

DEX-100

Data Extraction System

User's Manual



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Leading EDGE COMPUTING



Revision History

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Preface

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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.



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



Information to prevent *minor* physical injury, component damage, data loss, and/or program corruption when trying to complete a task.



Information to prevent *serious* physical injury, component damage, data loss, and/or program corruption when trying to complete a specific task.

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1 Introduction



ADLINK's DEX-100 intelligent data extraction system utilizes builtin frame grabber and optical character recognition (OCR) to collect and process legacy system-based display content. Easy-to-use DEX-PRO utilities simplify mapping of acquired video content with no additional programming required, with the system acquiring and processing targeted display content from multiple pages.

2 DI connections interface with external devices and extend M2M function, enabling integration of new devices such as barcode scanners and providing synchronization of all collected data for subsequent distribution to anywhere in the network.

The DEX-100 utilizes the DDS (Data Distribution Services) protocol to deliver full data availability in real time, enhancing reliability and efficiency. Remote control is also available.



1.1 Features

- ► Non-intrusive system
- ► VGA/DVI output Port support
- Remote monitoring by PS/2 and USB keyboard mouse devices
- Pre-installed DEX-PRO utility supports keyboard/mouse script edits and image data transformation
- ▶ Real-time data extraction and OP screen presentation
- Offline script editing
- Windows 10 IoT
- Data extraction via OCR (optical character recognition):
 - ▷ Up to 500 tags/30 extraction pages
 - OCR speed 35ms/ROI (at 1080x768 screen resolution, 52x20 pixels, w/ Windows default font @ 9 pt, speed may vary with resolution and font size)
- Data Extraction and User Full Machine Control modes hard or soft switchable by user
- Script generation:
 - > Over 50 script commands supported
 - Online and offline scripting supported (with offline reducing machine interference)
 - ▷ Pre-configured script loading for script deployment
- Event notification through machine alarm/warnings
- Data extraction summary page supports up to 500 rows of data
- Local Log file retained for up to 120 days

1.2 Specifications

System		
Processor Quad core Intel® Atom® processor E3950		
Operating System	Windows 10 IoT Enterprise 64	
RAM	DDR3L 1066 4GB	
Storage	128 GB SSD	
I/O Interface		
► 2x GbE LAN	V (Intel® I210-IT)	
► 2x COM (2x	(RS-232/422/485)	
▶ 2x USB 2.0	+ 2x USB 3.0 + 2x USB Micro-B	
► 2x PS/2 inp	ut+2x PS/2 output (keyboard/mouse)	
 VGA input, 	DVI input,	
 VGA output 	, DVI output,	
 DisplayPort (For local DP display) 		
► 2x isolated DI		
Power Supply		
DC Input	12-36 VDC	
AC Input	Optional 40W AC/DC adapter	
LED Indicators		
Mechanical		
Dimensions	140 (W) x 110 (D) x 80 (H) mm	
Weight < 1 kg		
Construction Full aluminum alloy		
Mounting Wall mount, DIN rail		
Communicatio n Protocol and Interface	DDS (Distributed Data Service), REST	
Field Bus Communicatio n	Modbus TCP and Modbus RTU	



Environmenta	& Electrical
Operating Temperature	Standard: 0 to 50°C
Storage Temperature	-40°C to 85°C
Humidity	Approx. 95% @40°C (non-condensing)
Vibration	Operating 5 Grms, 5-500Hz, 3 axes w/ SD/mSATA SSD
ESD	mSATA SSD ESD Contact +/-4 KV, Air +/-8 KV
Shock	Operating 100G, half sine 11 ms duration w/ SD/mSATA SSD
EMC	CE & FCC Class A (EN610006-4/EN61000-6-2)
Safety	UL by CB

Machine Output Display Resolution Support				
		640 x 480, 60fps		1280 x 800, 60fps
	►	640 x 480, 75fps		1280 x 800, 75 fps
	►	640 x 480, 85fps		1280 x 800, 85 fps
	►	800 x 600, 60fps		1280 x 1024, 60fps
		800 x 600, 75fps		1280 x 1024, 75 fps
	►	800 x 600, 85fps		1280 x 1024, 85 fps
	►	1024 x 768, 60fps		1360x 768, 60 fps
VGA	►	1024 x 768, 75fps		1400x 1050, 60 fps
	►	1024 x 768, 85fps		1400x 1050, 75 fps
	►	1152 x 864, 75fps		1440x 900, 60 fps
	►	1280x 720, 50 fps		1600x 1200, 60fps
	►	1280x 720, 60 fps		1680x 1050, 60 fps
	►	1280 x 768, 60fps		1920x 1080, 50 fps
		1280 x 768, 75 fps		1920x 1080, 60 fps
		1280 x 768, 85 fps		

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▶ 640 x 480, 60 fps	1360 x 768, 60 fps
▶ 800 x 600, 60 fps	▶ 1366 x 768, 60 fps
▶ 1024 x 768, 60 fps	▶ 1440 x 900, 60 fps
1024 x 768, 75 fps	▶ 1440 x 900, 75 fps
 1152 x 864, 75 fps 	▶ 1600 x 1200, 60 fps
 1280 x 720, 50 fps 	▶ 1680 x 1050, 60 fps
▶ 1280 x 720 , 60 fps	▶ 1920 x 1080, 24 fps
▶ 1280 x 768, 60 fps	▶ 1920 x 1080, 50 fps
1280 x 800, 60 fps	▶ 1920 x 1080, 60 fps
1280 x 800, 60 fps	▶ 1920 x 1200, 50 fps
1280 x 960, 60 fps	▶ 1920 x 1200, 60 fps
 1280 x1024, 60 fps 	

Power Consumption				
Power off	1.2W (0.05A@24VDC)	In shutdown mode with DC input and only USB keyboard/mouse		
System idle	21W (0.86A@24VDC)	Under Windows Desktop with no application programs executed		
		 Total PoE loading is 32W 		
System full load	164W (6.81A@24VDC)	 Dummy load of 4.5W in con- nection to represent each USB 3.0 load 		
		 Dummy load of 2.5W in con- nection to represent each USB 2.0 load 		
		 HDD permanently accessed 		
		 CPU(i7-6700) @ 100% load- ing (by Burn-in test program) 		
Recommended power supply	180W			



1.3 Mechanical Drawings



All dimensions shown are in millimeters (mm) unless otherwise stated.













Figure 1-4: (Left) Side View



Figure 1-5: Rear Side View

1.4 Front Panel I/O Connectors



Figure 1-6: Front Panel I/O

I/O connectors and controls on the DEX-100 front panel, as labeled, are as follows

- Power button
- VGA Out
- DisplayPort
- PS/2 keyboard port
- PS/2 mouse port
- ► Serial ports (COM1 and COM2)
- ▶ USB2.0 port x2
- USB 3.0 port x2
- LAN port x2
- Micro USB type B x2
- DI connectors
- LED indicators



1.4.1 Power Button

System is turned on when button is pressed, and the power LED lit. If the system hangs, depressing the button for 5 seconds powers down the unit. LED indicator functions as follows

System Status	Power Button LED
Idle on OS	Lit
Power OFF	Off
Sleep (S3)	Blinking

Table 1-1: Power Button LED Indicator Legend

1.4.2 VGA Out

One VGA connector for output supports 1920x1080 60Hz timing signal.



Figure 1-7: VGA Out Connector

Pin	Signal	Pin	Signal
1	RED	9	KEY/PWR
2	GREEN	10	GND
3	BLUE	11	ID0/RES
4	ID2/RES	12	ID1/SDA
5	GND	13	HSync
6	RED_RTN	14	VSync

Pin	Signal	Pin	Signal
7	GREEN_RTN	15	
8	BLUE_RTN	15	ID3/SCL

Table	1-2:	VGA	Out	Pin	Assignment
-------	------	-----	-----	-----	------------

1.4.3 DisplayPort

The DisplayPort v1.1 connection supports up to 3840x2160 @ 30Hz.



Figure 1-8: DisplayPort Connector

Pin	Signal	Pin	Signal
1	CN_DP0_P	2	GND
3	CN_DP0_N	4	CN_DP1_P
5	GND	6	CN_DP1_N
7	CN_DP2_P	8	GND
9	CN_DP2_N	10	CN_DP3_P
11	GND	12	CN_DP3_N
13	CN_CAD-L	14	CN_CEC
15	CN_AUX_P	16	GND
17	CN_AUX_N	18	DDP_HPD
19	GND	20	P3V3

Table 1-3: DisplayPort Pin Assignment



1.4.4 PS/2 Ports

Two PS/2 ports support keyboard and mouse connection.



Figure 1-9: PS/2 Port

Pin	Signal	Description
1	+DATA	Data
2	N/A	N/C [b]
3	GND	Ground
4	Vcc	+5 V DC at 275 mA
5	+CK	Clock
6	N/A	N/C (c]

Table 1-4: PS/2 Port Pin Assignment

1.4.5 Serial ports (COM1 and COM2)

COM1 supports RS-232/422/485 based on switch setting on the mainboard, with RS-232 the default, and COM2 supports RS-232 only.



Figure 1-10: COM1 and COM2 Connectors

Pin	Signal		
	RS232	RS422	RS485
1	DCD#	TXD422-	485DATA-
2	RXD	TXD422+	485DATA+
3	TXD	RXD422+	N/S
4	DTR#	RXD422-	N/S
5	GND	N/S	N/S
6	DSR#	N/S	N/S
7	RTS#	N/S	N/S
8	CTS#	N/S	N/S
9	RI#	N/S	N/S

Table 1-5: COM1 and COM2 Connectors Pin Assignments

1.4.6 USB Ports

2 USB 3.0 and 2USB 2.0 ports each provide 5V power for connected devices.





Figure 1-11: USB 2.0

Pin	Signal	
1	Vcc	
2	UV0-	
3	UV0+	
4	GNE	

Table 1-6: USB 2.0 Pin Assignments



Figure 1-12: USB 3.0

Pin	Signal	
1	USB3.0_P5VA	
2	USB2_CMAN	
3	USB2_CMAP	
4	GND	
5	USB3A_CMRXN	
6	USB3A_CMRXP	

Pin	Signal
7	GND
8	USB3A_CMTXN
9	USB3A_CMTXP

Table 1-7: USB 3.0 Pin Assignments

1.4.7 LAN Ports

Two Gigabit Ethernet ports support the intel i210IT GbE controller, providing

- ▶ IEEE 802.3az Energy Efficient Ethernet
- ► IEEE 1588/802.1AS precision time synchronization
- ▶ IEEE 802.3Qav traffic shaper
- ► Interrupt moderation, VLAN support, IP checksum offload
- ▶ PCIe OBFF (Optimized Buffer Flush/Fill)
- ► Four transmit and four receive queues
- RSS and MSI-X to lower CPU utilization in multi-core systems
- ► ECC error correcting memory in packet buffers
- Wake-On-LAN
- NC-SI for increased bandwidth passthrough
- Preboot eXecution Environment (PXE) flash interface
- Jumbo frame support



Figure 1-13: LAN Port



Pin	10BASE-T/100BASE-TX	1000BASE-T
1	TX+	LAN_MDI0+
2	TX-	LAN_MDI0-
3	RX+	LAN_MDI1+
4	N/A	LAN_MDI2+
5	N/A	LAN_MDI2-
6	RX-	LAN_MDI1-
7	N/A	LAN_MDI3+
8	N/A	LAN_MDI3-

LED	Activity	
	Off	No Link
LED1 (Active/Link)	Orange	Link Active
	Blinking	Data Activity
	Off	10 Mb connection
LED2 (Speed)	Green	100 Mb connection
(00000)	Orange	1 Gb connection

Table 1-9: LAN Port LED Legend

1.4.8 USB Micro-b Connector

USB keyboard and mouse bypass are provided by dual USB micro-b connectors, for connection to machine PC.

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Figure 1-14: USB Micro-b Connector

Pin	Signal	Description
1	VBUS	+5 V
2	D-	Data-
3	D+	Data+
4	ID	N/A
5	GND	Signal ground

|--|

1.4.9 DI Connectors

Dual channel digital input function is provided within a terminal block male connector.



Figure 1-15: DI Connector



Pin		VCOM=0V	VCOM=24V
1 Digital input 2	24V: Enabled	0V: Enabled	
	0V/open: Disabled	24V/open: Disabled	
2	VCOM	0V	24V
3 Digital inp	Digital input 1	24V: Enabled	0V: Enabled
	Digital input 1	0V/open: Disabled	24V/open: Disabled

Table 1-11: DI Connector Pin Assignment

1.4.10 LED Indicators

In addition to the LED of the power button, LEDs on the front panel indicate operations as follows.

Indicator	Color	Description
U1	Green	User defined
U2	Green	User defined
U3	Green	User defined
Watchdog Timer (WDT)	Yellow	Indicates watchdog timer status, flashing when watchdog timer starts, with system will auto rebooting when timer expires
HDD	Red	Blinks when SATA HDD is active
Standby Power	Blue	Lights when DC input is plugged in, off when system powers on

Table 1-12: LED Indicator Legend

1.5 Right Side I/O Connectors



Figure 1-16: Right Side Panel I/O

 $\ensuremath{\text{I/O}}$ connectors and controls on the DEX-100 right side panel, as labeled, are as follows

- VGA In
- ▶ PS/2 mouse port
- ▶ PS/2 keyboard port



1.6 Left Side I/O Connectors



Figure 1-17: Left Side Panel I/O

 $\ensuremath{\text{I/O}}$ connectors and controls on the DEX-100 left side panel, as labeled, are as follows

- DC Power Connector
- ► DVI port
- ► MPC DVI port

1.6.1 DC Power Connector

Consists of V+, chassis ground, and V- pins. V+ and V- pins accept DC power input and chassis ground pin enhances EMC compatibility. The DC power input accepts 24 VDC input.



Figure 1-18: Power Supply Connector

Pin	Signal
1	V+(DC_IN)
2	GND(CHGND)
3	V- (DGND)

Table 1-13: DC Power Supply Pin Assignments

1.6.2 DVI Port

Both DVI-D connectors, one for input and the other for output, support 1920x1080 60Hz timing signal.



Figure 1-19: DVI Port

Pin	Signal	
1	V+(DC_IN)	



Pin	Signal
2	GND(CHGND)
3	V- (DGND)

Table	1-14: DVI	Port Pin	Assignments
-------	-----------	----------	-------------

1.7 DI/O Sample Circuits

1.7.1 Isolated Digital Input Circuits

The input can accept voltages up to 24V, with extra $10k\Omega$ input resistors (Rs). Connections between outside signals are as follows.



Figure 1-20: Digital Input Sample Application Circuit

2 Getting Started

2.1 Unpacking Checklist

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.

- ▶ DEX-100
- DI Connector
- DC Power Connector
- Recovery CD
- Technical service card

2.2 Adaptors & Additional Accessories

Device adaptors and other optional accessories should only be obtained through your ADLINK dealer. For more information, see "Getting Service" on page 69.

2.3 Wall Mounting

The DEX-100 provides 3 wall-mount configurations.



Mounting screws must be at least size #10 (min. 0.1875 in. or 4.762 mm) or M5 type long enough to provide sufficient support.





Figure 2-1: Wall-mount (Rear Panel Up)



Figure 2-2: Wall-mount (Right Side Panel Up)


Figure 2-3: Wall-mount (Left Panel Up)

Attach the provided wall-mount brackets in the four screw holes on the underside of the chassis (use four M4 screws) according to the desired configuration (wall-mount with rear panel up is shown as an example).



Figure 2-4: Wall-mount Bracket Attachment (Rear Panel Up)



2.4 DIN Rail Mounting

DEX-100 DIN rail installation is provided in right side up and left side up configurations.

2.4.1 DIN Rail Mount (Right Side Up)

Place the terminal plate with VGA label up and secure the provided DIN rail bracket via the two screw holes on the rear side of the terminal plate.



3. Secure the terminal plate via the 3 screw holes to the rear side of the chassis.





2.4.2 DIN Rail Mount (Left Side Up)

1. Place the terminal plate with DVI label up and secure the provided DIN rail bracket via the two screw holes on the rear side of the terminal plate.



2. Secure the terminal plate via the 3 screw holes to the rear side of the chassis.



2.5 Driver Installation



Due to lack of controller support under Windows 10, successful OS installation may be prevented. For available solutions, please contact your ADLINK representative.

Download requisite drivers, as follows, for your system from http:// www.adlinktech.com and install.

- Chipset
- Graphics
- Ethernet
- USB3
- Serial I/O
- ► TXE (Intel® Trusted Execution Technology)
- ► DEX-PRO Utility



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Appendix A BIOS Setup



BIOS options in the manual are for reference only, and are subject to configuration.

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 DEX-100. The BIOS setup program includes menus for configuring settings and enabling features of the DEX-100 series. Most users do not need to use the BIOS setup program, as the DEX-100 ships with default settings that work well for most configurations.

Enter BIOS setup by selecting DEL when the system is powered on. The POST (Power On Self Test) message appears. Selecting F7 at POST opens the one-time Boot Menu, allowing selection of boot device(s).



A.1 Main

BIOS Information		Board Information
BIOS Vendor	American Megatrends	
BIOS Version	1.00.10	
Build Date	12/27/2017	
MRC Version	0.56	
GOP Version	10.0.1035	
TXE FW Version	3.1.50.2222	
BIOS Boot Source	Primary BIOS	
System Information		
Project Name	DEX-series	
CPU Board version	A3	
CPU Brand String	Intel(R) Atom(TM) Proce	1
	ssor E3930 @ 1.30GHz	++: Select Screen
CPU Frequency	1.30GHz	14: Select Item
Total Memory	2048 MB(DDR3L)	Enter: Select
Memory Frequency	1600 MHz	+/-: Change Opt.
SOC SKU	DO	F1: General Help
		F8: Previous Values
⊢ Board Information		F9: Optimized Defaults
	filled an inclusion	F10: Save & Exit
System Date	[Net 12/2//2017]	ESC: EXIT
System Time	[18:10:54]	
Access Level	Administrator	

A.1.1 BIOS Information

Shows current system BIOS core version, BIOS version and Board version.

A.1.2 System Time/System Date

Changes system time and date. Highlight System Time or System Date using the up or down <Arrow> keys. Enter new values using the keyboard then <Enter>. Use < Tab > to move between fields. The date must be entered in MM/DD/YY format. The time is entered in HH:MM:SS format.



The time is in 24-hour format, for example, 5:30 A.M. appears as 05:30:00, and 5:30 P.M. as 17:30:00.

A.1.3 Board Information

Main	Aptio Setup	Utility – Copyright	(C) 2017 American	Megatrends,	Inc.
Board Informa Serial Number Manufacturing Last Repair D MAC ID	tion Date ate	987654321 2013/09/3 2013/09/0 665544332	1 1 2 211		
Runtime Stati Total Runtime Current Runti Power Cycles Boot Cycles Boot Reason	stics me	28h 23m Oh 03m 06: 99 1888 Software-0	s	++: Select : f4: Select Enter: Select +/-: Change F1: General F8: Previou: F9: Optimiz: F10: Save & ESC: Exit	Screen Item 2t Opt. Help s Values 2d Defaults Exit
-	Version 2.1	18.1263. Copyright (C) 2017 American Me	egatrends, In	10.

Displays serial number, manufacturing date, last repair date, and MAC ID. As well, Runtime Statistics are listed, including total runtime, current runtime, power cycles, boot cycles, and boot reason.



A.2 Advanced

Aptio Setup Utility – Copyright (C) 2017 American Main <mark>Advanced</mark> Security Boot Save & Exit	Megatrends, Inc.
 CPU Configuration Graphics Configuration Onboard Device Configuration Advanced Power Management USB Configuration SATA Configuration TPM Configuration Network Stack Configuration System Management Miscellaneous 	CPU Configuration Parameters
 Intel(R) I210 Gigabit Network Connection - 00:30:64:0A: Intel(R) I210 Gigabit Network Connection - 00:30:64:0A: 	<pre>++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F8: Previous Values F9: Optimized Defaults F10: Save & Exit ESC: Exit</pre>
Version 2.18.1263. Copyright (C) 2017 American Me	gatrends, Inc.



Setting incorrect or conflicting values in Advanced BIOS Setup may cause system malfunction.

A.2.1 CPU Configuration

PU Configuration		Number of cores to enable in
Pli Clanatura	EAECS.	each processor package.
lonocode Patch	2000.0	
av CPU Sneed	1300 MH2	
in CPU Speed	800 1017	
PU Speed	1900 MHz	
rocessor Cores	2	
uper Threading Technology	Not Supported	
ntel VT-x Technology	Supported	
4-bit	Supported	
1 Data Cache	24 kB x 2	
1 Code Cache	32-K8 × 2	++: Select Screen
2 Cache	1024 KB × 2	T4: Select Item
3 Cache	Not Present	Enter: Select
		File Common Male
ntal Victualitation Technology	(Conduced)	FU: Braulour Unions
T-4	[Disablad]	E9: Octimized Opticality
arden Mode	(Enabled)	E101 Shup & Evit
nitical Trip Point	[Disabled]	ESC: Exit
assive Cooling Trip Point	ID is abled!	and the second
and a second second		

Active Processor Cores

Number of cores to enable in each processor package.

Intel Virtualization Technology

When enabled, allows a VMM to utilize the additional hardware capabilities provided by Vanderpool Technology

VT-d

Enables/disables CPU VT-d

Turbo Mode

Enables/disables Turbo Mode.



Critical Trip Point

Temperature threshold of the Critical Trip Point.

Passive Cooling Trip Point

Temperature threshold of the Passive Cooling Trip Point.

A.2.2 Graphics Configuration

Aptio Setup Ut Advanced	llity – Copyright (C) 2017	7 American Megatrends, Inc.
Graphics Configuration OTT Size Apenture Size DVMT Fre-Allocated DVMT Total Gfx Hem	[8HB] [256HB] [256H]	Select the GTT Size ++: Select Screen TJ: Select Item Enter: Select +/-: Change Opt. FI: General Help F8: Previous Values F9: Optimized Defaults F10: Save & Exit ESC: Exit
Vetsion 2.18.	1263, Copuright (C) 2017 P	merican Megatrends, Inc.

GTT Size

Sets GTT size

Aperture Size

Sets aperture size

DVMT Pre-Allocated

Sets size of DVMT 5.0 pre-allocated (fixed) graphics memory used by internal graphics device

DVMT Total Gfx Mem

Sets size of DVMT5.0 total graphic memory used by internal graphics device

A.2.3 Onboard Device Configuration

Onboard Device Configuration		Select COM1 mode. RS232, RS422 or RS485
Serial Port Configuration		ALC: NOTION
COM1 Device Settings	IO=3F8h; IRQ=4;	
	[RS485]	
COM2 Device Settings	IO=2F8h; IRQ=3;	
COM2 Control	(RS485)	
HSUART	[Disabled]	
Serial Console Redirection		
Lan Port Configuration		++: Select Screen
LAN #1(Intel I210)	[Enabled]	T4: Select Item
LAN M2(Intel I210)	[Enabled]	Enter: Select
		+/-: Change Opt.
Hudio Configuration	[Dischlod]	F1: General Help
Realter Hudio Support	torsabredi	E9: Ontimized Defaults
		F10: Save & Exit
		ESC: Exit

COM1 Control

Selects COM1 mode from among RS232, RS422, and RS485.

COM2 Control

Selects COM2 mode from among RS232, RS422, and RS485.



HSUART

Enables/disables LPSS HSUART support.

LAN #1 (Intel I210)

Enables/disables LAN device #1.

LAN #2 (Intel I210)

Enables/disables LAN device #2.

Realtek Audio Support

Enables/disables Realtek audio device.

Serial Console Redirection

Aptio Setup Utility Advanced	– Copyright (C) 2017 Ameri	ican Megatrends, Inc.
Serial Console Redirection		Console Redirection Enable or Disable.
COM1 Console Redirection ▶ Console Redirection Settings		
COM2 Console Redirection ► Console Redirection Settings	[Disabled]	
		++: Select Screen f4: Select Item Enter: Select +/-: Change Opt. F1: General Help F8: Previous Values F9: Optimized Defaults F10: Save & Exit ESC: Exit
Version 2.18.1263.	Copyright (C) 2017 America	an Megatrends, Inc.



Console Redirection

Enables/Disables COM 1 console redirection.

Console Redirection Settings (COM 1)

COM1 Console Redirection Settings Terminal Type Sits per second Data Bits Stop Bits Stop Bits VT-UTF8 Combo Key Support VT-UTF8 Combo Key Support Reconder Mode Stop Bits IDISADLed		Emulation: ANSI: Extended ASCII char set. VTIO0: ASCII char set. VTIO0+: Extends VTIO0 to support color, function keys, etc. VT-UTF8: UBES UTF8 encoding to map Unicode chars onto 1 or more bytes.
Recorder Mode Resolution 100x31 Legacy OS Redirection Resolution Putty KesPad Redirection After 8105 POST	(olsabled) (80x24) (VT100) (Alsays Enable)	++: Select Screen II: Select Item Enter: Select +/-: Change Opt. F1: General Help F8: Previous Values F9: Optimized Defaults F10: Save & Exit ESC: Exit

Terminal Type

Emulation:

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

Selects serial port transmission speed, which must be matched on the other side, where long or noisy lines may require lower speeds.

Data Bits

Number of data bits

Parity

Parity bit can be sent with data bits to detect transmission errors, where

Even: parity bit is 0 if the number of 1's in the data bits is even

Odd: parity bit is 0 if number 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 allow for error detection, and can be used as an additional data bit.

Stop Bits

Indicate the end of a serial data packet (a start bit indicates the beginning), with standard setting 1 stop bit, and communication with slow devices may require more than 1 stop bit.

Flow Control

Can prevent data loss from buffer overflow, where, when sending data, if the receiving buffers are full, a 'stop' signal can be sent to stop the data flow, and once buffers are empty, a Start signal can be sent to re-start the flow. Hardware flow control uses two wires to send start/stop signals.

VT-UTF8 Combo Key Support

Enables VT-UTF8 Combination Key Support for ANSI/VT100 terminals

Recorder Mode

When enabled, only text will be sent, to capture terminal data.

Resolution 100x31

Enables/disables extended terminal resolution

Legacy OS Redirection Resolution

In legacy OS, the number of rows and columns supporting redirection

Putty KeyPad

Selects FunctionKey and KeyPad on PuTTY

Redirection After BIOS Post

When Bootloader is selected, Legacy Console Redirection is disabled before booting to legacy OS.

When Always Enable is selected, Legacy Console Redirection is enabled for legacy OS.

Default is set to Always Enable.



COM 2

Console Redirection

Enables/Disables COM 2 console redirection.

Console Redirection Settings (COM 2)

Aptio Setup Utility - Advanced	– Copyright (C) 2017 f	American Megatrends, Inc.
Advanced COM2 Console Redirection Settings Terminal Type Bits per second Data Bits Parity Stop Bits Flow Control VT-UTF8 Combo Key Support Recorder Mode Resolution 100x31 Legacy OS Redirection Resolution Putty KeyPad Redirection After BIOS POST	[ANSI] [115200] [8] [None] [1] [None] [Enabled] [Disabled] [Disabled] [80x24] [VT100] [Always Enable]	Emulation: 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. +*: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F8: Previous Values F9: Optimized Defaults F10: Save & Exit ESC: Exit
Version 2.18.1263. (Copyright (C) 2017 Ame	erican Megatrends, Inc.

Terminal Type

Emulation:

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

Selects serial port transmission speed, which must be matched on the other side, where long or noisy lines may require lower speeds.

Data Bits

Number of data bits

Parity

Parity bit can be sent with data bits to detect transmission errors, where

Even: parity bit is 0 if the number of 1's in the data bits is even

Odd: parity bit is 0 if number 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 allow for error detection, and can be used as an additional data bit.

Stop Bits

Indicate the end of a serial data packet (a start bit indicates the beginning), with standard setting 1 stop bit, and communication with slow devices may require more than 1 stop bit.

Flow Control

Can prevent data loss from buffer overflow, where, when sending data, if the receiving buffers are full, a 'stop' signal can be sent to stop the data flow, and once buffers are empty, a Start signal can be sent to re-start the flow. Hardware flow control uses two wires to send start/stop signals.

VT-UTF8 Combo Key Support

Enables VT-UTF8 Combination Key Support for ANSI/VT100 terminals



Recorder Mode

When enabled, only text will be sent, to capture terminal data.

Resolution 100x31

Enables/disables extended terminal resolution

Legacy OS Redirection Resolution

In legacy OS, the number of rows and columns supporting redirection

Putty KeyPad

Selects FunctionKey and KeyPad on PuTTY

Redirection After BIOS Post

When Bootloader is selected, Legacy Console Redirection is disabled before booting to legacy OS.

When Always Enable is selected, Legacy Console Redirection is enabled for legacy OS.

Default is set to Always Enable.

A.2.4 Advanced Power Management

Advanced Power Management		ATX: OS will turn off system
Power Supply Unit State After G3 RTC Hake system from S5 LAN #1 Hake LAN #2 Hake	(ATX Hode) [S0 State] [Disabled] [Disabled] [Disabled]	mode will not support S3 & S4
		++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F8: Previous Values F9: Optimized Defaults F10: Save & Exit ESC: Exit

Power Supply Unit

ATX: OS will turn off system power when shutdown, where AT mode does not support S3 & S4.

State After G3

Specifies state to enter when power is re-applied after a power failure (G3 state).

RTC Wake system from S5

Enables/disables System Wake on alarm event, where selecting FixedTime wakes system at hr::min::sec specified, and Dynamic-Time wakes system at the current time + Increase minute(s) specified



LAN #1 Wake

Enables/disables onboard Wake on LAN for #1

LAN #2 Wake

Enables/disables onboard Wake on LAN for #2

A.2.5 USB Configuration

Aptio Setup Utility - Advanced	Copyright (C) 2017 Americar	Megatrends, Inc.
USB Configuration		This is a workaround for OSes
XHCI Hand-off	[Enabled]	The XHCI ownership change
USB Mass Storage Driver Support	[Enabled]	should be claimed by XHCI driver.
USB hardware delays and time-outs:		
USB transfer time-out	[20 sec]	
Device reset time-out	[20 sec]	
Device power-up delay	[Auto]	
		++: Select Screen
		T4: Select Item
		Enter: Select
		F1: General Heln
		F8: Previous Values
		F9: Optimized Defaults
		F10: Save & Exit
		ESC: Exit
Version 2.18.1263. Co	opyright (C) 2017 American M	legatrends, Inc.

XHCI Hand-off

A workaround for OS without XHCI handoff support, where XHCI ownership change should be claimed by the XHCI driver.

USB Mass Storage Driver Support

Enables/disables USB mass storage driver support.

USB transfer time-out

Timeout value for Control, Bulk, and Interrupt transfers.

Device reset time-out

USB mass storage device Start Unit command timeout.

Device power-up delay

Maximum time the device will take before reporting to the Host Controller, where Auto uses default value, for a Root port 100 ms, and for a Hub port the delay is taken from the Hub descriptor.

A.2.6 SATA Configuration

Aptio Setup Uti Advanced	lity – Copyright (C) 2017 Amer	rican Megatrends, Inc.
SATA Configuration		Enable or Disable SATA Port
mSATA Port	[Not Installed] [Enabled]	
SATA Connector Port	[Not Installed] [Enabled]	
		++: Select Screen
		<pre>File Select Ttem Enter: Select +/-: Change Opt. File General Help File General Help File Select F</pre>
		FB: FFEVIOUS Values F9: Optimized Defaults F10: Save & Exit ESC: Exit
Version 2.18.1	263. Copyright (C) 2017 Americ	can Megatrends, Inc.

Port

Enables/disables SATA Port



A.2.7 TPM Configuration

Aptio Setup Utili Advanced	ty – Copyright (C) 2017 A	merican Megatrends, Inc.
Advanced TPM Configuration Security Device Support NO Security Device Found	[Disable]	Enables or Disables BIOS support for security device. O.S. will not show Security Device. TCG EFI protocol and INT1A interface will not be available. +*: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F6: Previous Values F9: Optimized Defaults F10: Save & Exit ESC: Exit
Version 2.18.126		

Security Device Support

Enables/disables BIOS support for security device, when enabled, OS will not show the security device, and TCG EFI protocol and INT1A interface will not be available.

Ap Advanced	tio Setup Utility – Copyright (C) 2017 American Megatrends, Inc.
Network Stack Co	nfiguration	Enable/Disable UEFI Network
Network Stack		Stack →t: Select Screen
		11: Select Item Enter: Select +/-: Change Opt. F1: General Help F8: Previous Values F9: Optimized Defaults F10: Save & Exit ESC: Exit

A.2.8 Network Stack Configuration

Network Stack

Enables/disables UEFI network stack



A.2.9 System Management

Aptio Setup Utility - (Advanced	Copyright (C) 2017 American	Megatrends, Inc.
System Management Version: 1.00		SEMA Features
SEMA Firmware Build Date SEMA Bootloader Build Date SEMA Features System Health Temperatures Power Consumption Flags Hardware Controls Power Up	BMC MXE-210 0v4 Jun 16 2017 bl_MXE-210 4v0 Mar 31 2017	<pre>++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F8: Previous Values F9: Optimized Defaults F10: Save & Exit ESC: Exit</pre>
Version 2.18.1263. Co	pyright (C) 2017 American Mu	egatrends, Inc.

Shows SEMA firmware and bootloader versions and build dates.

SEMA Features

Aptio Setup Utility – Copyright Advanced	(C) 2017 American	Megatrends, Inc.
SEMA Supported Features Uptime & Power Cycles Counter System Restart Event 1024 Bytes User-Flash Watchdog Temperatures Voltage Monitor Power-Up Watchdog Power Monitor (current sense) Boot Counter DTS register available DTS offset registers programmable TIVA BMC PEC protocol		<pre>++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F8: Previous Values F9: Optimized Defaults F10: Save & Exit ESC: Exit</pre>
Version 2.18.1263. Copyright (C		

Shows features supported by the SEMA version.



Temperatures

Aptio Advanced	Setup Utility – Copyright (C) 2017 American	Megatrends, Inc.
Temperatures			
CPU Temperature Current	64C		
Board Temperatures Current Startup Min Max	41C 26C 22C 56C		++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F8: Previous Values F9: Optimized Defaults F10: Save & Exit ESC: Exit
Versi	ion 2.18.1263. Copyright (C)	2017 American Me	gatrends, Inc.

Shows current CPU temperature, and current, startup, minimum, and maximum board temperatures.

Power Consumption

Aptio Setup Advanced	Utility – Copyright	(C) 2017 Americ	an Megatrends, Inc.	
Power Consumption				
Current Input Current Current Input Power VCDRE VGFX VIPOSS VIP35 VRTC V3P35 V3P36 V3P36 VIN VIP24A V1P86 V5_SBY	0.200A 1.000W 0.880V 1.041V 1.332V 3.041V 3.303V 3.307V 4.989V 1.235V 1.793V 4.965V		++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F8: Previous Value F9: Optimized Defa F10: Save & Exit ESC: Exit	s ults
Version 2.1	8.1263. Copyright (C) 2017 Americar	Megatrends, Inc.	

Shows current input current and power, as well as system voltages.



Flags

Aptio Set Advanced	up Utility – Copyright	(C) 2017 American	Megatrends, Inc.
Flags			
BMC Flags Exception Code	0x00 0x00		++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F8: Previous Values F9: Optimized Defaults F10: Save & Exit ESC: Exit
Version	2.18.1263. Copyright (C) 2017 American M	egatrends, Inc.

Shows BMC flags with exception codes.

Power Up

Aptio Setup Utility – Copyright (C) 2017 American Advanced	Megatrends, Inc.
Power-Up Power-Up Watchdog [Disabled] ATTENTION: Pressing F12 during start up disables the Power Up Watchdog.	The Power Up Watchdog resets the system after a certain amount of time after power up. Pressing F12 during start up disables the Power Up Watchdog. ++: Select Screen tl: Select Item Enter: Select +/-: Change Opt. F1: General Help F8: Previous Values F9: Optimized Defaults F10: Save & Exit ESC: Exit
Version 2.18.1263. Copyright (C) 2017 American Me	egatrends, Inc.

Lists Power-Up Watchdog status.



A.2.10 Miscellaneous

Aptio Advanced	Setup Utility – Copyright (C) 2017 Ame	erican Megatrends, Inc.
Miscellaneous		Select the target OS.
OS Selection		
		++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F8: Previous Values F9: Optimized Defaults F10: Save & Exit ESC: Exit
Vers.	ion 2.18.1263. Copyright (C) 2017 Ameri	ican Megatrends, Inc.

OS Selection

Allows selection of active OS.

A.2.11 Intel® I210 Gigabit Network Connection

Aptio Setup Utility – Advanced	Copyright (C) 2017 American	Megatrends, Inc.	
 NIC Configuration Blink LEDs 	0	Click to configure the network device port.	
UEFI Driver Adapter PBA Device Name Chip Type PCI Device ID PCI Address	Intel(R) PRO/1000 6.8 000300-000 Intel(R) I210 Gigabit Intel i210 1533 03:00:00		
Link Status MAC Address Virtual MAC Address	[Disconnected] 00:30:64:0A:D7:B1 00:00:00:00:00:00	++: Select Screen tl: Select Item Enter: Select +/-: Change Opt. F1: General Help F8: Previous Values F9: Optimized Defaults F10: Save & Exit ESC: Exit	
Version 2.18.1269. Copyright (C) 2017 American Megatrends, Inc.			

Blink LEDs

Identifies the physical network port by flashing the associated LED.



A.2.12 NIC Configuration

Aptio Se Advanced	etup Utility – Copyright (C) 2017 Americar	n Megatrends, Inc.
Link Speed Wake On LAN	[Auto Negotiated] [Enabled]	Specifies the port speed used for the selected boot protocol.
		<pre>++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F8: Previous Values F9: Optimized Defaults F10: Save & Exit ESC: Exit</pre>
Version	n 2.18.1263. Copyright (C) 2017 American ⊧	Megatrends, Inc.

Link Speed

Specifies the port speed used for the selected boot protocol.

Wake On LAN

Enables server power-up using an in-band magic packet.

A.3 Security

Aptio Setup Ut Main Advanced <mark>Security</mark> B	ility – Copyright (C) 2017 oot Save & Exit	American Megatrends, Inc.
Password Description		Set Administrator Password
If ONLY the Administrator's then this only limits access only asked for when entering If ONLY the User's password is a power on password and m boot or enter Setup. In Setu have Administrator rights. The password length must be in the following range: Minimum length	password is set, to Setup and is Setup. is set, then this ust be entered to p the User will 3	
Administrator Password User Password	20	++: Select Screen 1↓: Select Item Enter: Select +/-: Change Opt.
BIOS Lock ▶ Secure Boot menu	[Enabled]	F1: General Help F8: Previous Values F9: Optimized Defaults F10: Save & Exit ESC: Exit
Version 2.18.	1263, Copyright (C) 2017 An	erican Megatrends, Inc.



If only the Administrator's password is set, only access to Setup is limited and authorization requested only when entering Setup. If only the User's password is set, a password must be entered to boot or enter setup. In Setup the user has Administrator rights.

Administrator Password

Sets Administrator password.

User Password

Sets User password.

BIOS Lock

Enables/disable SC BIOS Lock, which must be enabled to ensure SMM flash protection.



A.3.1 Secure Boot

Aptio Setup L Security	Jtility – Copyright (C) 2017 An	merican Megatrends, Inc.
Secure Boot		Secure Boot activated when Platform Key(PK) is enrolled, System mode is User/Deployed.
System Mode	User	and CSM function is disabled
Secure Boot	Not Active	
Secure Boot Control		
		++: Select Screen f1: Select Item Enter: Select +/-: Change Opt. F1: General Help F8: Previous Values F9: Optimized Defaults F10: Save & Exit ESC: Exit
Version 2.18.1263. Copyright (C) 2017 American Megatrends, Inc.		

Shows System Mode and Secure Boot status.



Secure Boot is activated when Platform Key (PK) is enrolled, where System Mode is User/Deployed, and CSM function is disabled.
A.4 Boot

Boot Configuration Setup Prompt Timeout Bootup NumLock State [On] Quiet Boot [Enabled] Fast Boot [Disable] Boot Configuration [Disable] Boot Option #1 [Hard Disk] Boot Option #2 [CD/DVD] Boot Option #3 [USB Hard Disk] Boot Option #4 [USB Key/UEFI: SanDi] Boot Option #5 [USB Key/UEFI: SanDi] Boot Option #6 [USB Lan] Boot Option #8 [Network] VUEFI USB Key Drive BBS Priorities [Network] VUEFI USB Key Drive BBS Priorities For Save & Exit	Aptio Setup Utility – Copyright (C) 2017 American Megatrends, Inc. Main Advanced Security <mark>Boot</mark> Save & Exit		
Boot Configuration Boot Option #1 [Hard Disk] Boot Option #2 [CD/DVD] Boot Option #3 [USB Hard Disk] Boot Option #4 [USB CO/DVD] Boot Option #5 [USB Key:UEFI: SanDi] Boot Option #6 [USB Floppy] Boot Option #7 [USB Lan] Boot Option #8 [Network] + : Select Screen Boot Option #6 [USB Lan] Boot Option #8 [Network] + UEFI USB Key Drive BBS Priorities Fit General Help F8: Previous Values F9: Optimized Defaults F10: Save & Exit ESC: Exit	Boot Configuration Setup Prompt Timeout Bootup NumLock State Quiet Boot Fast Boot	1 [On] [Enabled] [Disable]	Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.
Boot Option #5 [USB Keg/GF1: SaNG1] Boot Option #6 [USB Floppy] Boot Option #7 [USB Lan] Boot Option #8 [Network] +: Select Item Boot Option #8 [Network] • UEFI USB Key Drive BBS Priorities F1: General Help F8: Previous Values F9: Optimized Defaults F10: Save & Exit ESC: Exit	Boot Configuration Boot Option #1 Boot Option #2 Boot Option #3 Boot Option #4	[Hard Disk] [CD/DVD] [USB Hard Disk] [USB CD/DVD]	
 UEFI USB Key Drive BBS Priorities F1: General Help F8: Previous Values F9: Optimized Defaults F10: Save & Exit ESC: Exit 	Boot Option #6 Boot Option #7 Boot Option #8	[USB R09:UEF1: SANDI] [USB Floppy] [USB Lan] [Network]	++: Select Screen 14: Select Item Enter: Select +/-: Change Opt.
	▶ UEFI USB Key Drive BBS Priorities		F1: General Help F8: Previous Values F9: Optimized Defaults F10: Save & Exit ESC: Exit

Setup Prompt Timeout

Number of seconds to wait for setup activation key, with 65535(0xFFFF) indicating infinite wait.

Bootup NumLock State

Sets keyboard NumLock status

Quiet Boot

Enables/disables Quiet Boot option

Fast Boot

Enables/disables boot with the minimal device initialization required to launch active boot option, with no effect on BBS boot options.



Sets number of seconds to wait for setup activation key.

Boot Option Priorities

Specifies the priority of boot devices, with all installed boot devices detected during POST and displayed, where selecting Boot Option # specifies the desired boot device.

A.5 Save & Exit

Aptio Setup Utility – Copyright (C) 2017 American Main Advanced Security Boot <mark>Save & Exit</mark>	Megatrends, Inc.	
Save Changes and Exit Discard Changes and Exit Save Changes and Reset Discard Changes and Reset	Exit system setup after saving the changes.	
Save Options Save Changes Discard Changes		
Restore Defaults Save as User Defaults Restore User Defaults		
Boot Override UEFI: SanDisk, Partition 1 Launch EFI Shell from filesystem device	<pre>++: Select Screen t↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F8: Previous Values F9: Optimized Defaults F10: Save & Exit ESC: Exit</pre>	
Version 2.18.1263. Copyright (C) 2017 American Megatrends, Inc.		

Save Changes and Exit

Exits system setup after saving the changes.

Discard Changes and Exit

Exits system setup without saving any changes.

Save Changes and Reset

Resets the system after saving changes.

Discard Changes and Reset

Resets system setup without saving any changes.

Save Changes

Saves changes to any setup options.

Discard Changes

Discards changes to any of the setup options.

Restore Defaults

Restores/loads default values for all setup options.

Save as User Defaults

Saves changes as User Defaults.

Restore User Defaults

Restores User Defaults to all setup options.

Launch EFI Shell from filesystem device

Attempts to launch EFI Shell application (Shell.efi) from one of the available filesystem devices.



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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.

S'il vous plaît prêter attention stricte à tous les avertissements et mises en garde figurant sur l'appareil, pour éviter des blessures ou des dommages.

- 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
- The device can be operated at an ambient temperature of 50°C;
- When installing/mounting or uninstalling/removing device; or when removal of a chassis cover is required for user servicing (See "Getting Started" on page 23.):
 - ▷ 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
- 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
- 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. *Risque d'explosion si la pile est remplacée par une autre de type incorrect. Veuillez jeter les piles usagées de façon appropriée.*

- 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
- If PoE (Power over Ethernet) is enabled for the device, the system can ONLY be deployed indoors. Unless otherwise noted, the PoE system is NOT designed to withstand the rigors of outdoor use.



BURN HAZARD

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

RISQUE DE BRÛLURES

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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Getting Service

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

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Ampro ADLINK Technology, Inc.

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