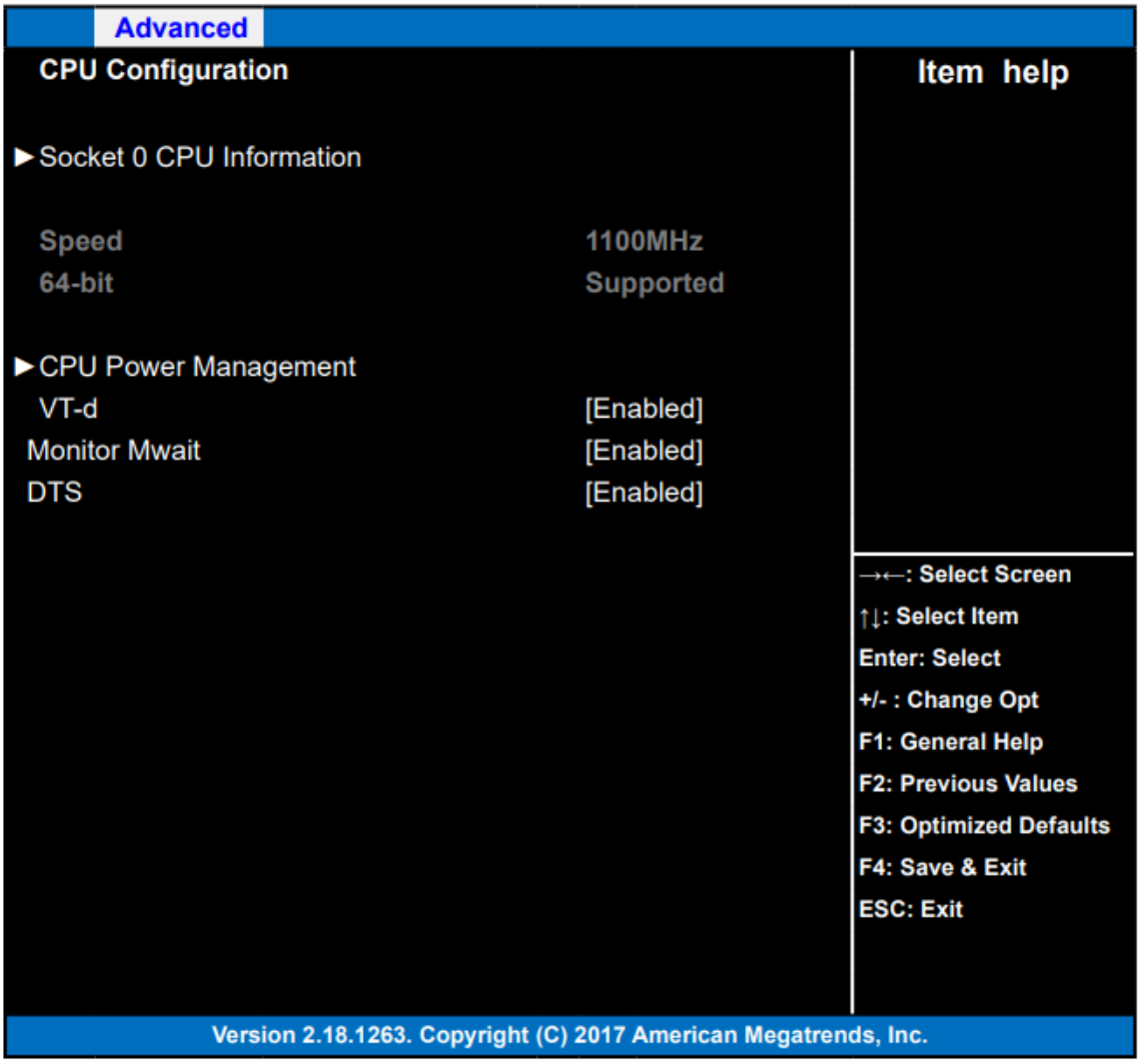
Field Name	AVSB
Default Value	Display the voltage of the AVSB
Comment	This field is not selectable. There is no help text associated with it.

S5 RTC Wake Settings



Field Name	Wake system from S5
Default Value	[Disabled]
Possible Value	Disabled / Fixed time / Dynamic Time
Help	Enable or disable System wake on alarm event. Select FixedTime, system will wake on the hr::min::sec specified. Select DynamicTime, System will wake on the current time + Increase minute(s).

CPU Configuration



Field Name	Socket 0 CPU Information
Help	Socket specific CPU Information.
Comment	Press Enter when selected to go into the associated Sub-Menu.

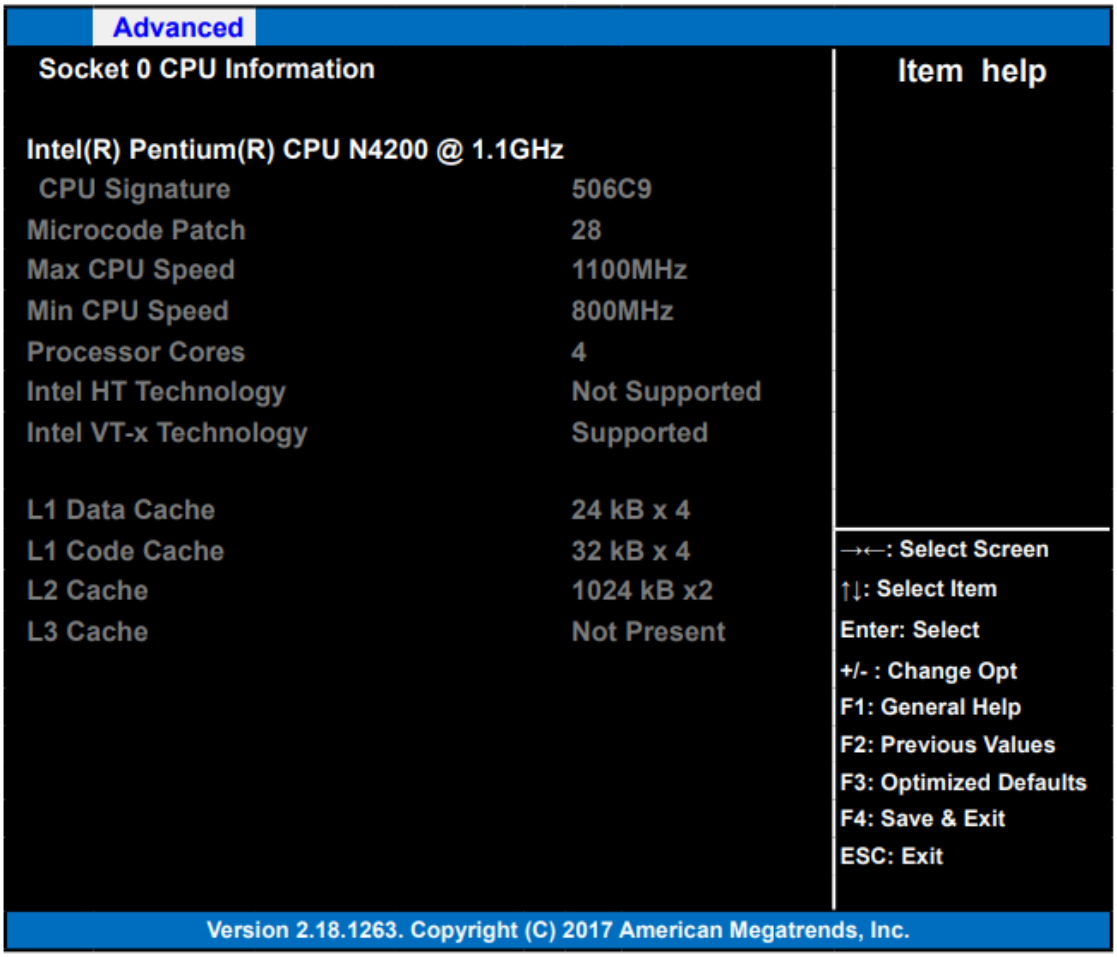
Field Name	CPU Power Management
Help	CPU Power Management options.
Comment	Press Enter when selected to go into the associated Sub-Menu.

Field Name	VT-d
Default Value	[Enabled]
Possible Value	Disabled / Enabled
Help	Enable/Disable CPU VT-d.

Field Name	Monitor Mwait
Default Value	[Enabled]
Possible Value	Disabled / Enabled / Auto
Help	Enable/Disable Monitor Mwait.

Field Name	DTS
Default Value	[Enabled]
Possible Value	Disabled / Enabled
Help	Enabled/Disabled Digital Thermal Sensor.

Socket 0 CPU Information



Field Name	CPU Signature
Default Value	Display the CPU signature
Comment	This field is not selectable. There is no help text associated with it.

Field Name	Microcode Patch
Default Value	Display the microcode patch.
Comment	This field is not selectable. There is no help text associated with it.

Field Name	Max CPU speed
Default Value	Display the max speed of CPU.
Comment	This field is not selectable. There is no help text associated with it.

Field Name	Min CPU Speed
Default Value	Display the min speed of CPU.
Comment	This field is not selectable. There is no help text associated with it.

Field Name	Processor Cores
Default Value	Display the core numbers of processor.
Comment	This field is not selectable. There is no help text associated with it.

Field Name	Intel HT Technology
Default Value	Display the Intel HT Technology.
Comment	This field is not selectable. There is no help text associated with it.

Field Name	Intel VT-x Technology
Default Value	Display the Intel VT-x Technology.
Comment	This field is not selectable. There is no help text associated with it.

Field Name	VSM
Default Value	Display the voltage of the VSM
Comment	This field is not selectable. There is no help text associated with it.

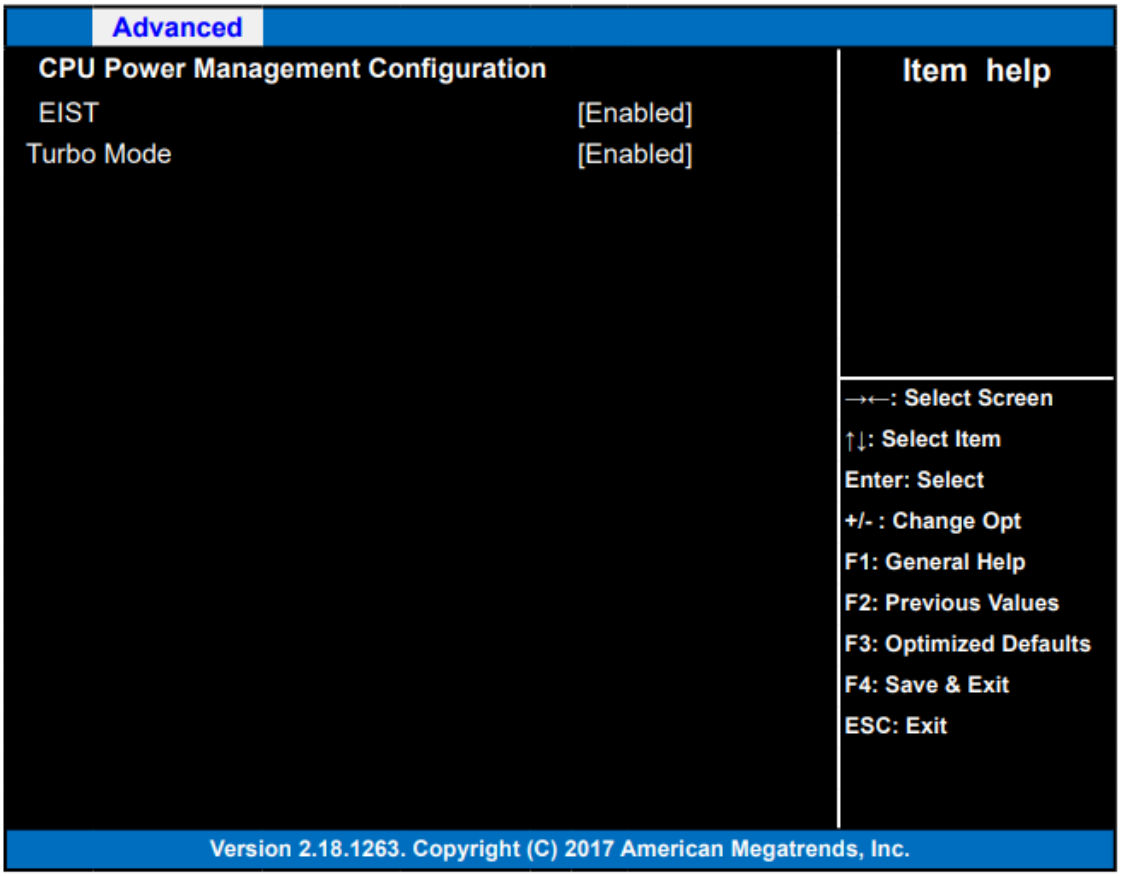
Field Name	L1 Data Cache
Default Value	Display the L1 data cache size.
Comment	This field is not selectable. There is no help text associated with it.

Field Name	L1 Code Cache
Default Value	Display the L1 code cache size.
Comment	This field is not selectable. There is no help text associated with it.

Field Name	L2 Cache
Default Value	Display the L2 cache size.
Comment	This field is not selectable. There is no help text associated with it.

Field Name	L3 Cache
Default Value	Display the L3 cache size.
Comment	This field is not selectable. There is no help text associated with it.

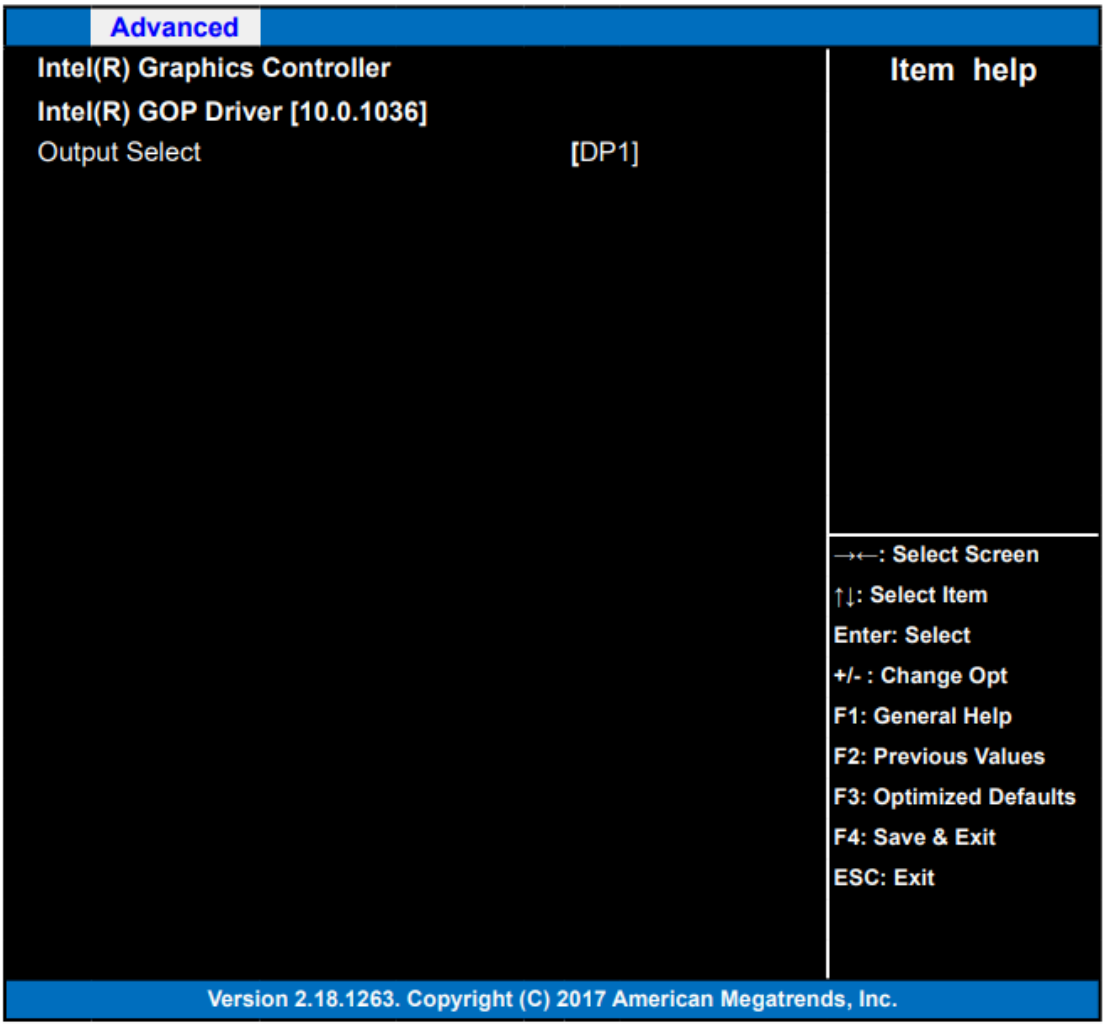
CPU Power Management



Field Name	EIST
Default Value	[Enabled]
Possible Value	Disabled / Enabled
Help	Enable/Disable Intel SpeedStep.

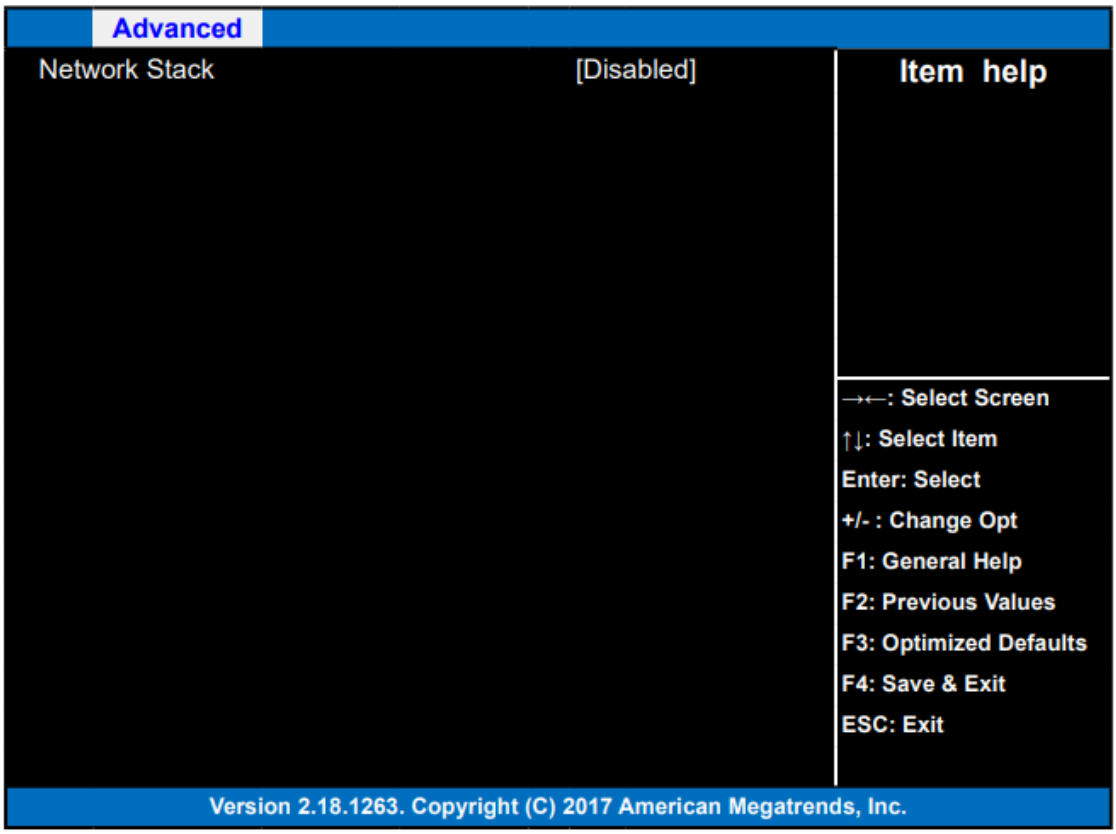
Field Name	Turbo Mode
Default Value	[Enabled]
Possible Value	Disabled / Enabled
Help	Turbo Mode.

AMI Graphic Output Protocol Policy



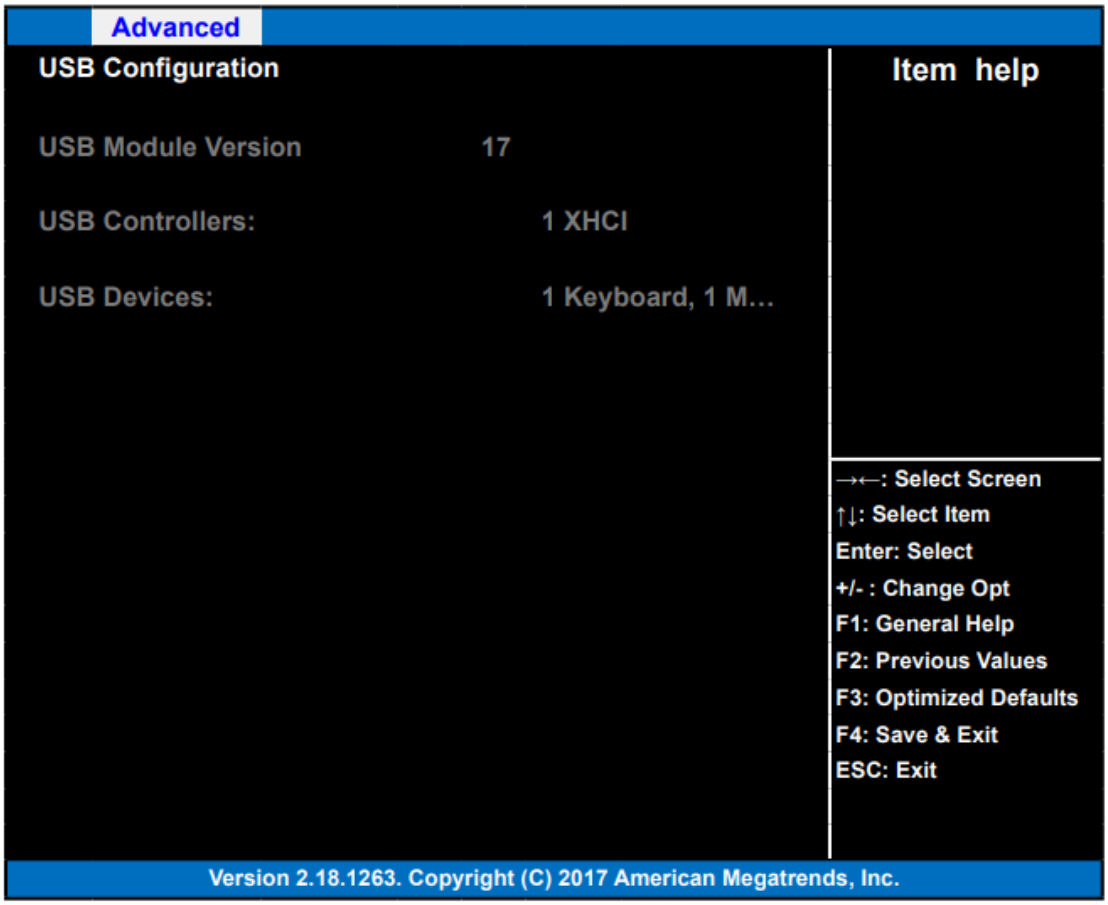
Field Name	Output Select
Default Value	Depend on connecting port
Possible Value	DP1 / DP2
Help	Output Interface.

Network Stack Configuration



Field Name	Network Stack
Default Value	[Disabled]
Possible Value	Disabled / Enabled
Help	Enable/Disable UEFI Network Stack.

USB Configuration

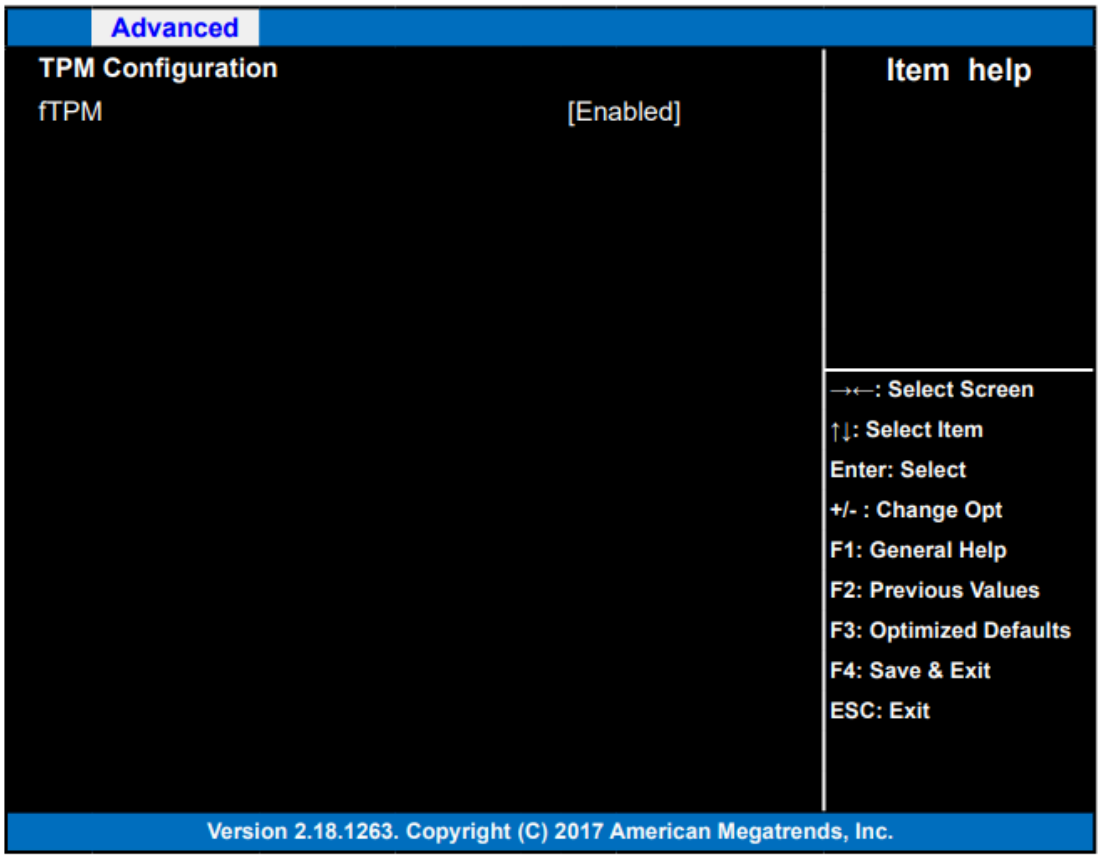


Field Name	USB Module Version
Default Value	Display the USB module version
Comment	This field is not selectable. There is no help text associated with it.

Field Name	USB Controllers
Default Value	Display the USB controller number.
Comment	This field is not selectable. There is no help text associated with it.

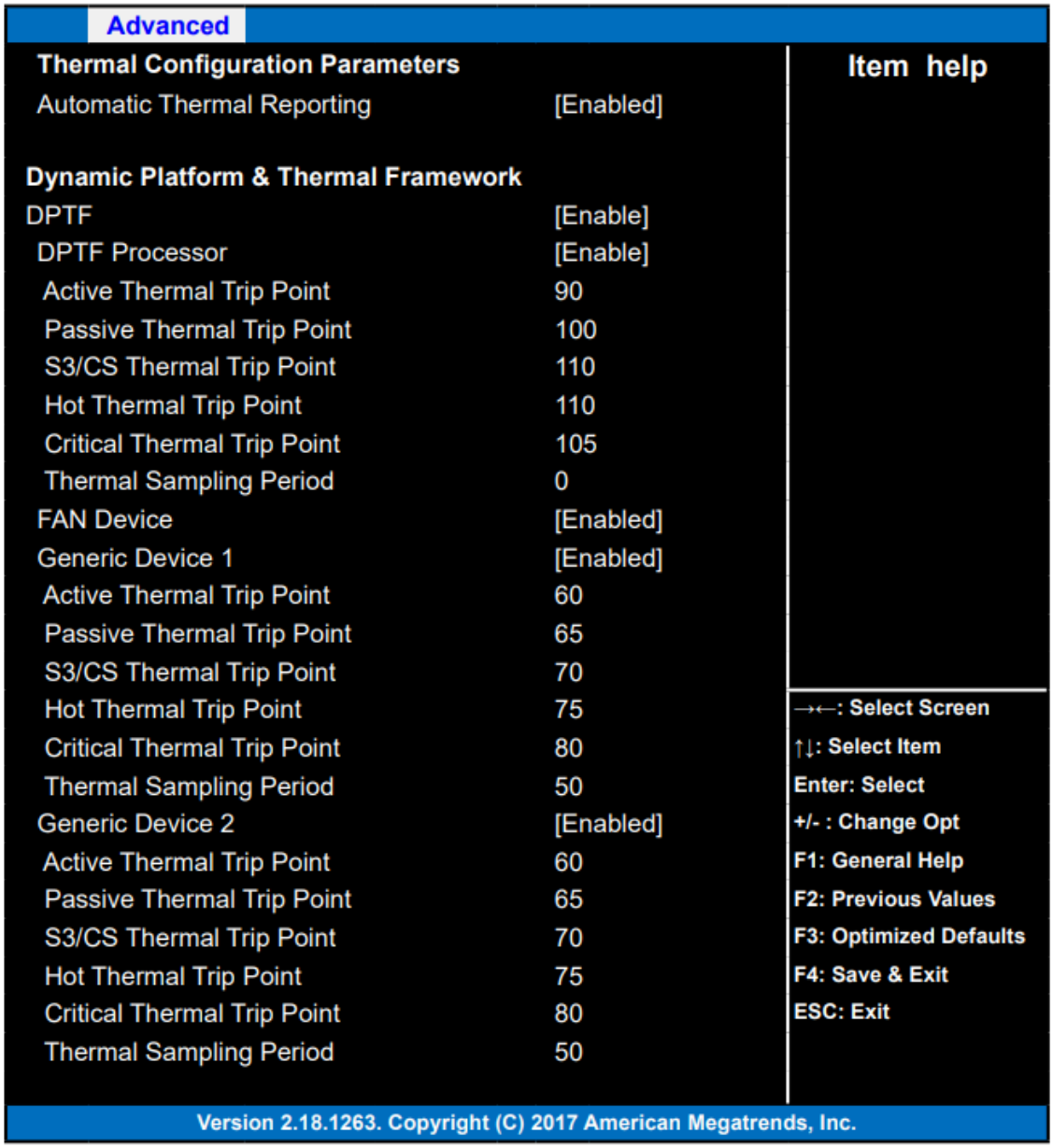
Field Name	USB Devices
Default Value	Display the USB device number.
Comment	This field is not selectable. There is no help text associated with it.

Platform Trust Technology



Field Name	fTPM
Default Value	[Enabled]
Possible Value	Enabled / Disabled
Help	Enable/Disable fTPM.

Thermal



Field Name	Automatic Thermal Reporting
Default Value	[Enabled]
Possible Value	Disabled / Enabled

Help	Configure _CRT, _PSV and _AC0 automatically based on values recommended in BWG's Thermal Reporting for Thermal Management settings. Set to Disabled for manual configuration.

Field Name	DPTF
Default Value	[Enable]
Possible Value	Disable / Enable

Field Name	DPTF Processor
Default Value	[Enable]
Possible Value	Disable / Enable
Help	Enable/Disable Processor Participant Device

Field Name	Active Thermal Trip Point
Default Value	90
Possible Value	0-127
Help	This value controls the temperature of the ACPI Active Thermal Trip Point. NOTE: a value of zero will cause the DPTF driver to disable the trip point.

Field Name	Passive Thermal Trip Point
Default Value	100
Possible Value	0-127
Help	This value controls the temperature of the ACPI Passive Thermal Trip Point. NOTE: a value of zero will cause the DPTF driver to disable the trip point.

Field Name	S3/CS Thermal Trip Point
Default Value	110
Possible Value	0-127
Help	This value controls the temperature of the ACPI Critical Thermal Trip Point for entering S3 or CS. NOTE: a value of zero will cause the DPTF driver to disable the trip point.

Field Name	Hot Thermal Trip Point
Default Value	110
Possible Value	0-127
Help	This value controls the temperature of the ACPI Hot Thermal Trip Point. NOTE: a value of zero will cause the DPTF driver to disable the trip point.

Field Name	Critical Thermal Trip Point
Default Value	105
Possible Value	0-127
Help	This value controls the temperature of the ACPI Critical Thermal Trip Point. NOTE: a value of zero will cause the DPTF driver to disable the trip point.

Field Name	Thermal Sampling Period
Default Value	0
Possible Value	0-100

Help	The polling interval in 10ths of seconds. A value of 0 tells the driver to use interrupts. NOTE: The granularity of the sampling period is 0.1 seconds. For example, if the sampling period is 30 seconds, then _TSP needs to report 300; if the sampling period is 0.5 seconds, then choose 5.

Field Name	FAN Device
Default Value	[Enabled]
Possible Value	Disabled / Enabled
Help	Enable the Fan device.

Field Name	Generic Device 1
Default Value	[Enabled]
Possible Value	Disabled / Enabled
Help	Enable/Disable Thermistor 1 device.

Field Name	Active Thermal Trip Point
Default Value	60
Possible Value	0–127
Help	This value controls the temperature of the ACPI Active Thermal Trip Point. NOTE: a value of zero will cause the DPTF driver to disable the trip point.

Field Name	Passive Thermal Trip Point
Default Value	65
Possible Value	0–127
Help	This value controls the temperature of the ACPI Passive Thermal Trip Point. NOTE: a value of zero will cause the DPTF driver to disable the trip point.

Field Name	S3/CS Thermal Trip Point
Default Value	70
Possible Value	0–127
Help	This value controls the temperature of the ACPI Critical Thermal Trip Point for entering S3 or CS. NOTE: a value of zero will cause the DPTF driver to disable the trip point.

Field Name	Hot Thermal Trip Point
Default Value	75
Possible Value	0–127
Help	This value controls the temperature of the ACPI Hot Thermal Trip Point. NOTE: a value of zero will cause the DPTF driver to disable the trip point.

Field Name	Critical Thermal Trip Point
Default Value	80
Possible Value	0–127
Help	This value controls the temperature of the ACPI Critical Thermal Trip Point. NOTE: a value of zero will cause the DPTF driver to disable the trip point.

Field Name	Thermal Sampling Period
Default Value	50
Possible Value	0–100
Help	The polling interval in 10ths of seconds. A value of 0 tells the driver to use interrupts. NOTE: The granularity of the sampling period is 0.1 seconds. For example, if the sampling period is 30 seconds, then _TSP needs to report 300; if the sampling period is 0.5 seconds, then choose 5.

Field Name	Generic Device 2
Default Value	[Enabled]
Possible Value	Disabled / Enabled
Help	Enable/Disable Thermistor 2 device.

Field Name	Active Thermal Trip Point
Default Value	60
Possible Value	0–127
Help	This value controls the temperature of the ACPI Active Thermal Trip Point. NOTE: a value of zero will cause the DPTF driver to disable the trip point.

Field Name	Passive Thermal Trip Point
Default Value	65
Possible Value	0–127
Help	This value controls the temperature of the ACPI Passive Thermal Trip Point. NOTE: a value of zero will cause the DPTF driver to disable the trip point.

Field Name	S3/CS Thermal Trip Point
Default Value	70
Possible Value	0–127
Help	This value controls the temperature of the ACPI Critical Thermal Trip Point for entering S3 or CS. NOTE: a value of zero will cause the DPTF driver to disable the trip point.

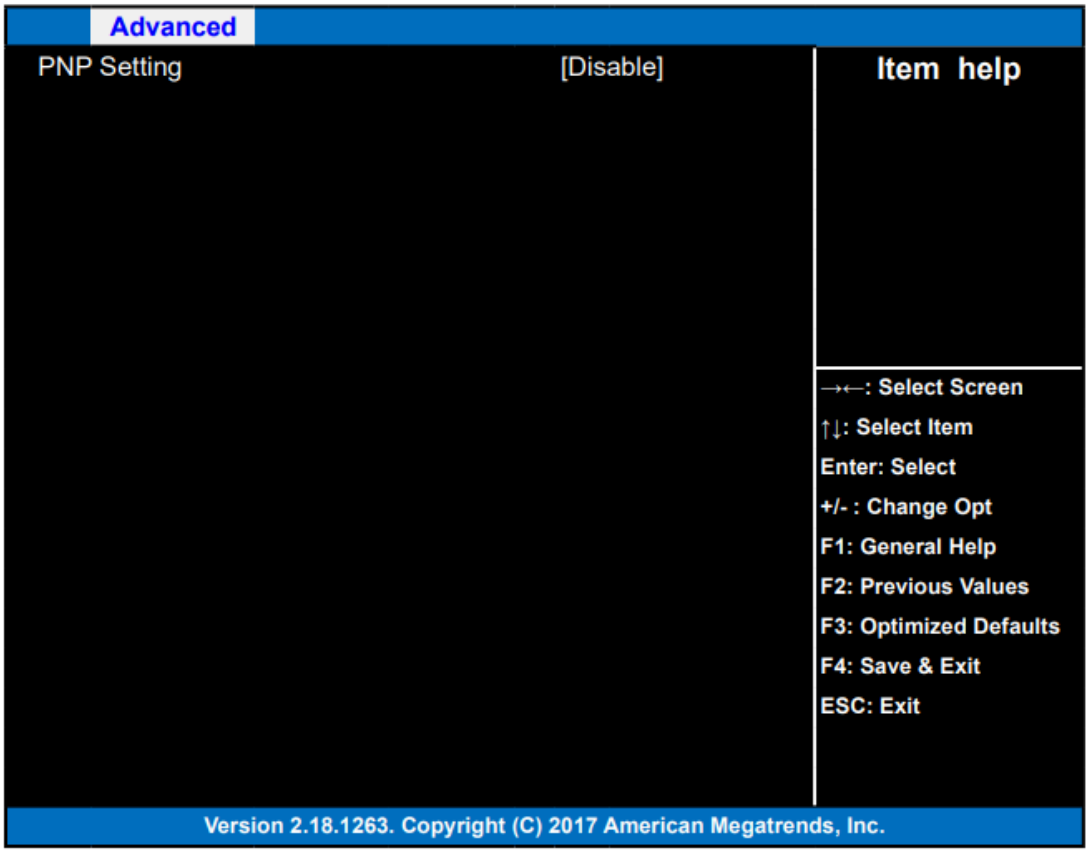
Field Name	Hot Thermal Trip Point
Default Value	75
Possible Value	0–127
Help	This value controls the temperature of the ACPI Hot Thermal Trip Point. NOTE: a value of zero will cause the DPTF driver to disable the trip point.

Field Name	Critical Thermal Trip Point
Default Value	80
Possible Value	0–127
Help	This value controls the temperature of the ACPI Critical Thermal Trip Point. NOTE: a value of zero will cause the DPTF driver to disable the trip point.

Field Name	Thermal Sampling Period
Default Value	50
Possible Value	0–100

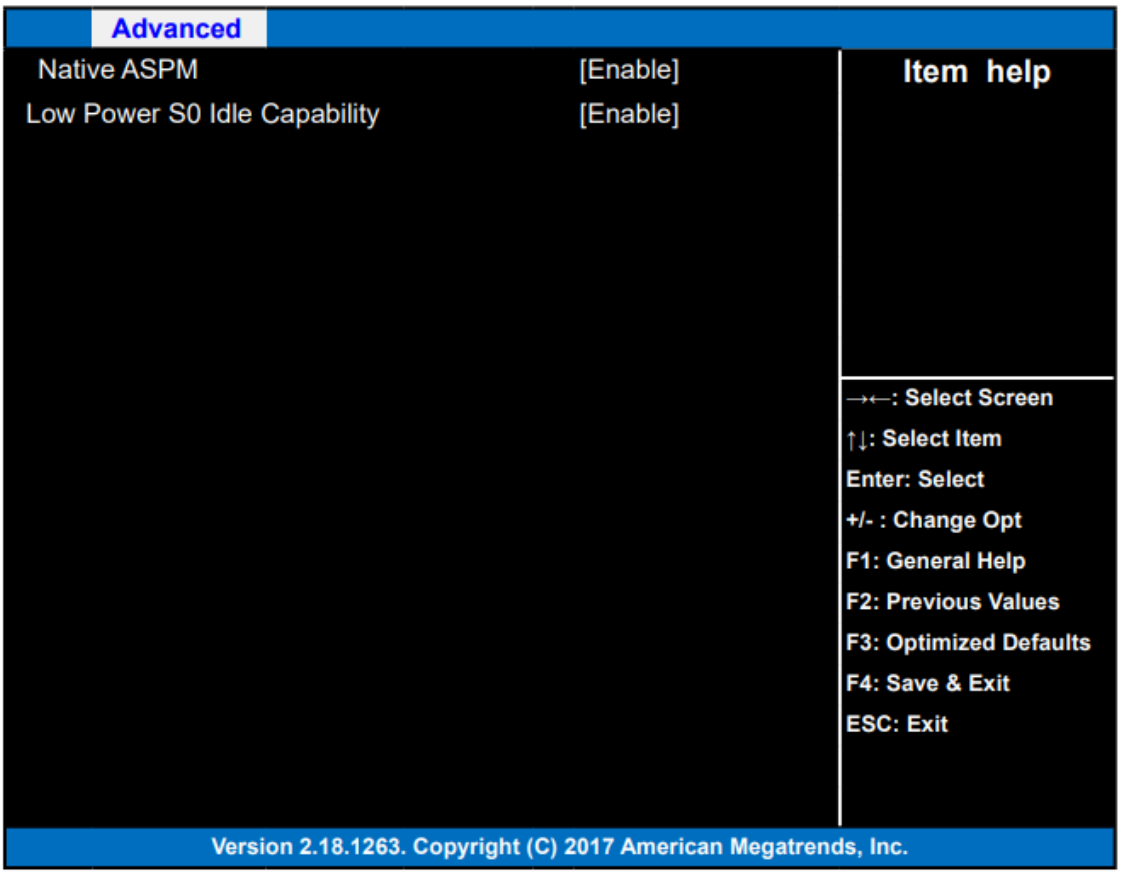
Help	The polling interval in 10ths of seconds. A value of 0 tells the driver to use interrupts. NOTE: The granularity of the sampling period is 0.1 seconds. For example, if the sampling period is 30 seconds, then _TSP needs to report 300; if the sampling period is 0.5 seconds, then choose 5.

System Component



Field Name	PNP Setting
Default Value	[Disable]
Possible Value	Disable / Performance / Power / Power & Performance
Help	Select PNP setting mode, Disable, Performance, Power or Power & Performance mode.

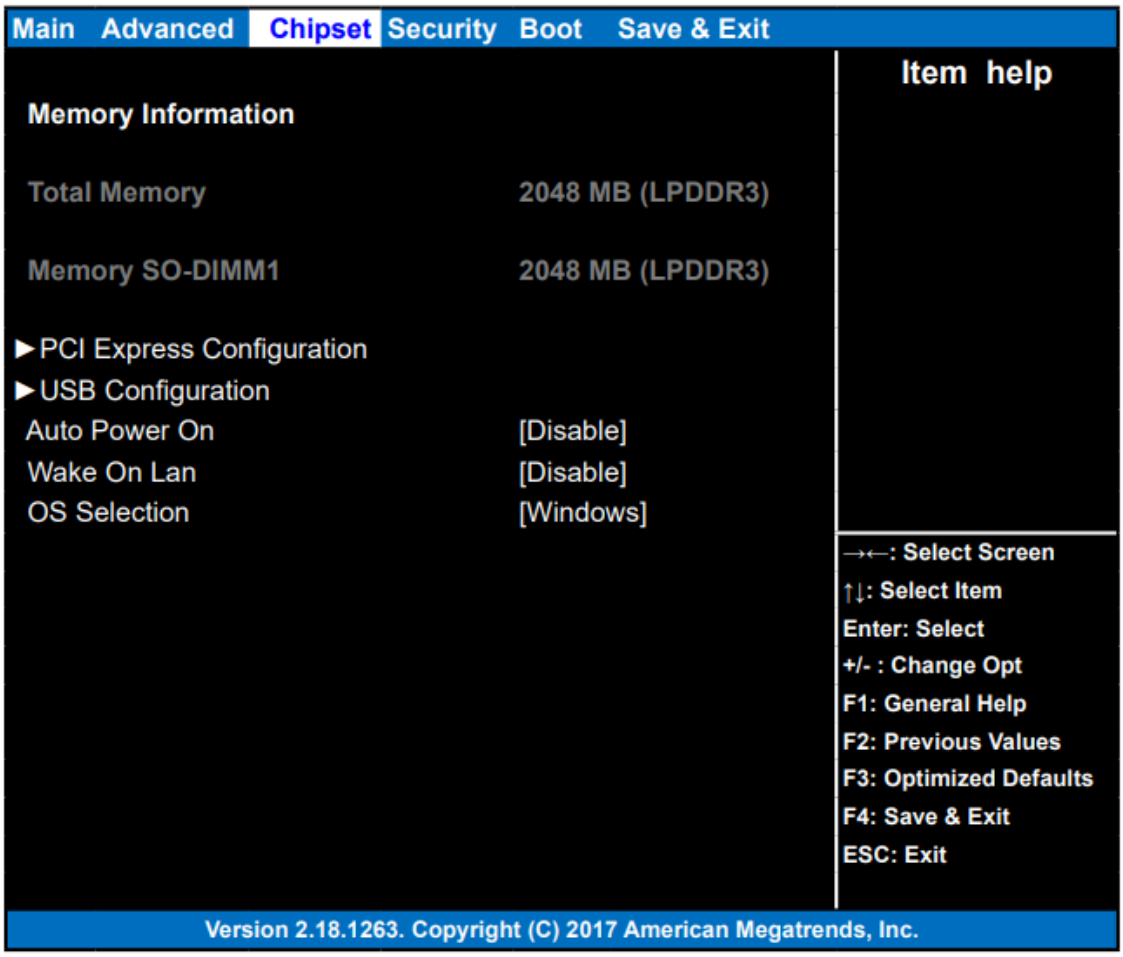
RC ACPI Settings



Field Name	Native ASPM
Default Value	[Enable]
Possible Value	Disabled / Enable
Help	On enable, vista will control the ASPM support for the device. If disabled, the BIOS will.

Field Name	Low Power S0 Idle Capability
Default Value	[Enable]
Possible Value	Disable / Enable
Help	This variable determines if we enable ACPI Lower Power S0 Idle Capability (Mutually exclusive with Smart connect). Also updates the Platform S0ix Capability Support in IGD OpRegion.

Chipset



Field Name	Total Memory
Default Value	Display the total memory size.
Comment	This field is not selectable. There is no help text associated with it.

Field Name	Memory Slot0
Default Value	Display the memory size of slot0.
Comment	This field is not selectable. There is no help text associated with it.

Field Name	PCI Express Configuration
Help	PCI Express Configuration Settings.
Comment	Press Enter when selected to go into the associated Sub-Menu.

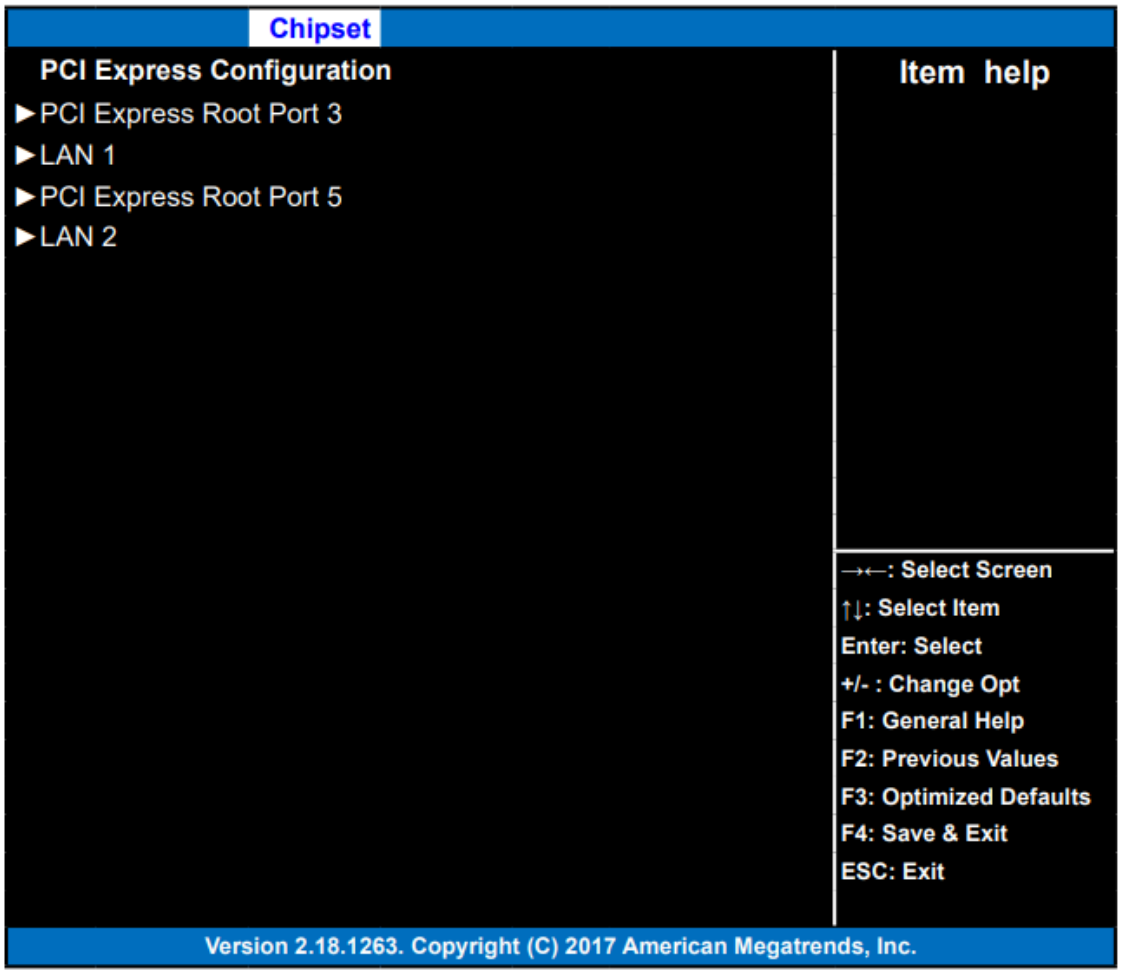
Field Name	USB Configuration
Help	USB Configuration Settings.
Comment	Press Enter when selected to go into the associated Sub-Menu.

Field Name	Auto Power On
Default Value	[Disable]
Possible Value	Enable / Disable / Last State
Help	Specify what state to go to when power is re-applied after a power failure (G3 state). Enable: System will boot directly as soon as power applied. Disable: System will keeps in power-off state until power button is pressed.

Field Name	Wake On Lan
Default Value	[Disable]
Possible Value	Disable / Enable
Help	Enable or Disable the Wake on Lan.

Field Name	OS Selection
Default Value	[Windows]
Possible Value	Windows / Intel Linux
Help	Select the target OS.

PCI Express Configuration



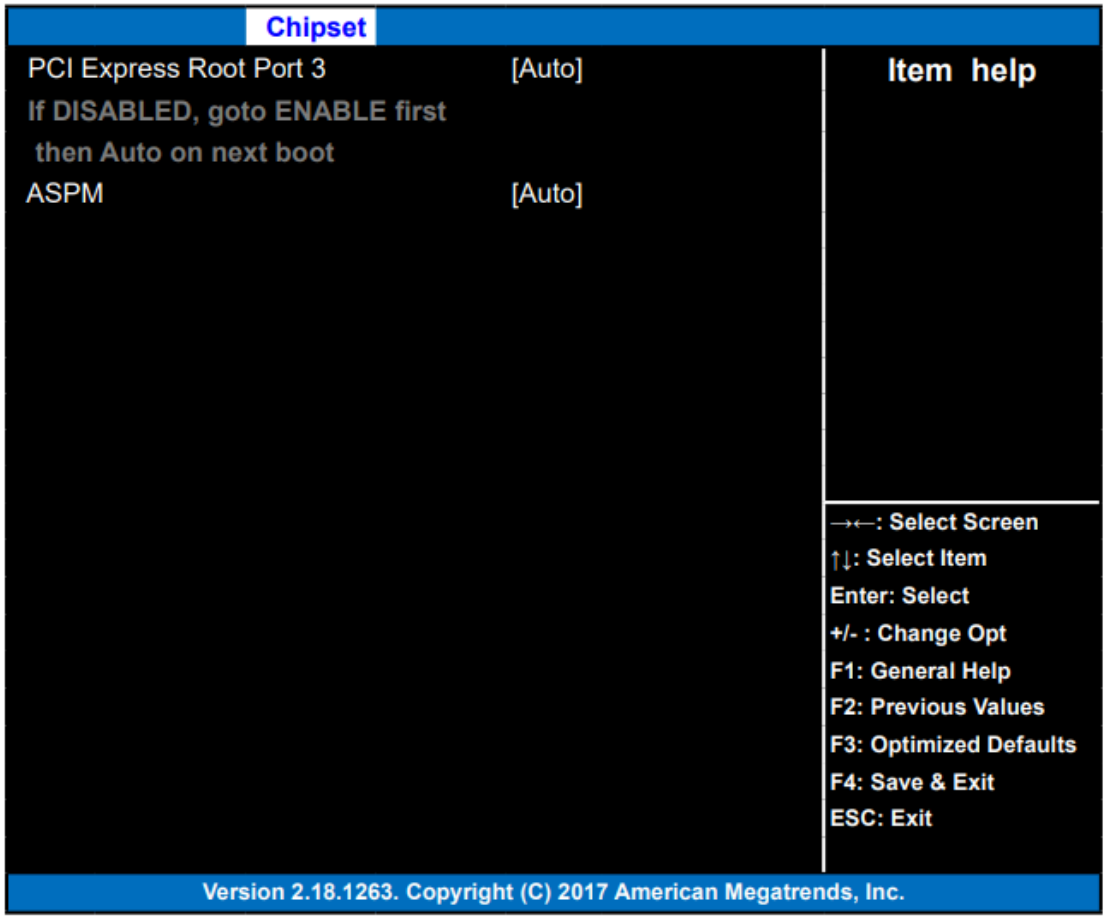
Field Name	PCI Express Root Port 3
Help	Control the PCI Express Root Port. AUTO: To disable unused root port automatically for the most optimum power savings. Enable: Enable PCIe root port. Disable: Disable PCIe root port.
Comment	Press Enter when selected to go into the associated Sub-Menu.

Field Name	LAN 1
Help	Control the PCI Express Root Port. AUTO: To disable unused root port automatically for the most optimum power savings. Enable: Enable PCIe root port. Disable: Disable PCIe root port.
Comment	Press Enter when selected to go into the associated Sub-Menu.

Field Name	PCI Express Root Port 5
Help	Control the PCI Express Root Port. AUTO: To disable unused root port automatically for the most optimum power savings. Enable: Enable PCIe root port. Disable: Disable PCIe root port.
Comment	Press Enter when selected to go into the associated Sub-Menu.

Field Name	LAN2
Help	Control the PCI Express Root Port. AUTO: To disable unused root port automatically for the most optimum power savings. Enable: Enable PCIe root port. Disable: Disable PCIe root port.
Comment	Press Enter when selected to go into the associated Sub-Menu.

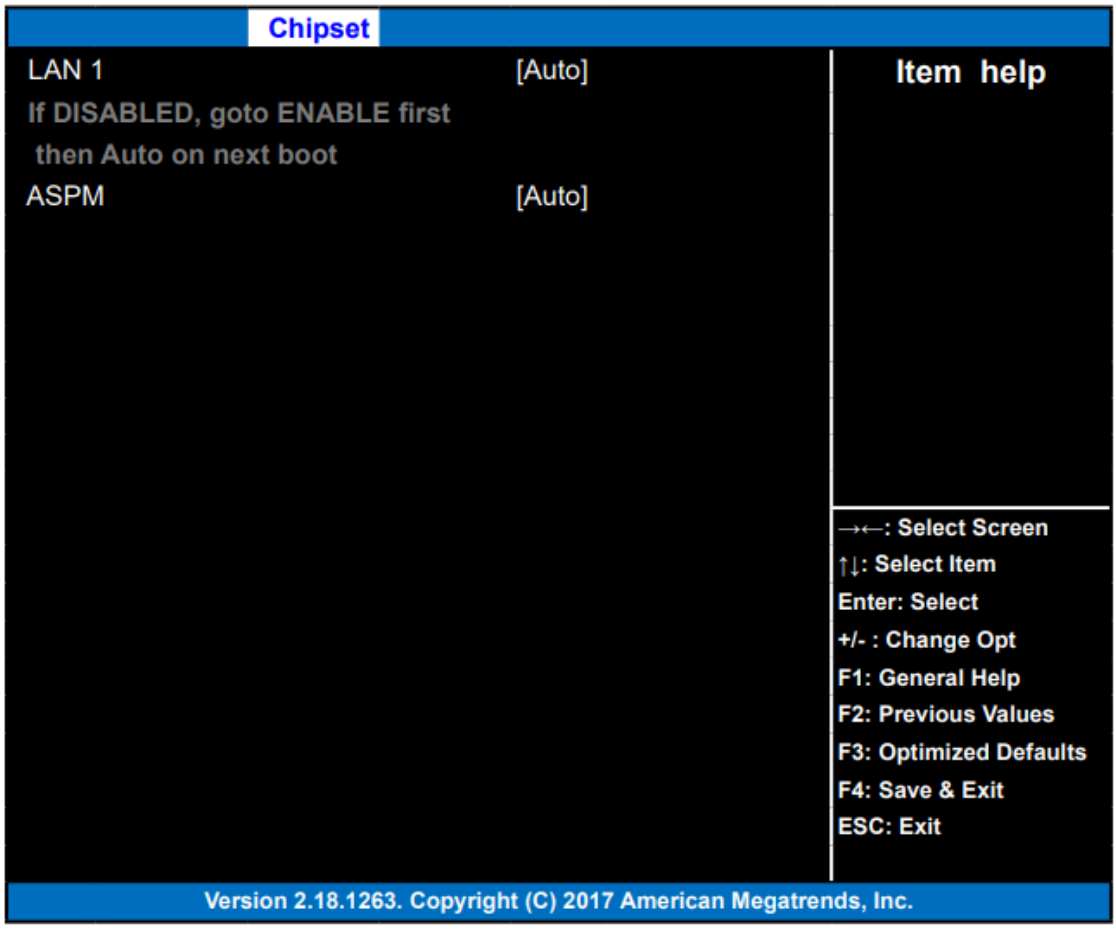
PCI Express Root Port 3



Field Name	PCI Express Root Port 3
Default Value	[Auto]
Possible Value	Disable / Enable / Auto
Help	Control the PCI Express Root Port. AUTO: To disable unused root port automatically for the most optimum power savings. Enable: Enable PCIe root port. Disable: Disable PCIe root port.

Field Name	ASPM
Default Value	[Auto]
Possible Value	Disable / L0s / L1 / L0sL1 / Auto
Help	PCI Express Active State Power Management settings.

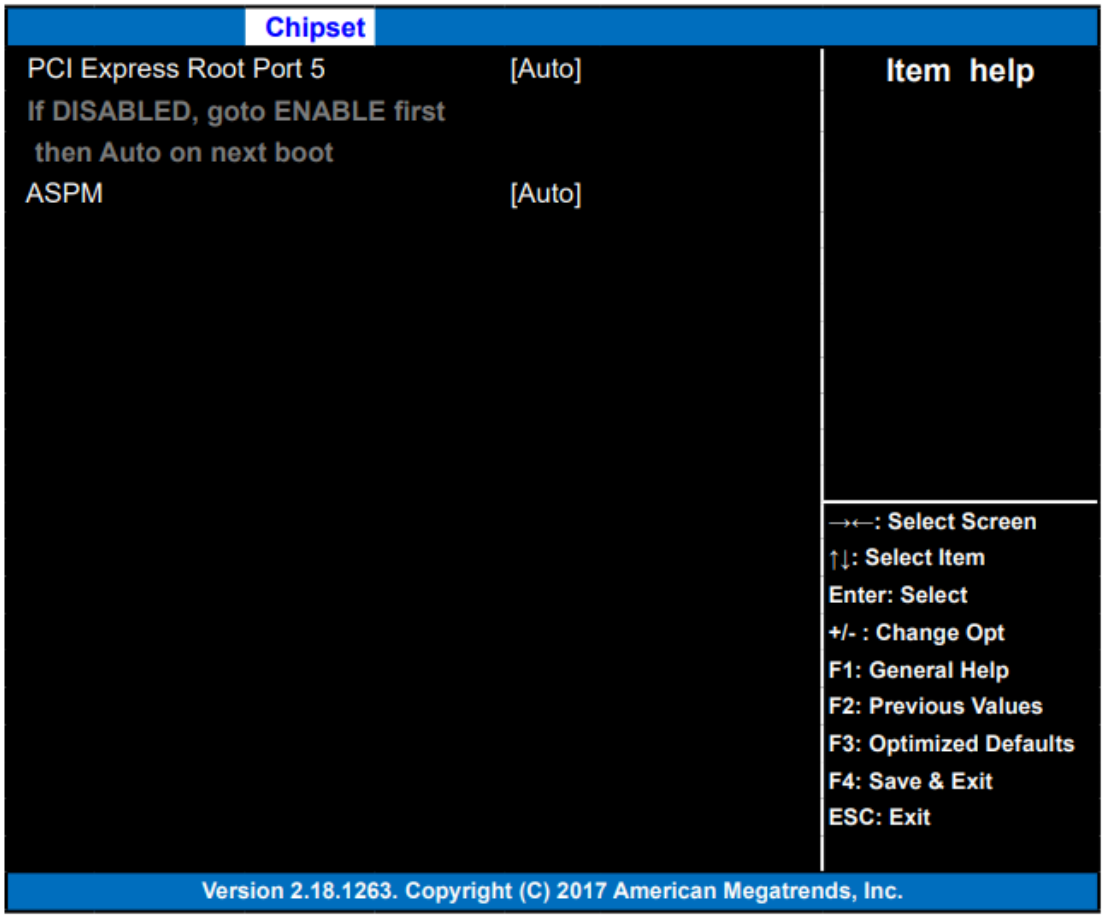
LAN 1



Field Name	LAN 1
Default Value	[Auto]
Possible Value	Disable / Enable / Auto
Help	Control the PCI Express Root Port. AUTO: To disable unused root port automatically for the most optimum power savings. Enable: Enable PCIe root port. Disable: Disable PCIe root port.

Field Name	ASPM
Default Value	[Auto]
Possible Value	Disable / L0s / L1 / L0sL1 / Auto
Help	PCI Express Active State Power Management settings.

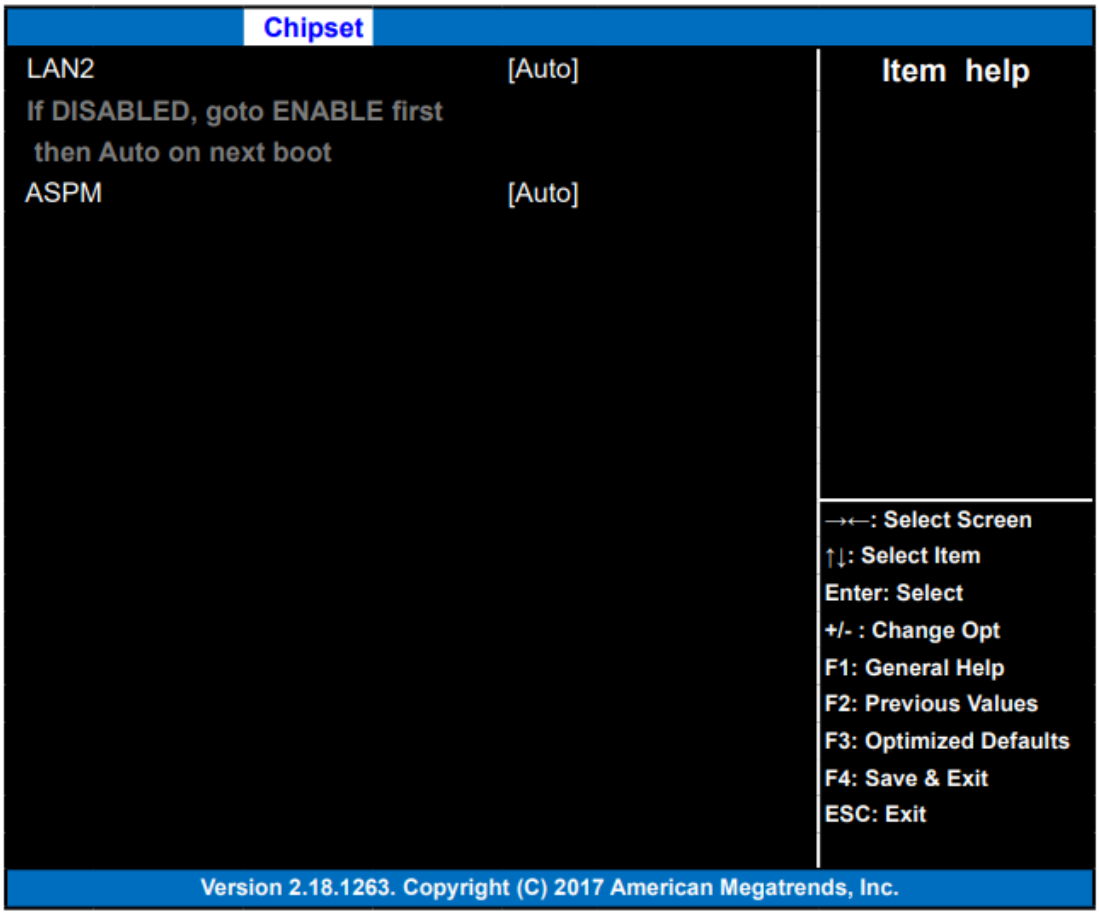
PCI Express Root Port 5



Field Name	PCI Express Root Port 5
Default Value	[Auto]
Possible Value	Disable / Enable / Auto
Help	Control the PCI Express Root Port. AUTO: To disable unused root port automatically for the most optimum power savings. Enable: Enable PCIe root port. Disable: Disable PCIe root port.

Field Name	ASPM
Default Value	[Auto]
Possible Value	Disable / L0s / L1 / L0sL1 / Auto
Help	PCI Express Active State Power Management settings.

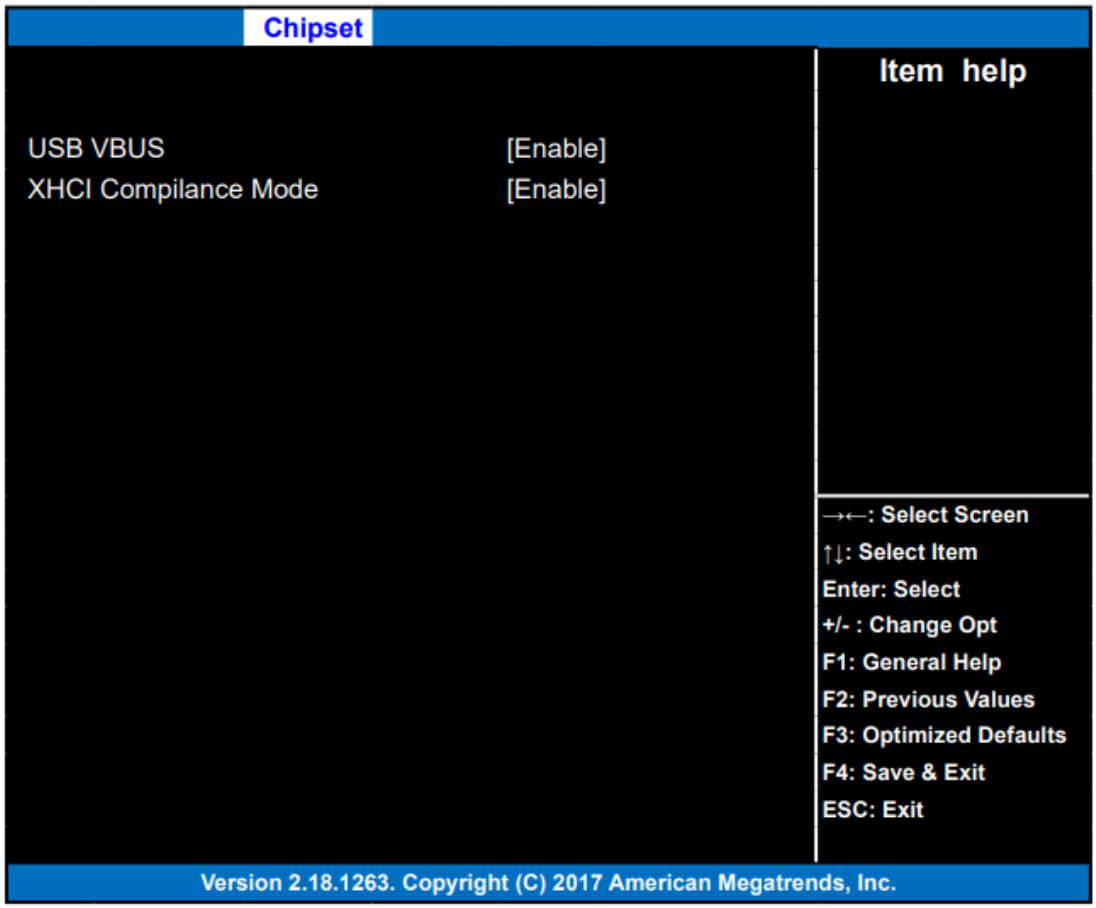
LAN2



Field Name	LAN2
Default Value	[Auto]
Possible Value	Disable / Enable / Auto
Help	Control the PCI Express Root Port. AUTO: To disable unused root port automatically for the most optimum power savings. Enable: Enable PCIe root port. Disable: Disable PCIe root port.

Field Name	ASPM
Default Value	[Auto]
Possible Value	Disable / L0s / L1 / L0sL1 / Auto
Help	PCI Express Active State Power Management settings.

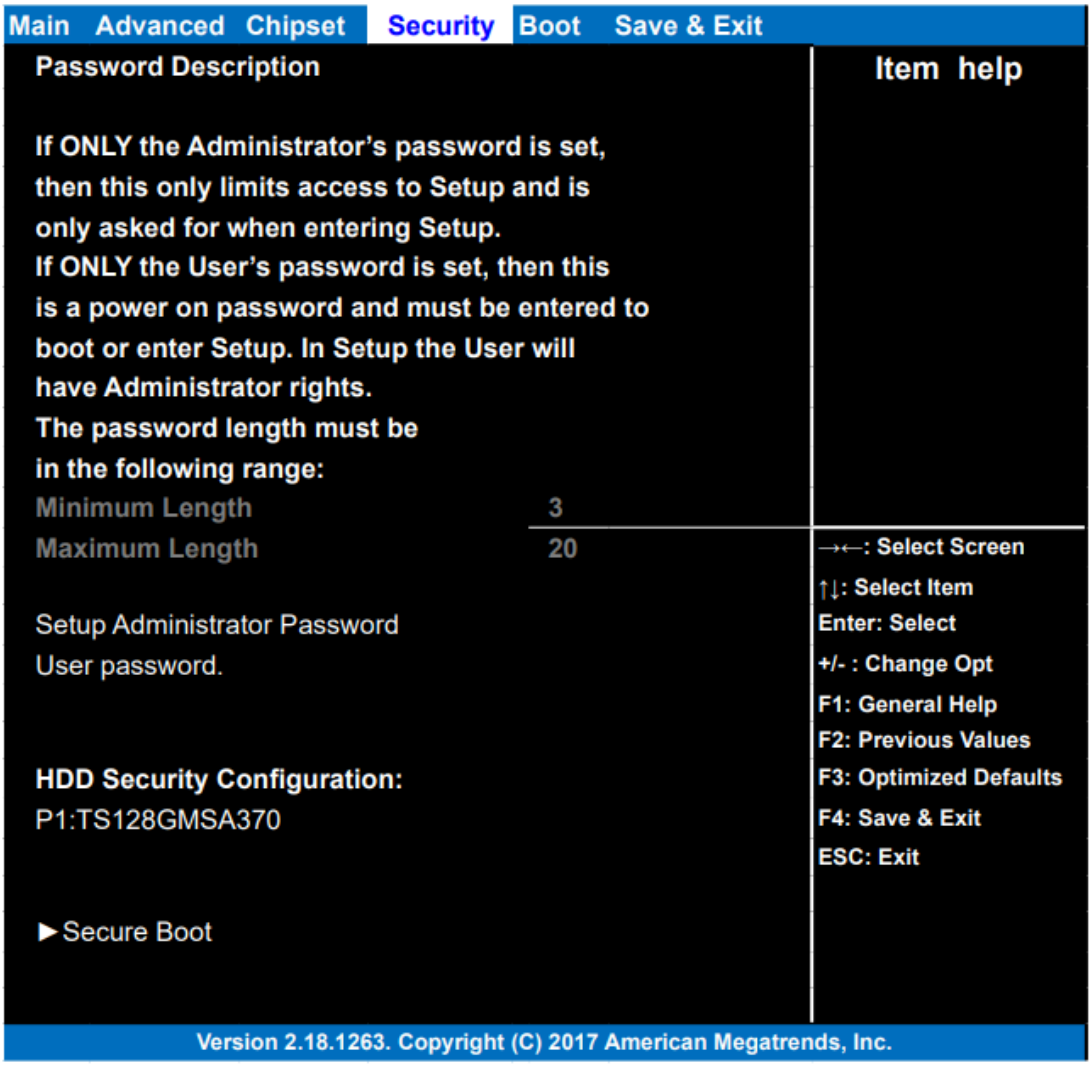
USB Configuration



Field Name	USB VBUS
Default Value	[Enable]
Possible Value	Disable / Enable
Help	VBUS should be Enable in HOST mode. It should be Disable in OTG device mode.

Field Name	XHCI Compliance Mode
Default Value	[Enable]
Possible Value	Enable / Disable
Help	Options to Enable XHCI Link Compliance Mode. Default is Enable to enable Compliance Mode. Set Disable to disable Compliance Mode.

Security



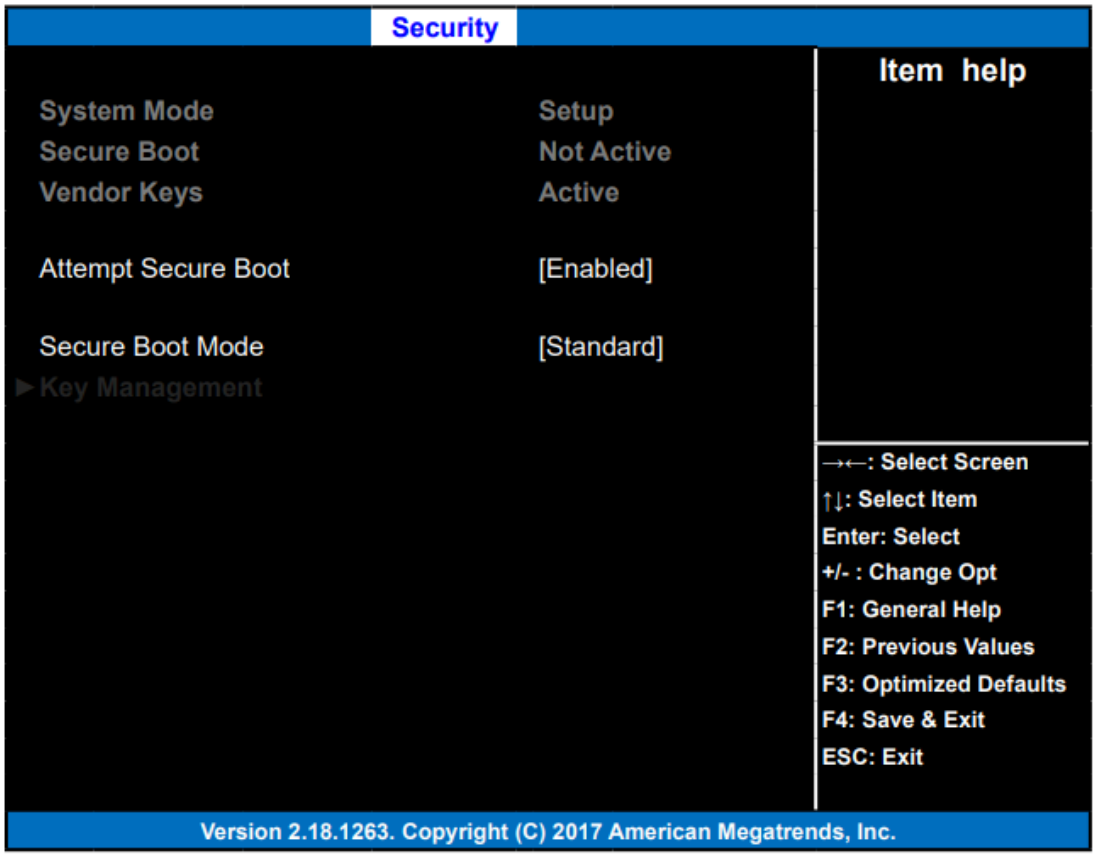
Field Name	Setup Administrator Password
Help	Set Setup Administrator Password.
Comment	Press Enter when selected to go into the associated Sub-Menu.

Field Name	User Password
Help	Set User Password
Comment	Press Enter when selected to go into the associated Sub-Menu.

Field Name	P1:TS128GMSA370
Help	HDD Security Configuration for selected drive.
Comment	Press Enter when selected to go into the associated Sub-Menu.

Field Name	Secure Boot
Help	Customizable Secure Boot settings.
Comment	Press Enter when selected to go into the associated Sub-Menu.
Help	Secure Boot Mode – Custom & Standard, Set UEFI Secure Boot Mode to STANDARD mode or CUSTOM mode, this change is effect after save. And after reset, the mode will return to STANDARD mode.

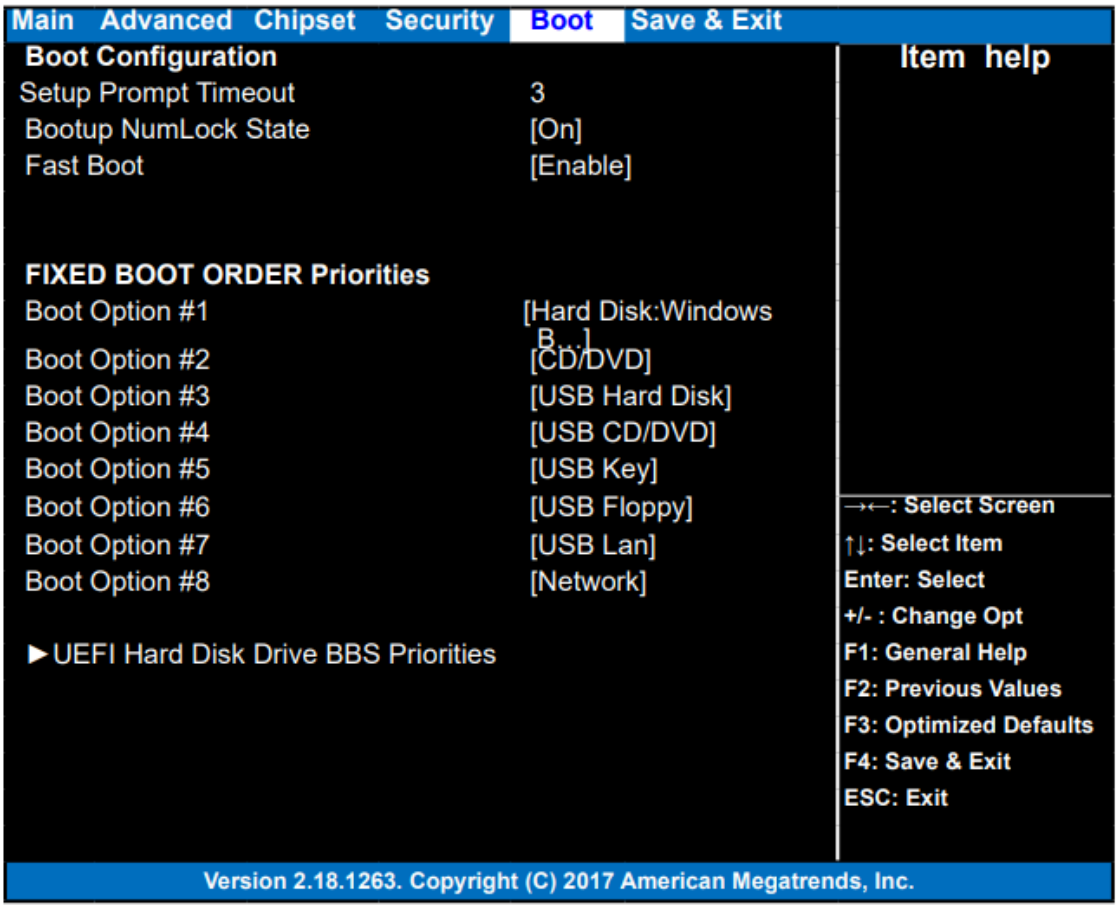
Secure Boot



Field Name	Attempt Secure Boot
Default Value	[Enabled]
Possible Value	Disabled / Enabled
Help	Secure Boot activated when Platform Key(PK) is enrolled, System mode is User/Deployed, and CSM function is disabled.

Field Name	Secure Boot Mode
Default Value	[Standard]
Possible Value	Standard / Customized
Help	Secure Boot Mode – Custom & Standard, Set UEFI Secure Boot Mode to STANDARD mode or CUSTOM mode, this change is effect after save. And after reset, the mode will return to STANDARD mode.

Boot



Field Name	Setup Prompt Timeout
Default Value	3
Possible Value	1~65535
Help	Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.

Field Name	Bootup NumLock State
Default Value	[On]
Possible Value	On / Off
Help	Select the keyboard NumLock state.

Field Name	Fast Boot
Default Value	[Enable]
Possible Value	Disable / Enable

Help	Enables or disables FastBoot features. Most probes are skipped to reduce time cost during boot.

Field Name	Boot Option #1
Default Value	[Hard Disk:Windows Boot Manager (P1: TS128GMSA370)]
Possible Value	Hard Disk:Windows Boot Manager (P1: TS128GMSA370) CD/DVD USB Hard Disk USB CD/DVD USB Key USB Floppy USB Lan Network Disable
Help	Sets the system boot order.

Field Name	Boot Option #2
Default Value	[CD/DVD]
Possible Value	Hard Disk:Windows Boot Manager (P1: TS128GMSA370) CD/DVD USB Hard Disk USB CD/DVD USB Key USB Floppy USB Lan Network Disable
Help	Sets the system boot order.

Field Name	Boot Option #3
Default Value	[USB Hard Disk]
Possible Value	Hard Disk:Windows Boot Manager (P1: TS128GMSA370) CD/DVD USB Hard Disk USB CD/DVD USB Key USB Floppy USB Lan Network Disable
Help	Sets the system boot order.

Field Name	Boot Option #4
Default Value	[USB CD/DVD]
Possible Value	Hard Disk:Windows Boot Manager (P1: TS128GMSA370) CD/DVD USB Hard Disk USB CD/DVD USB Key USB Floppy USB Lan Network Disable
Help	Sets the system boot order.

Field Name	Boot Option #5
Default Value	[USB key]
Possible Value	Hard Disk:Windows Boot Manager (P1: TS128GMSA370) CD/DVD USB Hard Disk USB CD/DVD USB Key USB Floppy USB Lan Network Disable
Help	Sets the system boot order.

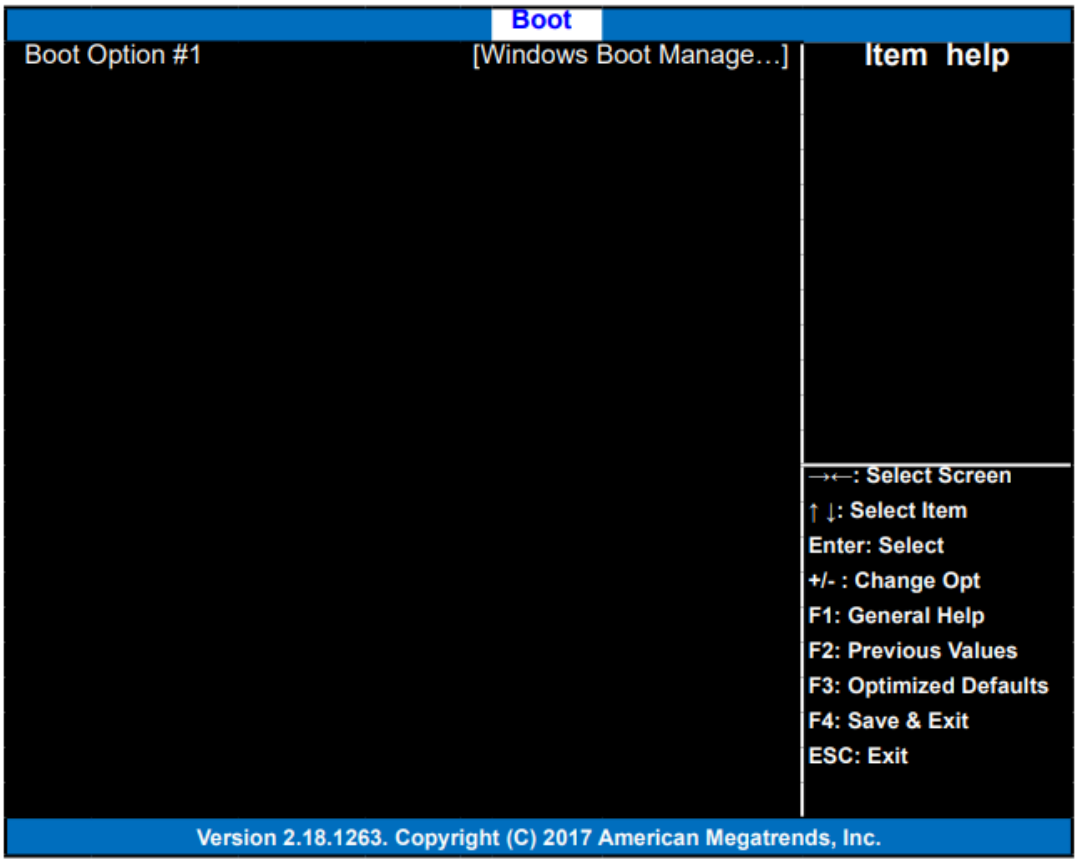
Field Name	Boot Option #6
Default Value	[USB Floppy]
Possible Value	Hard Disk:Windows Boot Manager (P1: TS128GMSA370) CD/DVD USB Hard Disk USB CD/DVD USB Key USB Floppy USB Lan Network Disable
Help	Sets the system boot order.

Field Name	Boot Option #7
Default Value	[USB Lan]
Possible Value	Hard Disk:Windows Boot Manager (P1: TS128GMSA370) CD/DVD USB Hard Disk USB CD/DVD USB Key USB Floppy USB Lan Network Disable
Help	Sets the system boot order.

Field Name	Boot Option #8
Default Value	[Network]
Possible Value	Hard Disk:Windows Boot Manager (P1: TS128GMSA370) CD/DVD USB Hard Disk USB CD/DVD USB Key USB Floppy USB Lan Network Disable
Help	Sets the system boot order.

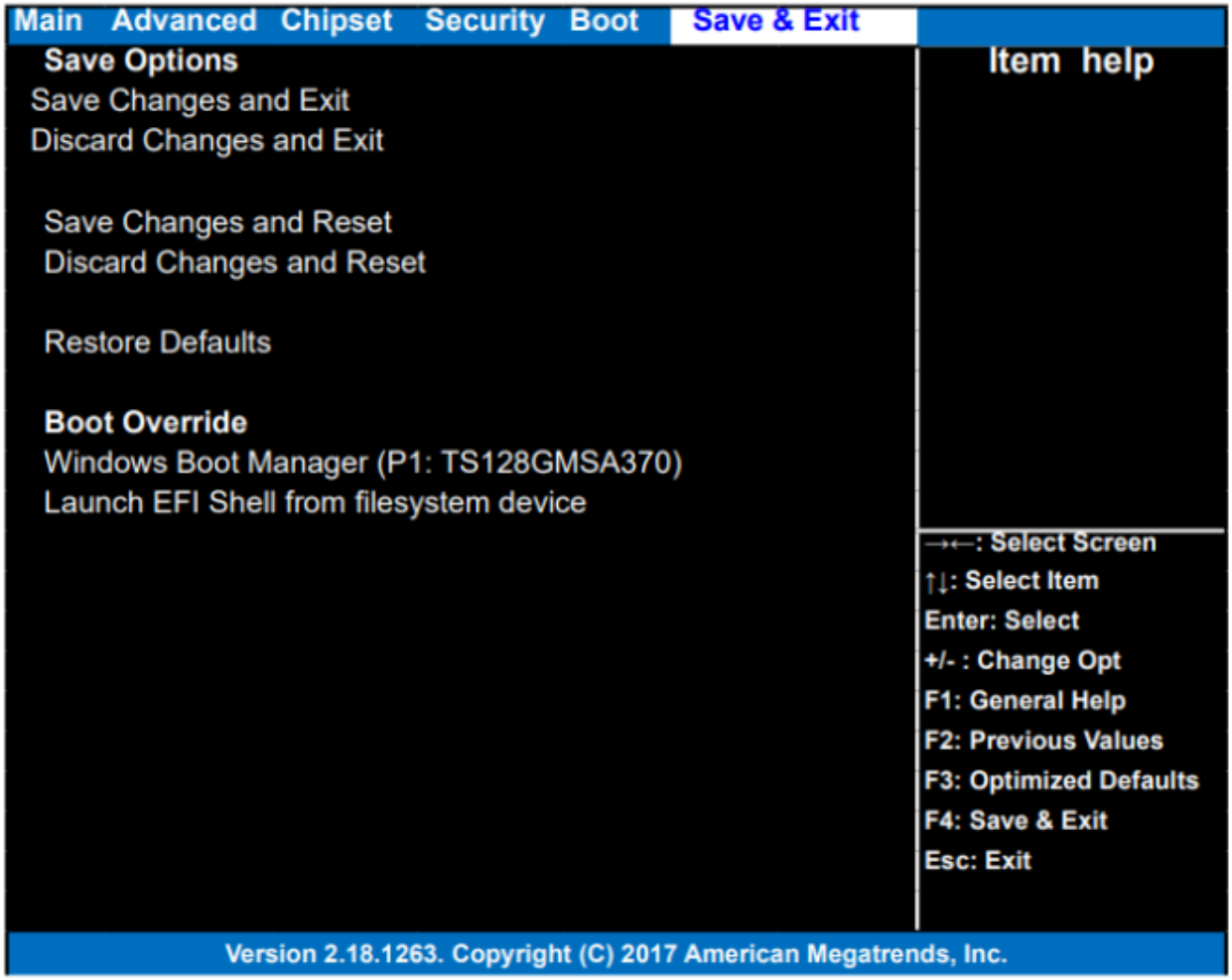
Field Name	UEFI Hard Disk Drive BBS Priorities
Help	Specifies the Boot Device Priority sequence from available UEFI Hard Disk Drives.
Comment	Press Enter when selected to go into the associated Sub-Menu.

UEFI Hard Disk Drive BBS Priorities



Field Name	Boot Option #1
Default Value	[Windows Boot Manager (P1: TS128GMSA370)]
Possible Value	Windows Boot Manager (P1: TS128GMSA370) Disable
Help	Sets the system boot order.

Save & Exit


Main Advanced Chipset Security Boot Save & Exit
Save Options
Save Changes and Exit
Discard Changes and Exit
Save Changes and Reset
Discard Changes and Reset
Restore Defaults
Boot Override
Windows Boot Manager (P1: TS128GMSA370)
Launch EFI Shell from filesystem device
Item help
→←: Select Screen
↑↓: Select Item
Enter: Select
+/- : Change Opt
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
Esc: Exit
Version 2.18.1263. Copyright (C) 2017 American Megatrends, Inc.

Field Name	Save Changes and Exit
Help	Exit system setup after saving the changes.

Field Name	Discard Changes and Exit
Help	Exit system setup without saving any changes.

Field Name	Save Changes and Reset
Help	Reset the system after saving the changes.

Field Name	Discard Changes and Reset
Help	Reset system setup without saving any changes.

Field Name	Restore Defaults
Help	Restore/Load Default values for all the setup options.

Field Name	Windows Boot Manager (P1: TS128GMSA370)

Field Name	Launch EFI Shell from filesystem device
Help	Attempts to Launch EFI Shell application (Shell.efi) from one of the available filesystem devices.

4.2- Drivers & Downloads

Windows Drivers

Windows 10 Drivers ↗

BIOS Updates

Version	Link
D7870A15	Download ↗
D7870A13	Download ↗

Update the BIOS with the file(s) above. you can follow this How-To guide for installation instructions.

4.3- Driver Installation

Windows 10

Download the driver archive ↗ and extract it.
In the Windows 10 folder, there are two applications required for full functionality, the kernel driver that allows communication with the CEC module, and the user driver that keeps the module up-to-date with the system's HDMI port addresses.
To install the kernel driver, right-click on ADP107.inf and select install. Accept any prompts that follow, then restart the system.

Linux

Download the driver archive ↗ and extract it.
Install the necessary prerequisites using:\

```
sudo apt-get install build-essential linux-headers-uname -r make i2c-
tools
```

In the Linux folder, you will find a kernel module that can be compiled from the command line.
From the driver package's Linux folder, run the following commands:\

```
make
sudo make install
```

Finally, restart the system. Upon reboot, you should find that a character device is loaded at /dev/adp107 that can be used to communicate with the device using the application codes included in the next section.

Example Code: Python

Ubuntu – Scan for HDMI addresses and power up displays
Prerequisites: python-smbus

```
import smbus
smbusNumber = 5
adp107Address = 0x20
physAddrOffset = 0x43
powerOnOffset = 0x4f
powerOffOffset = 0x50
ddcNumbers = [0,1]

def apd107ReadHdmiDdc(ddcNumber):
    bus = smbus.SMBus(ddcNumber)
    rawEdid = []
    hdmiAddress = [ddcNumber]
    for i in range(0, 256, 32):
        try:
            rawEdid += bus.read_i2c_block_data(0x50, i, 32)
        except:
            print "Failed to read DDC-%" % ddcNumber
            return None
    if rawEdid[126] == 0: #no extensions after main EDID block
        return None
    if rawEdid[130] == 4: #no data blocks present in extended EDID
        return None

    edidIndex = 132
    blockType = 0
    blockLen = 0

    while edidIndex < (rawEdid[130] + 128):
        blockType = rawEdid[edidIndex] >> 5
        blockLen = rawEdid[edidIndex] & 0x1f
        if (blockType == 3): #vendor block containing HDMI physical
address
            hdmiAddress.append(rawEdid[edidIndex+4])
            hdmiAddress.append(rawEdid[edidIndex+5])
            return hdmiAddress
        edidIndex = edidIndex + blockLen + 1


def adp107ScanSetHdmiAddresses(bus):
    for ddc in ddcNumbers:
        hdmiAddress = adp107ReadHdmiDdc(ddc)
        if hdmiAddress is not None:
            bus.write_i2c_block_data(adp107Address, physAddrOffset,
hdmiAddress)

def adp107PowerOnDisplay(bus, displayNum):
    bus.write_i2c_block_data(adp107Address, powerOnOffset, [displayNum])
```

```
def adp107PowerOffDisplay(bus, displayNum):
    bus.write_i2c_block_data(adp107Address, powerOffOffset, [displayNum])

adp107Bus = smbus.SMBus(smbusNumber)
adp107ScanSetHdmiAddresses(adp107Bus)
#commands are ignored if ScanSetHdmiAddresses didn't find an HDMI address
adp107PowerOnDisplay(bus, 0)
adp107PowerOnDisplay(bus, 1)
```

5- Troubleshooting & FAQ

Auto power on

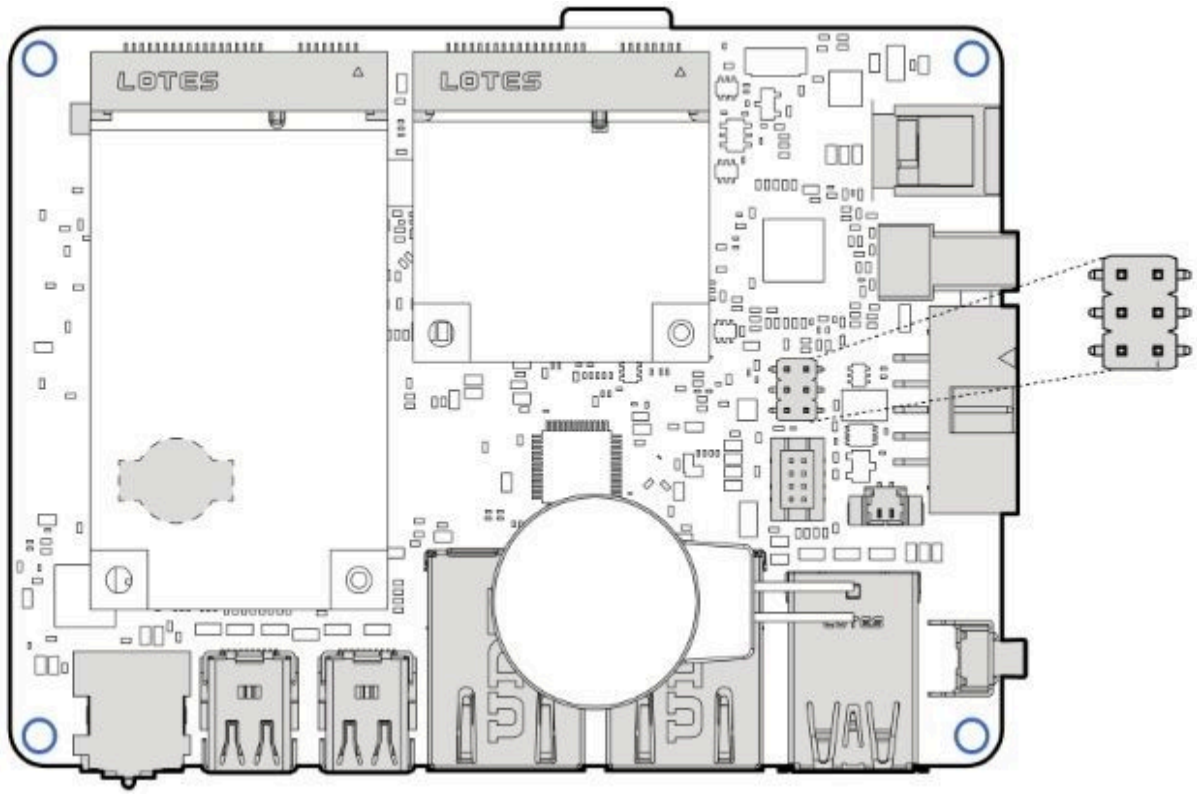
- Power on the CL200 and press the Esc key a few times to access the BIOS
- Navigate to the Chipset tab
- Change auto power on to [enable]
- Save & Exit
- The CL200 will now automatically turn on when power is connected

How to enable Watchdog in Ubuntu (20.04/22.04)

- Enter the BIOS and ensure that the watchdog timer is enabled. The option is at the top of the Advanced settings page.
- Install the watchdog package using `*sudo apt-get install watchdog*`.
- In the terminal, run `*lsmod | grep wdat_wdt*` to see if the watchdog module is loaded. If the command returns nothing, the module is not loaded.
- If the watchdog module is not loaded, it is likely blacklisted by default. Open `*/usr/lib/modprobe.d/blacklist_linux-hwe-5.19_5.12.0-43-generic.conf*` with a text editor and remove or comment out `*blacklist wdat_wdt*`. If there are other `*blacklist_linux...*` files here, ensure that the blacklist is removed from them as well.
- Open `*/etc/default/watchdog*` with a text editor and add or modify the watchdog module line to be as follows: `*watchdog_module="wdat_wdt"*`. Other watchdog module settings can be adjusted here as well.

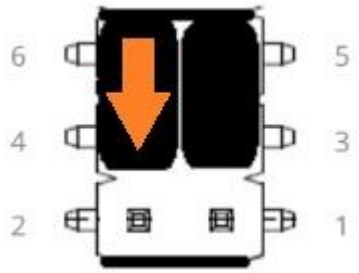
- Open `*/etc/watchdog.conf*` and add or modify the watchdog device line to be as follows: `*watchdog-device = /dev/watchdog*`(it may also be `*watchdog0*`) . There are additional settings here that can be changed as needed, such as the watchdog timeout which controls how long it takes to trigger a system reboot after an event. The timeout defaults to 60s but can be adjusted by adding the line `*watchdog-timeout = #*` where `*#*` is the desired time in seconds.
- Reboot the system.
- The following commands should be run as the root user. To confirm the watchdog timer is working correctly, you can kill the watchdog process, stopping the watchdog pulse and causing the system to reboot using the following command: `*killall -STOP watchdog*`, if `*killall*` is not available try `*pkill -STOP watchdog*`. A kernel panic can also be triggered and cause the watchdog to reboot the system using the following command: `*echo c > /proc/sysrq-trigger*`.

Clear CMOS



- Locate the Clear CMOS jumpers
- Remove the black jumper from pins 6 and 4
- Install it onto pins 4 and 2, moving it down by 1 pin
- Wait 30 seconds

- Restore the jumper to its original 6-4 position
- The CMOS is now clear



mSATA/WiFi Card Installation

- Open the system following the Disassembly steps above.
- Install the WiFi and/or mSATA card as shown. Install the WiFi antenna pigtail cables as shown.
- The nuts and washers are loose for illustration purposes. They should be fully hand tightened

- Apply the thermal pad to the top of the WiFi/mSATA card. This can be located in your system's accessories.

Optional CEC module (ADP107)

The ADP107 is a module that is installed in-line with the DisplayPort outputs on configured OnLogic systems. Its purpose is to enable Consumer Electronics Control (CEC) functionality which manages the connection between the system and any connected displays according to a set of preconfigured rules. This allows command signals to be passed to the displays when the computer starts, stops, wakes, and sleeps, in a user-configurable order after a configurable time delay.

Default Behavior

The device's default configuration is to power up displays when the system starts/wakes and power them off when the system stops/sleeps. It is also configured by default to start the computer when the connected display powers on, and to power the computer off
when the displays are powered off. The default startup delay timer is set to 5 seconds.

6- Regulatory Compliance and Safety Information

This document provides international regulatory and safety compliance information for the OnLogic Fanless computers xxxx-CL2YY-xxxx, (where x can be any alphanumeric character or blank and Y is numeric character) computer system.

For more information on accessories and additional features, visit the product page: https://www.onlogic.com/store/computers/industrial/fanless/cl200-series/

FCC

This device complies with part 15 of the FCC rules as a Class A device. 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 might cause undesired operation.

Industry Canada Compliance Statement

This Class A digital apparatus complies with Canadian ICES-003.

Avis de Conformité à la Réglementation d'Industrie Canada

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

CE

This equipment complies with all applicable European Union (CE) directives if it has a CE marking. For this device to remain CE compliant, only CE compliant parts can be installed, and proper cables and cabling techniques are required.

Safe Use and Installation Instructions

1. Do not open or modify the device. The device uses components that comply with FCC and CE regulations. Modification of the device will void these certifications.

2. Install the device securely. Be careful handling the device to prevent injury and do not drop.
3. Wall or ceiling mounting device requires use of a mounting plate or bracket. Plate or bracket must be of metal construction and have a minimum thickness of 1mm.
4. Use M3x0.5mm Flat Head screws to attach mounting plate or mounting brackets to threaded holes on bottom of chassis. Screws should be a minimum length of 4mm. Add 1mm of screw length for every mm of additional thickness of plate or bracket beyond 1.5mm.
5. Operational temperature must be between 0-50°C with a non-condensing relative humidity of 10-90%. Derated operational temperature of 0-40°C dependent on included power adapter. See Table 1 below.
6. The device can be stored at temperatures between 0-60°C.
7. Keep the device away from liquids and flammable materials.
8. Do not clean the device with liquids. The chassis can be cleaned with a cloth.
9. Allow at least 2 inches of space around all sides of the device for proper cooling. If the device is mounted to a vertical surface then the recommended device orientation is so that heatsink fins allow air to rise unobstructed. Alternative orientations may result in reduced operational temperature range.
10. This device is intended for indoor operation only.
11. Use UL Listed external power supply with rated output 12V d.c., 3A min.
12. Install the device only with shielded network cables.
13. Service and repair of the device must be done by qualified service personnel. This includes but is not limited to replacement of CMOS battery. Replacement CMOS battery must be of same type as original.
14. Proper disposal of CMOS battery must comply with local governance.

WARNING: There is danger of explosion if the CMOS battery is replaced incorrectly. Disposal of battery into fire or a hot oven, or mechanically crushing or cutting of a battery can result in an explosion.

Wireless

If this product was configured with a wireless device, the FCC and IC IDs will be detailed on a label on the chassis.

6.2- Regulatory Documents

119KB	TAA Compliance.pdf PDF	Download Open
167KB	IEC.pdf PDF	Download Open
111KB	CECModuleManual.pdf PDF	Download Open

6.3- Security Advisory

For the latest security advisories concerning OnLogic products, including vulnerability disclosures and necessary updates, please refer to our official Security Advisories page. It is recommended to regularly check this resource for critical security information.
Access Security Advisories

7- Appendices

Revision History

Revision History	Date
First Release of CL200 Manual	09/26/2022
Updated Errata and feature list	06/12/2023
Updated Specs for CL250	07/22/2024