Karbon 300 Manual

Version 3.0

US Office
Phone: +1 802 861 2300
Email: info@logicsupply.com
www.logicsupply.com

EU Office
Phone: +31 85 2733760
Email: info@logicsupply.eu
www.logicsupply.com

Karbon 300 Manual

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Preface

About Logic Supply

Logic Supply is powering innovation with highly configurable embedded and IoT computers engineered for reliability. Businesses worldwide depend on our solutions to operate in the toughest environments while tapping into the evolving Industrial Internet of Things.

This guide will introduce you to the Karbon 300 (K300) rugged computer and walk you through hardware installation, BIOS setup, and the Logic Supply Microcontroller (LS MCU) setup. For technical questions or support, please reach out via our contact information below.

You have a lot of choices when choosing computer hardware. The Logic Supply Team wants to thank you for trusting our hardware to meet your application needs. Karbon 300 is the result of input from partners like you. We've worked hard to create a system that meets the varied needs of industrial and IoT computing and we've manufactured this system under our strict quality assurance and immunity standards to serve you best. If you have any concerns about the quality or performance of this product, please contact us directly or visit our support pages at US: https://www.logicsupply.com/company/support/ or EU: https://www.logicsupply.com/eu-en/company/support/.

Contact Information

Logic Supply Global
35 Thompson Street
South Burlington, VT 05403
USA

+1 802 861 2300
info@logicsupply.com

Logic Supply Europe
De Boedingen 39
4906 BA Oosterhout
The Netherlands

+31 88 5200 700
info@logicsupply.eu

Revision History

Revision	Date	Notes
1.0	05/15/2019	Initial Karbon 300 manual release
2.0	07/29/2019	Updated DIO Circuit Diagram
3.0	08/20/2019	Updated part number for 3-pin CAN bus terminal block connector

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Regulatory Compliance: This digital device is designed to comply with all applicable FCC Rules Part 15 and CE compliance requirements for electronic equipment. For more detailed or additional regulatory compliance information, please see the relevant product page at www.logicsupply.com or contact Logic Supply directly at info@logicsupply.com.

Regulatory Compliance and Safety Information

This document provides international regulatory and safety compliance information for the Logic Supply Rugged Fanless PC model K300 computer system. This information also covers models xxxxxK300xxxxxxxxxxxxxxx (where x is any alphanumeric character, "-" or blank designating configuration differences).

Safe use and installation instructions

1. Do not open or modify the device. This device uses components that comply with FCC and CE regulations. Modification of the device may 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 or rear of chassis. Screws should be minimum length of 4mm. Add 1mm of screw length for every millimeter of additional thickness of plate or bracket beyond 1.5mm.
5. Ambient operating temperature must be between -25°C to 70°C with a non-condensing relative humidity of 10-90%. Operational temperature is dependent on component selection including power adapter. See Table 1 below for derating.
6. The device can be stored at temperatures between -40°C to 85°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 device is mounted to vertical surface then 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 9-36V DC.
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 the CMOS battery. Replacement CMOS battery must be of the 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.

Précautions et guide d'installation

1. Ne pas ouvrir ou modifier l'appareil. L'appareil utilise des composants conformes aux réglementations FCC et EC. La modification de l'appareil peut annuler ces certifications.
2. Installez l'appareil en toute sécurité. Soyez prudent lors de la manipulation de l'appareil pour éviter les blessures et ne pas faire tomber.
3. Le montage au mur ou au plafond nécessite l'utilisation d'une plaque de montage ou d'un support. La plaque ou le support doit être en métal et doit avoir une épaisseur minimale de 1 mm.
4. Utilisez des vis à tête plate M3x0,5mm pour fixer la plaque de montage ou les supports aux trous filetés situés au bas ou à l'arrière du châssis. Les vis doivent avoir une longueur minimale de 4 mm. Ajoutez 1 mm de longueur de vis pour chaque mm d'épaisseur supplémentaire de plaque ou de support dépassant 1,5 mm.
5. La plage de températures de fonctionnement doit être de -25 °C à 70 °C avec une humidité relative de 10 à 90% sans condensation. La température de fonctionnement dépend du choix du composant, y compris de l'adaptateur d'alimentation. Voir le tableau 1 ci-dessous pour le déclassement.
6. La plage de températures de stockage doit être de -40 °C à 85 °C.
7. Gardez l'appareil à l'écart des liquides et des matières inflammables.
8. Ne nettoyez pas l'appareil avec des liquides. Le châssis peut être nettoyé avec un chiffon.
9. Laissez au moins 5 cm d'espace autour de tous les côtés de l'appareil pour un refroidissement correct. Si l'appareil est monté sur une surface verticale, l'orientation recommandée est telle que les ailettes du dissipateur de chaleur permettent à l'air de monter sans obstruction. Les orientations alternatives peuvent entraîner une réduction de la plage de température de fonctionnement.
10. Cet appareil est conçu uniquement pour une utilisation en intérieur.
11. Utilisez une alimentation externe listée UL avec une sortie nominale de 9-36V DC.
12. Installez l'appareil uniquement avec des câbles réseau blindés.
13. L'entretien et la réparation de l'appareil doivent être effectués par du personnel qualifié. Cela inclut, sans toutefois s'y limiter, le remplacement de la batterie CMOS. La batterie CMOS de remplacement doit être du même type que l'originale.
14. La mise au rebut des batteries usagées doit être réalisée conformément aux réglementations environnementales.

Table 1 - Operational temperature rating by included power adapter

Power Adapter Model (Modèle d'adaptteur d'alimentation)	Description (Description)	Operating Temperature (Plage de températures de fonctionnement)
GST60A12	60W AC-DC SWITCHING ADAPTOR; Input: 100-240Vac, 50/60Hz, 1.4A; Output: 12Vdc, 5.0A	-25°C - 50°C
GST90A24	90W AC-DC SWITCHING ADAPTOR; Input: 100-240Vac, 50/60Hz, 1.3A; Output: 24Vdc, 3.75A	-25°C - 40°C
GST120A24	120W AC-DC SWITCHING ADAPTOR; Input: 100-240Vac, 50/60Hz, 1.4A; Output: 24Vdc, 5.0A	-25°C - 40°C
FSP090-AAAN3	90W AC-DC SWITCHING ADAPTOR; Input: 100-240Vac, 50/60Hz, 1.2A; Output: 24Vdc, 3.75A	0°C - 40°C
FSP120-AAAN3	120W AC-DC SWITCHING ADAPTOR; Input:100-240Vac, 50/60Hz, 1.2A; Output: 24Vdc,5.0A	0°C - 40°C
No Adapter (Sans adaptateur)	--	-25°C - 70°C
Interchangeable Adapter (Adaptateur interchangeable)	UL Listed; Output: 9-36Vdc, 60W minimum; -25°C - 70°C ambient operating temperature (-25°C - 70°C plage de températures de fonctionnement)	-25°C - 70°C

Declaration of Conformity

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.

ISED (Innovation, Science and Economic Development Canada)

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

CE

This equipment complies with all application 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.

We of:

Logic Supply, Inc.
35 Thompson Street
South Burlington, VT 05403
USA

Logic Supply BV
De Boedingen 39
4906 BA Oosterhout
The Netherlands

In accordance with the following Directive(s):
Electromagnetic Compatibility (2014/30/EU)
Low-Voltage (2014/35/EU)
RoHS 2 (2011/65/EU)
Radio Equipment (2014/53/EU) - Only applicable for configurations with wireless transmitters

Hereby declare that:
Equipment: Logic Supply model(s): xxxxxK300xxxxxxxxxxxxxxx

Is in conformity with the applicable requirements of the following documents:
EN 55032:2015/AC:2016 Class A
EN 55035:2017
EN 61000-3-2:2014 Class D
EN 61000-3-3:2013
EN 61000-4-2:2009
EN 61000-4-3:2006+A1:2008+A2:2010
EN 61000-4-4:2012
EN 61000-4-5:2014+A1:2017
EN 61000-4-6:2014+AC:2015
EN 61000-4-8:2010
EN 61000-4-11:2004+A1:2017
EN 62368-1:2014
EN 301 489-1 V2.2.0 (2017-03) Draft
EN 301 489-17 V3.2.0 (2017-03) Draft

Reports: BTL-EMC-1-1901T106, BTL-EMC-2-1906T106, BTL-ETSE-1-1901T106
Hereby declare the equipment named above has been designed and/or tested to comply with the relevant sections of the above referenced specifications. The unit complies with all applicable Essential Requirements of the Directives.

1 - System Overview

1.1 - What's In The Box

1.1.1 - Accessories

- 3-pin Power Terminal Block Connector (Dinkle 2ESDVM-03P)
- 3-pin CAN bus Terminal Block Connector (Dinkle EC350V-03P)
- 10-pin DIO Terminal Block Connector (Dinkle EC350V-10P)
- M.2 and mPCIe expansion card screws

If you purchased additional items such as specific mounting brackets, power supplies or antennas, they will be located in the system box or within the outer shipping carton.

All drivers and product guides can be found on the corresponding product page. For more information on accessories and additional features, visit the Karbon 300 page at US: https://www.logicsupply.com/k300/ or EU: https://www.logicsupply.com/eu-en/k300/.

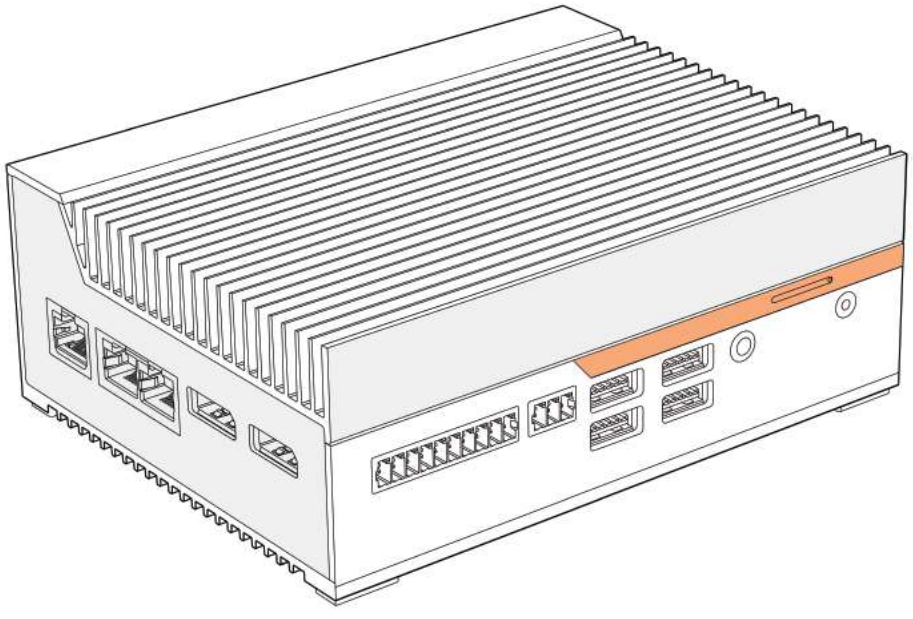
1.2 - Highlights

Karbon 300 is designed for use as an industrial or mobile gateway, automation PC, workstation or digital media device, Karbon 300's all-metal chassis measures just 154 x 56 x 119 mm and can be wall, VESA or DIN rail mounted. The system is powered by either an Intel® Apollo Lake Atom E3930 Dual-Core, or E3950 Quad-Core processor. Connectivity includes 3x LAN with optional Power over Ethernet (PoE+), dual DisplayPorts, dual RS-232/422/485 COM ports, 4x USB 3.0, integrated CAN bus and DIO. Available wireless options include Wi-Fi/Bluetooth, 4G LTE and LTE Cat M1. Expansion and storage can be configured via two M.2 slots and one mPCIe slot. The system is available with 4 or 8 GB of onboard high-speed LPDDR4 memory. OS options include multiple versions of Windows 10 and Ubuntu Linux.

Karbon 300 can be configured with an Intel Movidius Vision Processing Unit (VPU) to accelerate machine vision algorithms and enable AI and machine learning applications. Integrated hardware TPM provides Root of Trust data security to help protect sensitive information and integrated Consumer Electronics Control allows Karbon 300 to control connected displays in digital signage, kiosk or entertainment installations.

To meet the demands of extreme computing environments, Karbon 300 is tested according to IEC 60068-2-27 and IEC 60068-2-64 procedures for shock and vibration. EMC, shock and vibration performance also meets the in-vehicle UNECE Reg.10 E-mark and rolling stock EN50155 standards. The system is CE and FCC compliant. A wide input voltage rating, operating temperature range of -25~70°C (-13~158°F) and automotive ignition power sensing capability make the system well-suited to in-vehicle and other mobile installations.

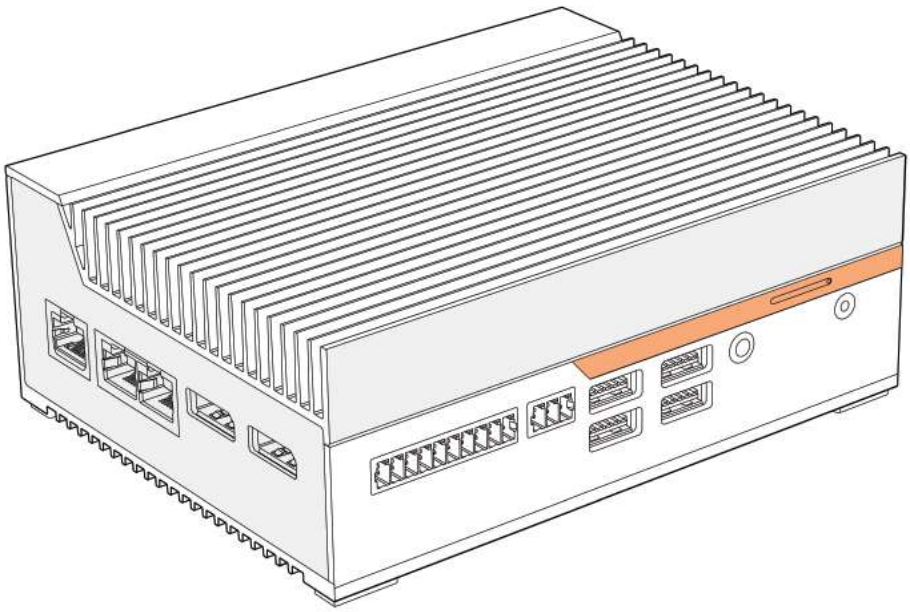
The Karbon 300 rugged fanless computer has been engineered to help innovators overcome the limitations of deploying reliable computer hardware in challenging environments.

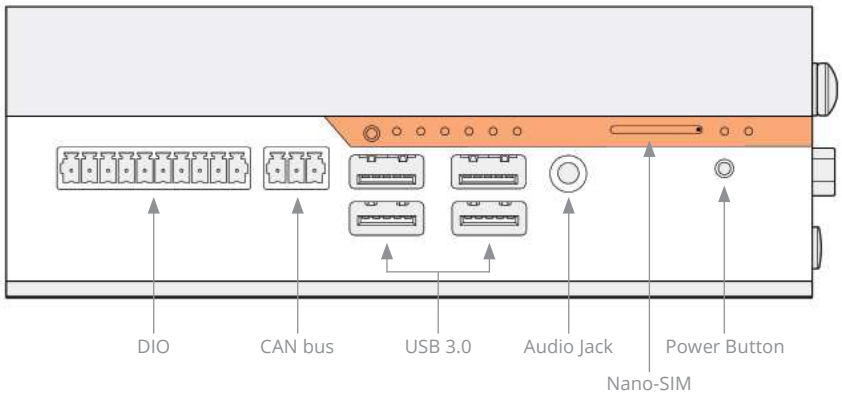


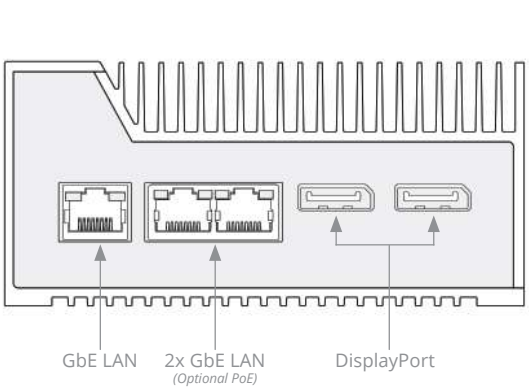
1.3 - Key Features

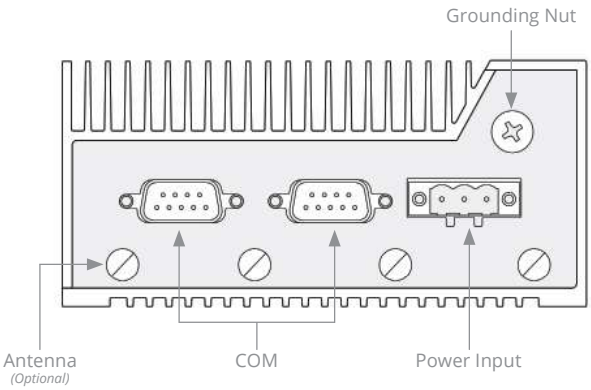
	Karbon 300 Series			
	K300-E3930-4-P	**K300-E3930-4P-P**	**K300-E3950-8-P**	**K300-E3950-8P-P**
Processor	Intel Atom x5-E3930 Dual-core		Intel Atom x7-E3950 Quad-core	
System Memory	4GB Onboard LPDDR4		8GB Onboard LPDDR4	
Integrated Graphics	Intel HD Graphics 500		Intel HD Graphics 505	
Bottom I/O	3x GbE LAN	1x GbE LAN 2x PoE LAN	3x GbE LAN	1x GbE LAN 2x PoE LAN
	2x Full-size DisplayPort			
Top I/O	2x Serial RS-232/422/485			
	3-pin Power input			
	4x Antenna holes			
Front I/O	Power button			
	1x 3.5 mm Audio jack (mic-in, line-out)			
	8-bit Isolated DIO			
	4x USB 3.0 Type A			
	8x Status LEDs			
	3-pin CAN bus 2.0B			
	Nano-SIM slot (4FF)			
Storage	M.2 2280 M-key (PCIe x2, SATA)			
Expansion	Full-length mPCIe slot (PCIe, USB)			
	M.2 2230 E-key (PCIe, USB)			
Special Features	Logic Supply Microcontroller (LS MCU)			
	Onboard TPM 2.0 (Nuvoton NPCT750)			
	Automotive Ignition Power Sensing			
	SuperCap backup for RTC battery			
Operating Systems	Windows 10, Ubuntu 18.04			
LAN Controller	Intel Ethernet Controller I210-IT			
Voltage Input	9~36 VDC			
Dimensions	56 x 154 x 119 mm			
Mounting	Wall mount (edge and bottom) DIN Rail mount (edge and bottom) VESA mount (bottom)			
Environment	Operating Temperature : -25°C ~ 70°C			
	Operating Humidity: 0~90%			
	Storage Temperature: -40°C ~ 85°C			
	Storage Humidity: 0~95%			
Certification	2011/65/EU (RoHS 2 Directive) CE EN 55024 EN 55032 EN 62368-1 FCC 47 CFR Part 15 IEC 60068-2-27 IEC 60068-2-64			

1.4 - Exterior Features

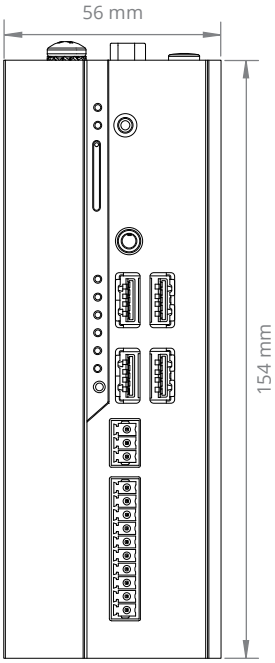




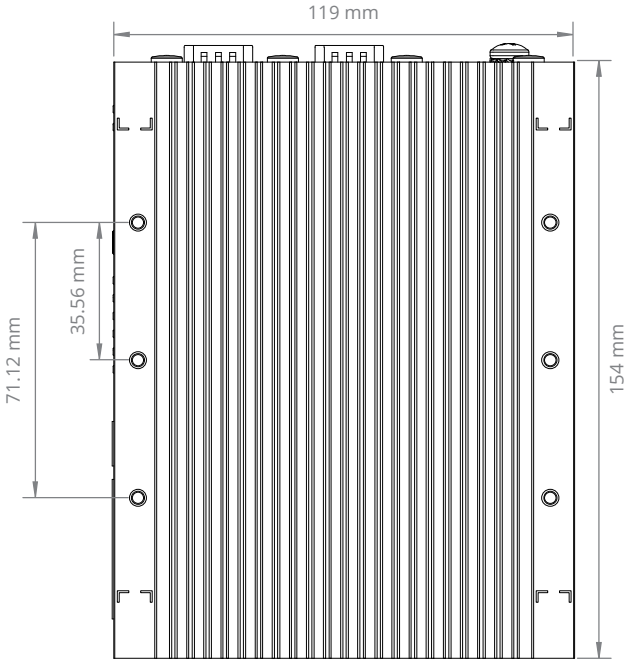




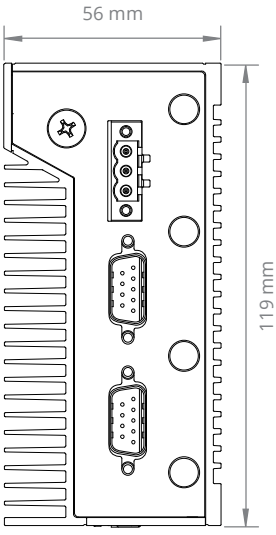
1.5 - Dimensional Drawings



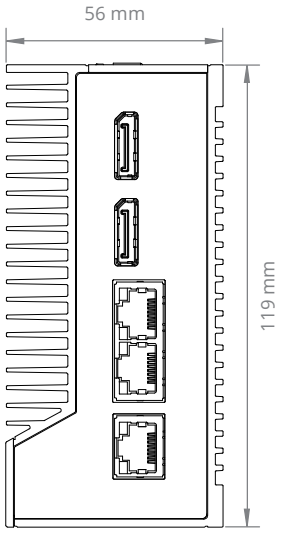
FRONT



SIDE



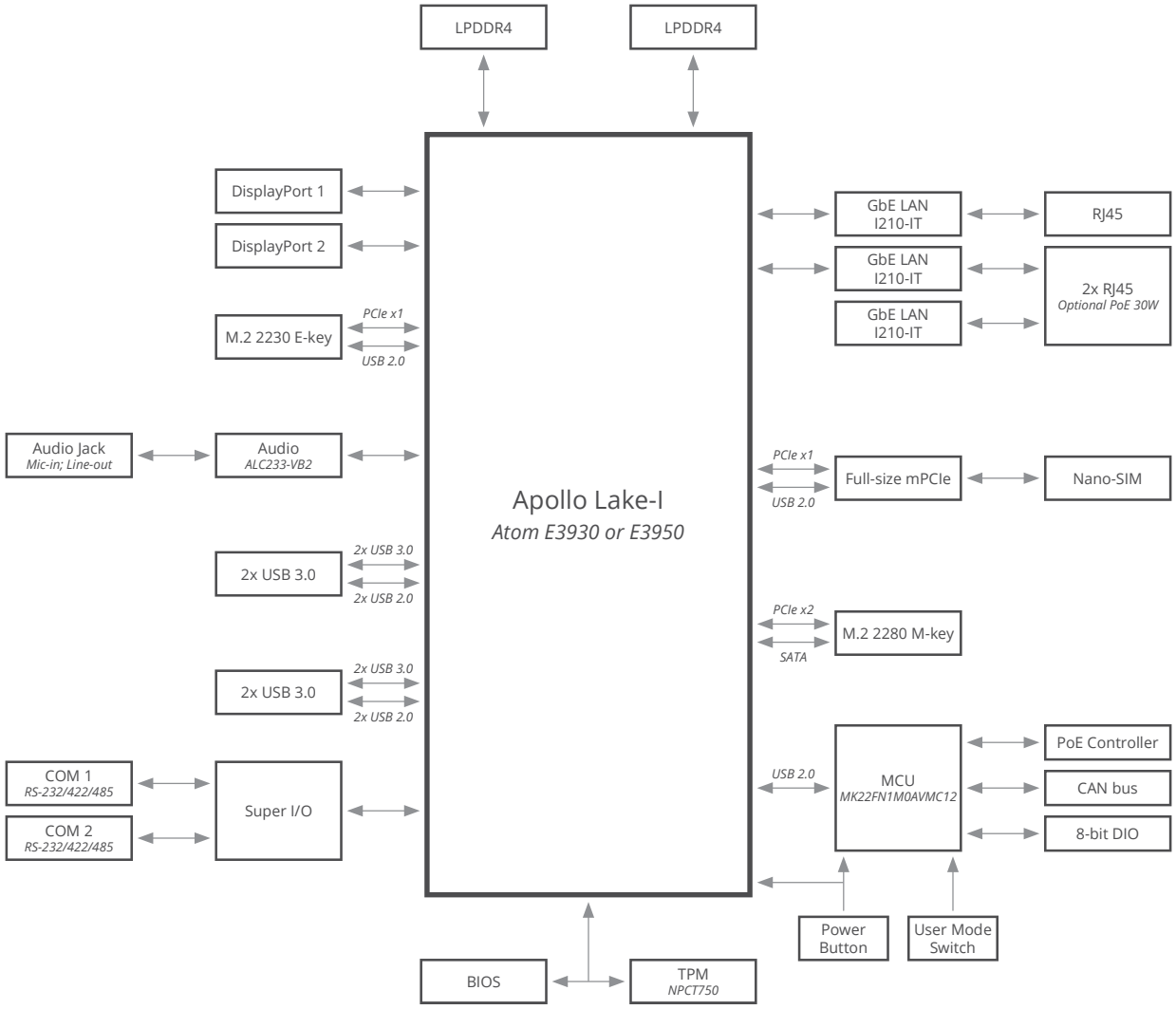
TOP



BOTTOM

1.6 - Motherboard Overview

1.6.1 - System Block Diagram



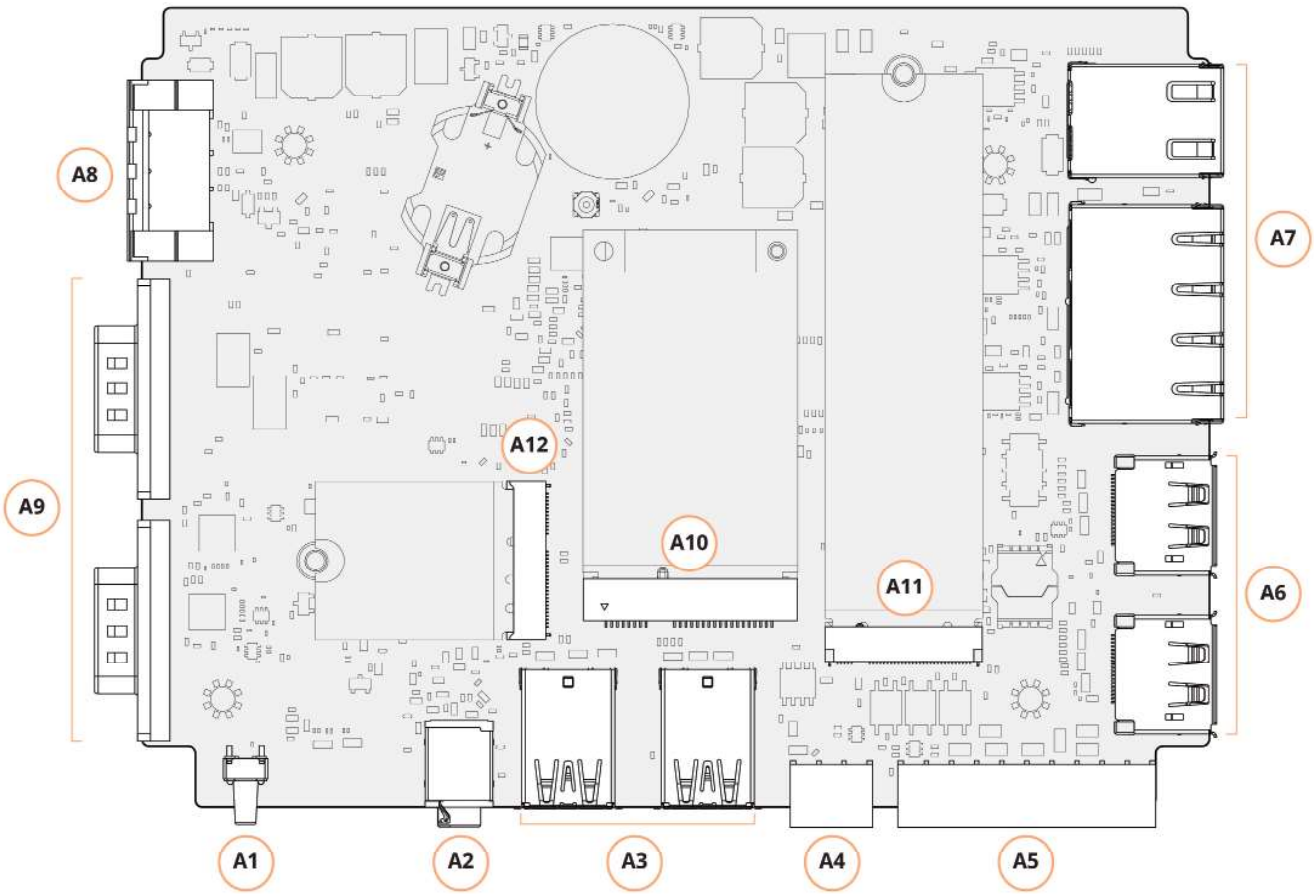
1.6.2 - Memory Specification

System	Memory	Manufacturer	Part Number	Quantity	Total Capacity
K300-E3930-4-P	LPDDR4	Samsung	K4F6E304HBMGCJ	2	4 GB
K300-E3930-4P-P	LPDDR4	Samsung	K4F6E304HBMGCJ	2	4 GB
K300-E3950-8-P	LPDDR4	Samsung	K4FBE3D4HMMGCJ	2	8 GB
K300-E3950-8P-P	LPDDR4	Samsung	K4FBE3D4HMMGCJ	2	8 GB

Karbon 300 system memory is soldered on the motherboard. Onboard memory for all K300 models is dual-channel LPDDR4. Manufacturer and part numbers are subject to change, so please check the system pages for updates.

1.6.3 - Motherboard Features

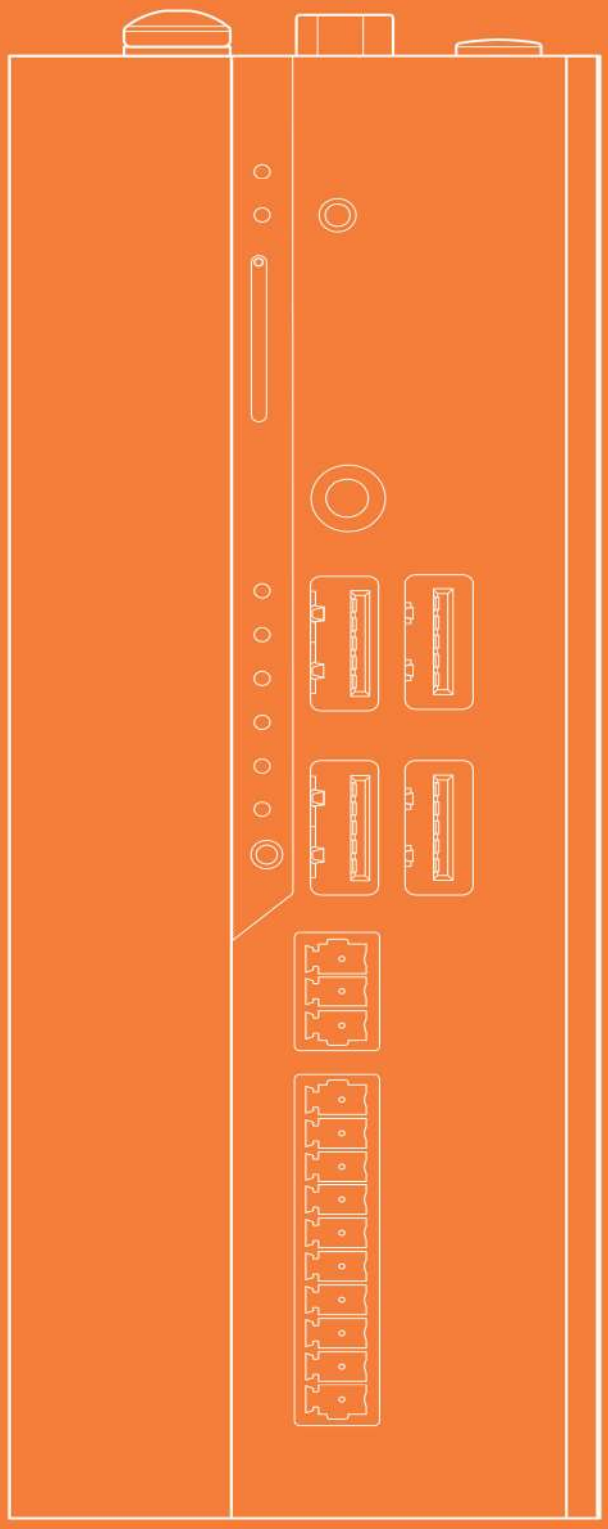
Back



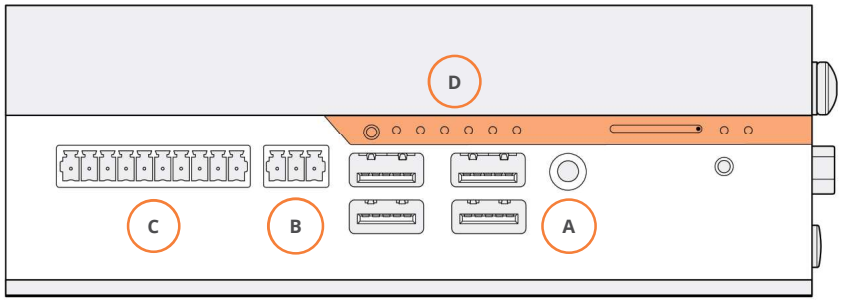
Front

Item	Function Description
A1	Power button
A2	3.5 mm Audio jack
A3	4 x USB 3.0 Type A ports
A4	3-pin CAN bus
A5	8-bit isolated DIO (10-pin)
A6	2 x Full-size DisplayPort
A7	1 x RJ45 GbE LAN port
	2 x RJ45 GbE LAN ports with optional PoE (30W total)
A8	3-pin power input (9~36 VDC)
A9	2 x Serial RS-232/422/485 ports
A10	Full-size mPCIe
A11	M.2 2280 M-key for NVMe or SATA storage
A12	M.2 2230 E-key for Wi-Fi or WAN card

2 - Pin Definitions



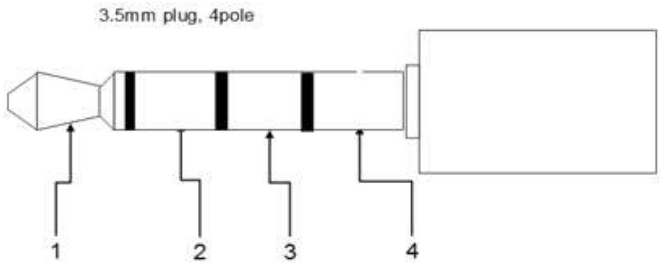
2.1 - External I/O Definitions



Item	Function
A	Audio
B	CAN bus
C	DIO
D	LEDs

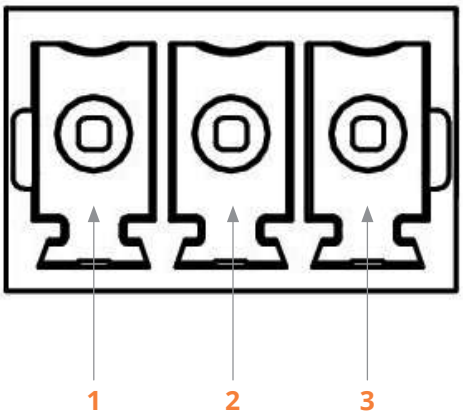
A 2.1.1 - Audio Jack

The 3.5 mm combination audio jack supports audio-out and MIC-in following the CTIA standard.



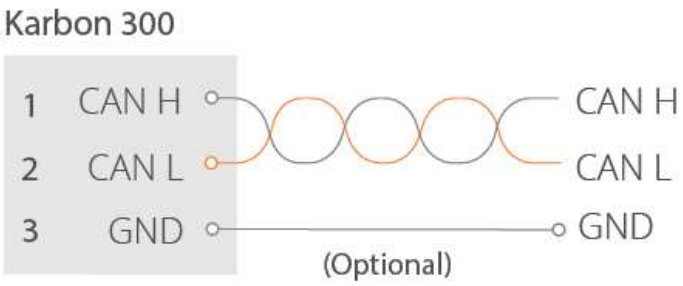
	Description	Peripheral Connection	
		Headset	Headphones
1	Left Audio	Left Audio	Left Audio
2	Right Audio	Right Audio	Right Audio
3	Ground	Ground	Ground
4	Microphone	Microphone	

B 2.1.2 - CAN Bus



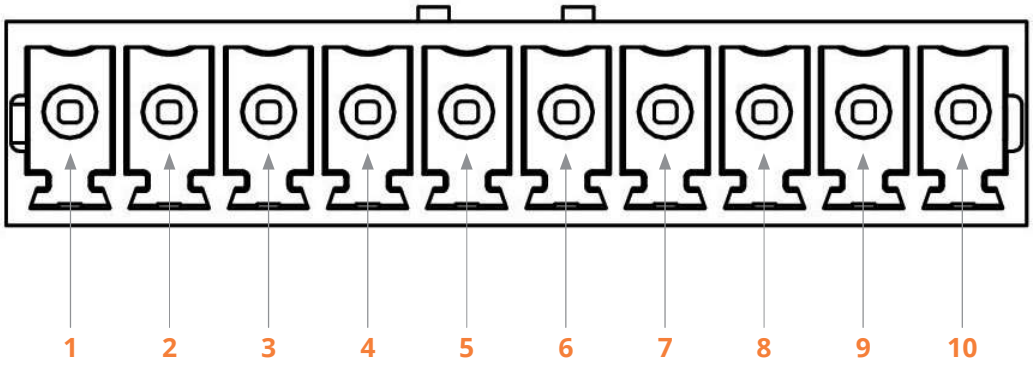
Pin 1	Pin 2	Pin 3
CAN H	CAN L	GND

2.1.2.1 - CAN Bus Circuit Demo



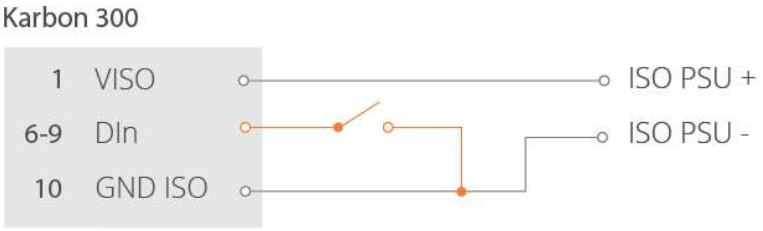
C 2.1.3 - DIO

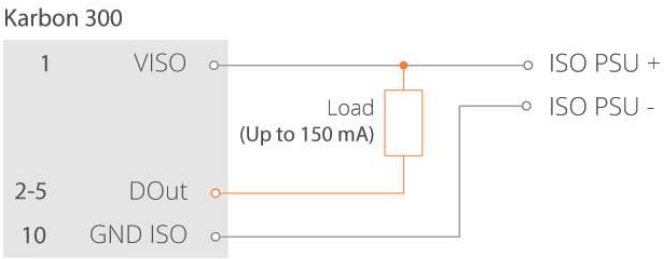
The Karbon 300 DIO terminals are optically isolated. This means that the terminal is separated from other motherboard features for protection. In addition, the DIO requires external power from a 9-36VDC source through Pin 1 to function.

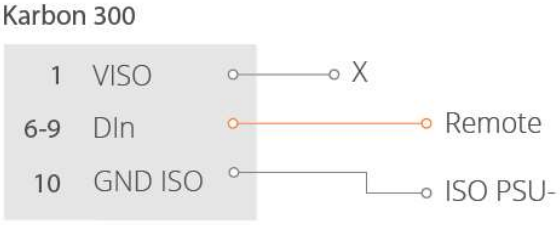


Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9	Pin 10
Power	Out 1	Out 2	Out 3	Out 4	In 1	In 2	In 3	In 4	GND

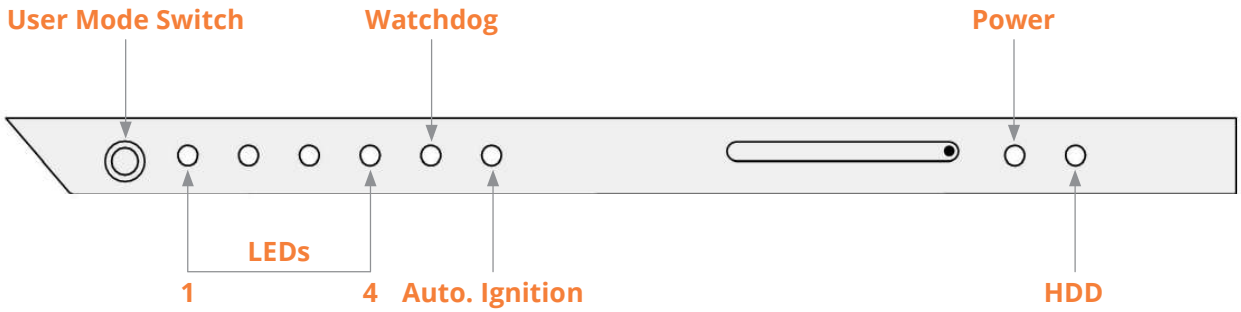
2.1.3.1 - DIO Circuit Demo





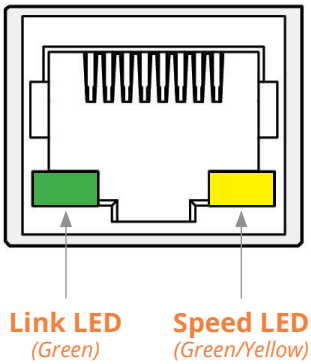


D 2.1.4 - LEDs



LED	On	Off	Blink	Pulse
HDD	-	-	Internal solid state drive activity	-
Power	Device is on	Device is on	Device is asleep	-
Automotive Ignition	Ignition input to device is on	Ignition input to device is on	-	-
Watchdog	Internal MCU is not functioning normally	Internal MCU is not functioning normally	Firmware bootloader is active	Internal MCU is functioning normally
LEDs 1~4	Currently selected user mode	Currently selected user mode	-	-

2.1.5 - LAN

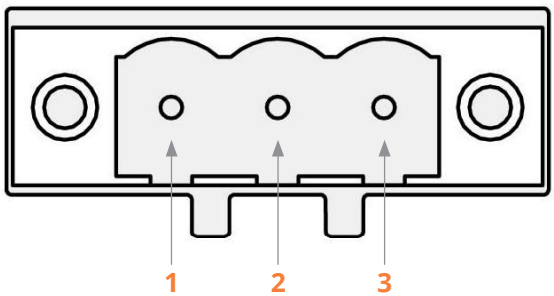


LED	Color	State	Condition
Link	-	Off	LAN link is not established
	Green	On	LAN link is established
		Blinking	LAN activity occurring
Speed	-	Off	10 Mb/s data rate
	Green	On	100 Mb/s data rate
	Yellow	On	1000 Mb/s data rate

The dual LAN ports on Karbon 300 are PoE enabled for models K300-E3930-4P-P and K300-E3950-8P-P. When PoE is disabled the LAN ports function as standard GbE ports. The single LAN ports on all Karbon 300 models are standard GbE ports.

2.1.6 - Automotive Ignition Power Sensing (IGN)

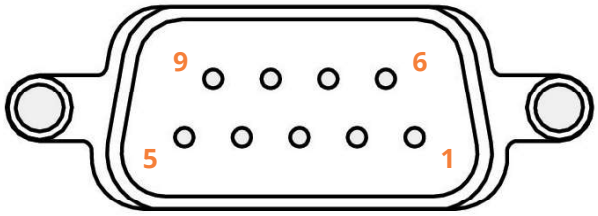
Automotive ignition power sensing timing settings can be modified through Logic Supply's microcontroller (LS MCU). Please refer to Section 5 for setup instructions.



Pin	Definition
1	GND
2	Ignition
3	9~36 VDC input

2.1.7 - Serial Port

The serial port mode on Karbon 300 can be selected in the BIOS configuration. The serial ports support RS-232, RS-422, and RS-485 configurations. Refer to Section 4 for BIOS configuration instructions.



RS-232 Pin Definitions

Pin	Name	Signal
1	DCD	Data Carrier Detect
2	RX	Data Recieve
3	TX	Data Transmit
4	DTR	Data Terminal Body
5	GND	Ground
6	DSR	Data Set Ready
7	RTS	Request to Send
8	CTS	Clear to Send
9	RI	Ring Indicator

RS-422 Pin Definitions

Pin	Name	Signal
1	TX-	Transmit B
2	TX+	Transmit A
3	RX+	Recieve A
4	RX-	Recieve B
5	NC	No connect
6	NC	No connect
7	NC	No connect
8	NC	No connect
9	NC	No connect

RS-485 Pin Definitions

Pin	Name	Signal
1	TX-/RX-	Transmit/Recieve B
2	TX+/RX+	Transmit/Recieve A
3	NC	Recieve A
4	NC	Recieve B
5	NC	No connect
6	NC	No connect
7	NC	No connect
8	NC	No connect
9	NC	No connect

2.2 - On-Board I/O Definitions

2.2.1 - M.2 2230 E-key Expansion

E-key			
GND	1	2	NC
USB DP	3	4	NC
USB DN	5	6	NC
GND	7	8	NC
NC	9	10	NC
NC	11	12	NC
NC	13	14	NC
NC	15	16	NC
NC	17	18	GND
NC	19	20	Do not connect
NC	21	22	NC
NC	23		
KEY			
		32	NC
GND	33	34	NC
PCIE TXP	35	36	NC
PCIE TXN	37	38	NC
GND	39	40	NC
PCIE RXP	41	42	NC
PCIE RXN	43	44	NC
GND	45	46	NC
PCIE CLKP	47	48	NC
PCIE CLKN	49	50	SUSCLK
GND	51	52	PCIE RST#
PCIE CLKREQ#	53	54	WDISABLE2#
PCIE WAKE1#	55	56	WDISABLE1#
GND	57	58	SMB DATA
NC	59	60	SMB CLK
NC	61	62	NC
GND	63	64	NC
NC	65	66	NC
NC	67	68	NC
GND	69	70	NC
NC	71	72	3.3 V
NC	73	74	3.3 V
GND	75		

NC = Not Connected

2.2.2 - M.2 2280 M-key Expansion

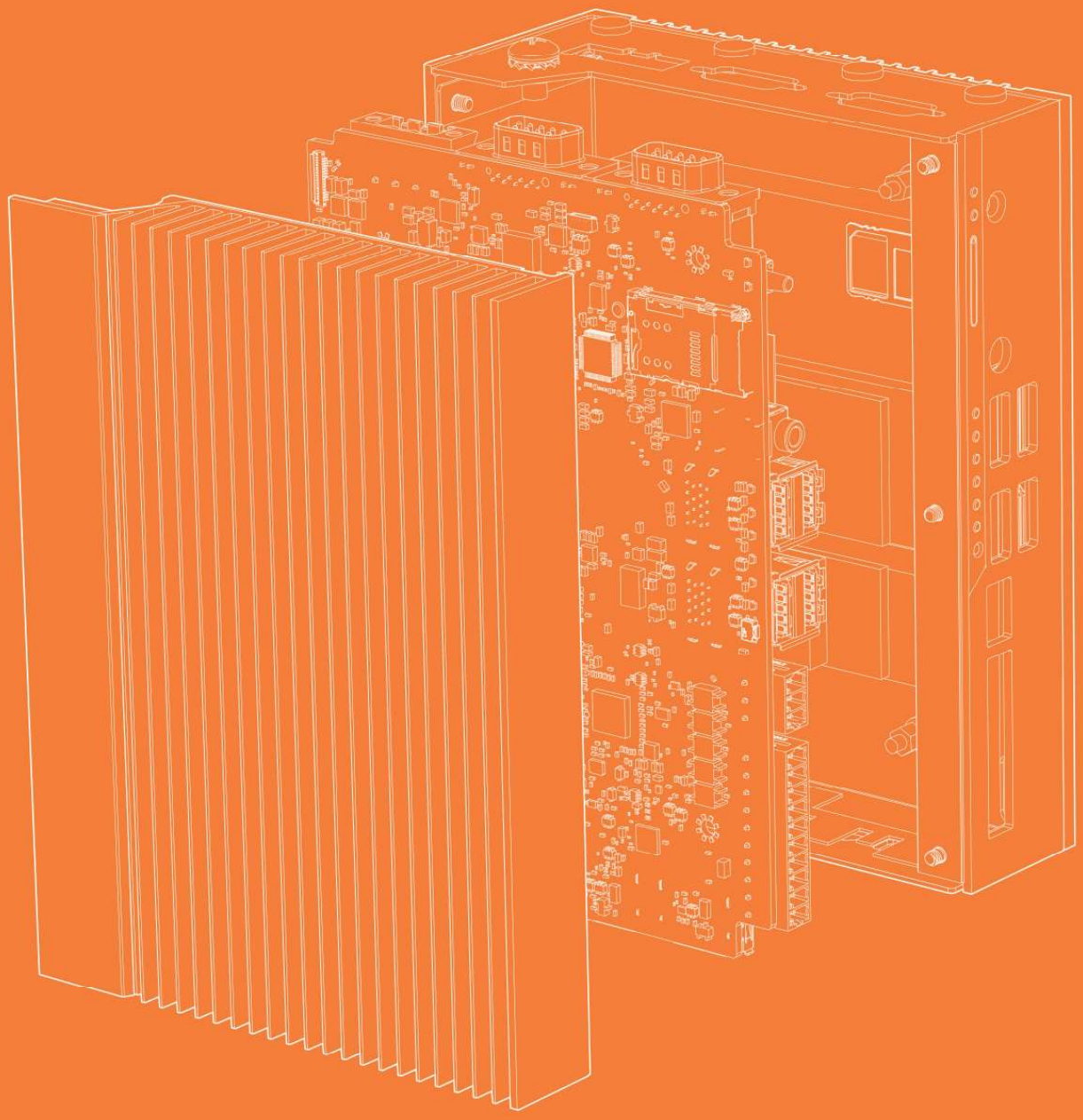
M-key			
GND	1	2	3.3 V
GND	3	4	3.3 V
USB DP	5	6	NC
USB DN	7	8	NC
GND	9	10	HDD LED
NC	11	12	3.3 V
NC	13	14	3.3 V
GND	15	16	3.3 V
NC	17	18	3.3 V
NC	19	20	NC
GND	21	22	NC
NC	23	24	NC
NC	25	26	NC
GND	27	28	NC
PCIE RX1N	29	30	NC
PCIE RX1P	31	32	NC
GND	33	34	NC
PCIE TX1N	35	36	NC
PCIE TX1P	37	38	DEVSLP
GND	39	40	NC
PCIE RX0N / SATA RXP	41	42	NC
PCIE RX0P / SATA RXN	43	44	NC
GND	45	46	NC
PCIE TX0N / SATA TXP	47	48	NC
PCIE TX0P / SATA TXN	49	50	PCIE RST#
GND	51	52	PCIE CLKREQ#
PCIE CLKN	53	54	NC
PCIE CLKP	55	56	NC
GND	57	58	NC
KEY			
NC	67	68	SUSCLK
SATA/PCIE DET	69	70	3.3 V
GND	71	72	3.3 V
GND	73	74	3.3 V
GND	75		

NC = Not Connected

2.2.3 - mPCIe Expansion

mPCIe			
NC	1	2	3.3 V
NC	3	4	GND
NC	5	6	NC
NC	7	8	UIM PWR
GND	9	10	UIM DATA
PCIE CLKN	11	12	UIM CLK
PCIE CLKP	13	14	UIM RST#
GND	15	16	UIM VPP
NC	17	18	GND
NC	19	20	NC
GND	21	22	NC
PCIE RXN	23	24	3.3 V
PCIE RXP	25	26	GND
GND	27	28	NC
GND	29	30	SMB CLK
PCIE TXN	31	32	SMB DATA
PCIE TXP	33	34	GND
GND	35	36	NC
GND	37	38	NC
3.3 V	39	40	GND
3.3 V	41	42	NC
GND	43	44	NC
NC	45	46	NC
NC	47	48	NC
NC	49	50	GND
NC	51	52	3.3 V

3 - Installation



Before starting installation:

- Read and understand the installation precautions listed in the “Pre-Installation Precautions” section.
- Refer to the drawings and specifications in this chapter for:
  - Using available screw hole positions
  - Installing modules in the expansion slots (M.2 and mPCIe slots)

3.1 - Pre-Installation Precautions

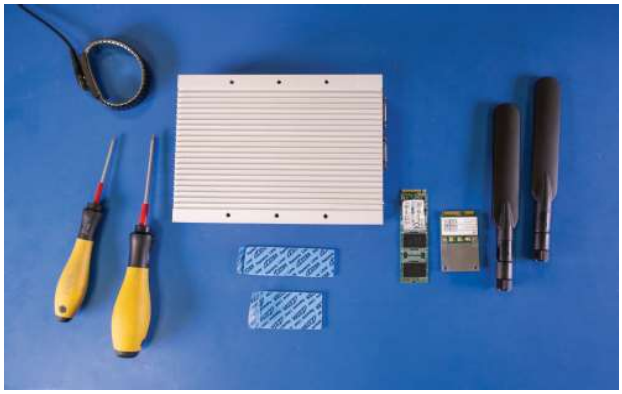
Read the following precautions before installing expansion cards into the motherboard:

- 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

3.2 - M.2 or mPCIe Expansion Installation

To add M.2 or mPCIe expansion cards, including Wi-Fi, to the Karbon 300, follow this procedure:

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



2. Remove the four screws from the front of the case. Retain screws.

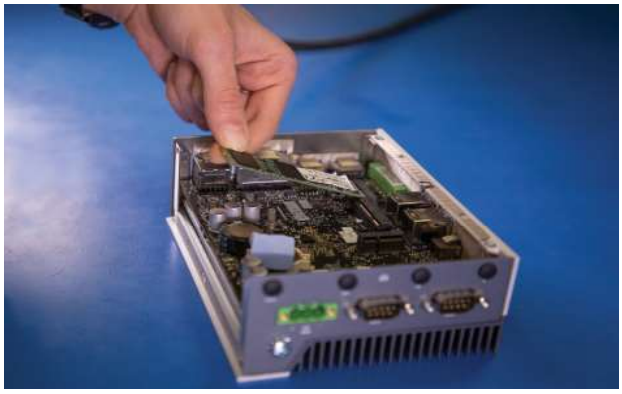
3. Remove the cover of the unit by sliding it toward the rear.

4. Unscrew the screw on the standoff for the card length required. Retain screw.

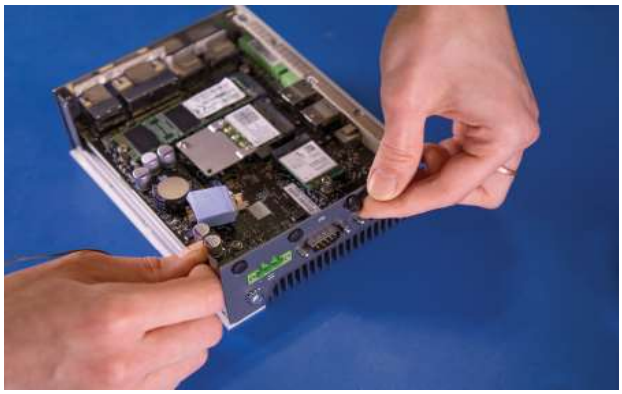
5. Insert card at a 45 degree angle into the mPCIe or M.2 slots until it snaps in.

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

7. Install additional expansion cards as needed following the same instructions as above.

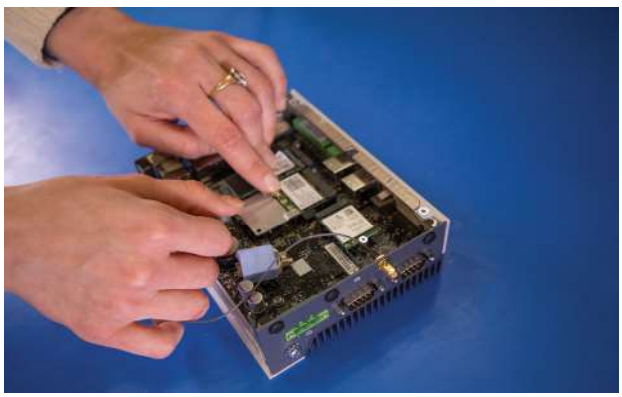


8. To install antennas for Wi-Fi or 4G remove rubber port blockers to install SMA connector through antenna holes.



9. Remove nut first and line up the key. Install nut on the outside to hold connector in place.

10. Connect the ends of the pigtail connectors to the gold pins on the Wi-Fi or 4G card.



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

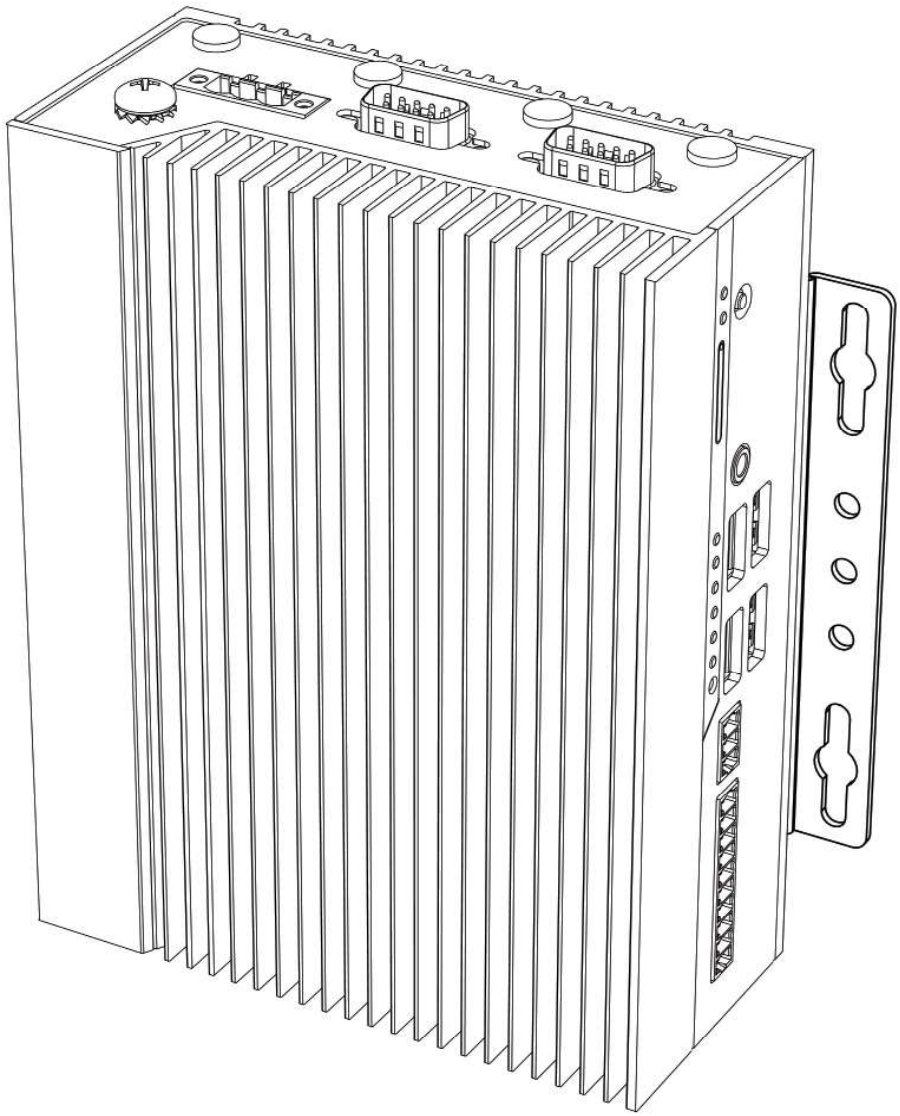
12. Install cover onto the unit using retained screws.

13. Install antennas onto exposed SMA connectors.

3.3 - Mounting Information

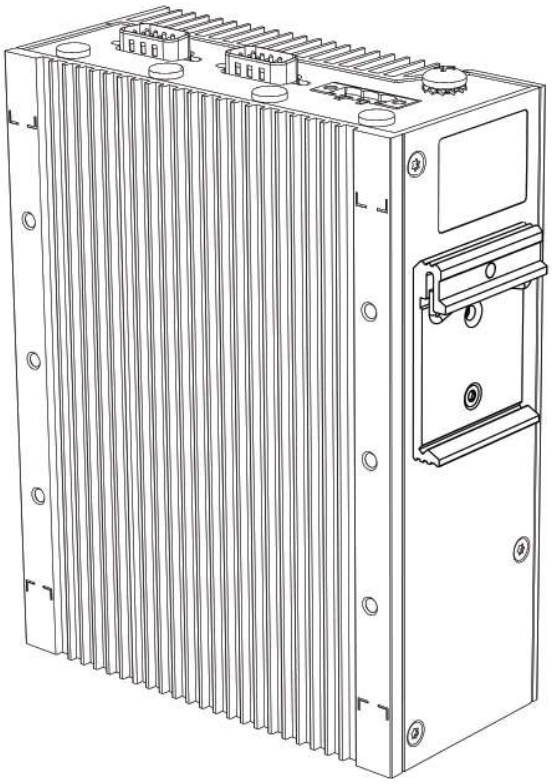
3.3.1 - Wall Mounting

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

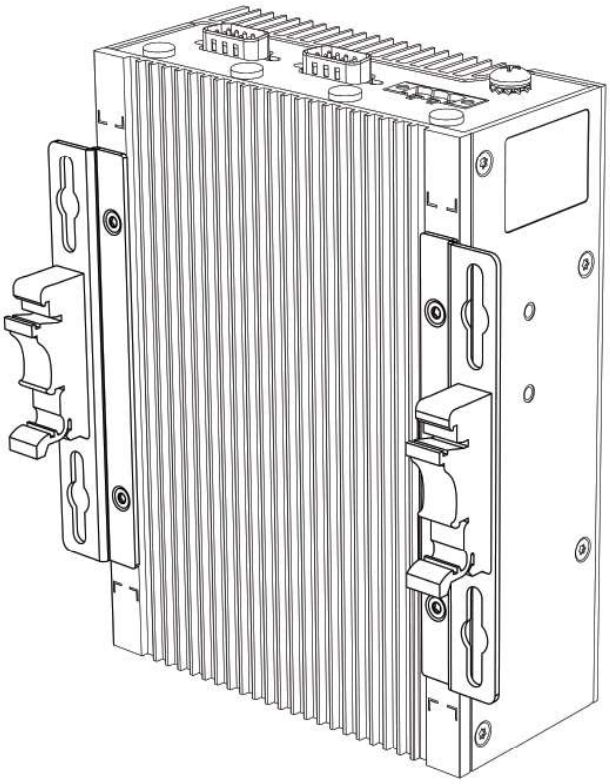


3.3.2 - DIN Rail Mounting

Step 1: Attach wall mounting brackets to the chassis
Step 2: Attach DIN Rail mounting brackets to the chassis
Step 3: Clip system to the DIN Rail



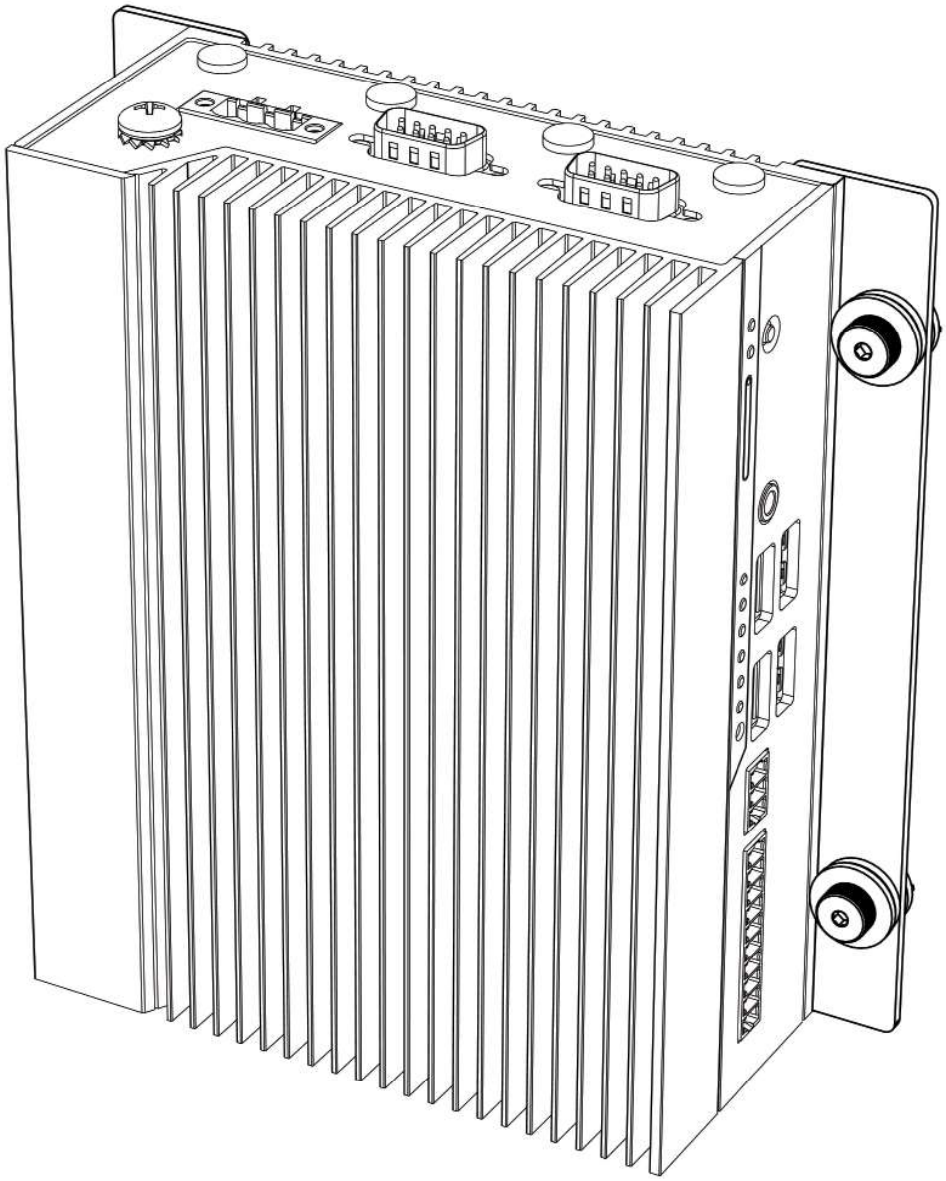
DIN Rail Edge Mounting



DIN Rail Back Mounting

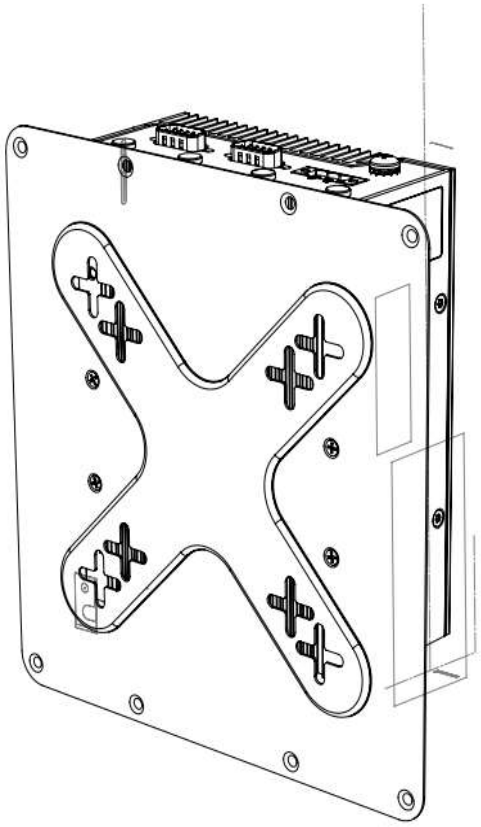
3.3.3 - Wall (Shock and Vibration) Mounting

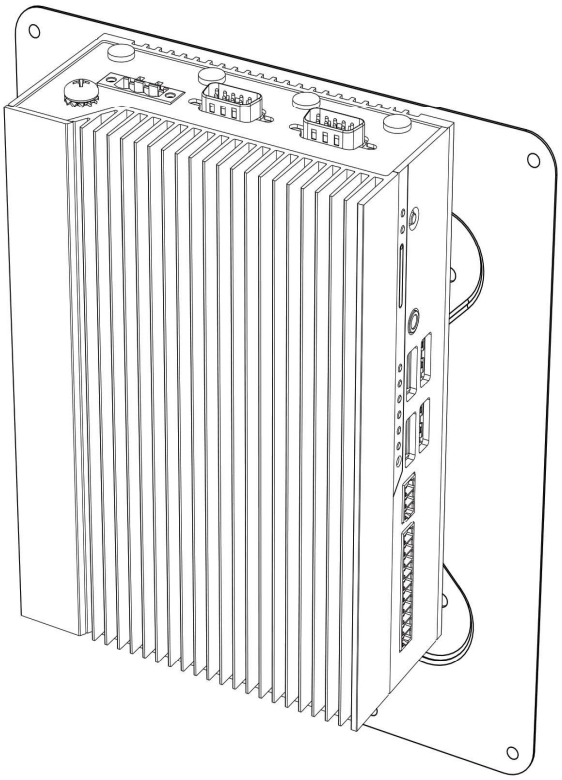
Step 1: Attach wall mounting brackets to the chassis
Step 2: Mark and prep holes in surface for mounting
Step 3: Fasten system to surface



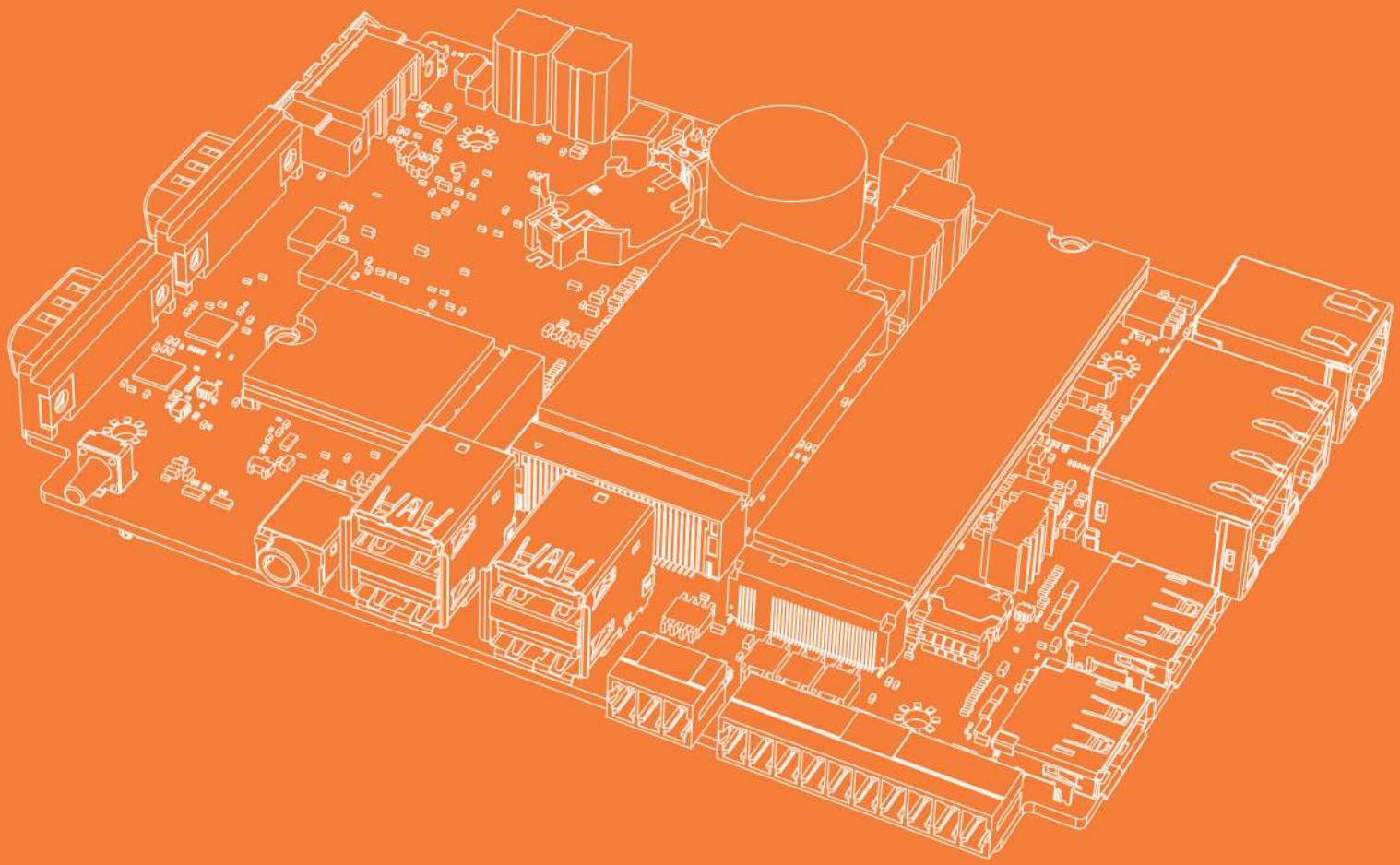
3.3.4 - VESA Mounting

Step 1: Install four VESA screws into the display/surface
Step 2: Attach VESA bracket to the chassis
Step 3: Hang combined system and bracket to the display/surface





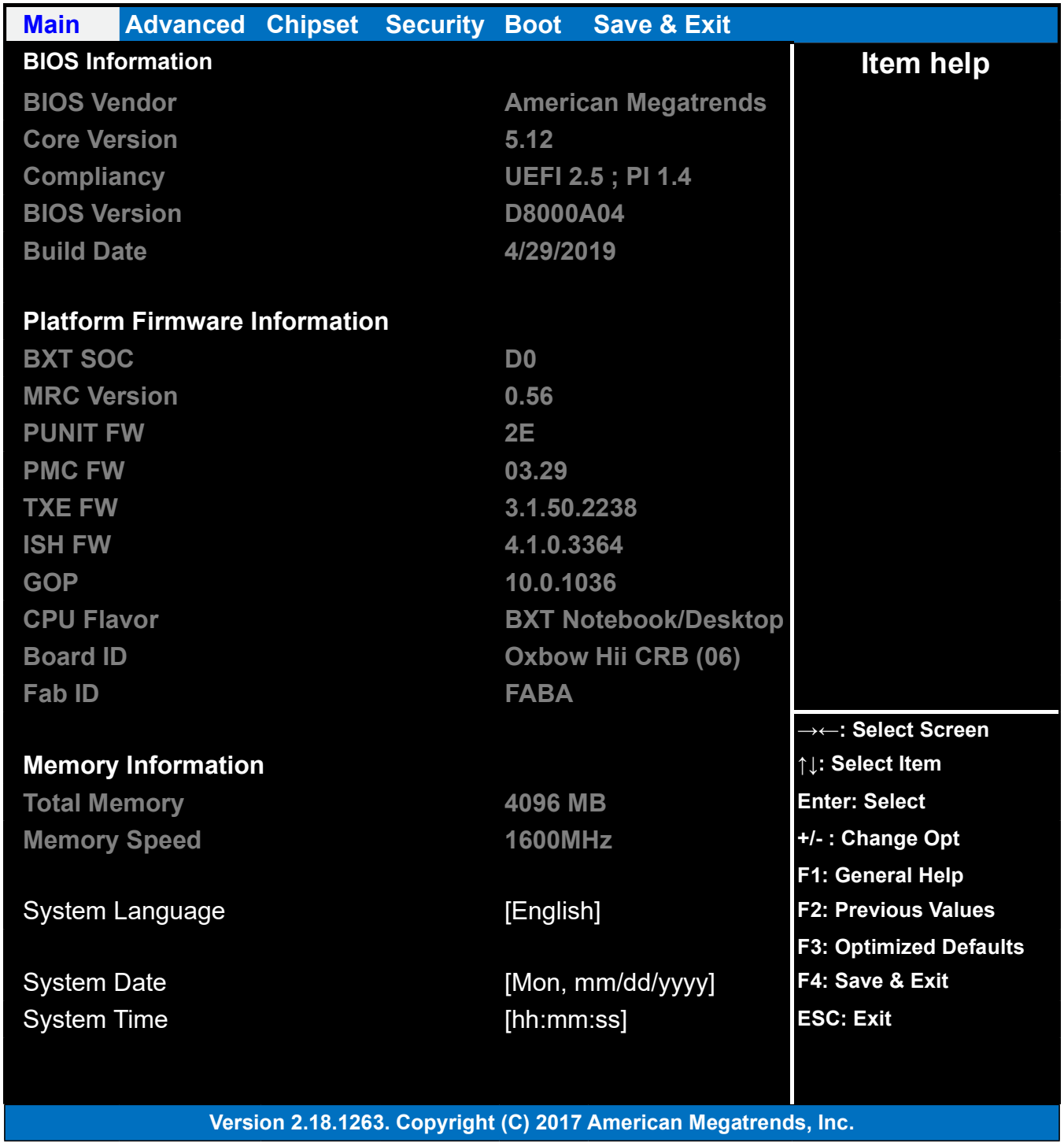
4 - BIOS Setup



4.1 - UEFI Overview

The following section describes the Karbon 300 UEFI. It shows each screen menu with a table describing the various fields and values. To enter UEFI setup hold the ESC key during boot.

4.2 - Main Page



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.

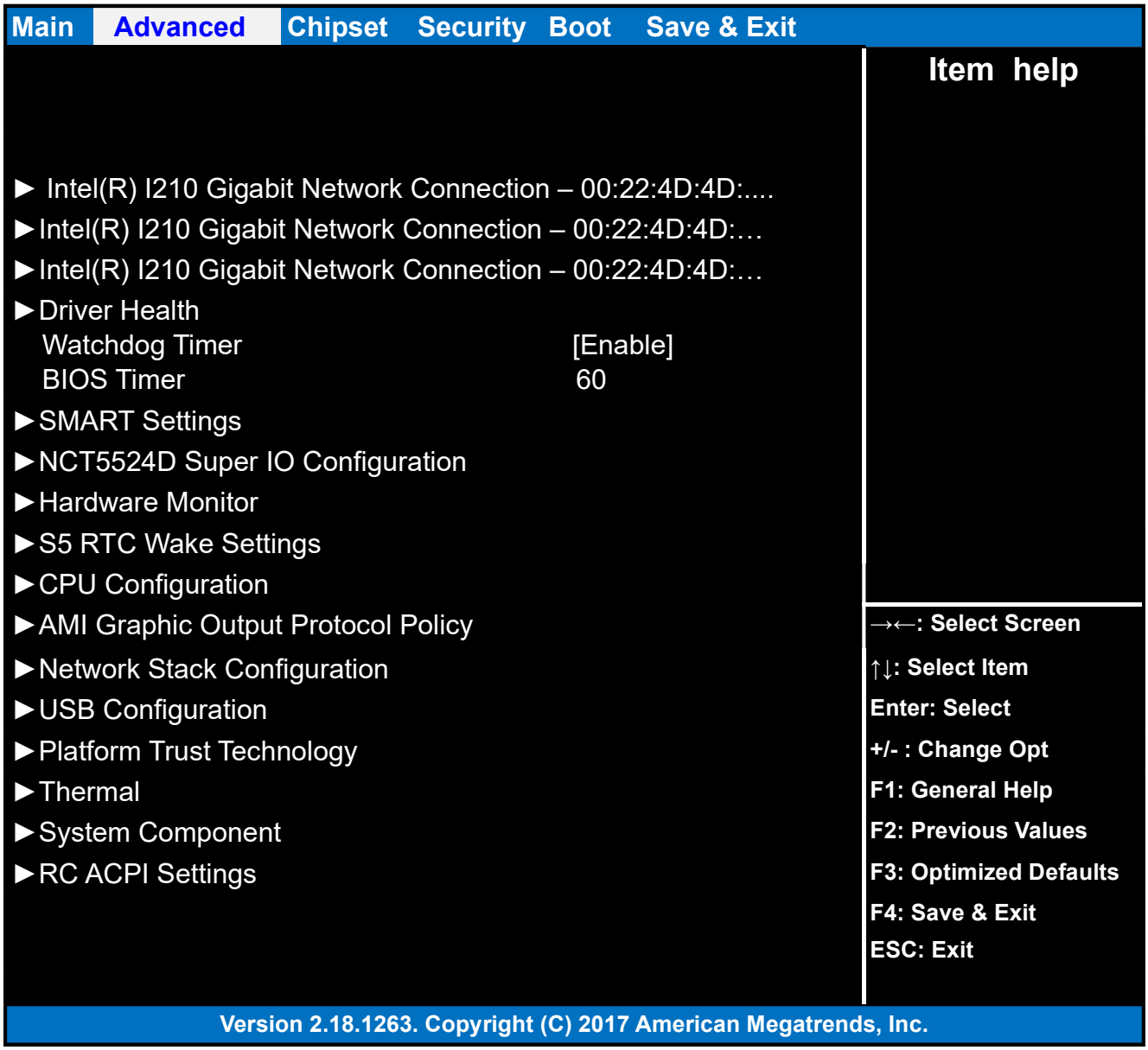
Field Name	Memory Speed
Value	Display the installed memory speed.
Comment	This field is not selectable. There is no help text associated with it.

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. Default Ranges: Year: 2005 - 2099 Months: 1-12 Days: dependant on month

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

4.3 - Advanced Page



Field Name	Watchdog Timer
Default Value	[Enabled]
Possible Value	Disabled/Enabled
Help	Disabled: disable TCO watchdog timer, halt timer count: no reset will occur, enabled: enable TCO watchdog timer, start timer count.

Field Name	BIOSTimer
Default Value	60
Possible Value	30~255
Help	Set BIOS watchdog timer.

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.

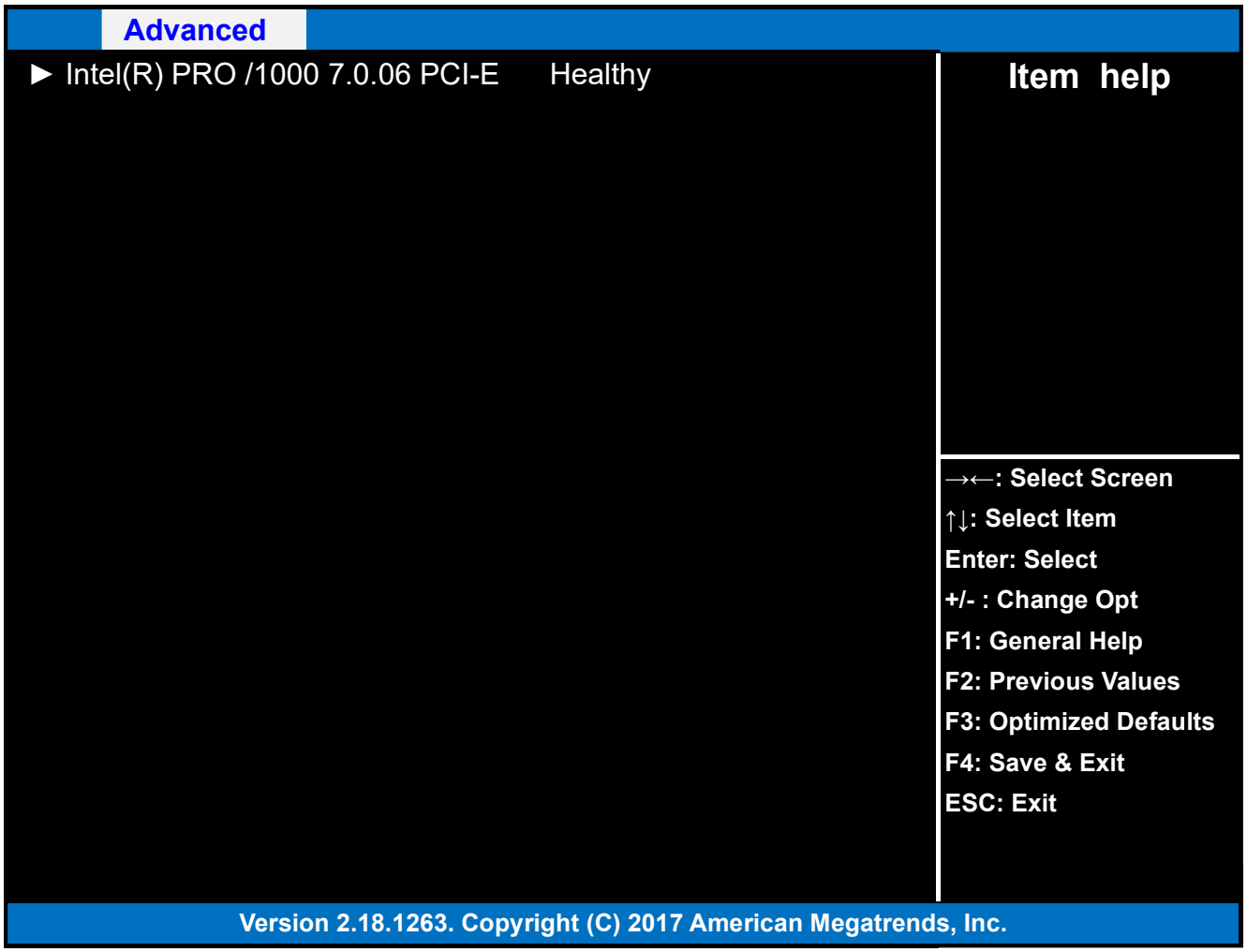
Field Name	Platform Trust Technology
Help	Platform Trust Technology
Comment	Press Enter when selected to go into the associated Sub-Menu.

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.

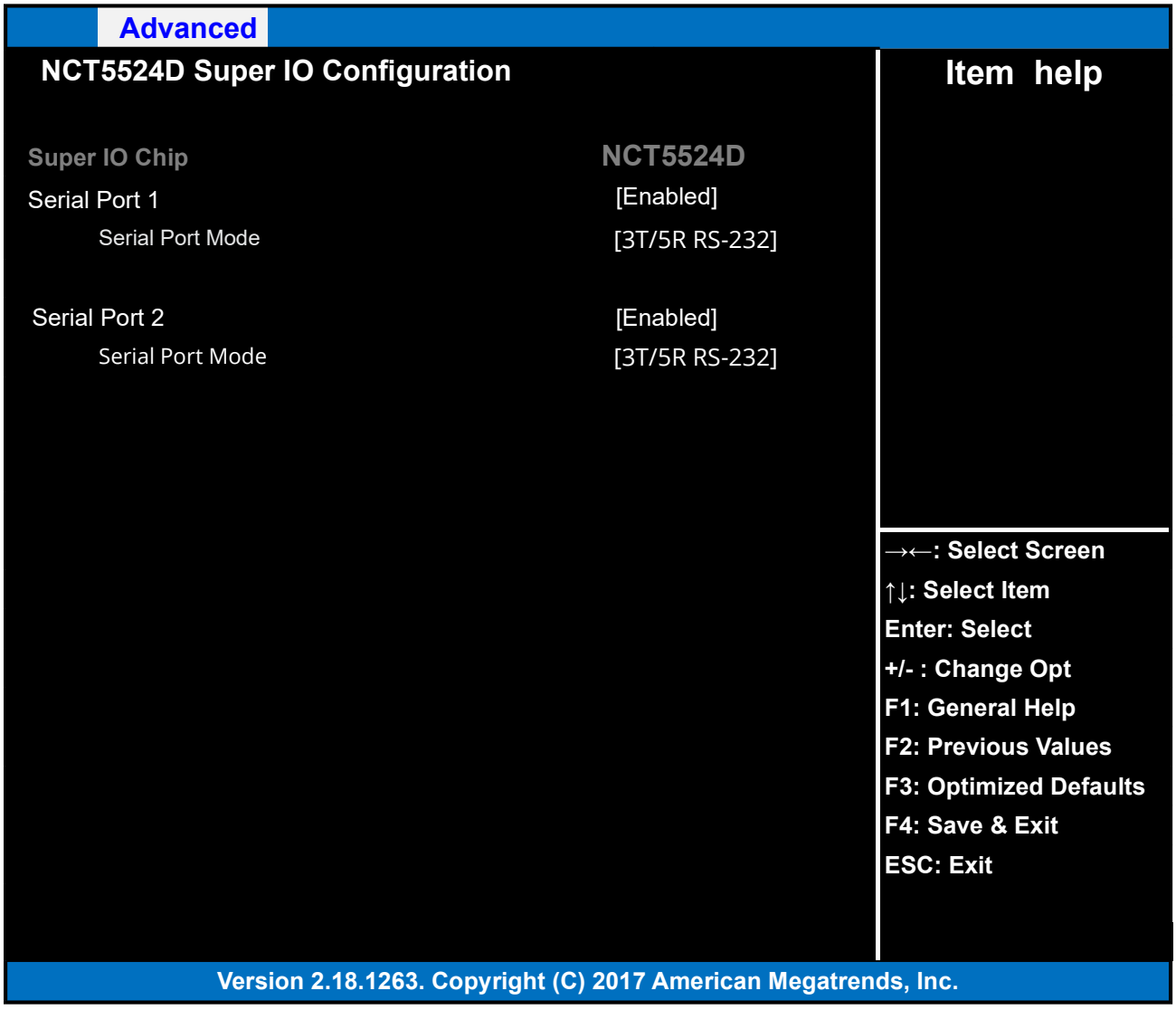
Field Name	RC ACPI Settings
Help	RC ACPI Settings
Comment	Press Enter when selected to go into the associated Sub-Menu.

4.3.1 - Driver Health



Field Name	Intel(R) PRO/1000 7.0.06 PCI-E
Help	Provides Health Status for the Drivers/Controllers
Comment	Press Enter when selected to go into the associated Sub-Menu.

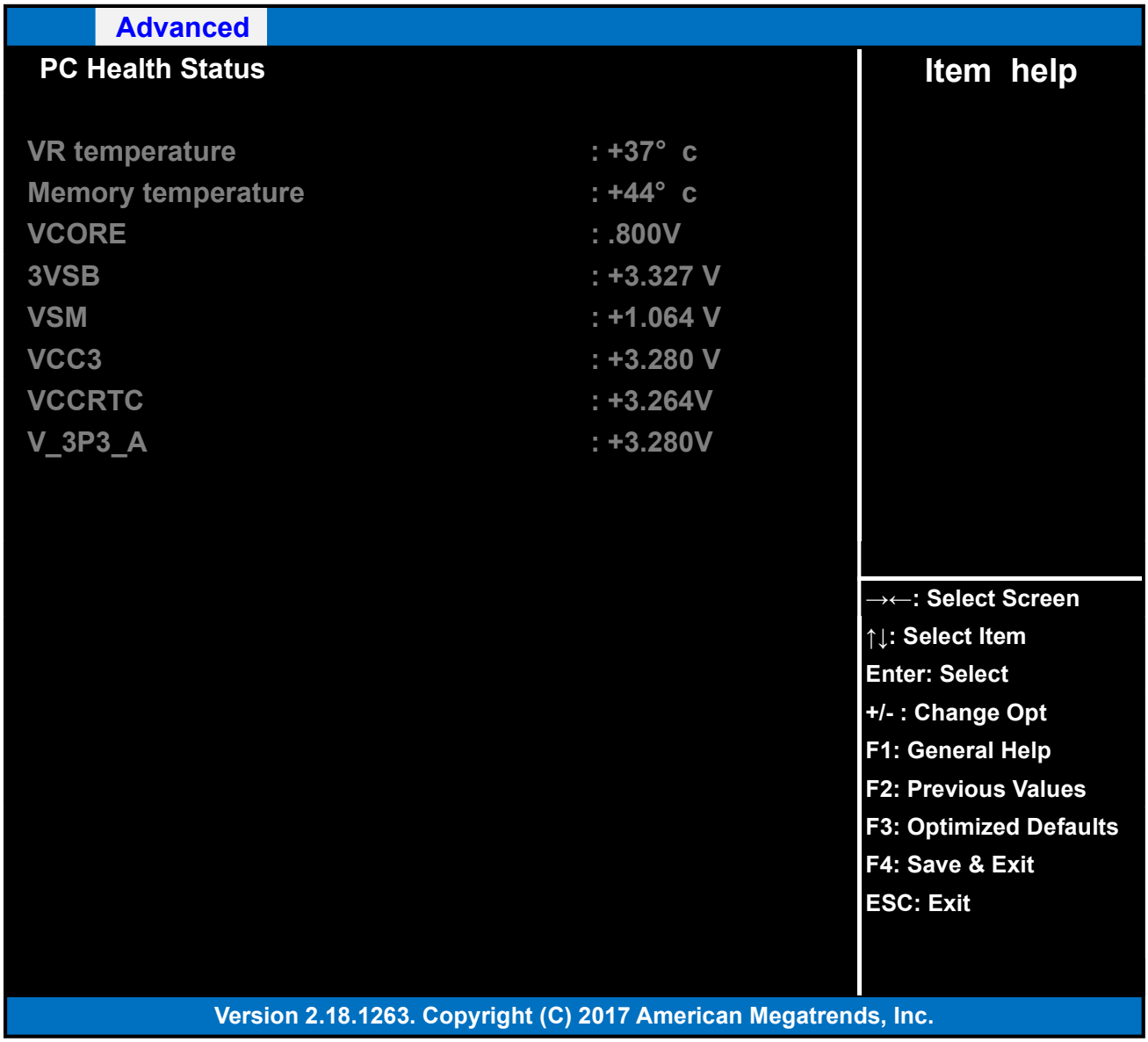
4.3.2 - NCT5524D Super IO Configuration



Field Name	Serial Port 1 & Serial Port 2
Default Value	[Enabled]
Possible Value	Disabled / Enabled
Help	Enable or Disable Serial Port (COM).

Field Name	Serial Port Mode
Default Value	[3T/5R RS-232]
Possible Value	1T/1R RS-422 3T/5R RS-232 1T/1R RS-485 TX ENABLE Low Active 1T/1R RS-485 with termination resistor TX ENABLE Low Active 1T/1R RS-422 with termination resistor Disabled
Help	Select Serial Port Mode

4.3.3 - 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.
Range	-40 - 105 C

Field Name	Memory temperature
Default Value	Display the temperature of the memory
Comment	This field is not selectable. There is no help text associated with it.
Range	-40 - 105 C

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.
Range	.5 - 1.5 V

Field Name	3VSB
Default Value	Display the voltage of the 3VSB.
Comment	This field is not selectable. There is no help text associated with it.
Range	3.135~3.465 V

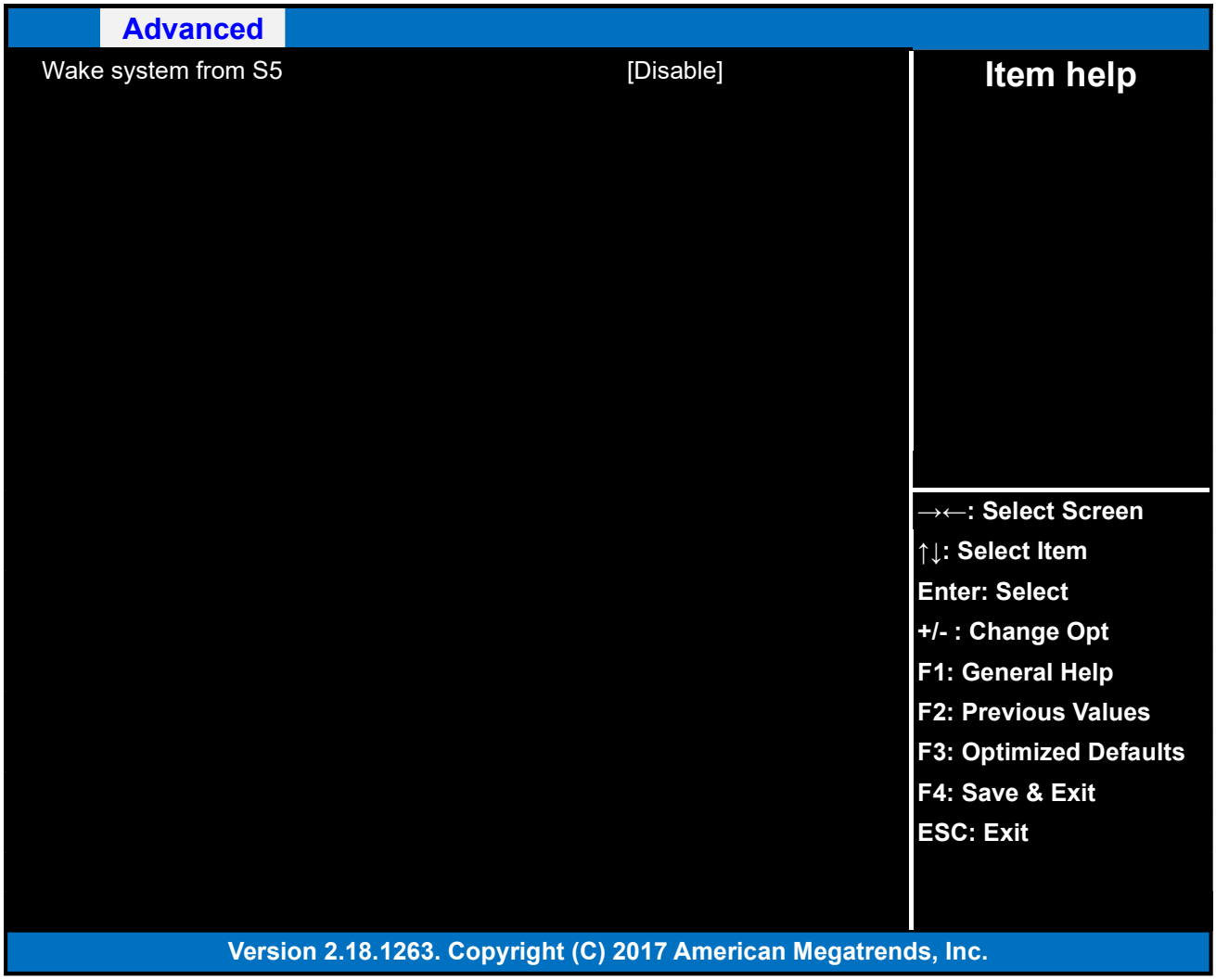
Field Name	VSM
Default Value	Display the voltage of the VSM.
Comment	This field is not selectable. There is no help text associated with it.
Range	1.14~1.26 V

Field Name	VCC3
Default Value	Display the voltage of the VCC3.
Comment	This field is not selectable. There is no help text associated with it.
Range	3.135~3.465 V

Field Name	VCCRTC
Default Value	Display the voltage of the VCCRCT.
Comment	This field is not selectable. There is no help text associated with it.
Range	3.135~3.465 V

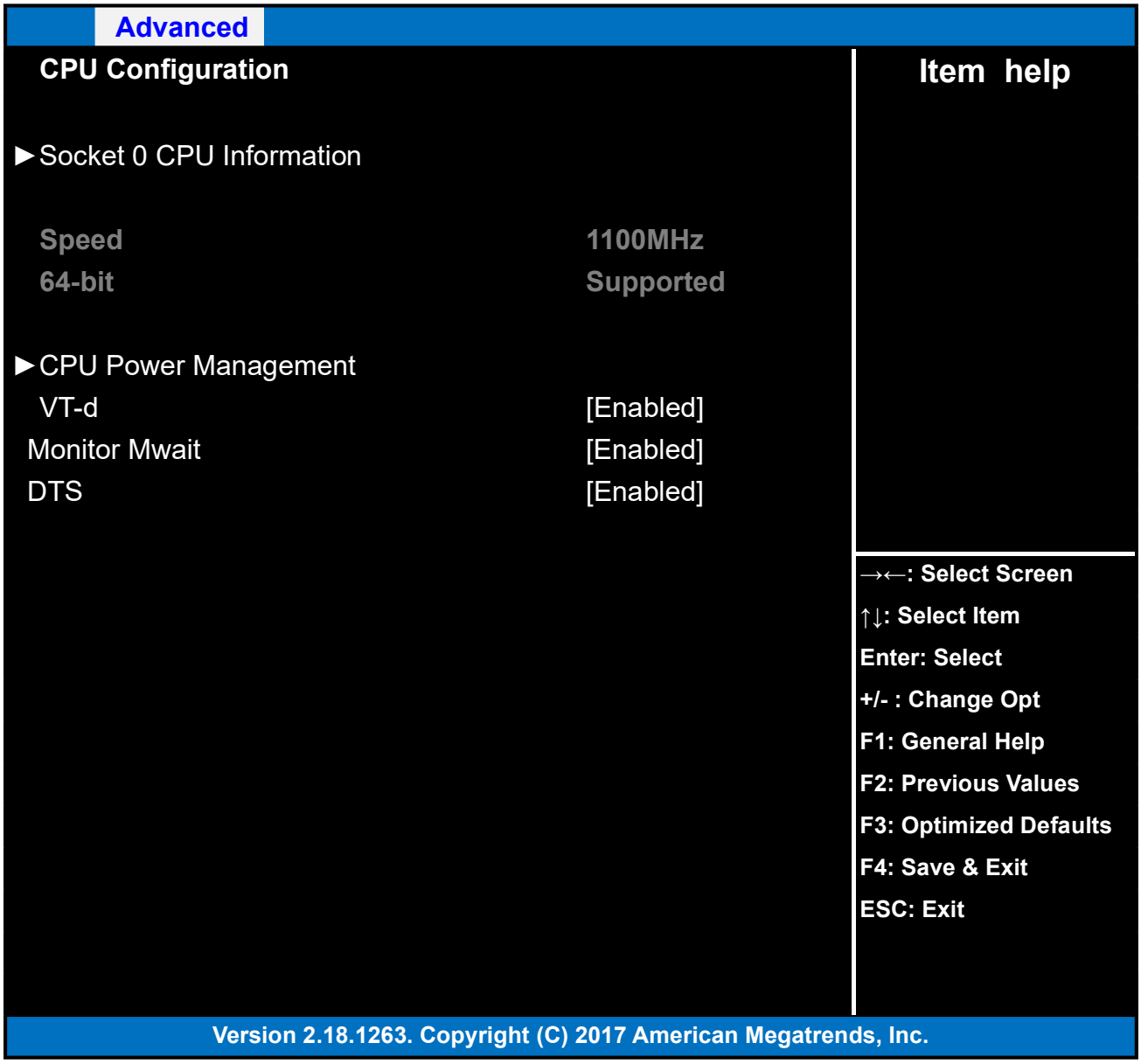
Field Name	V_3P3_A
Default Value	Display the voltage of the V_3P3_A.
Comment	This field is not selectable. There is no help text associated with it.
Range	3.135~3.465 V

4.3.4 - 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).

4.3.5 - 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.

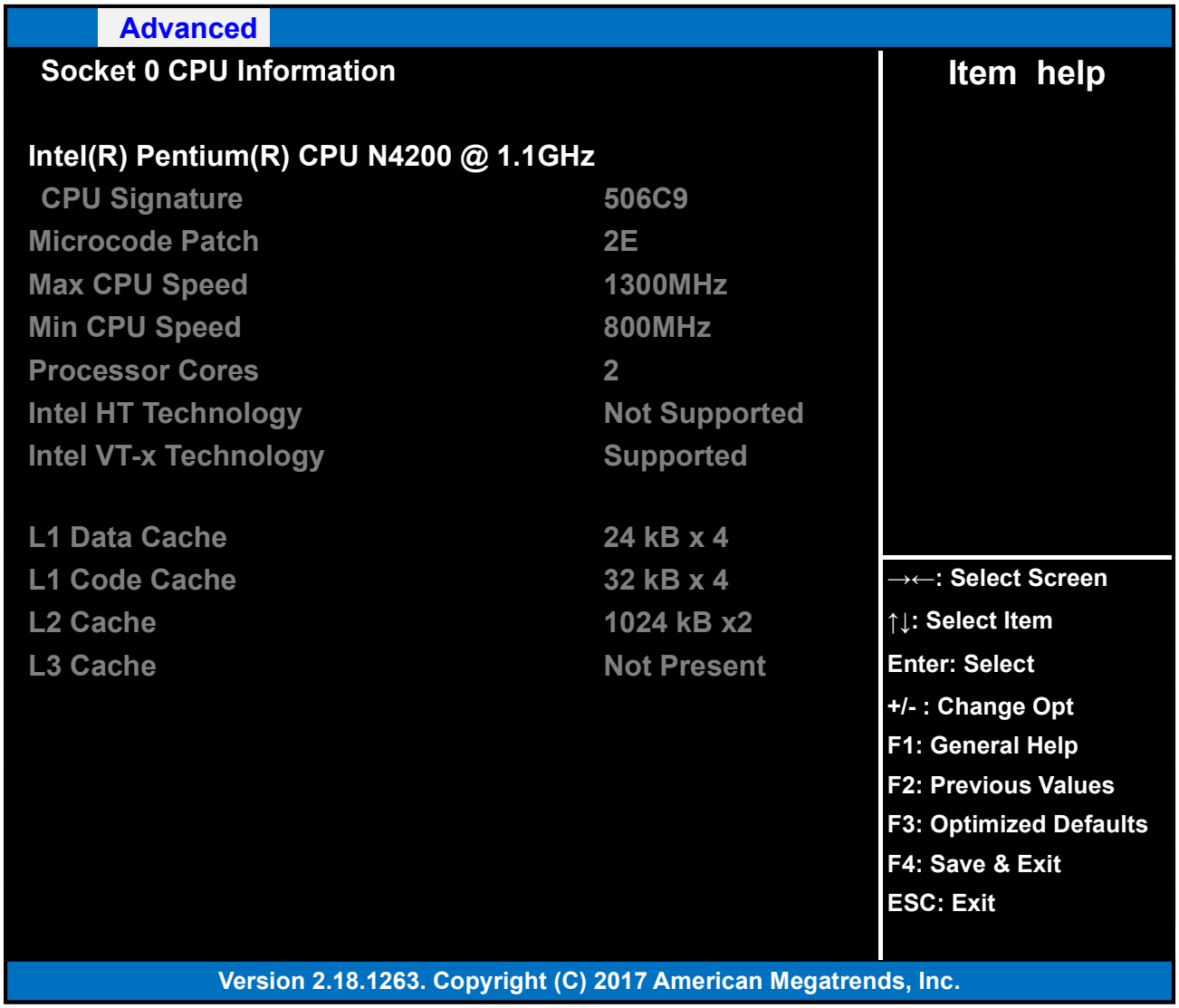
Field Name	CPU Power Management
Help	CPU Power Management options.
Comment	Press Enter when selected to go into the associated Sub-Menu.

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.

4.3.5.1 - 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.

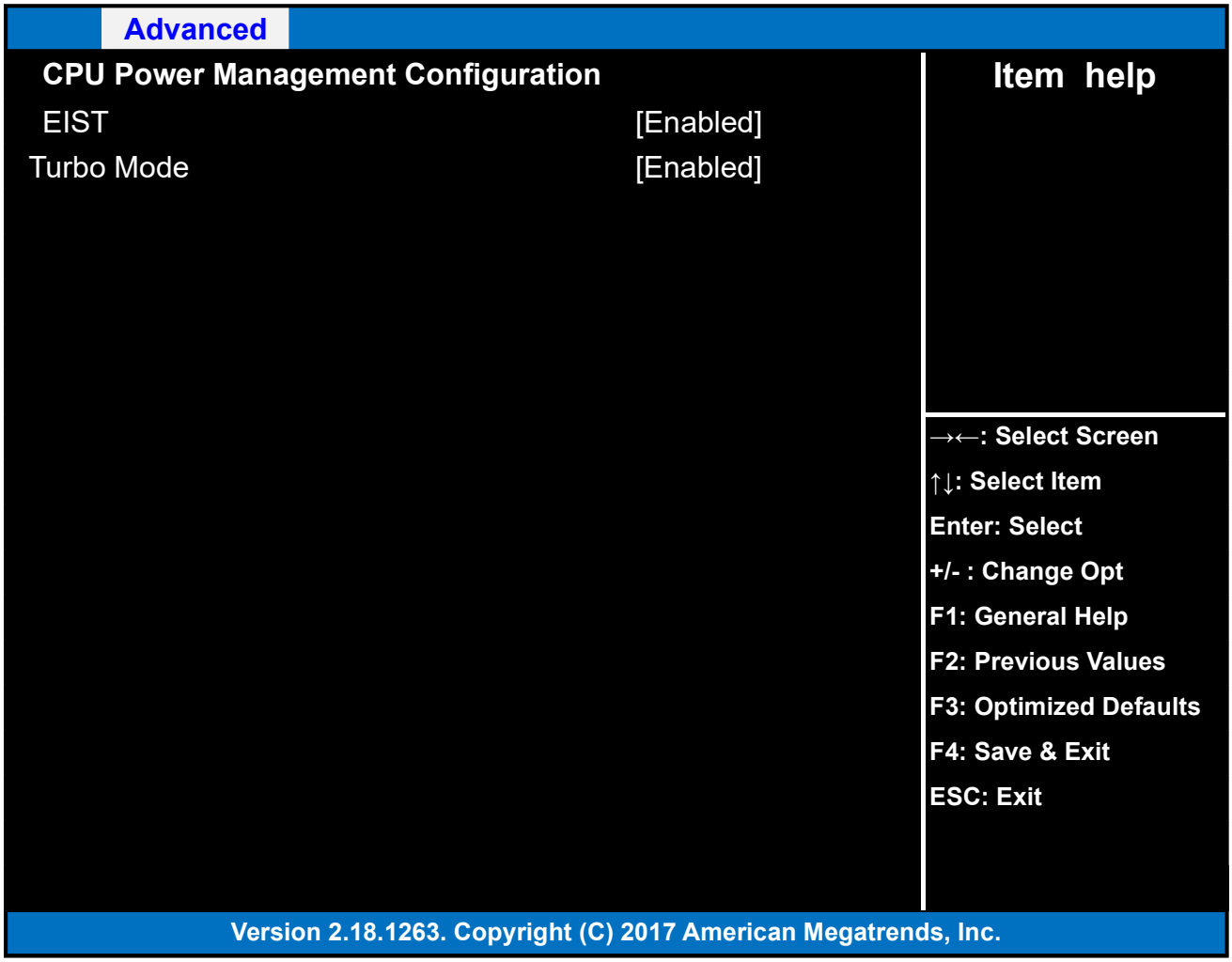
Field Name	L1 Data Cache
Default Value	Display the L1 data cache size.
Comment	This field is not selectable. There is no help text associated with it.

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.

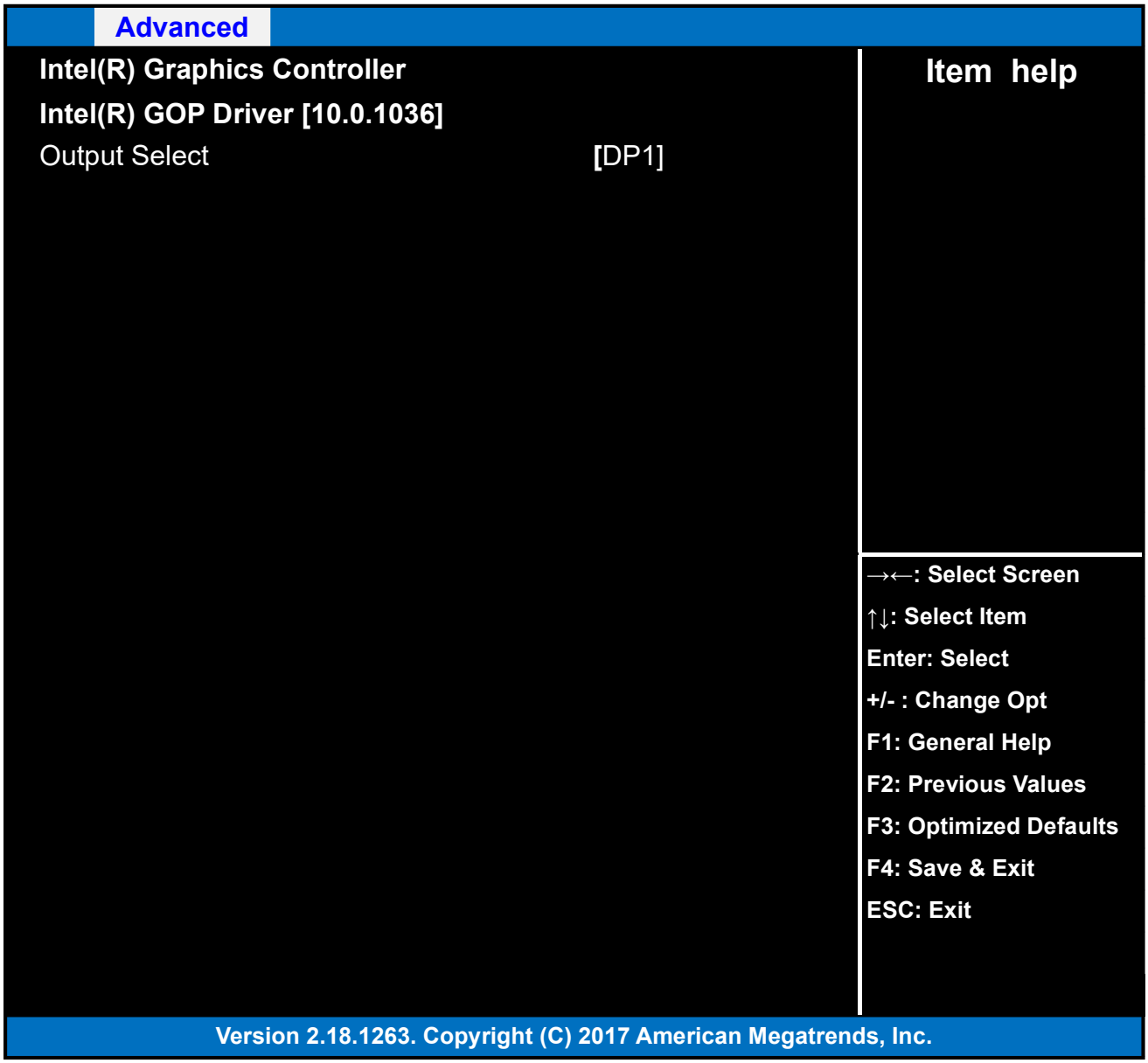
4.3.5.2 - CPU Power Management Configuration



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

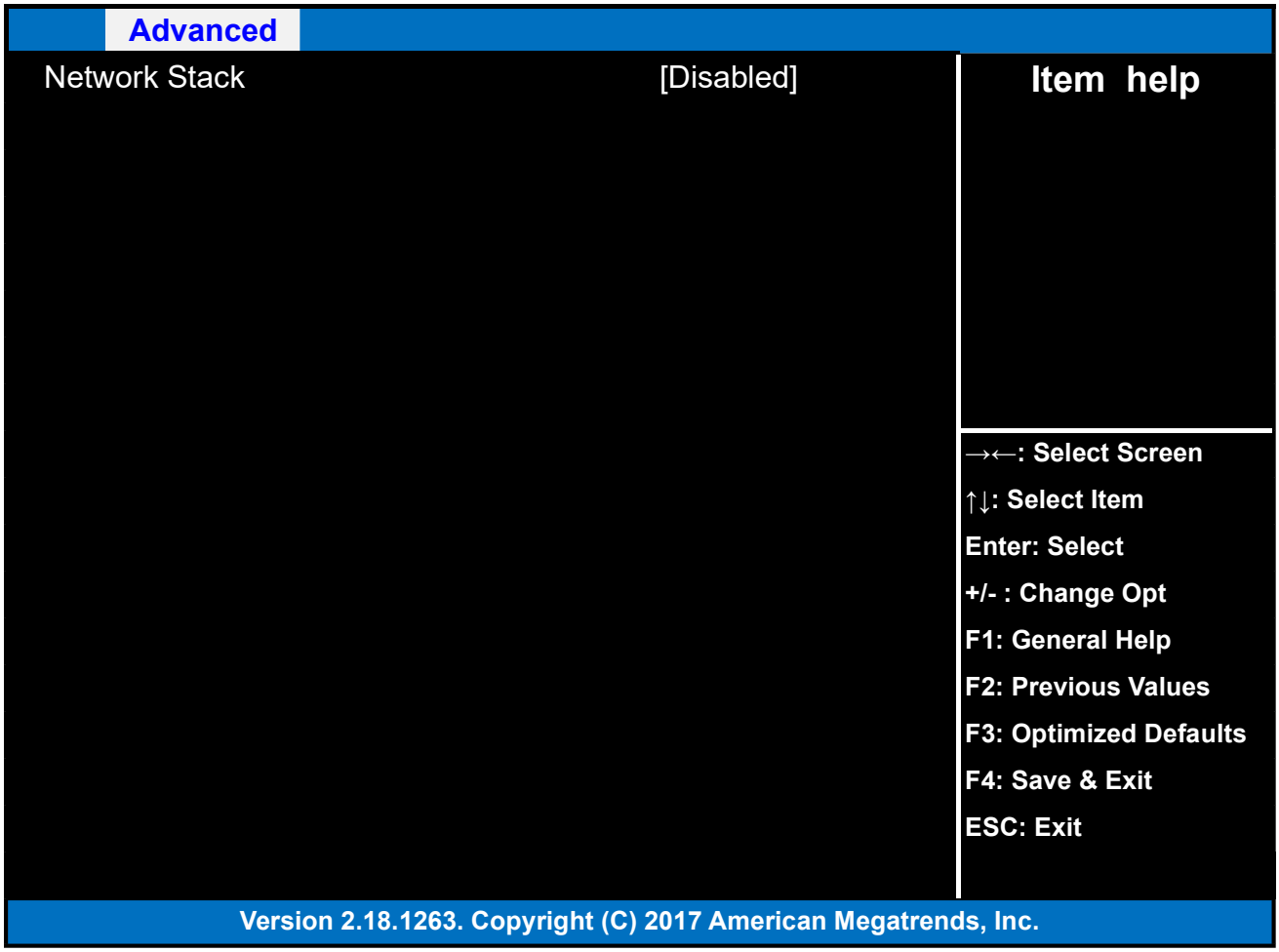
Field Name	Turbo Mode
Default Value	[Enabled]
Possible Value	Disabled / Enabled
Help	Turbo Mode.

4.3.6 - AMI Graphic Output Protocol Policy



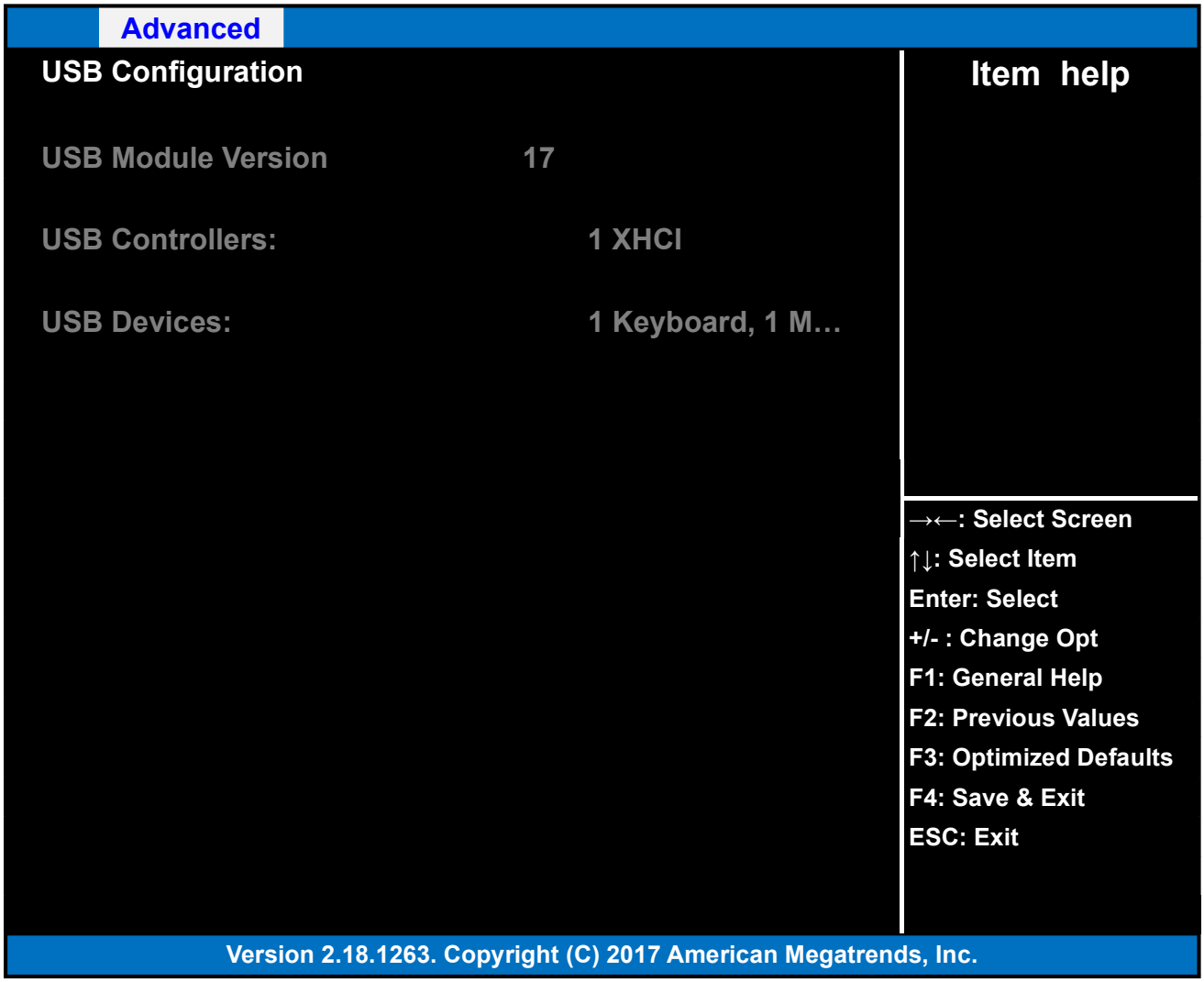
Field Name	Output Select
Default Value	Depend on connecting port
Possible Value	DP1 / DP2
Help	Output Interface.

4.3.7 - Network Stack Configuration



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

4.3.8 - USB Configuration

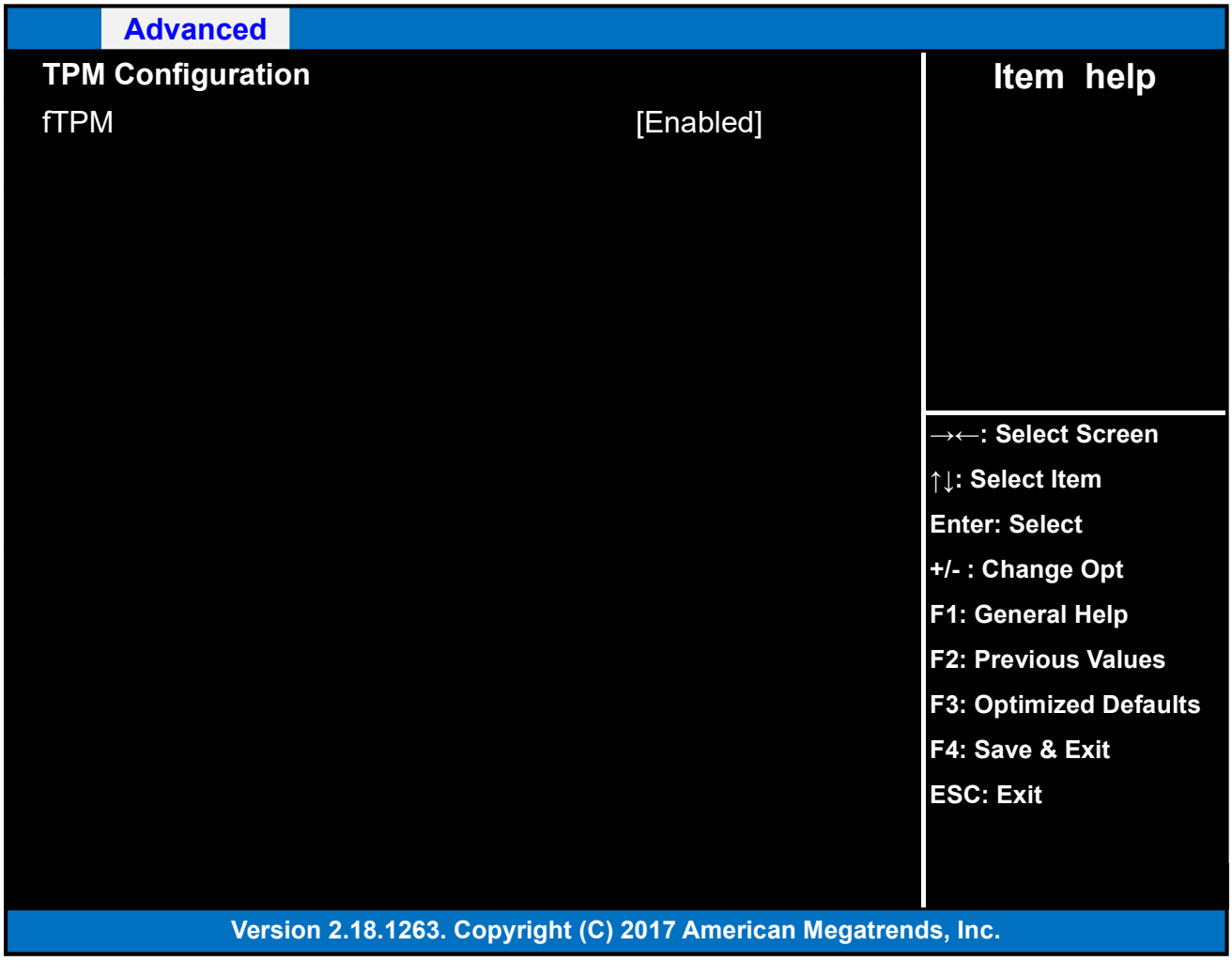


Field Name	USB Module Version
Default Value	Display the USB module version
Comment	This field is not selectable. There is no help text associated with it.

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.

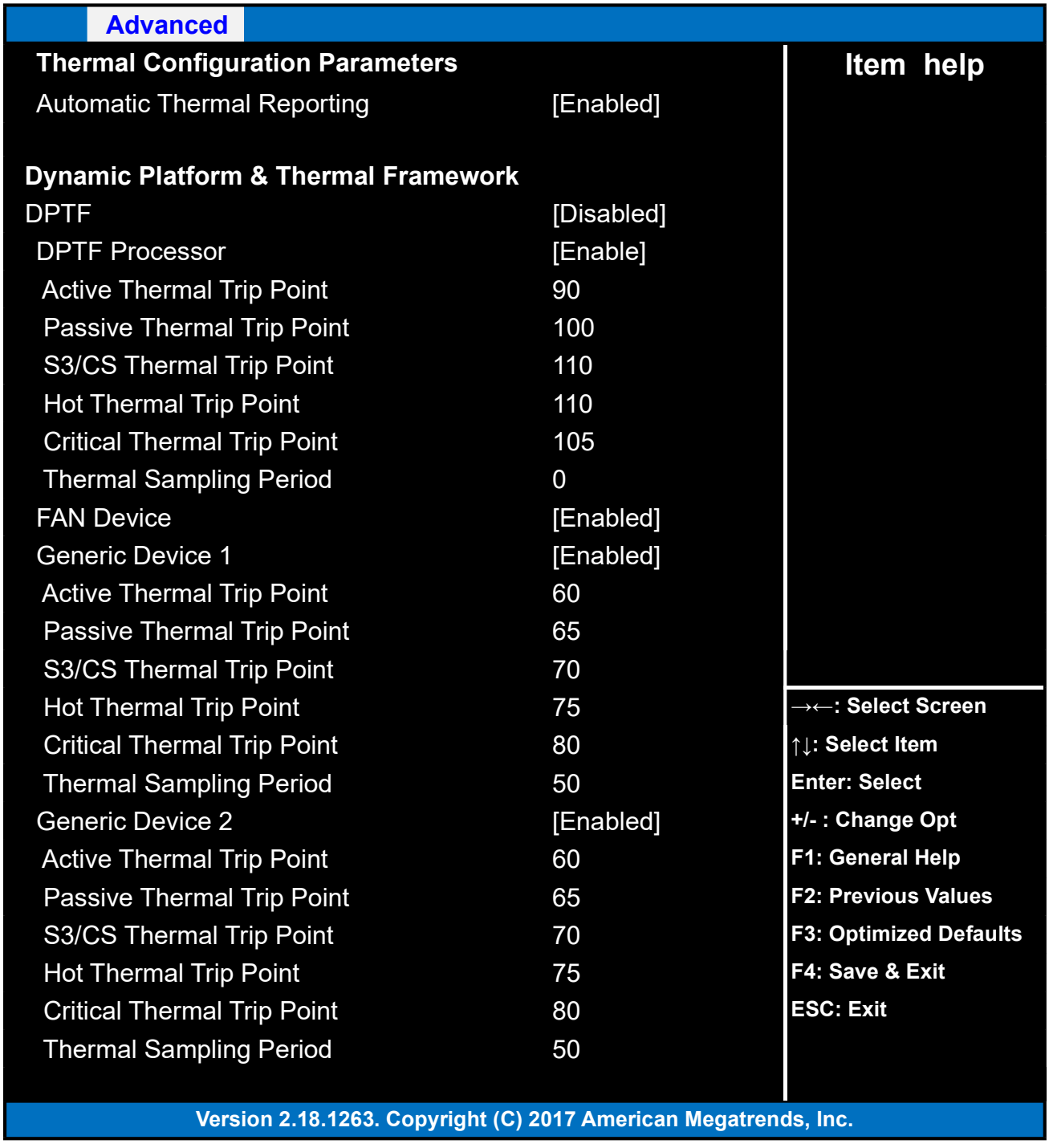
Field Name	USB Devices
Default Value	Display the USB device number.
Comment	This field is not selectable. There is no help text associated with it.

4.3.9 - Platform Trust Technology (PTT)



Field Name	fTPM
Default Value	[Enabled]
Possible Value	Enabled / Disabled
Help	“Enable” to activate fTPM. “Disable” to activate dTPM.

4.3.10 - 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	[Disabled]
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.

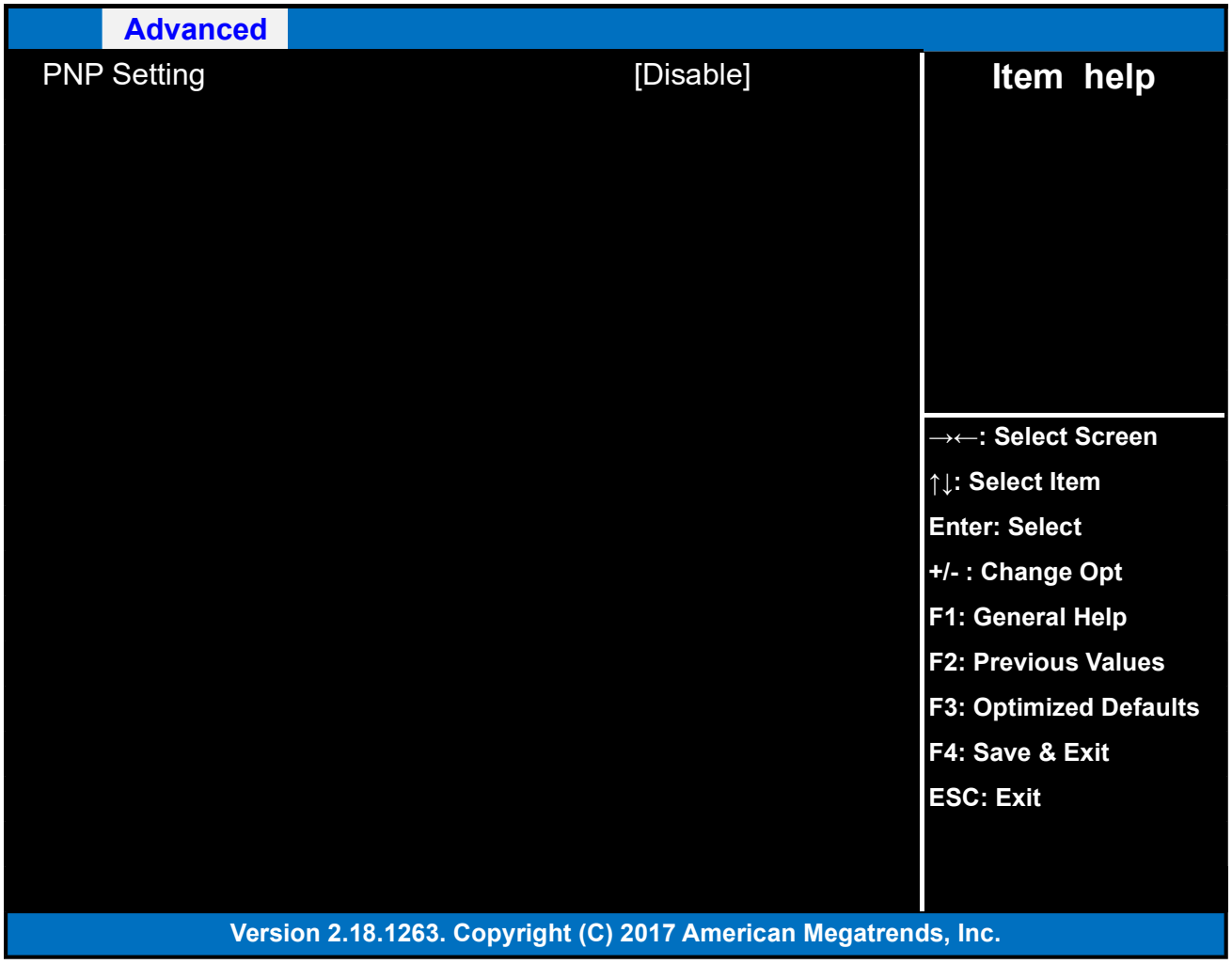
Field Name	S3/CS Thermal Trip Point
Default Value	70
Possible Value	0~127
Help	This value controls the temperature of the ACPI Critical Thermal Trip Point for entering S3 or CS. NOTE: a value of zero will cause the DPTF driver to disable the trip point.

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.

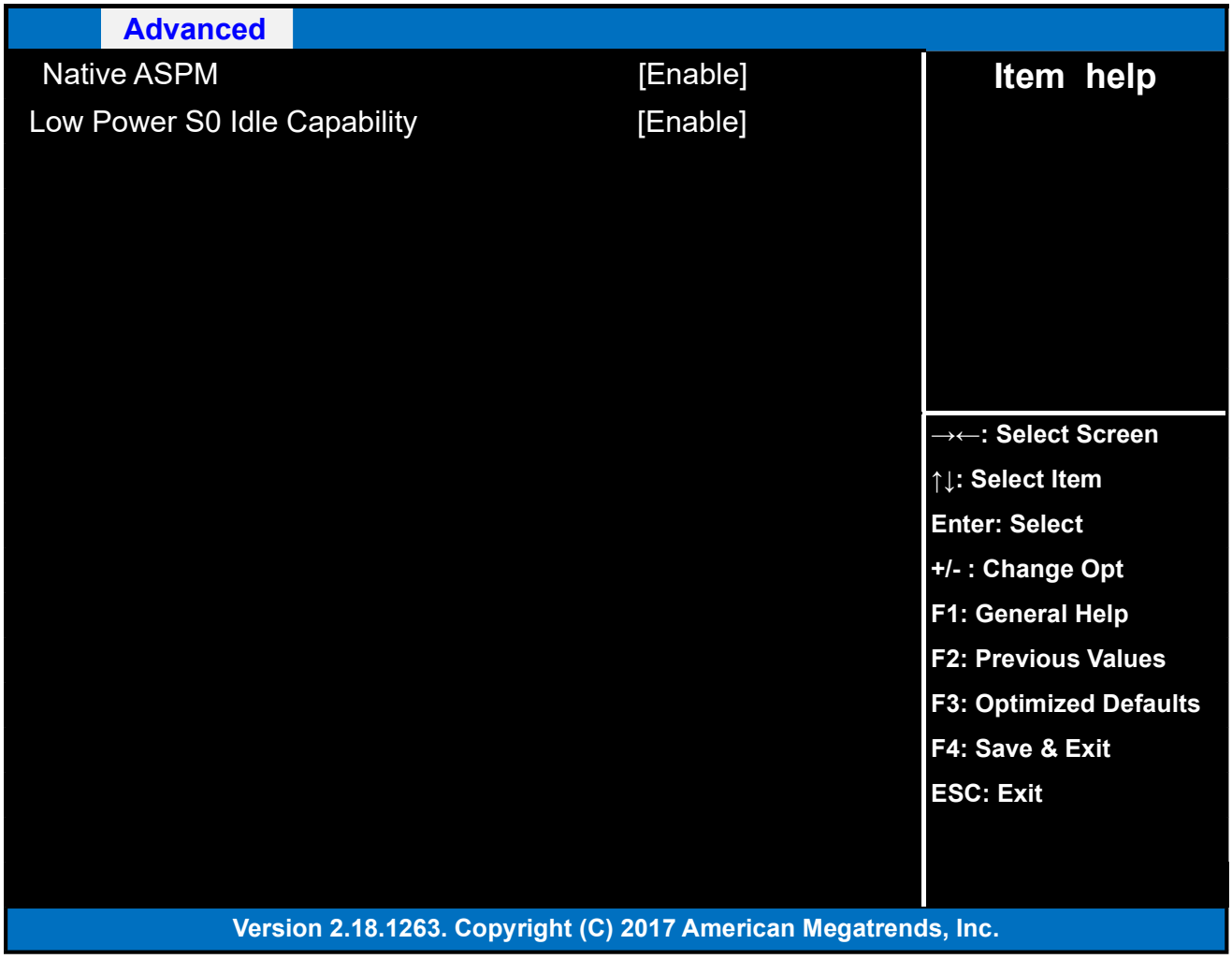
Field Name	Thermal Sampling Period
Default Value	50
Possible Value	0~100
Help	The polling interval in 10ths of seconds. A value of 0 tells the driver to use interrupts. NOTE: The granularity of the sampling period is 0.1 seconds. For example, if the sampling period is 30 seconds, then _TSP needs to report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

4.3.11 - 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.

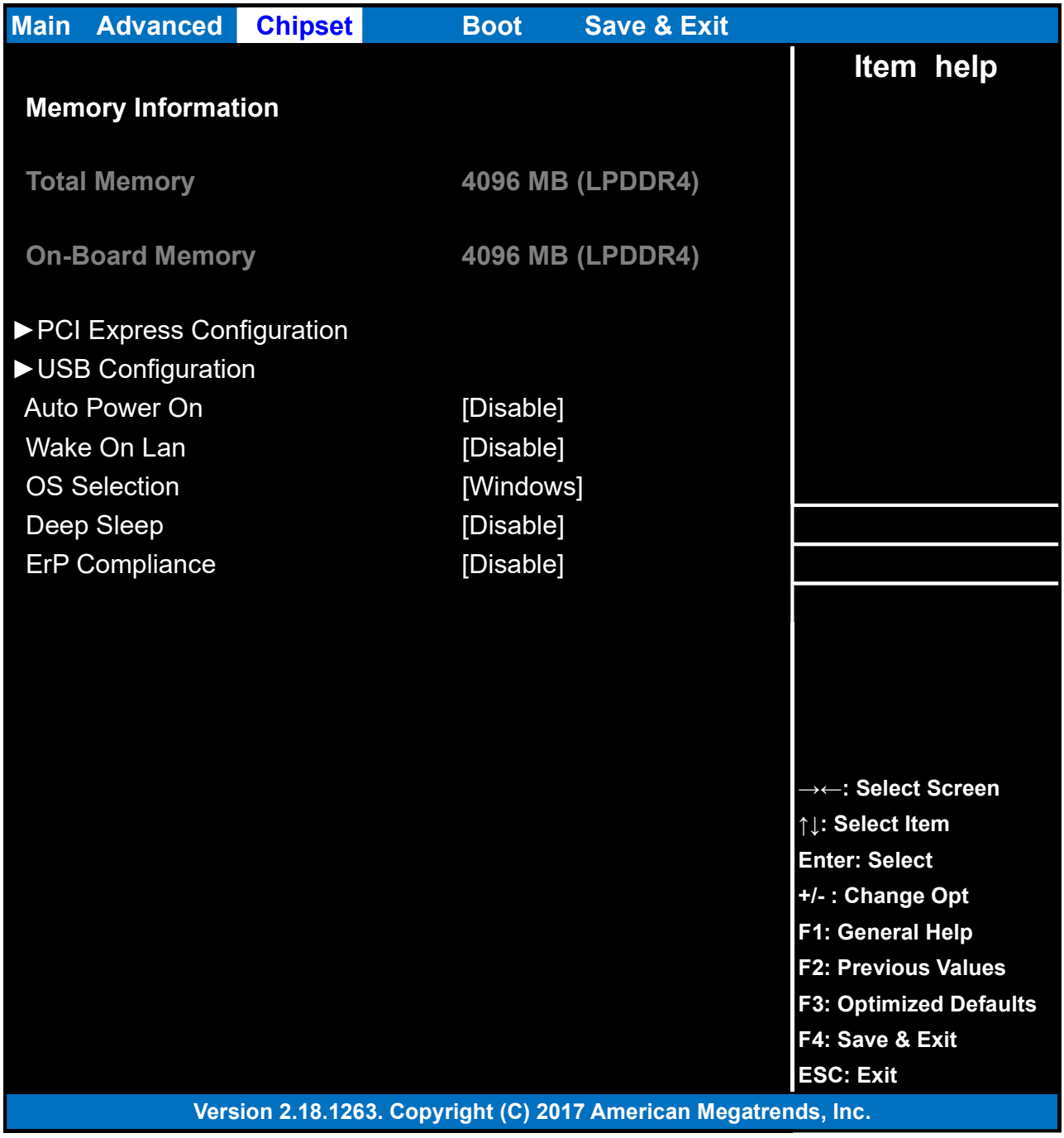
4.3.12 - RC ACPI Settings



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.

4.4 - Chipset Page



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	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 keep in power-off state until power button is pressed.

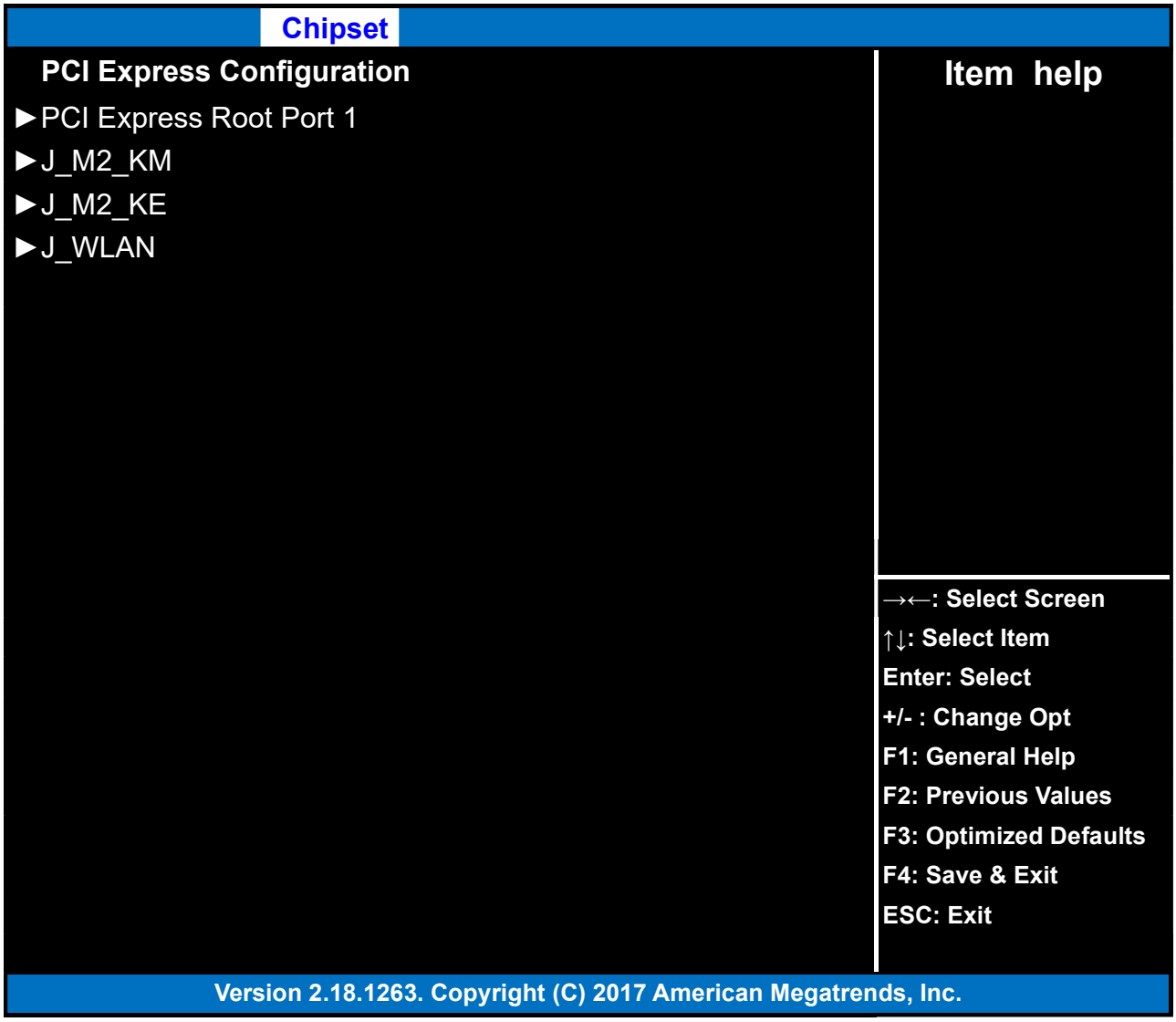
Field Name	Wake On Lan
Default Value	[Disable]
Possible Value	Disable / Enable
Help	Enable or Disable the Wake on Lan.

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

Field Name	Deep Sleep
Default Value	[Disable]
Possible Value	Disable / Enable
Help	Deep Sleep Enable/Disable.

Field Name	ErP Compliance
Default Value	[Disable]
Possible Value	Disable / Enable
Help	Disabled: Deep Sleep option is disabled, S0 Idle option is enabled. Enabled: Deep Sleep option is enabled, S0 Idle option is disabled.

4.4.1 - PCI Express Configuration



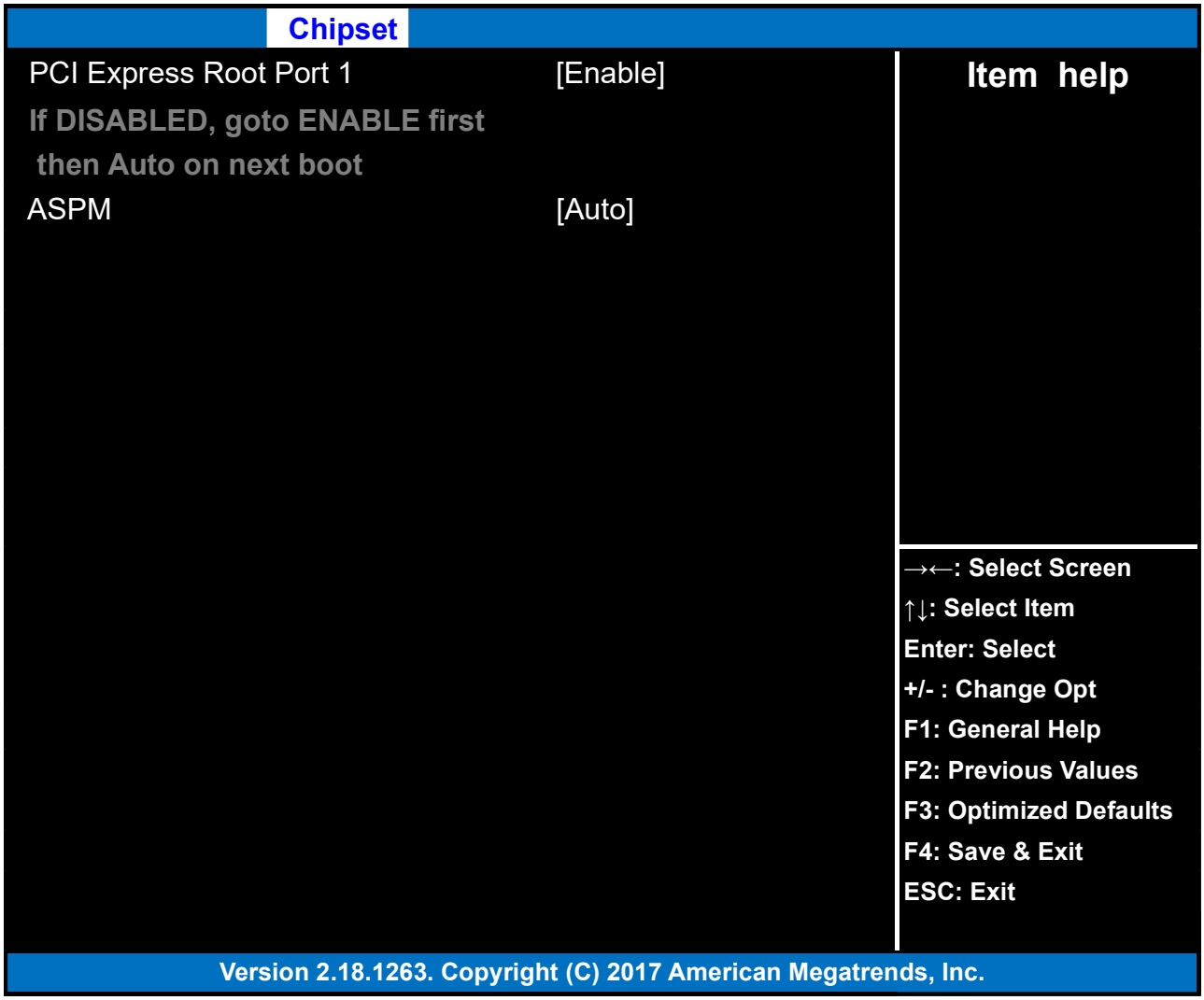
Field Name	PCI Express Root Port 1
Help	Control the PCI Express Root Port. Enable: Enable PCIe root port. Disable: Disable PCIe root port
Comment	Press Enter when selected to go into the associated Sub-Menu.

Field Name	J_M2_KM
Help	Control the PCI Express Root Port. Enable: Enable PCIe root port. Disable: Disable PCIe root port.
Comment	Press Enter when selected to go into the associated Sub-Menu.

Field Name	J_M2_KE
Help	Control the PCI Express Root Port. Enable: Enable PCIe root port. Disable: Disable PCIe root port.
Comment	Press Enter when selected to go into the associated Sub-Menu.

Field Name	J_WLAN
Help	Control the PCI Express Root Port. Enable: Enable PCIe root port. Disable: Disable PCIe root port.
Comment	Press Enter when selected to go into the associated Sub-Menu.

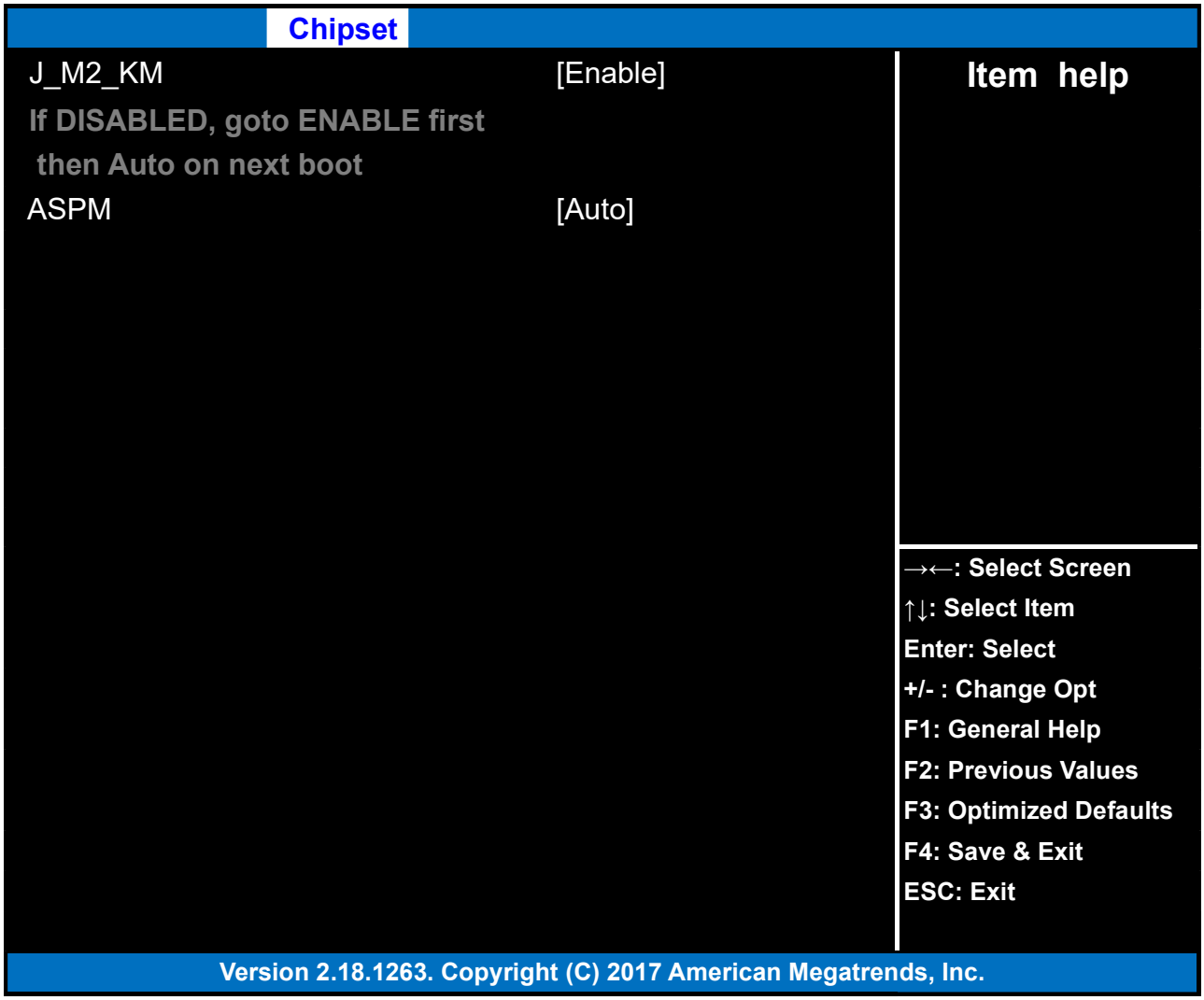
4.4.1.1 - PCI Express Root Port 1



Field Name	PCI Express Root Port 1
Default Value	[Enable]
Possible Value	Disable / Enable
Help	Control the PCI Express Root Port. 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.

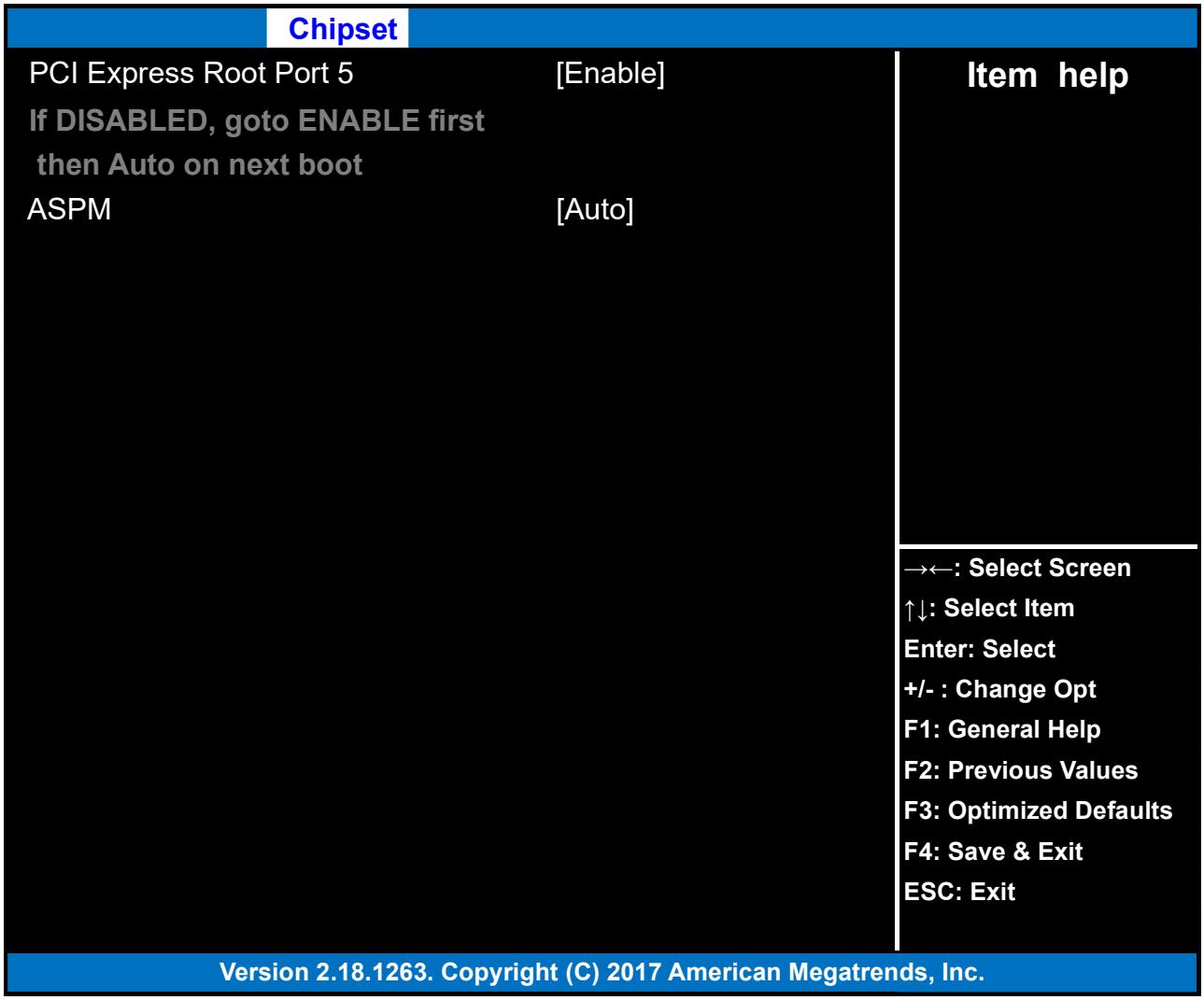
4.4.1.2 - J_M2_KM



Field Name	J_M2_KM
Default Value	[Enable]
Possible Value	Disable / Enable
Help	Control the PCI Express Root Port. 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.

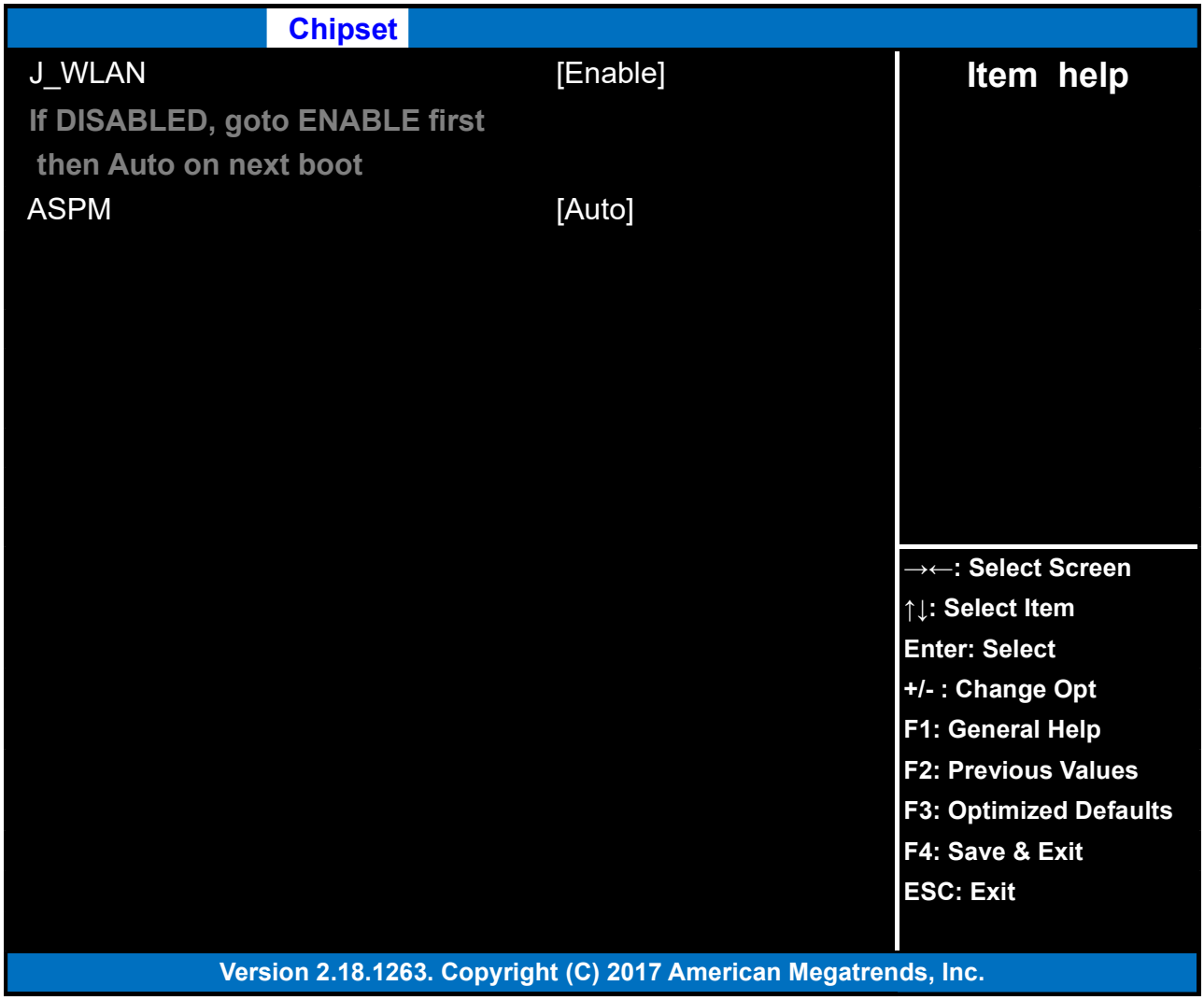
4.4.1.3 - J_M2_KE



Field Name	J_M2_KE
Default Value	[Enable]
Possible Value	Disable / Enable
Help	Control the PCI Express Root Port. 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.

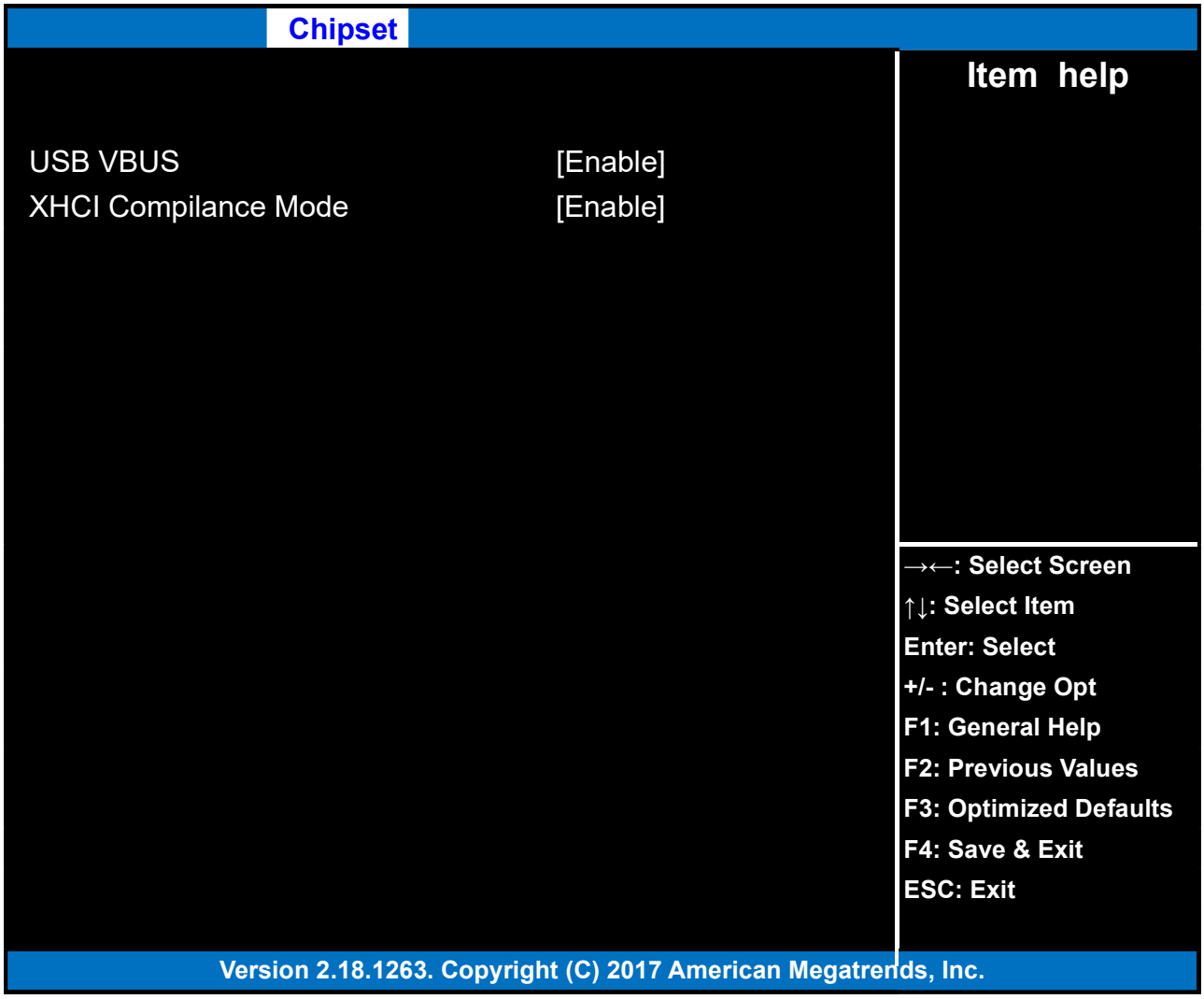
4.4.1.4 - J_WLAN



Field Name	J_WLAN
Default Value	[Enable]
Possible Value	Disable / Enable
Help	Control the PCI Express Root Port. 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.

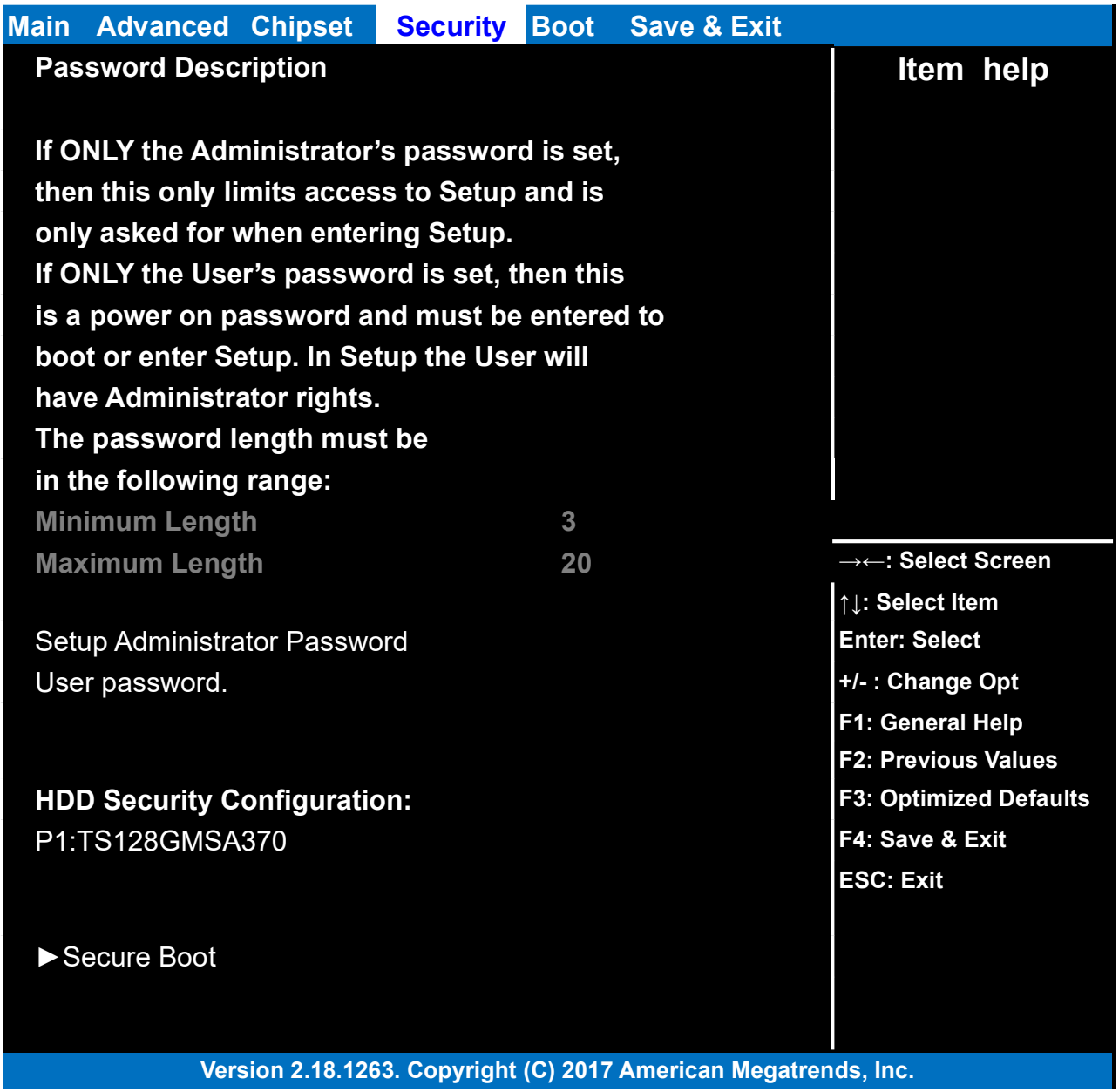
4.4.2 - USB Configuration



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.

4.5 - Security Page



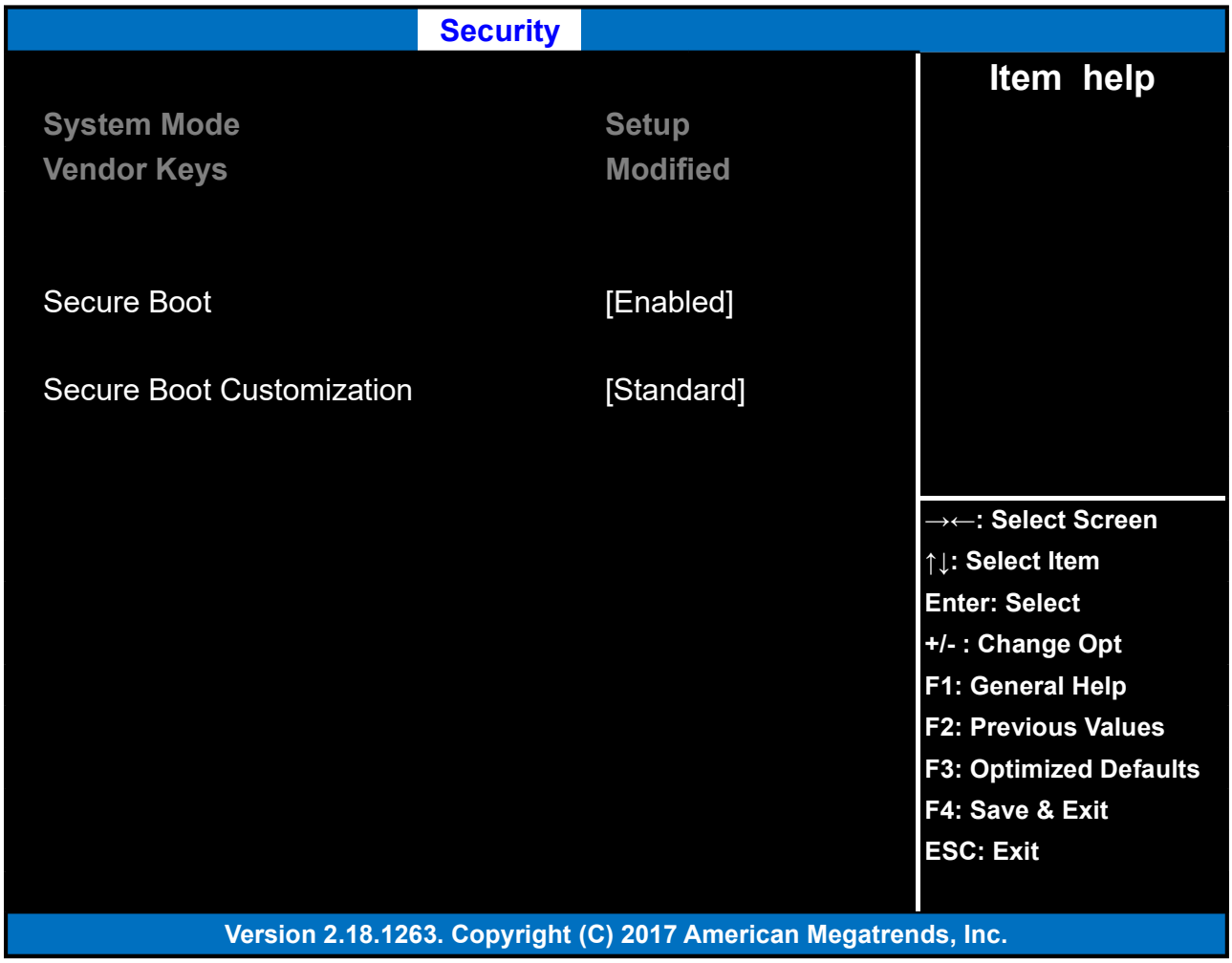
Field Name	Setup Administrator Password
Help	Set Setup Administrator Password.
Comment	Press Enter when selected to go into the associated Sub-Menu.

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.

4.5.1 - Secure Boot

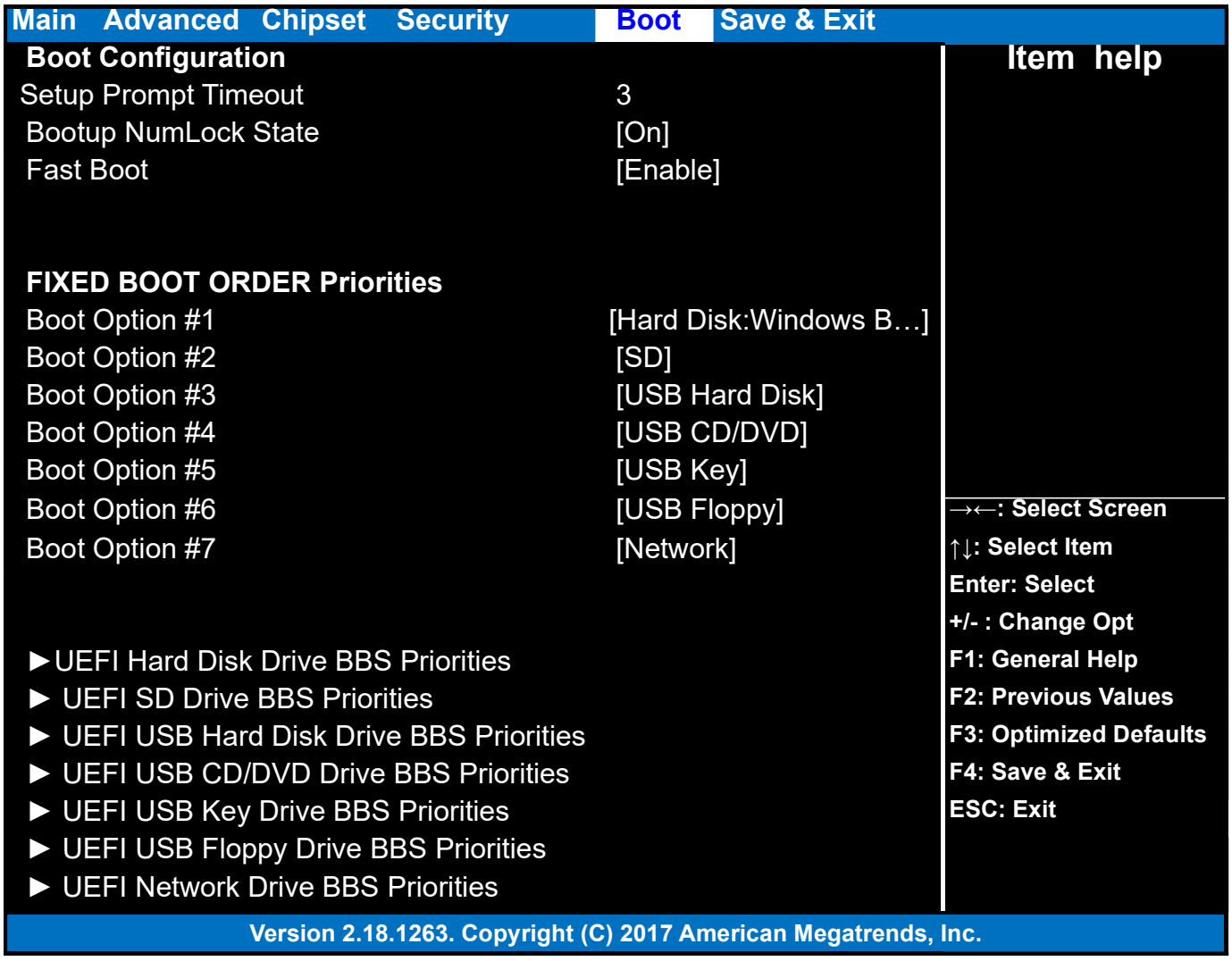


Field Name	Secure Boot
Default Value	[Enabled]
Possible Value	Disabled / Enabled
Help	Secure Boot activated when Platform Key(PK) is enrolled, System mode is User/Deployed, and CSM function is disabled.

Field Name	Secure Boot Customization
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.

4.5.2 - HDD Security Configuration

4.6 - Boot Page



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) SD USB Hard Disk USB CD/DVD USB Key USB Floppy Network Disabled
Help	Sets the system boot order.

Field Name	Boot Option #2
Default Value	[SD]
Possible Value	SD USB Hard Disk USB CD/DVD USB Key USB Floppy Network Disabled
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) SD USB Hard Disk USB CD/DVD USB Key USB Floppy Network Disabled
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) SD USB Hard Disk USB CD/DVD USB Key USB Floppy Network Disabled
Help	Sets the system boot order.

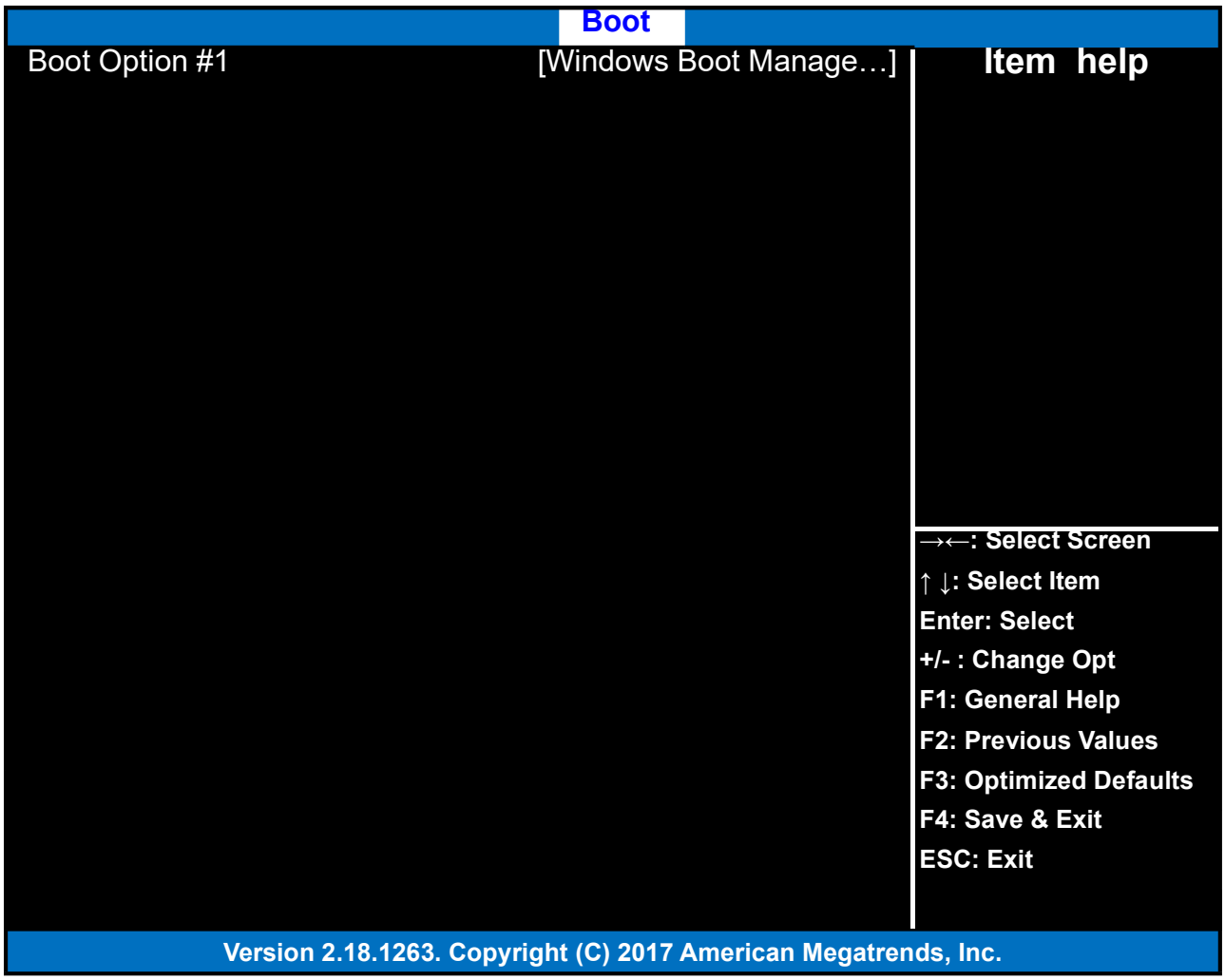
Field Name	Boot Option #5
Default Value	[USB Key]
Possible Value	Hard Disk:Windows Boot Manager (P1: TS128GMSA370) SD USB Hard Disk USB CD/DVD USB Key USB Floppy Network Disabled
Help	Sets the system boot order.

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

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

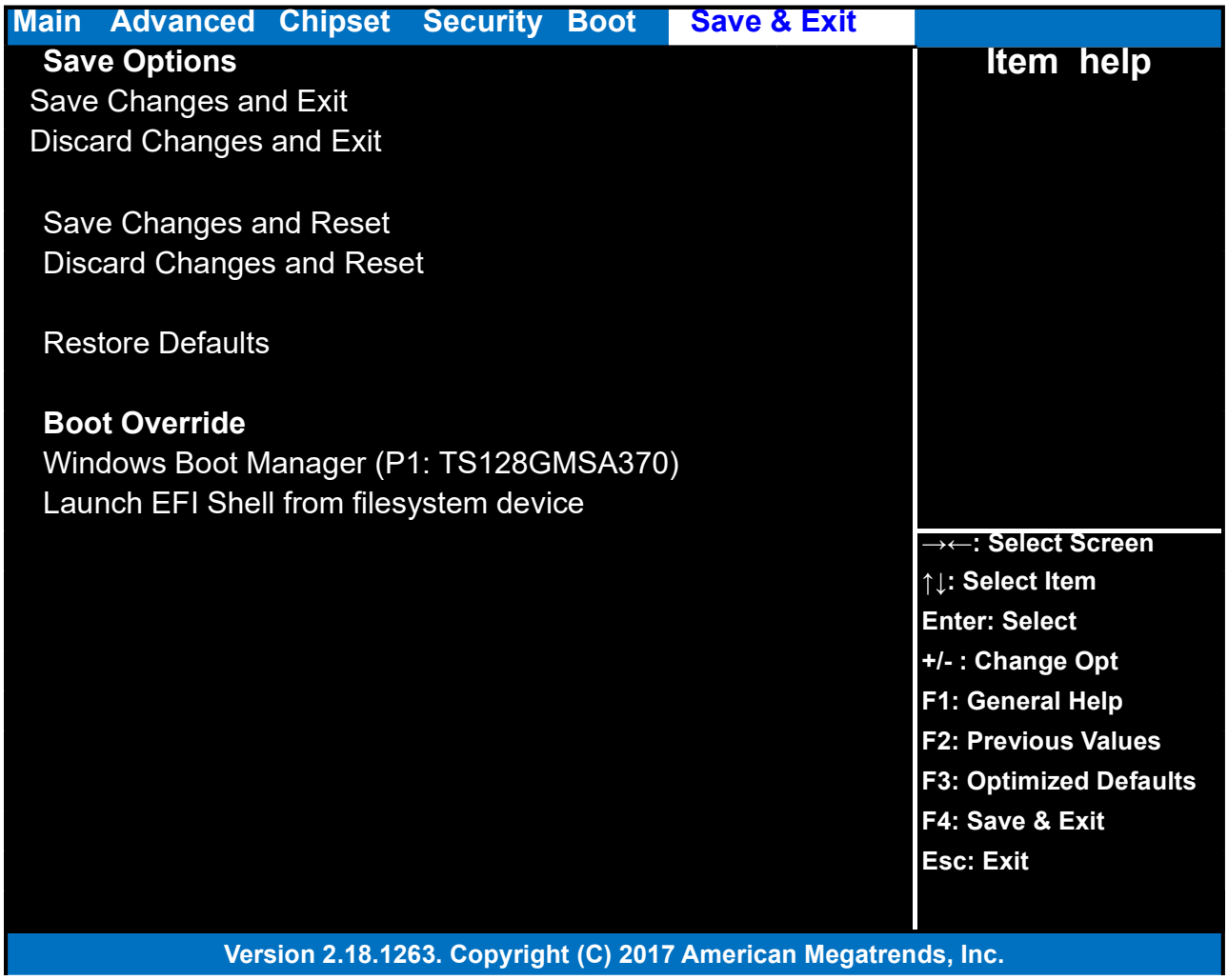
Field Name	UEFI Hard Disk Drive BBS Priorities
Help	Specifies the Boot Device Priority sequence from available UEFI Hard Disk Drives.
Comment	Press Enter when selected to go into the associated Sub-Menu.

4.6.1 - 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.

4.7 - Save & Exit Page



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.

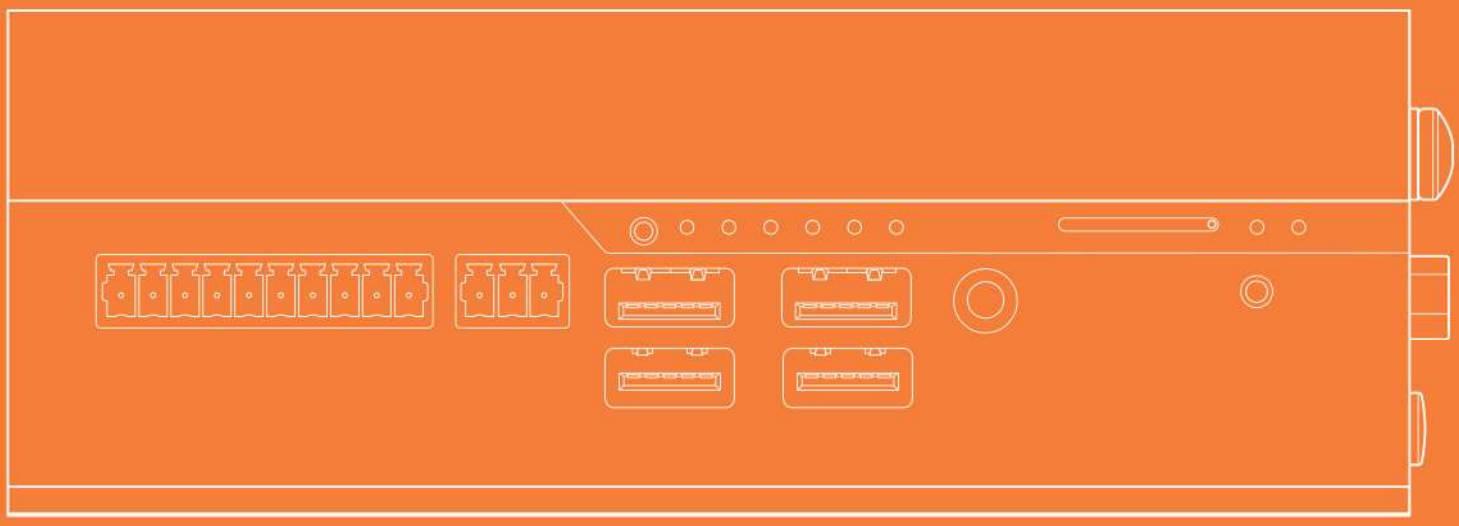
Field Name	Discard Changes and Reset
Help	Reset system setup without saving any changes.

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.

5 - Logic Supply Microcontroller



US Office
Phone: +1 802 861 2300
Email: info@logicsupply.com
www.logicsupply.com

EU Office
Phone: +31 85 2733760
Email: info@logicsupply.eu
www.logicsupply.com

5.1 - Overview

The microcontroller on the Karbon 300 controls several systems, including:

- Automotive Ignition Power Sensing
- CAN bus
- DIO
- Status LEDs
- Power management and wake-up
- DisplayPort CEC and persistent EDID

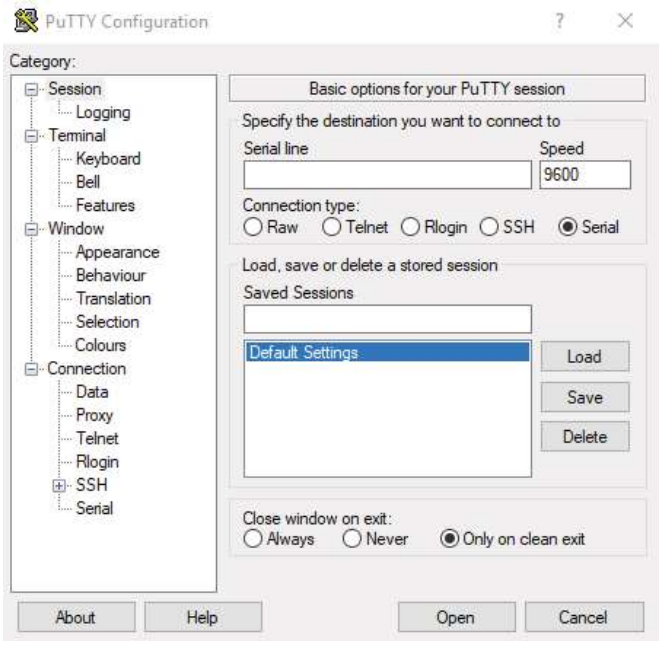
A segment is exposed for user control via two serial ports. By reading and writing to these serial ports, the user can send and receive CAN messages, read/set the DIO state, and select from a number of configuration options. One port is dedicated to K300's CAN bus, while another doubles as a serial terminal and the DIO interface. Any configuration settings may be saved to non-volatile memory. This means that upon a long power-off, the MCU settings will be retained.

5.2 - Using the Serial Interface

5.2.1 - Method 1 - Serial Terminal Program

Using a serial terminal program to interface with the microcontroller provides the most terminal-like experience, but is the least automated option. The following example uses the popular terminal program PuTTY, however, provided it has the local line editing, the serial terminal of your preference should work just as well. The steps are as follows:

1. Download and launch PuTTY from here: https://www.putty.org/
2. You should now see a window that looks like this:



3. Select **"Serial"** from connection type.
4. Under **"Serial line"** enter the name of the serial terminal device. Generally, this will be **"COM4"** on Windows and **"/dev/ttyACM1"** on Linux.
5. Select the **"Terminal"** category on the left menu and force **"Local echo"** and **"Local line editing"** on.

6. Click **"Open"** to launch the interface.
7. You can now enter commands directly to this terminal.

5.2.2 - Method 2 - Pykarbon

If automation is required any programming language that can attach to a serial interface can be used to automate reading and writing to Karbon 300's IO. This example uses Python and the pySerial module:

1. Download and install Python 3 here: https://www.python.org/downloads/
2. Install the pySerial module by running **"python -m pip install pykarbon"** from a command terminal.
3. See the tech resource site at https://www.logicsupply.com/support/ for further reference on how to configure a serial port connection.

5.3 - Serial Interface Technical Details

5.3.1 - Connection Specs

1. Baudrate
   - Recommended baudrate: 9600
   - Note: Because the Karbon 300 operates using a virtual serial port, it is able to support a broad range of baudrates. It is not required to operate the serial interface at the recommended rate.

2. Flow Control
   - XON/XOFF

3. Command Format
   - Commands are expected to be sent by line instead of by character, such that each command requires a single transaction
   - Line terminating characters will be ignored. The system is not sensitive to CRLF vs LF termination

4. Received Data Format
   - Each line of returned data will be “/n/r” terminated

5.3.2 - Commands

- Commands sent to the K300 should be in **all lower case** transmitted to the Serial Terminal port in a single transaction. Commands are not sensitive to line termination.
- An error response will be sent if an unsupported command is sent or if the command is transmitted with the wrong number of accompanying arguments.

The K300 Serial Terminal Interface supports the following commands:

Command	Value	Description
can-message [id] [data] Formats and sends a can packet, given some id and data. Supports standard data frames only. Example: 'can-message 101 1122334455667788'	id	A three character hex string. Supports values between 1 and 7FF.
	data	A hex string up to 16 characters.
config	-	Responds with the current configuration setting details. Sends a total of 13 lines.
dio-state Reports the current state of the digital IO, which is represented by eight characters. Each character may be '1' or '0'. The bit order is fixed, and will always be: I0-I1-I2-I3-O0-O1-O2-O3 (where 'I' is input, and 'O' is output)	1	On
	0	Off
launch-bootloader	-	Causes the MCU to turn off most systems, and restart into the bootloader region. Once in the bootloader a firmware update may be loaded onto the device
save-config	-	Saves any changes made to the currently selected user configuration. Saving changes is required if the changes need to persist across system reboots, or when changing user modes.
set-do [value] Sets the output state of the four digital outputs. Example: 'set-do 0110' will turn digital outputs one and two on, and zero and three off.	1	Turn digital output on.
	0	Turn digital output off.
status	-	Reports status information about they system. On the K300, this consists of the firmware version number and a thermal trip indicator.
user-config [configuration-number] Sets the current user configuration. Example: 'user-config 1' will select user configuration one as the currently used settings.	1~4	Configuration number for user settings.
version	-	Prints the firmware version number and build date.

Command	Value	Description
set [option] [value] Changes setting in user configuration to a new value. **option [value]** One of the user-selectable options. These include:		
ignition-sense	on	The system will respond to inputs on the ignition sense pin.
	off	The system will ignore all ignition events.
startup-timer Sets delay before system powers on after detecting ignition. Only valid if ignition sense is 'on'.	0~9999	Seconds
auto-power-on	on	The system will power on when attached to AC power.
	off	The system will follow the BIOS configuration. Note: It may be desirable to enable this setting as well as any BIOS options, as this option will persist even if the CMOS is cleared.
shutdown-voltage Sets the voltage that will trigger shutdown. This is designed to protect automotive systems from battery drain. The delay between detecting this low voltage and a shutdown triggering is also programmable.	0~30	Volts
hotplug Enables or disables display port hotplug detect.	on	Enabled DisplayPort hotplug detect.
	off	Disabled DisplayPort hotplug detect. The K300 will assume that both ports are connected to a device.
shutdown-timer Sets the time, in seconds, before the K300 will soft power off after passing the shutdown voltage threshold.	0~9999	Seconds
can-baudrate Sets the baudrate for the K300 CAN device.	100~1000	kbit/s
dio-bio-switch A switch to control the power state of the K300 with digital inputs. In order to use this feature, the digital inputs must be powered externally.	on	The digital inputs will act as a remote power switch when the system is off or sleeping. When the system is on, they will behave as normal digital inputs.
	off	Digital inputs will behave as normal digital inputs and will not control the power state of the system.
hard-off-timer Sets the time, in seconds, before the K300 will enter a very low power mode after passing the shutdown voltage threshold.	0~9999	Seconds
boot-config Determines which user configuration will be loaded when the K300 is attached to AC power. Only one configuration may have this value set as 'true'. By default, user configuration one will be loaded at boot.	true	Sets the configuration to be loaded upon AC power-up.
	false	Disables the configuration to be loaded upon AC power-up.

6 - Power Management

Karbon 300 supports multiple power states. Wake-up events can be configured in the MCU and BIOS. This section describes power management functions and gives information on power input protection circuitry.

6.1 - Wake-Up Events

The motherboard supports the following wake-up events:

Wake-Up Event	From ACPI State	Comments
Power Button	VR-Disabled, S5, S4, S3	
Ignition	VR-Disabled, S5, S4, S3	Must be enabled in the MCU.
Digital Input	S5, S4, S3	Must be enabled in the MCU. Requires external reference power source.
LAN	S5, S4, S3	Must be enabled per port and generally in BIOS.
USB	S3	
RTC Alarm	S5	Wake from S5 must be enabled in BIOS.

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

6.2 - Protection Circuitry

Parameter	Value
Nominal operating voltage (Rated DC value of input)	9~36VDC
Undervoltage protection trip DC level (system turns off)	8.1V
Overvoltage protection trip DC level (system turns off)	42.5V
Maximum safe DC voltage (system not damaged)	50V
Minimum safe reverse voltage (system not damaged)	-40V
Ignition pin safe voltage range	-20~50V

These DC levels specified are the absolute max values for the pins for function and safety of the system. The protection circuitry allows for brief transient voltages above these levels without the system turning off. (transients up to 50V for <30 ms)

A TVS protection on the input allows protection for:

- 5000W peak pulse power capability at 10/1000µs waveform, repetition rate (duty cycles): 0.01%
- IEC-61000-4-2 ESD 30kV(Air), 30kV (Contact)
- EFT protection in accordance with IEC 61000-4-4