EMP-510 Series

Fanless Embedded Computer

User's Manual



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LEADING EDGE COMPUTING

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Revision History

Revision	Release Date	Description of Change(s)
1.0	2023-02-20	Initial release

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Preface

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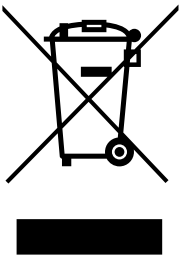
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WARNING: This product can expose you to chemicals including acrylamide, arsenic, benzene, cadmium, Tris(1,3-dichloro-2-propyl) phosphate (TDCPP), 1,4-Dioxane, formaldehyde, lead, DEHP, styrene, DINP, BBP, PVC, and vinyl materials, which are known to the State of California to cause cancer, and acrylamide, benzene, cadmium, lead, mercury, phthalates, toluene, DEHP, DIDP, DnHP, DBP, BBP, PVC, and vinyl materials, which are known to the State of California to cause birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

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Conventions

Take note of the following conventions used throughout this manual to make sure that users perform certain tasks and instructions properly.

NOTE: Additional information, aids, and tips that help users perform tasks.

CAUTION: Information to prevent ***minor*** physical injury, component damage, data loss, and/or program corruption when trying to complete a task.
ATTENTION: Informations destinées à prévenir les blessures corporelles mineures, les dommages aux composants, la perte de données et/ou la corruption de programme lors de l'exécution d'une tâche.

WARNING: Information to prevent ***serious*** physical injury, component damage, data loss, and/or program corruption when trying to complete a specific task.
AVERTISSEMENT: Informations destinées à prévenir les blessures corporelles graves, les dommages aux composants, la perte de données et/ou la corruption de programme lors de l'exécution d'une tâche spécifique.

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1 Introduction

The EMP-510 Series multi-screen media player/embedded computers feature a powerful and energy-efficient 11th Gen. Intel® processor, optional Microsoft® Windows® or Linux® Ubuntu operating system, and 4 video-out connectors in a compact, durable and fanless package, ideal for high-quality and optimal display experiences in advertising, digital menu board, and digital billboard applications.

1.1 Features

- 11th Gen Intel® Core™ i5/i3 and Celeron® BGA SoC processor
- 2x DDR4 SODIMM up to 64GB
- FHD/4K/8K up to 4x independent displays (supports quad display, 3x HDMI 2.0b and 1x DP 1.4)
- 2x GbE, 1x COM, 4x USB ports
- M.2 2280 SSD
- WiFi/LTE compatibility
- OS support
  - Windows 10 IoT Enterprise/LTSC 64-bit
  - Ubuntu Linux

1.2 Optional Accessories

- M.2 SATA SSD
  - up to 1TB
- Wireless Module
  - WiFi kit (w/ antenna)
  - LTE kit (w/ antenna)
- AC/DC Adapter
  - 84W for EMP-510-i3 and EMP-510-6305E
  - 120W for EMP-510-i5

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1.3 Specifications

Model	EMP-510-i5	EMP-510-i3	EMP-510-6305E
System Core			
Processor	Intel® Core™ i5-1145G7E	Intel® Core™ i3-1115G4E	Intel® Celeron® 6305E
TDP	15W - 28W		
# of Cores	4	2	2
Base Frequency	1.5 GHz	2.2 GHz	1.8 GHz
Max. Turbo Frequency	4.1 GHz	3.9 GHz	N/A
Memory	2x 260-pin DDR4 SODIMM, supports 3200MHz SDRAM up to 64GB		
Storage	1x M-key 2280 (PCIe x4+SATA) for SSD, up to 1TB		
I/O Interface			
Display output	1x DP 1.4/DP++, max. resolution up to 7680x4320@60Hz 3x HDMI 2.0b, max. resolution up to 3840x2160@60Hz		
Ethernet	2x GbE RJ45		
Serial Ports	1x DB9 COM (RS-232)		
USB Ports	4x USB 3.0		
Audio	Line-out, Line-in		
Security	fTPM		
DC input	12V DC		
Antennas	2x Antenna holes for SMA-type antennas (WiFi/BT/LTE)		

Table 1-1: EMP-510 Series Specifications

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Model	EMP-510-i5	EMP-510-i3	EMP-510-6305E
Expansion	▶ 1x Full size mini-PCIe socket (PCIe+USB2.0) for optional LTE module with 1x external SIM ▶ 1x M.2 E-key 2230 (PCIe+USB2.0) for optional WIFI/BT module		
Mechanical			
Dimensions	211 (W) x 115 (D) x 35 (H) mm		
Weight	2.5 kg		
Mounting	Wall mount (default) / VESA mount (optional)		
Environmental			
Operating Temperature	Standard: 0°C to 50°C (with 0.6 m/s air flow) ETT: -20°C to +50°C		
Storage Temperature	-40°C to 85°C (-40°F to 185°F) (excluding storage)		
Humidity	95% @ 40°C (104°F) (non-condensing)		
Vibration	Operating: 3 Grms, 5-500 Hz, 3 axes (w/ SSD)		
Shock	Operating: 50 Grms, half sine 11ms duration (w/ SSD)		
ESD	Contact ±4KV, Air ±8KV		
EMC	EN55032/ 55035, CE, FCC Class B		
Safety	UL/cUL, CB		

Table 1-1: EMP-510 Series Specifications

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1.4 Power Consumption

Power consumption is based on lab data in which 12V DC is applied and current is measured by the DC power supply. The power consumption (W) is calculated as the product of applied voltage (V) and the current (A). Platforms tested for this data have available external I/O interfaces and are attached to supported devices such as keyboard/mouse, USB dummy load, COM loop-back, LAN port, and with an internal SSD driver installed. Information is presented for reference only. Actual power consumption will vary with different attached devices and operating systems.

	EMP-510-i5	EMP-510-i3	EMP-510-6305E
Power Off (S5)	1.4W	1.4W	1.4W
System Idle (S0)	25.2W	19.7W	11.1W
System Full Load	102W	66.2W	47.8W
Recommended Power Supply	120W	84W	84W

Table 1-2: Power Consumption

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1.5 Block Diagram

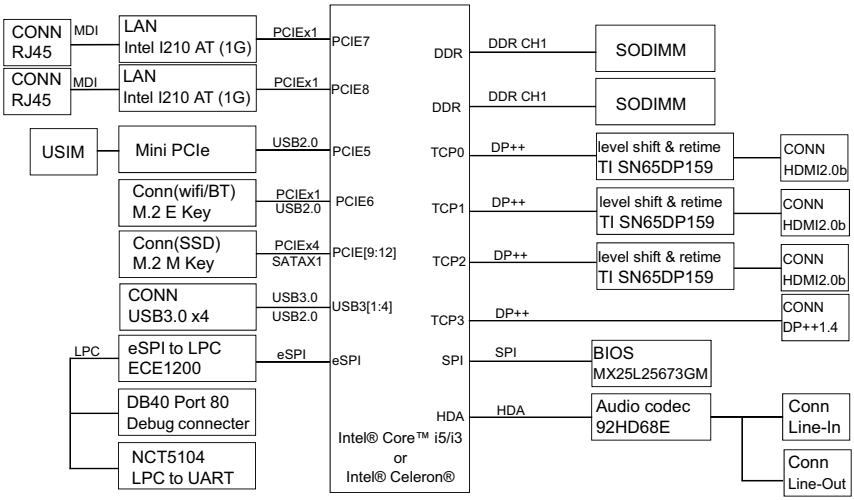


Figure 1-1: EMP-510 Series Block Diagram

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1.6 Mechanical Dimensions

NOTE:

All dimensions shown in millimeters (mm).

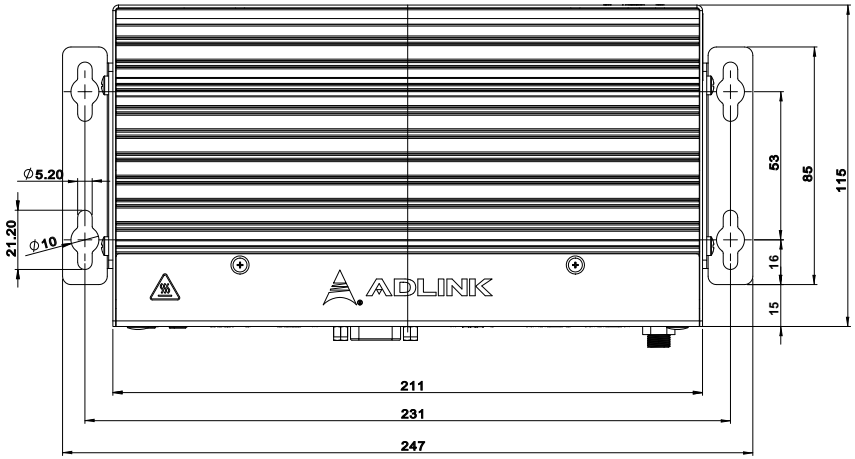


Figure 1-2: Top View

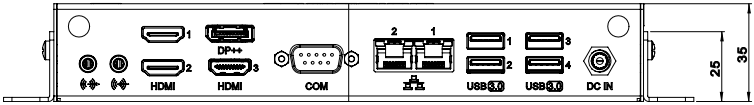


Figure 1-3: Front View

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1.7 Front Panel I/O Connectors

The EMP-510 Series provides the following external I/O connectors.

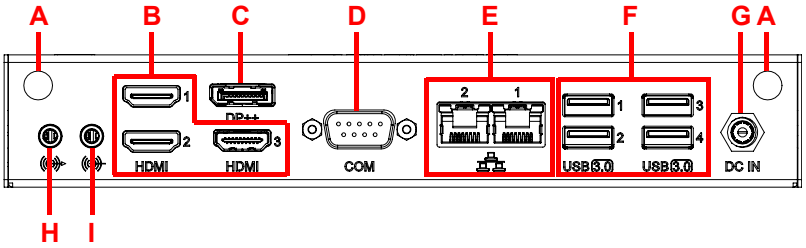


Figure 1-4: Front Panel I/O Connectors

A	Wireless antenna holes
B	3x HDMI 2.0b
C	DP 1.4
D	COM RS-232
E	2x LAN
F	4x USB 3.0 Gen1
G	12V DC input jack
H	Line-out 3.5mm audio jack
I	Line-in 3.5mm audio jack

Table 1-3: Front Panel I/O Connector Legend

1.7.1 Wireless Antenna Holes

SMA-type antenna holes are reserved for use with a wireless, WiFi, or LTE module. Wireless antennas should be attached to the holes when a wireless, WiFi, or LTE module has been installed in the EMP-510 Series.

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1.7.2 Line-in/Line-out Audio Connectors

The EMP-510 Series implements Intel® High Definition Audio with a Tempo Semiconductor 92HD68E Series Audio CODEC, with support up to 24-bit, 192 KHz sample rate high quality headphone output and microphone input.

1.7.3 Display Connections

The EMP-510 Series supports 4 independent display output ports under Windows 10 and Ubuntu Linux, and 2 independent display output ports in the UEFI shell, as shown in the following table.

System	Maximum Number of Independent Displays	Notes
Windows	4	
Ubuntu Linux	4	
UEFI Shell	2	Priority 1: HDMI 1 Priority 2: HDMI 2 Priority 3: HDMI 3 Priority 4: DP

Table 1-4: Maximum Number of Independent Displays

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The maximum display resolution depends on the total number and type of display connections, as shown in the following table.

Number of Connected Displays	Connector Port	Maximum Resolution
1 (DP or 1 HDMI)	DP	7680 x 4320
	HDMI port 1 or 2 or 3	3840 x 2160
2 (DP + 1 HDMI)	DP	7680 x 4320
	HDMI port 1 or 2 or 3	3840 x 2160
2 HDMI	HDMI port 1 or 2 or 3	3840 x 2160
	HDMI port 1 or 2 or 3	3840 x 2160
3 (DP + 2 HDMI)	DP	7680 x 4320
	HDMI port 1 or 2 or 3	3840 x 2160
	HDMI port 1 or 2 or 3	3840 x 2160
3 HDMI	HDMI port 1	3840 x 2160
	HDMI port 2	3840 x 2160
	HDMI port 3	3840 x 2160
4 (DP + 3 HDMI)	DP	4096 x 2160
	HDMI port 1	3840 x 2160
	HDMI port 2	3840 x 2160
	HDMI port 3	3840 x 2160

Table 1-5: Maximum Display Resolution

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DisplayPort Connector

One DisplayPort connector, supporting the DP 1.4 standard specification, supports resolutions up to 7680 x 4320 at 60Hz.

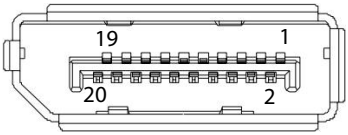


Figure 1-5: DisplayPort Connector Pin Definition

Pin	Signal	Pin	Signal
1	CON_DDI1_TX0_P	11	GND
2	GND	12	CON_DDI1_TX3_N
3	CON_DDI1_TX0_N	13	CON_DDI1_DDC_AUX_SEL
4	CON_DDI1_TX1_P	14	CON_DDI1_CONFIG_2
5	GND	15	CON_DDI1_I2CCLK_AUX_P
6	CON_DDI1_TX1_N	16	GND
7	CON_DDI1_TX2_P	17	CON_DDI1_I2CCLK_AUX_N
8	GND	18	CON_DDI1_HPD
9	CON_DDI1_TX2_N	19	GND
10	CON_DDI1_TX3_P	20	P_+3V3_DP1

Table 1-6: DisplayPort Pin Definition

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HDMI Connector

The HDMI connector supports HDMI 2.0b.

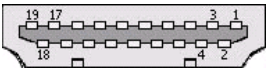


Figure 1-6: HDMI Connector Pin Definition

Pin #	Signal	Pin #	Signal
1	TMDS Data2+	2	TMDS Data2 Shield
3	TMDS Data2–	4	TMDS Data1+
5	TMDS Data1 Shield	6	TMDS Data1–
7	TMDS Data0+	8	TMDS Data0 Shield
9	TMDS Data0–	10	TMDS Clock+
11	TMDS Clock Shield	12	TMDS Clock–
13	CEC	14	Reserved
15	SCL	16	SDA
17	DDC/CEC Ground	18	+5 V Power
19	Hot Plug Detect		

Table 1-7: HDMI Connector Pin Definition

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1.7.4 COM Port Connector

The COM port is a D-sub 9-pin connector supporting RS-232 mode.

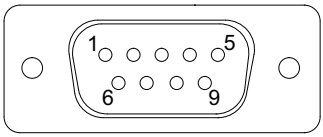


Figure 1-7: COM Port Pin Definition

Pin	Signal	RS-232
1	COM1_DCD-L_CN	DCD#
2	COM1_RXD_CN	RXD
3	COM1_TXD_CN	TXD
4	COM1_DTR-L_CN	DTR#
5	GND	GND
6	COM1_DSR-L_CN	DSR#
7	COM1_RTS-L_CN	RTS#
8	COM1_CTS-L_CN	CTS#
9	COM1_RI-L_CN	RI#

Table 1-8: COM Port Pin Definition

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1.7.5 Gigabit Ethernet Port

Two Gigabit Intel® Ethernet Controller I210 Series RJ45 connectors support up to 1000/100/10 Mbit/s connections.

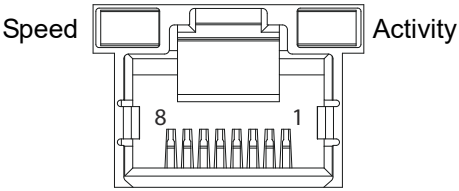


Figure 1-8: Ethernet Port and LEDs

Pin	10BASE-T/100BASE-TX	1000BASE-T
1	TX+	TX0+
2	TX-	TX0-
3	RX+	TX1+
4	-	TX1-
5	-	TX2+
6	RX-	TX2-
7	-	TX3+
8	-	TX3-

Table 1-9: Ethernet Port Pin Definition

LED	LED Color	Status	Description
Active/Link (right)	Yellow	OFF	Ethernet port is disconnected
		ON	Ethernet port is connected with no activity
		Flashing	Ethernet port is connected and active
Speed (left)	Green/ Yellow	OFF	10 Mbps
		Green	100 Mbps
		Yellow	1000 Mbps

Table 1-10: Active/Link and Speed LED Indicators

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1.7.6 USB 3.0 Connector

Four USB 3.0 Gen1 (5 Gbps with 1600 mA power and OCP protection) Type-A connectors are provided compatible with SuperSpeed, Hi-Speed, Full-speed, and Low-speed USB devices suitable for USB peripherals.

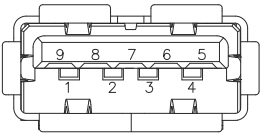


Figure 1-9: USB 3.0 Type-A Connector Pin Definition

Pin No.	Signal
1	VBUS
2	D-
3	D+
4	GND
5	StdA_SSRX−
6	StdA_SSRX+
7	GND_DRAIN
8	StdA_SSTX−
9	StdA_SSTX+

Table 1-11: USB 3.0 Type-A Connector Pin Definition

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1.7.7 DC-in Power Connector

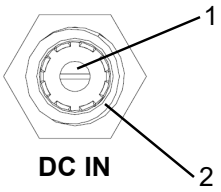


Figure 1-10: DC-in Power Connector

Pin	Function	Description
1	Power	Power input
2	Ground	Reference ground

Table 1-12: DC-in Power Connector Pin Definitions

1.7.8 Line-in/Line-out 3.5mm Audio Jack Connector

Double-stacked ø3.5mm stereo audio jacks provide Line-in and Line-out adio connections.

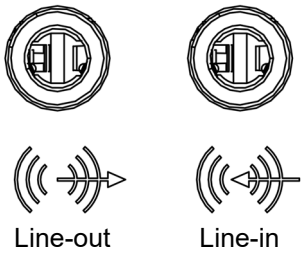


Figure 1-11: Line-in/Line-out 3.5mm Audio Jack Connector

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1.8 Rear Panel

The EMP-510 Series provides the following buttons and LED on the rear panel.

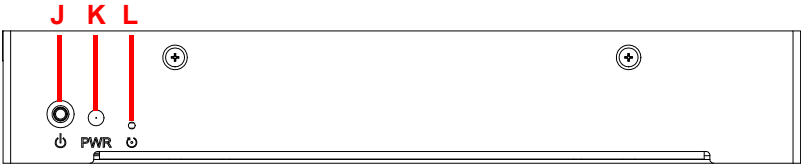


Figure 1-12: Rear Panel

Item	Function	Description
J	Power Button	Press to turn system on/off.
K	Power LED	Power off: off Power on: on
L	Reset Button	Press and hold with a thin object, like the end of a paper clip, for 3 seconds to reset the system.

Table 1-13: Rear Panel Legend

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2 Getting Started

2.1 Packing List

Before unpacking, check the shipping carton for any damage. If the shipping carton and/or contents are damaged, inform your dealer immediately. Retain the shipping carton and packing materials for inspection. Obtain authorization from your dealer before returning any product to ADLINK. Ensure that the following items are included in the package.

- EMP-510 controller
- Wall-mount brackets (screws included)
- 120W adapter or 84W adapter (120W used in EMP-510-i5, 84W used in EMP-510-i3 and EMP-510-6305E)

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2.2 Mounting

2.2.1 Install the Wall-Mount Brackets

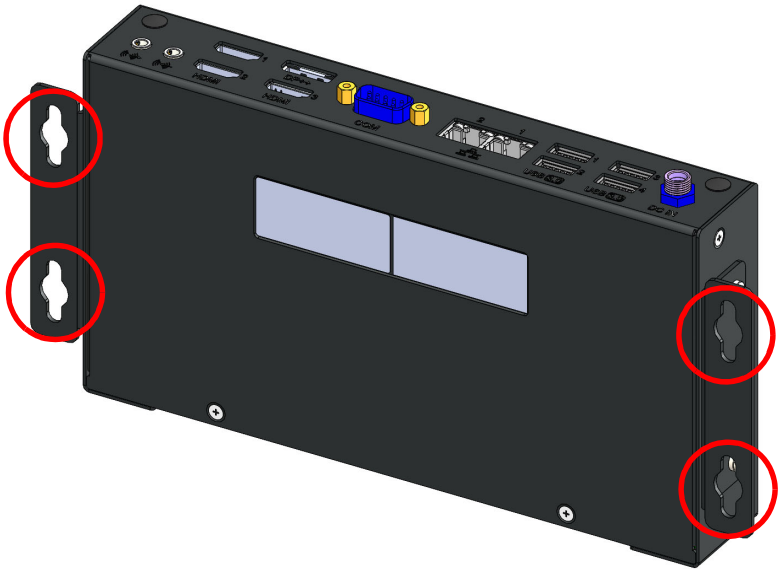
Use the 4 footpad screws included in the package contents to attach the 2 wall-mount brackets to the chassis with 6kgf/cm of torque.



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2.2.2 Mounting the Device

Mount the device to a wall using the 4 keyhole openings indicated with M4 8mm screws torqued to 6kgf/cm according to the spacing dimensions of the holes in the bracket as shown in Figure 1-2.



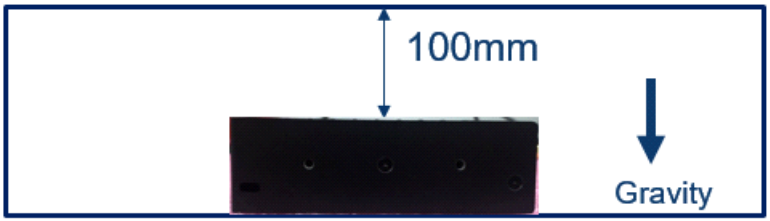
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2.3 Thermal Considerations

System placement recommendation

The recommended system space is 500x456x120mm^3, with an airflow speed of 0.6m/s for better thermal dissipation performance. Refer to the figures below for the recommended minimum system clearances.





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3 BIOS Setup

The Basic Input/Output System (BIOS) is a program that provides a basic level of communication between the processor and peripherals. In addition, the BIOS also contains codes for various advanced features applied to the EMP-510. The BIOS setup program includes menus for configuring settings and enabling features of the EMP-510. Most users do not need to use the BIOS setup program, as the EMP-510 ships with default settings that work well for most configurations.



BIOS options used in this manual are for reference only, and are subject to change. Users can download the latest BIOS version from the ADLINK website.



Changing BIOS settings may lead to unexpected system behavior and the possible inability to boot.

3.1 BIOS Setup Menu

The BIOS Setup Utility is invoked by pressing <ESC> or <DEL> when the system boots. A system reboot is required when changes are made in the BIOS Setup Utility.

The BIOS Setup Utility includes the following hotkeys.

- <F1>: General help
- <F8>: Load previous BIOS values
- <F9>: Load BIOS default values
- <F10>: Save & Exit the Setup Utility

Menu Selection Bar

The Menu Selection Bar is located at the top of the screen. It displays the top level menus available to the user.

- Main Menu
- Advanced Menu
- Chipset Menu
- Security Menu
- Boot Menu
- Save & Exit Menu

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3.2 Menu Structure

This section presents the six primary menus of the BIOS Setup Utility. Use the following tables as a quick reference for the contents of the BIOS Setup Utility. The remainder of this chapter describe the submenus and options for each menu item. The default settings are presented in bold, and the function of each setting is described in the right hand column of the table.


NOTE:

- ► indicates a submenu
- Gray text indicates info only
- **Bold text** indicates a default setting

Main	Advanced
- BIOS Information - System Information	- CPU Configuration ► - Power & Performance ► - Thermal Configuration ► - OverClocking Performance Menu ► - NCT5104D Super IO Configuration ► - Serial Port Console Redirection ► - USB Configuration ► - Network Stack Configuration ► - NVMe Configuration ► - RAM Disk Configuration ► - Intel(R) I210 Gigabit Network Connection – 00:30:64:31:CF:1B ► - Intel(R) I210 Gigabit Network Connection – 00:30:64:31:CF:1C ►

Chipset	Security
- System Agent (SA) Configuration ► - PCH-IO Configuration ►	Password Description - Administrator Password - User Password - Secure Boot ►

Boot	Save & Exit
- Boot Configuration ► - UEFI Application Boot Priorities	- Save Options ► - Default Options ► - Boot Override ►

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3.3 Main Menu

This menu provides read-only information about your system and also allows you to set the System Date and Time. Refer to the tables below for details of the submenus and settings.

3.3.1 Main > BIOS Information

Feature	Options	Description
BIOS Vendor	Info only	BIOS Vendor
BIOS Version	Info only	BIOS Version
Build Date	Info only	BIOS build date
MRC Version	Info only	MRC Version
GOP Version	Info only	GOP Version
ME FW Version	Info only	ME FW Version

3.3.2 Main > System Information

Feature	Options	Description
Project Name	Info only	EMP-510
CPU Board Version	Info only	CPU Board Version
CPU Brand String	Info only	CPU Brand String
Stepping	Info only	CPU Stepping
GT Info	Info only	GT Info
Number of Processors	Info only	Number of Processors
CPU Frequency	Info only	CPU Frequency
Total Memory	Info only	Total Memory
Memory Frequency	Info only	Memory Frequency
PCH SKU	Info only	PCH SKU
System Date	Info only	System Date
System Time	Info only	System Date
Access Level	Administrator	Access Level

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3.4 Advanced Menu

This menu contains the settings for most of the user interfaces in the system.

3.4.1 Advanced > CPU Configuration

Feature	Options	Description
Type	Info only	Displays the Processor Type
ID	Info only	Displays the Processor ID
Speed	Info only	Displays the Processor Speed.
L1 Data Cache	Info only	Displays the Processor L1 Data Cache size.
L1 Instruction Cache	Info only	Displays the Processor L1 Instruction Cache size.
L2 Cache	Info only	Displays the Processor L2 Cache size.
L3 Cache	Info only	Displays the Processor L3 Cache size.
L4 Cache	Info only	Displays the Processor L4 eDRAM size.
VMX	Supported	VMX Supported or Not
SMX/TXT	Not Supported	SMX/TXT Supported or Not
Active Processor Cores	**All** 1 2 3 4 5 6 7 8	Number of cores to enable in each processor package.
Hyper-Threading	Disabled **Enabled**	Enables/Disables Hyper-Threading Technology.

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3.4.2 Advanced > Power & Performance > CPU - Power Management Control

Feature	Options	Description
Intel(R) SpeedStep(tm)	Disabled **Enabled**	Allows more than two frequency ranges to be supported.
Turbo Mode	Disabled **Enabled**	Enables/Disables processor Turbo Mode (requires EMTTM enabled). AUTO means enabled.
Power Limit1	[Max-Value, Min-Value, Step-Value] = [28000, 15000, 12500]	Power Limit 1 in Milli Watts. BIOS will round to the nearest 1/8W when programming. 0 = no custom override. For 12.50W, enter 12500. Overclocking SKU: Value must be between Max and Min Power Limits (specified by PACKAGE_POWER_SKU_MSR). Other SKUs: This value must be between Min Power Limit and TDP Limit.
Power Limit2	[Max-Value, Min-Value, Step-Value] = [70000, 28000, 12500]	Power Limit 2 value in Milli Watts. BIOS will round to the nearest 1/8W when programming. 0 = no custom override. For 12.50W, enter 12500. Processor applies control policies such that the package power does not exceed this limit.
C states	Disabled **Enabled**	Enables/Disables CPU Power Management. Allows CPU to go to C states when it is not 100% utilized.
Enhanced C-states	Disabled **Enabled**	Enables/Disables C1E. When enabled, CPU will switch to minimum speed when all cores enter C-State.
C-State Auto Demotion	Disabled **C1**	Configures C-State Auto Demotion
C-State Un-demotion	Disabled **C1**	Configures C-State Un-demotion
Package C-State Demotion	Disabled **Enabled**	Package C-State Demotion
Package C-State Un-demotion	Disabled **Enabled**	Package C-State Un-demotion

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3.4.3 Advanced > Thermal Configuration

Feature	Options	Description
Enable All Thermal Functions	Disabled **Enabled**	Enables: - Memory Thermal Management - Active Trip Points - Critical Trip Points Set to disabled for manual configuration.

3.4.4 Advanced > OverClocking Performance Menu

Feature	Options	Description
WDT Enable	Disabled **Enabled**	Enables/Disables WatchDog Timer. Note: This option is ignored on debug BIOS.

3.4.5 Advanced > NCT5104D Super IO Configuration

Feature	Options	Description
Super IO Chip	Info only	
Serial Port 1 Configuration ►	Sub-Menu	
Serial Port	Disabled **Enabled**	Enables/Disables Serial Port (COM)
Device Settings	IO=3F8h IRQ=4	
Change Settings	**Auto** IO=3F8h; IRQ=4 IO=3F8h; IRQ=3,4,5,6,7,9,10,11,12 IO=2F8h; IRQ=3,4,5,6,7,9,10,11,12 IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12 IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12	Select an optimal setting for Super IO Device.

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3.4.6 Advanced > Serial Port Console Redirection

Feature	Options	Description
Console Redirection	**Disabled** Enabled	Enables/Disables Console Redirection
Console Redirection Settings ►	Sub-Menu	
Terminal Type	VT100 VT100+ VT-UTF8 **ANSI**	ANSI: Extended ASCII char set. - VT100: ASCII char set. - VT100+: Extends VT100 to support color, function keys, etc. - VT-UTF8: Uses UTF8 encoding to map Unicode chars onto 1 or more bytes.
Bits per second	9600 19200 38400 57600 **115200**	Selects serial port transmission speed. The speed must be matched on the other side. Long or noisy lines may require lower speeds.
Data Bits	7 **8**	Data Bits
Parity	**None** Even Odd Mark Space	A parity bit can be sent with the data bits to detect some transmission errors. - Even: parity bit is 0 if the num of 1's in the data bits is even. - Odd: parity bit is 0 if num of 1's in the data bits is odd. - Mark: parity bit is always 1. - Space: Parity bit is always 0. Mark and Space Parity do not
Stop Bits*	**1** 2	Stop bits indicate the end of a serial data packet. (A start bit indicates the beginning). The standard setting is 1 stop bit. Communication with slow devices may require more than 1 stop bit.

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Feature	Options	Description
Flow Control*	**None** Hardware RTS/CTS	Flow control can prevent data loss from buffer overflow. When sending data, if the receiving buffers are full, a 'stop' signal can be sent to stop the data flow. Once the buffers are empty, a 'start' signal can be sent to re-start the flow. Hardware flow control uses two wires to send start/stop
VT-UTF8 Combo Key Support	Disabled **Enabled**	Enables/Disables VT-UTF8 Combination Key Support for ANSI/VT100 terminals
Recorder Mode	**Disabled** Enabled	With this mode enabled only text will be sent. This is to capture Terminal data.
Resolution 100x31	**Disabled** Enabled	Enables/Disables extended terminal resolution
Putty KeyPad	**VT100** LINUX XTERMR6 SCO ESCN VT400	Select FunctionKey and KeyPad on Putty.

3.4.7 Advanced > USB Configuration

Feature	Options	Description
Legacy USB Support	**Enabled** Disabled	Enables Legacy USB support. AUTO option disables legacy support if no USB devices are connected. DISABLE option will keep USB devices available only for EFI applications.
XHCI Hand-off	**Enabled** Disabled	This is a workaround for OSes without XHCI hand-off support. The XHCI ownership change should be claimed by the XHCI driver.
USB Mass Storage Driver Support	Disabled **Enabled**	Enables/Disables USB Mass Storage Driver Support.
USB hardware delays and time-outs:		

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Feature	Options	Description
USB transfer time-out	1 sec 5 sec 10 sec **20 sec**	The time-out value for Control, Bulk, and Interrupt transfers.
Device reset time-out	10 sec **20 sec** 30 sec 40 sec	USB mass storage device Start Unit command time-out.
Device power-up delay	**Auto** Manual	Maximum time the device will take before it properly reports itself to the Host Controller. 'Auto' uses the default value: 100 ms for a Root port, for a Hub port the delay is taken from the Hub descriptor.

3.4.8 Advanced > Network Stack Configuration

Feature	Options	Description
Network Stack	**Disabled** Enabled	Enables/Disables UEFI Network Stack
Ipv4 PXE Support	**Disabled** Enabled	Enables/Disables IPv4 PXE boot support. If disabled, IPv4 PXE boot support will not be available.
Ipv4 HTTP Support	**Disabled** Enabled	Enables/Disables IPv4 HTTP boot support. If disabled, IPv4 HTTP boot support will not be available.
Ipv6 PXE Support	**Disabled** Enabled	Enables/Disables IPv6 PXE boot support. If disabled, IPv6 PXE boot support will not be available.
Ipv6 HTTP Support	**Disabled** Enabled	Enables/Disables IPv6 HTTP boot support. If disabled, IPv6 HTTP boot support will not be available.

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Feature	Options	Description
PXE boot wait time	[Max-Value, Min-Value, Step-Value] = [0x05, **0x00**, 0x01]	Wait time in seconds to press ESC key to abort PXE boot. Use either +/- or numeric keys to set the value.
Media detect count	[Max-Value, Min-Value, Step-Value] = [0x32, **0x01, 0x01**]	Number of times the presence of media will be checked. Use either +/- or numeric keys to set the value.

3.4.9 Advanced > NVMe Configuration

Feature	Options	Description
NVMe controller and Drive information		
No NVME Device Found		
Controller 0		
Nvme Size		

3.4.10 Advanced > RAM Disk Configuration

Feature	Options	Description
Disk Memory Type	**Boot Service Data** Reserved	Specifies type of memory to use from available memory pool in system to create a disk.
Create raw ►	Sub-Menu	
Size (Hex)	1	The valid RAM disk size should be multiples of the RAM disk block size.
Create & Exit		
Discard & Exit		

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Feature	Options	Description
Create from file ►	Sub-Menu	
Created RAM disk list:		
Remove selected RAM disk(s).		

3.4.11 Advanced > Intel(R) I210 Gigabit Network Connection – 00:30:64:31:CF:1B

Feature	Options	Description
NIC Configuration ►	Sub-Menu	
Blink LEDs	0	Blink LEDs for a duration up to 15 seconds.
UEFI driver	Info only	
Adapter PBA		
Device Name	Intel(R) I210 Gigabit Network Connection	
Chip Type	Intel I210	
PCI Device ID	1539	
PCI Address	01:00:00	
Link Status	[Disconnected]	
MAC address	00:30:64:34:CF:1B	

3.4.12 Advanced > Intel(R) I210 Gigabit Network Connection – 00:30:64:31:CF:1C

Feature	Options	Description
NIC Configuration ►	Sub-Menu	
Blink LEDs	0	Blink LEDs for a duration up to 15 seconds.
UEFI driver	Info only	
Adapter PBA		
Device Name	Intel(R) I210 Gigabit Network Connection	

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Feature	Options	Description
Chip Type	Intel I210	
PCI Device ID	1539	
PCI Address	02:00:00	
Link Status	[Disconnected]	
MAC address	00:30:64:34:CF:1C	

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3.5 Chipset

3.5.1 Chipset > System Agent (SA) Configuration

Feature	Options	Description
VT-d	Supported	
Memory Configuration ►	Sub-Menu	
Memory RC Version	Info only	
Memory Speed	Info only	
Memory Timings (tCL-tRCD-tRP-tRAS)	Info only	
Controller 0 Channel 0 Slot 0	Info only	
Size	Info only	
Number of Ranks	Info only	
Manufacturer	Info only	
Controller 0 Channel 0 Slot 1	Info only	
Controller 1 Channel 0 Slot 0	Info only	
Controller 1 Channel 0 Slot 1	Info only	

3.5.2 Chipset > PCH-IO Configuration > SATA Configuration

Feature	Options	Description
SATA Controller(s)	Disabled **Enabled**	Enables/Disables SATA Device.
SATA Controller Speed	Default Gen1 Gen2 **Gen3**	Indicates the maximum speed the SATA controller can support.
Serial ATA Port 1		
Software Preserve		
Port 1	Disabled **Enabled**	Enables/Disables SATA Port
Configured as eSATA	Hot Plug supported	

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3.6 Security

Password Description	
If ONLY the Administrator's password is set, then this only limits access to Setup and is only asked for when entering Setup. If ONLY the User's password is set, then this is a power on password and must be entered to boot or enter Setup. In Setup the User will have Administrator rights.	
The password length must be in the following range:	
Minimum length	3
Maximum length	20
Administrator Password	
User Password	
Secure Boot ►	Sub-Menu

3.6.1 Security > Secure Boot

Feature	Options	Description
System Mode	User	
Secure Boot*	**Disabled** Enabled	Enables/Disables Secure Boot feature,
Secure Boot Mode	**Standard** Custom	Secure Boot mode options:
Restore Factory Keys		
Reset To Setup Mode		
Key Management		

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3.7 Boot

3.7.1 Boot > Boot Configuration

Feature	Options	Description	
Setup Prompt Timeout	[Max-Value, Min-Value, Step-Value] = [0xFFFF, **0x0001**, **0x0001**]	Number of seconds to wait for setup activation key. 65535 (0xFFFF) means indefinite waiting.	
Bootup NumLock State	On **Off**	Selects the keyboard NumLock state.	
Quiet Boot	Disabled **Enabled**	Enables/Disables Quiet Boot option.	
Fast Boot	**Disabled** Enabled	Enables/Disables boot with initialization of a minimal set of devices required to launch active boot option. Has no effect for BBS boot options.	
Boot Option #1	Hard Disk NVME UEFI AP CD/DVD SD USB Hard Disk USB CD/DVD USB Key USB Floppy USB LAN Network Disabled	**Hard Disk**	Sets the system boot order
Boot Option #2		**NVME**	
Boot Option #3		**UEFI AP**	
Boot Option #4		**CD/DVD**	
Boot Option #5		**SD**	
Boot Option #6		**USB Hard Disk**	
Boot Option #7		**USB CD/DVD**	
Boot Option #8		**USB Key**	
Boot Option #9		**USB Floppy**	
Boot Option #10		**USB LAN**	
Boot Option #11		**Network**	
UEFI Application Boot Priorities			

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3.8 Save & Exit

Feature	Options	Description
Save Options	Info only	
Save Changes and Exit	Yes No	Exits system setup after saving the changes.
Discard Changes and Exit	Yes No	Exits system setup without saving any changes.
Save Changes and Reset	Yes No	Resets the system after saving the changes.
Discard Changes and Reset	Yes No	Resets system setup without saving any changes.
Save Changes	Yes No	Saves changes done so far to any of the setup options.
Discard Changes	Yes No	Discards changes done so far to any of the setup options.
Default Options	Info only	
Restore Defaults	Yes No	Restores/Loads default values for all the setup options.
Save as User Defaults	Yes No	Saves the changes done so far as User Defaults.
Restore User Defaults	Yes No	Restores the User Defaults to all the setup options.
Boot Override	Info only	
UEFI: Built-in EFI Shell		
Launch EFI Shell from filesystem device		

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4 Driver & Application Installation

After installing the operating system, all related drivers must be installed for the system to function properly. This section describes the drivers needed for Windows operating systems and the procedures to install them. For other OS support, contact ADLINK for further information.

Install drivers as follows.

1. Fully install Microsoft Windows OS before installing any drivers. Most standard I/O device drivers have been included in Microsoft Windows OS. For Windows 10 IoT Enterprise users, please note that you need Administrator privilege to install the drivers properly.

2. Install the chipset driver.

3. Install the graphics driver.

4. Install the Ethernet driver.

5. Install the USB 3.0 driver.

6. Install the I/O driver.

The driver can be downloaded from the ADLINK website.

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Important Safety Instructions

For user safety, please read and follow all instructions, Warnings, Cautions, and Notes marked in this manual and on the associated device before handling/operating the device, to avoid injury or damage.

- Read these safety instructions carefully.
- Keep the User's Manual for future reference.
- Read the Specifications section of this manual for detailed information on the recommended operating environment.
- It is recommended that the device be installed in Information Technology Rooms that are in accordance with Article 645 of the National Electrical Code and NFPA 75.
- When installing/mounting or uninstalling/removing device is required:
  - Turn off power and unplug any power cords/cables.
  - Reinstall all chassis covers before restoring power.
- To avoid electrical shock and/or damage to device:
  - Keep device away from water or liquid sources.
  - Keep device away from high heat or humidity.
  - Keep device properly ventilated (do not block or cover ventilation openings).
  - Always use recommended voltage and power source settings.
  - Always install and operate device near an easily accessible electrical outlet.
  - Secure the power cord (do not place any object on/over the power cord).
  - Only install/attach and operate device on stable surfaces and/or recommended mountings.
  - The device is powered by an adapter or DC source. Ensure that the adapter or DC source is properly grounded.
- If the device will not be used for long periods of time, turn off and unplug from its power source.
- Never attempt to repair the device, which should only be serviced by qualified technical personnel using suitable tools.

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- A Lithium-type battery may be provided for uninterrupted backup or emergency power.



Risk of explosion if battery is replaced with one of an incorrect type; please dispose of used batteries appropriately.

- The device must be serviced by authorized technicians when:
  - The power cord or plug is damaged
  - Liquid has entered the device interior
  - The device has been exposed to high humidity and/or moisture
  - The device is not functioning or does not function according to the User's Manual
  - The device has been dropped and/or damaged and/or shows obvious signs of breakage
- Disconnect the power supply cord before loosening the thumbscrews and always fasten the thumbscrews with a screwdriver before starting the system up.
- It is recommended that the device be installed only in a server room or computer room where access is:
  - Restricted to qualified service personnel or users familiar with restrictions applied to the location, reasons therefor, and any precautions required
  - Only afforded by the use of a tool or lock and key, or other means of security, and controlled by the authority responsible for the location.

	**BURN HAZARD** Touching this surface could result in bodily injury. To reduce risk, allow the surface to cool before touching.

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Consignes de Sécurité Importante

Pour la sécurité de l'utilisateur, veuillez lire et suivre toutes les instructions, avertissements, mises en garde et notes marqués dans ce manuel et sur l'appareil associé avant de manipuler/ d'utiliser l'appareil, afin d'éviter toute blessure ou tout dommage.

- *Lisez attentivement ces consignes de sécurité*
- *Conservez le manuel de l'utilisateur pour pouvoir le consulter ultérieurement*
- *Lisez la section Spécifications de ce manuel pour des informations détaillées sur l'environnement d'exploitation recommandé*
- *Il est recommandé d'installer l'appareil dans Information Salles technologiques conformes à l'article 645 du Code national de l'électricité et NFPA 75.*
- *Lorsque l'installation/le montage ou la désinstallation/le retrait du périphérique est requis:*
  - *Mettez l'appareil hors tension et débranchez tous les cordons/câbles d'alimentation*
  - *Réinstallez tous les couvercles de châssis avant de rétablir l'alimentation*
- *Pour éviter les chocs électriques et/ou d'endommager l'appareil:*
  - *Tenez l'appareil à l'écart de toute source d'eau ou de liquide.*
  - *Tenez l'appareil à l'écart d'une forte chaleur ou d'une humidité élevée.*
  - *Maintenez l'appareil correctement ventilé (n'obstruer ou ne couvrez pas les ouvertures de ventilation).*
  - *Utilisez toujours les réglages de tension et de source d'alimentation recommandés.*
  - *Installez et utilisez toujours l'appareil près d'une prise de courant facilement accessible.*
  - *Fixez le cordon d'alimentation (ne placez aucun objet sur le cordon d'alimentation).*

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- *Installez/fixez et utilisez l'appareil uniquement sur des surfaces stables et/ou sur les fixations recommandées.*
- *L'ordinateur Smart Touch est alimenté par un adaptateur ou une source CC. Veuillez vous assurer que l'adaptateur ou la source CC doit conserver la connexion à la terre s'il est doté d'une protection.*

- *Si l'appareil ne doit pas être utilisé pendant de longues périodes, éteignez-le et débranchez-le de sa source d'alimentation*
- *N'essayez jamais de réparer l'appareil, qui ne doit être réparé que par un personnel technique qualifié à l'aide d'outils appropriés*
- *Une batterie de type Lithium peut être fournie pour une alimentation de secours ininterrompue ou d'urgence.*



ATTENTION: Risque d'explosion si la pile est remplacée par une autre de type incorrect. Veuillez jeter les piles usagées de façon appropriée.

- *L'appareil doit être entretenu par des techniciens agrees lorsque:*
  - *Le cordon d'alimentation ou la prise est endommagé(e)*
  - *Un liquide a pénétré à l'intérieur de l'appareil.*
  - *L'appareil a été exposé à une forte humidité et/ou de la buée.*
  - *L'appareil ne fonctionne pas ou ne fonctionne pas selon le manuel de l'utilisateur.*
  - *L'appareil est tombé et/ou a été endommagé et/ou présente des signes évidents de dommage.*
- *Débranchez le cordon d'alimentation avant de desserrer les vis à oreilles et serrez toujours les vis à oreilles avec un tournevis avant de mettre le système en marche.*

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- *Il est recommandé d'installer l'appareil uniquement dans une salle de serveurs ou une salle informatique où l'accès est:*
  - *Réservé au personnel de service qualifié ou aux utilisateurs familiarisés avec les restrictions appliquées à l'emplacement, aux raisons de ces restrictions et toutes les précautions requises*
  - *Uniquement autorisé par l'utilisation d'un outil, d'une serrure et d'une clé, ou d'un autre moyen de sécurité, et contrôlé par l'autorité responsable de l'emplacement.*

	***RISQUE DE BRÛLURES*** ***Partie chaude!*** *Ne touchez pas cette surface, cela pourrait entraîner des blessures. Pour éviter tout danger, laissez la surface refroidir avant de la toucher.*

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EMC Compliance

CE Warning

This is a Class B product. In a domestic environment, this product may cause radio interference, in which case the user may be required to take adequate measures.

FCC Warning

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

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

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Getting Service

Ask an Expert: http://askanexpert.adlinktech.com

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