

## ASDM-L-CFS

Smart Display Module

User's Manual 1st Ed

Last Updated: April 23, 2020

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#### Packing List

Before setting up your product, please make sure the following items have been shipped:

ltem		Quantity
•	ASDM-L-CFS	1

If any of these items are missing or damaged, please contact your distributor or sales representative immediately.

#### About this Document

This User's Manual contains all the essential information, such as detailed descriptions and explanations on the product's hardware and software features (if any), its specifications, dimensions, jumper/connector settings/definitions, and driver installation instructions (if any), to facilitate users in setting up their product.

Users may refer to the product page at AAEON.com for the latest version of this document.

#### Safety Precautions

Please read the following safety instructions carefully. It is advised that you keep this manual for future references

- 1. All cautions and warnings on the device should be noted.
- 2. Make sure the power source matches the power rating of the device.
- Position the power cord so that people cannot step on it. Do not place anything over the power cord.
- Always completely disconnect the power before working on the system's hardware.
- No connections should be made when the system is powered as a sudden rush of power may damage sensitive electronic components.
- If the device is not to be used for a long time, disconnect it from the power supply to avoid damage by transient over-voltage.
- 7. Always disconnect this device from any AC supply before cleaning.
- 8. While cleaning, use a damp cloth instead of liquid or spray detergents.
- 9. Make sure the device is installed near a power outlet and is easily accessible.
- 10. Keep this device away from humidity.
- 11. Place the device on a solid surface during installation to prevent falls
- 12. Do not cover the openings on the device to ensure optimal heat dissipation.
- 13. Watch out for high temperatures when the system is running.
- 14. Do not touch the heat sink or heat spreader when the system is running
- 15. Never pour any liquid into the openings. This could cause fire or electric shock.
- As most electronic components are sensitive to static electrical charge, be sure to ground yourself to prevent static charge when installing the internal components. Use a grounding wrist strap and contain all electronic components in any static-shielded containers.

- 17. If any of the following situations arises, please the contact our service personnel:
  - i. Damaged power cord or plug
  - ii. Liquid intrusion to the device
  - iii. Exposure to moisture
  - iv. Device is not working as expected or in a manner as described in this manual
  - v. The device is dropped or damaged
  - vi. Any obvious signs of damage displayed on the device

## DO NOT LEAVE THIS DEVICE IN AN UNCONTROLLED ENVIRONMENT WITH TEMPERATURES BEYOND THE DEVICE'S PERMITTED STORAGE TEMPERATURES (SEE CHAPTER 1) TO PREVENT DAMAGE.

#### FCC Statement



This device complies with Part 15 FCC Rules. 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 may cause undesired operation.

#### Caution:

There is a danger of explosion if the battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions and your local government's recycling or disposal directives.

#### Attention:

Il y a un risque d'explosion si la batterie est remplacée de façon incorrecte. Ne la remplacer qu'avec le même modèle ou équivalent recommandé par le constructeur. Recycler les batteries usées en accord avec les instructions du fabricant et les directives gouvernementales de recyclage. 产品中有毒有害物质或元素名称及含量

AAEON Main Board/ Daughter Board/ Backplane

	有毒有害物质或元素					
部件名称	铅	汞	镉	六价铬	多溴联苯	多溴二苯醚
	(Pb)	(Hg)	(Cd)	(Cr(VI))	(PBB)	(PBDE)
印刷电路板				0	0	0
及其电子组件	×	0	0	0	0	0
外部信号				0	0	0
连接器及线材	×		0	0	0	0
O: 表示该有毒有害物质在该部件所有均质材料中的含量均在 SJ/T 11363-2006 标准规定的限量要求以下。						
X: 表示该有毒有害物质至少在该部件的某一均质材料中的含量超出 SJ/T 11363-2006 标准规定的限量要求。						
备注:此产品所标示之环保使用期限,系指在一般正常使用状况下。						

#### Poisonous or Hazardous Substances or Elements in Products

AAEON Main Board/ Daughter Board/ Backplane

	Poisonous or Hazardous Substances or Elements					
Component	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent Chromium (Cr(VI))	Polybrominated Biphenyls (PBB)	Polybrominated Diphenyl Ethers (PBDE)
PCB & Other Components	Х	0	0	0	0	0
Wires & Connectors for External Connections	Х	0	0	0	0	0

O: The quantity of poisonous or hazardous substances or elements found in each of the component's parts is below the SJ/T 11363-2006-stipulated requirement.

X: The quantity of poisonous or hazardous substances or elements found in at least one of the component's parts is beyond the SJ/T 11363-2006-stipulated requirement.

Note: The Environment Friendly Use Period as labeled on this product is applicable under normal usage only

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# Chapter 1

Product Specifications

ASDM-L-CFS

## 1.1 Specifications

System	
Form Factor	Intel SDM-L Module
CPU	8 <sup>th</sup> /9 <sup>th</sup> Generation Intel® Core <sup>™</sup> , Pentium®, and Celeron® processors (Coffee Lake S, Coffee Lake Refresh) TDP up to 35W
CPU Frequency	Up to 4.0 GHz
Chipset	Intel® Chipsets H310/ Q370
Memory Type	DDR4 2666 SO-DIMM x 2 (non-ECC)
Max. Memory Capacity	Up to 32GB
BIOS	AMI BIOS
Wake On LAN	Yes
Watchdog Timer	255 Levels
Power Requirement	12V DC from the Docking Board through the Edge Connector
Power Supply Type	AT/ATX
Power Consumption (Typical)	12V, 6.08A, estimate 72.96W with i7-9700TE at 100% loading
Dimension (L x W x H)	3.94" x 6.89" x 0.79" (100 mm x 175 mm x 20 mm)
Operating Temperature	32°F ~ 131°F (0°C ~ 55°C)
Storage Temperature	-40°F ~ 176°F (-40°C ~ 80°C)

System	
Operating Humidity	0% ~ 90% relative humidity, non-condensing
MTBF (Hours)	—
Certification	CE/FCC Class A
Display	
Controller	Intel® UHD Graphics 630/620/610
Video Output	HDMI 2.0 x 1 (through Edge connector)
	DP1.2 x 1 (through Edge connector)
Audio	Through HDMI, DP by edge connector
I/O	
Ethernet	Intel® I219 GbE x 1
USB Port	USB 3.2 Gen 1 x 2 / USB 3.2 Gen 2 support by
	Q370
Storage	M.2 2242 B-Key x 1
Expansion Slot	M.2 2230 E-Key x 1

ТРМ

TPM 2.0 (Optional)

ASDM-L-CF

## Chapter 2

Hardware Information

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#### 2.1 Dimensions

#### 2.1.1 Module dimensions



Solder Side



ASDM-L-CFS MODULAR





#### 2.3 List of Jumpers

The ASDM-L-CFS features a number of jumpers allowing for manual configuration of the system to suit the needs of the user.

Label	Function
JP1	Clear CMOS Jumper

### 2.3.1 Clear CMOS Jumper (JP1)





## 2.4 List of Connectors

The ASDM-L-CFS features a number of connectors and switches allowing for configuration and connection with external devices such as hard disk drives or a keyboard.

Label	Function
CN1	CPU FAN
CN2	Dual USB 3.0 Ports
CN3	Battery
CN4	LAN (RJ-45) Port
CN5	LPC/SM BUS Port
CN6	M.2 Key-E Slot (2230)
CN7	M.2 Key-B Slot (2242)
CN8	SPI Debug Port
DIMM1	DDR SO-DIMM Slot
DIMM2	DDR SO-DIMM Slot
GF1	SDM Gold Finger

#### 2.4.1 CPU FAN (CN1)



Pin	Pin Name	Signal Type	Signal Level
1	GND	GND	
2	FAN_POWER	PWR	+12V
3	FAN_TAC	IN	
4	FAN_CTL	OUT	

### 2.4.2 Dual USB 3.0 Ports (CN2)



Pin	Pin Name	Signal Type	Signal Level
1	+5VSB	PWR	+5V
2	USB_D-	DIFF	

Pin	Pin Name	Signal Type	Signal Level
3	USB_D+	DIFF	
4	GND	GND	
5	USB_SSRX-	DIFF	
6	USB_SSRX+	DIFF	
7	GND	GND	
8	USB_SSTX-	DIFF	
9	USB_SSTX+	DIFF	
10	+5VSB	PWR	+5V
11	USB_D-	DIFF	
12	USB_D+	DIFF	
13	GND	GND	
14	USB_SSRX-	DIFF	
15	USB_SSRX+	DIFF	
16	GND	GND	
17	USB_SSTX-	DIFF	
18	USB_SSTX+	DIFF	

## 2.4.3 Battery (CN3)

Pin	Pin Name	Signal Type	Signal Level
1	+3.3V	PWR	3.3V
2	GND	GND	

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#### 2.4.4 LAN (RJ45) Port (CN4)



Pin	Pin Name	Signal Type	Signal Level
1	MDI0+	DIFF	
2	MDI0-	DIFF	
3	MDI1+	DIFF	
4	MDI2+	DIFF	
5	MDI2-	DIFF	
6	MDI1-	DIFF	
7	MDI3+	DIFF	
8	MDI3-	DIFF	

#### 2.4.5 LPC/SM BUS Port (CN5)



Pin	Pin Name	Signal Type	Signal Level
1	LAD0	I/O	+3.3V
2	LAD1	I/O	+3.3V
3	LAD2	I/O	+3.3V
4	LAD3	I/O	+3.3V
5	+3.3V	PWR	+3.3V
6	LFRAME#	IN	
7	LRESET#	OUT	+3.3V
8	GND	GND	
9	LCLK	OUT	
10	HWRST	OUT	
11	PWRBTN	OUT	
12	GND	GND	

## 2.4.6 M.2 Key-E Slot (2230) (CN6)

Pin	Pin Name	Signal Type	Signal Level
1	GND	GND	
2	+3.3VSB	PWR	+3.3V
3	USB_D+	DIFF	
4	+3.3VSB	PWR	+3.3V
5	USB_D-	DIFF	
6	NC		
7	GND	GND	
8	NC		
9	NC		
10	NC		
11	NC		
12	NC		
13	NC		
14	NC		
15	NC		
16	NC		
17	NC		
18	NC		
19	NC		
20	NC		
21	NC		
22	NC		
23	NC		
32	NC		
33	GND	GND	

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Pin	Pin Name	Signal Type	Signal Level
34	NC		
35	PCIE_TX+	DIFF	
36	NC		
37	PCIE_TX-	DIFF	
38	NC		
39	GND	GND	
40	NC		
41	PCIE_RX+	DIFF	
42	NC		
43	PCIE_RX-	DIFF	
44	NC		
45	GND	GND	
46	NC		
47	PCIE_REF_CLK+	DIFF	
48	NC		
49	PCIE_REF_CLK-	DIFF	
50	NC		
51	GND	GND	
52	PCIE_RST#	OUT	+3.3V
53	PCIE_CLK_REQ#	IN	+3.3V
54	W_DISABLE2#	OUT	+3.3V
55	PCIE_WAKE#	IN	+3.3V
56	W_DISABLE1#	OUT	+3.3V
57	GND	GND	
58	NC		
59	NC		
60	NC		

Pin	Pin Name	Signal Type	Signal Level
61	NC		
62	NC		
63	GND	GND	
64	NC		
65	NC		
66	+3.3VSB	PWR	+3.3V
67	NC		
68	NC		
69	GND	GND	
70	NC		
71	NC		
72	+3.3VSB	PWR	+3.3V
73	NC		
74	+3.3VSB	PWR	+3.3V
75	GND	GND	

## 2.4.7 M.2 Key-B Slot (2242) (CN7)

Pin	Pin Name	Signal Type	Signal Level
1	GND	GND	
2	+3.3V	PWR	+3.3V
3	GND	GND	
4	+3.3V	PWR	+3.3V
5	GND	GND	
6	N.C		
7	USB_D+	DIFF	
8	W_DISABLE	IN	

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Pin	Pin Name	Signal Type	Signal Level
9	USB_D-	DIFF	
10	SSD_LED#	OUT	
11	GND	GND	
20	N.C		
21	GND	GND	
22	N.C		
23	N.C		
24	N.C		
25	N.C		
26	N.C		
27	GND	GND	
28	N.C		
29	PERN1/USB3.0-RX-	DIFF	
30	N.C		
31	PERN1/USB3.0-RX+	DIFF	
32	N.C		
33	GND	GND	
34	N.C		
35	PERN1/USB3.0-TX-	DIFF	
36	N.C		
37	PERN1/USB3.0-TX+	DIFF	
38	DEVSLP	IN	
39	GND	GND	
40	N.C		
41	PERNO/SATA-B+	DIFF	
42	N.C		
43	PERNO/SATA-B-	DIFF	

Pin	Pin Name	Signal Type	Signal Level
44	N.C		
45	GND	GND	
46	N.C		
47	PETNO/SATA-A-	DIFF	
48	N.C		
49	PETNO/SATA-A+	DIFF	
50	PERST#	IN	
51	GND	GND	
52	CLKREQ#	OUT	
53	REFCLKN	DIFF	
54	PEWAKE#	OUT	
55	REFCLKP	DIFF	
56	N.C		
57	GND	GND	
58	N.C		
59	N.C		
60	N.C		
61	N.C		
62	N.C		
63	N.C		
64	N.C		
65	N.C		
66	N.C		
67	N.C		
68	N.C		
69	GND	GND	
70	+3.3V	PWR	+3.3V

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Pin	Pin Name	Signal Type	Signal Level
71	GND	GND	
72	+3.3V	PWR	+3.3V
73	GND	GND	
74	+3.3V	PWR	+3.3V
75	N.C		

## 2.4.8 SPI Debug Port (CN8)

Pin	Pin Name	Signal Type	Signal Level
1	spi_miso	OUT	
2	GND	GND	
3	SPI_CLK	IN	
4	+3.3VSB	PWR	+3.3V
5	spi_mosi	IN	
6	SPI_CS	IN	
7	NC		

## 2.4.9 DDR SO-DIMM Slot (DIMM1/DIMM2)

DDR SO-DIMM Slots follow standard specifications.

## 2.3.8 SDM Gold Finger (GF1)

Pin	Pin Name	Signal Type	Signal Level
A1	+12V	PWR	+12V
A2	+12V	PWR	+12V
A3	+12V	PWR	+12V
A4	GND	GND	
A5	GND	GND	
A6	PWRGD#	OUT	+3.3V
A7	SLP_S4	OUT	+3.3V
A8	SDM_DET#	OUT	
A9	CEC		
A10	I2C0_SDA	I/O	+3.3V
A11	I2C0_SCL	OUT	+3.3V
A12	GSPI_CLK	OUT	+1.8V
A13	GSPI_CS0#	OUT	+1.8V
A14	GND	GND	
A15	PCIE_TX+	DIFF	
A16	PCIE_TX-	DIFF	
A17	GND	GND	
A18	PCIE_RX+	DIFF	
A19	PCIE_RX-	DIFF	
A20	GND	GND	
A21	PCIE_REF_CLK+	DIFF	
A22	PCIE_REF_CLK-	DIFF	
A23	GND	GND	
A24	PCIE_WAKE#	IN	+3.3V
A25	PCIE_CLK_REQ#	IN	+3.3V

A26	PCIE_RST#	OUT	+3.3V
A27	GND	GND	
A28	HDMI_CLK_N	DIFF	
A29	HDMI_CLK_P	DIFF	
A30	GND	GND	
A31	HDMI_D0_N	DIFF	
A32	HDMI_D0_P	DIFF	
A33	GND	GND	
A34	HDMI_D1_N	DIFF	
A35	HDMI_D1_P	DIFF	
A36	GND	GND	
A37	HDMI_D2_N	DIFF	
A38	HDMI_D2_P	DIFF	
A39	GND	GND	
A40	hdmi_sda	I/O	+3.3V
A41	HDMI_SCL	OUT	+3.3V
A42	HDMI_HPD	IN	
A43	GND	GND	
A44	NC		
A45	NC		
A46	NC		
A47	NC		
A48	NC		
A49	NC		
B1	+12V	PWR	+12V
B2	+12V	PWR	+12V
B3	+3VSB	PWR	+3.3V
B4	GND	GND	

B5	GND	GND	
B6	PWRBTN#	IN	
B7	RESET#	IN	
B8	SYSFAN#	IN	
B9	GND	GND	
B10	I2C1_SDA	I/O	+3.3V
B11	I2C1_SCL	OUT	+3.3V
B12	gspi_mosi	OUT	+1.8V
B13	gspi_miso	IN	+1.8V
B14	GND	GND	
B15	UART_TXD	OUT	+3.3V
B16	UART_RXD	IN	+3.3V
B17	GND	GND	
B18	USB_SSTX+	DIFF	
B19	USB_SSTX-	DIFF	
B20	GND	GND	
B21	USB_SSRX+	DIFF	
B22	USB_SSRX-	DIFF	
B23	GND	GND	
B24	USB_D+	DIFF	
B25	USB_D-	DIFF	
B26	USB_OC#	IN	
B27	GND	GND	
B28	DP3-	DIFF	
B29	DP3+	DIFF	
B30	GND	GND	
B31	DP2-	DIFF	
B32	DP2+	DIFF	

B33	GND	GND
B34	DP1-	DIFF
B35	DP1+	DIFF
B36	GND	GND
B37	DP0-	DIFF
B38	DP0+	DIFF
B39	GND	GND
B40	DP_AUX-	DIFF
B41	DP_AUX+	DIFF
B42	DP_HPD	IN
B43	GND	GND
B44	NC	
B45	NC	
B46	NC	
B47	NC	
B48	NC	
B49	NC	
#### 2.5 Function Block



### 2.6 Electrical Specifications for I/O Ports

I/O	Reference	Signal	Output
CPU FAN	CN1	+12V	+12V/0.5A
USB 3.0 Ports	CN2	+5VSB	+5V/1A (per channel)
LPC/SM BUS Port	CN5	+3.3V	+3.3V/0.5A
M.2 Key-E (2230)	CN6	+3.3VSB	+3.3V/2A
M.2 Key-B (2242)	CN7	+3.3VSB	+3.3V/2.5A

# Chapter 3

AMI BIOS Setup

#### 3.1 System Test and Initialization

The ASDM-L-CFS module uses certain routines to perform testing and initialization during the boot up sequence. If an error, fatal or non-fatal, is encountered, the module will output a few short beeps or display an error message. The module can usually continue the boot up sequence with non-fatal errors.

The system configuration verification routines check the current system configuration against the values stored in the CMOS memory and BIOS NVRAM. If a system configuration is not found or an error is detected, the module will load the default configuration and reboot automatically.

There are four situations in which you will need to setup system configuration:

- 1. You are starting your system for the first time
- 2. You have changed the hardware attached to your system
- 3. The system configuration is reset by the Clear CMOS Jumper (See Ch. 2)
- 3. The CMOS memory has lost power and the configuration information has been erased.

The ASDM-L-CFS CMOS memory has an integral lithium battery backup for data retention. However, you will need to replace the battery unit when it runs down.

#### 3.2 AMI BIOS Setup

The AMI BIOS ROM has a pre-installed Setup program that allows users to modify basic system configurations. These configurations are stored in the battery-backed CMOS RAM and BIOS NVRAM so the information is retained when power is turned off.

To enter BIOS Setup, press <Del> or <ESC> immediately while your computer is powering up.

The following BIOS menus and their functions are listed below.

Main – Date and time can be set here. Press <Tab> to switch between elements

Advanced - Enable/ disable boot option for legacy network devices

Chipset - Host bridge parameters

Security - The setup administrator password can be set here

Boot - Enable/ disable Quiet Boot option

Save & Exit – Save your changes and exit the program

# 3.3 Setup submenu: Main

BIOS Information ASDM-L-CFS R0.8 (CFSLAM08)(12/24/2019)	Set the Date. Use Tab to switch between Date elements.
BIOS Vendor American Compliancy UEFI 2.7;	Vegatrends Year: 2005-2009 PI 1.6 Months: 1-12 Days: dependent on month
Firmware VENDOR     AAEON       Firmware Information     CPU Board       Firmware Version     ASDMSE15       Build Date     1/22/2019       System Date     [Tue 12/2       System Time     [10:03:58]	4/2019]
Access Level Administr	tor U-Select I tem Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit

#### 3.4 Setup submenu: Advanced



# 3.4.1 Trusted Computing

Configuration	Enables or Disables BIOS support for security device
NO Security Device Found	O.S. will not show Security Device. TCG EFI protocol and INTIA interface will not be available.
	++: Select Screen 14: Select Item
	Fiter: Select +/-: Change Opt. F1: General Help F2: Previous Values
	F3: Optimized Defaults F4: Save & Exit ESC: Exit

Options Summary		
Security Device Support	Disable	
	Enable	Optimal Default, Failsafe Default
Enables or Disables BIOS	support for security device	
O.S. will not show Securit	y Device. TCG EFI protocol	and INT1A interface will not be
available.		
SHA-1 PCR Bank	Disable	
	Enable	Optimal Default, Failsafe Default
Enable or Disable SHA-1 PCR Bank		
SHA256 PCR Bank	Disable	
	Enable	Optimal Default, Failsafe Default
Enable or Disable SHA256 PCR Bank		
Pending Operation	None	Optimal Default, Failsafe Default
	TPM Clear	
Schedule an Operation for	or the Security Device. NOT	E: Your Computer will reboot
during restart in order to	change State of Security D	evice.

Options Summary		
Platform Hierarchy	Disabled	
	Enabled	Optimal Default, Failsafe Default
Enable or disable Platfor	m Hierarchy	
Storage Hierarchy	Disabled	
	Enabled	Optimal Default, Failsafe Default
Enable or Disable Storag	e Hierarchy	
Endorsement Hierarchy	Disabled	
	Enabled	Optimal Default, Failsafe Default
Enable or Disable Endorsement Hierarchy		
TPM2.0 UEFI Spec	TCG_1_2	
Version	TCG_2	Optimal Default, Failsafe Default
Select the TCG2 Spec Version Support,		
TCG_1_2: Compatible mode for Win8/Win10		
TCG_2: Support new TCG	2 protocol and event form	at for Win10 or later
Physical Presence Spec	1.2	
Version	1.3	Optimal Default, Failsafe Default
Select to Tell O.S. to support PPI Spec Version 1.2 or 1.3. Note some HCK tests might not support 1.3.		

# 3.4.2 CPU Configuration

Aptio Setup Utilit Advanced	y – Copyright (C) 2019 Americ:	an Megatrends, Inc.
CPU Configuration Type ID Microcode Revision Speed L1 Data Cache L1 Instruction Cache L2 Cache L3 Cache L4 Cache VMX SMX/TXT	Intel(R) Core(TM) 17-8700T CPU @ 2.40GHz 0x906EA B4 2400 MHz 32 KB × 6 32 KB × 6 256 KB × 6 12 MB N/A Supported Supported	Enabled or Disabled Hyper-Threading Technology.
Hyper-Threading Active Processor Cores Intel (VMX) Virtualization Technology C states Intel(R) SpeedStep(tm) Turbo Mode	(Enabled) (Ail) (Enabled) (Enabled) (Enabled) (Enabled)	++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit

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Options Summary			
Hyper-Threading	Disabled		
	Enabled	Optimal Default, Failsafe Default	
Enabled or Disabled Hype	r-Threading Technology		
Active Processor Cores	All	Optimal Default, Failsafe Default	
	1		
Number of cores to enable in each processor package.			
Intel (VMX) Virtualization	Disabled		
Technology	Enabled	Optimal Default, Failsafe Default	
When enabled, a VMM ca	n utilize the additional hard	lware capabilities provided by	
Vanderpool Technology.			
C-States	Disabled		
	Enabled	Optimal Default, Failsafe Default	
Enable/Disable CPU Power 100% utilized.	Management. Allows CPL	J to go to C states when it's not	

Table continues on next page...

Options Summary		
Intel(R) SpeedStep(tm)	Disabled	
	Enabled	Optimal Default, Failsafe Default
Allows more than two frequency ranges to be supported.		
Turbo Mode	Disabled	
	Enabled	Optimal Default, Failsafe Default
Enable/Disable processor	Turbo Mode (requires Intel	Speed Step or Intel Speed Shift to
be available and enabled)		

# 3.4.3 SATA Configuration

Aptio Setup U Advanced	Jtility – Copyright (C) 2019 Amer.	ican Megatrends, Inc.
SATA Controller(s)	[Enabled]	Enable/Disable SATA Device.
M.2(SATA) M.2(SATA)	[Enabled] TS64GMTS400 (64.0GB)	)
		++: Select Screen
		T↓: Select Item Enter: Select +/-: Change Opt. F1: General Helo
		F2: Previous Values F3: Optimized Defaults F4: Save & Exit
Version 2.2	1 1275 Convergent (C) 2019 America	an Megatrends. The

Options Summary		
SATA Controller(s)	Disabled	
	Enabled	Optimal Default, Failsafe Default
Enable/Disable SATA Device.		
M.2(SATA)	Disabled	
	Enabled	Optimal Default, Failsafe Default
Enable or Disable SATA Po	rt	

## 3.4.4 Hardware Monitor

Aptio Setup Utili Advanced	ty – Copyright (C) 2019 Am	merican Megatrends, Inc.
Pc Health Status		Smart Fan Configuration
CPU Temperature(DTS) Thermal Source 1(T1) Thermal Source 2(T2)	: +70 °c : +55 °c : +49 °c	
FAN 1 Speed	: N/A	
+12V +5V VDDQ VCORE	: +11.719 V : +5.052 V : +1.235 V : +0.844 V	
▶ Fan 1 Mode Configuration		++: Select Screen f1: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
United at 0.00 407		

Options Summary		
Smart Fan	Disable	
	Enable	Optimal Default, Failsafe Default
Enables or Disables	s Smart Fan.	

### 3.4.4.1 Smart Fan Mode Configuration



Options Summary			
CPU Smart Fan	Full Mode	Optimal Default, Failsafe Default	
Control	Manual Mode by PWM		
	Auto Mode by PWM		
PWM signal	Non-inverting		
	Inverting	Optimal Default, Failsafe Default	
Select output PWM of inverting or non-inverting signal			
Monitor Thermal	THERMAL_SRC1(T1)	Optimal Default, Failsafe Default	
	THERMAL_SRC2(T2)		
Select monitor thermal source			
Temperature of Start	30	Optimal Default, Failsafe Default	
Temperature of Start			
Temperature of Off	20	Optimal Default, Failsafe Default	
Temperature of Off			

Options Summary		
Start of PWM	40	Optimal Default, Failsafe Default
Start PWM		
Slope (PWM)	1 (PWM)	Optimal Default, Failsafe Default
Slope (PWM)		

# 3.4.5 SIO Configuration

	Aptio Setup Utility – Copyright (C) 2019 American Advanced	Megatrends, Inc.
	AMI SIO Driver Version : A5.09.01	View and Set Basic properties
►	Super IO Chip Logical Device(s) Configuration [#Active*] Serial Port	Like IO Base, IRQ Range, DMA Channel and Device Mode.
	WARNING: Logical Devices state on the left side of the control, reflects the current Logical Device state. Changes made during Setup Session will be shown after you restart the system.	
		++: Select Screen 11: Select Itm Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
	Version 2.20.1275. Copyright (C) 2019 American Mu	egatrends, Inc.

# 3.4.5.1 Serial Port 1 Configuration

Serial Port 1 Configuration		Allows user to change Device's
Use This Device Logical Device Settings:	[Enabled]	Resource settings. New settings will be reflected on This Setup Page after System restarts.
Possible:		
WARNING: Disabling SIO Logical D	evices may have unwanted	
		++: Select Screen ↑↓: Select Item
		Enter: Select
		F1: General Help
		F2: Previous Values
		IE3: UNTIMIZED HETAULTS
		F4: Save & Exit
		F3: Optimized Defaults F4: Save & Exit ESC: Exit

Options Summary			
Use This Device	Disable		
	Enable	Optimal Default, Failsafe Default	
Enable or Disable this Logical Device.			
Possible:	Use Automatic Settings	Optimal Default, Failsafe Default	
	IO=3F8h; IRQ=4		
	10=2C8h; IRQ=11		
Allows user to change Device's Resource settings. New settings will be reflected on This			
Setup Page after System restarts.			

### 3.4.6 Seriallo Configuration



Options Summary			
SPI0 Controller	Disable	Optimal Default, Failsafe Default	
	Enable		
Enables/Disables Seriallo Controller If given device is Function 0 PSF disabling is			
skipped. PSF default will remain and device PCI CFG Space will still be visible. This is			
needed to allow PCI enumerator access functions above 0 in a multifunction device			

## 3.4.7 Power Management

Power Management		Select system power mode.
Power Mode State After G3	[ATX Type] [Last State]	
√ake Events		
RTC wake system from S5 Wake on LAN Enable	[Disabled] [Enabled]	
		++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit

Options Summary				
Power Mode	АТХ Туре	Optimal Default, Failsafe Default		
	АТ Туре			
Select system power	mode			
State After G3	S0 State	Optimal Default, Failsafe Default		
	S5 State			
	Last State			
Specify what state to go to when power is re-applied after a power failure (G3 state).				
RTC wake system	Disable	Optimal Default, Failsafe Default		
from S5	Fixed Time			
	Dynamic Time			
Fixed Time: System will wake on the hr::min::sec specified./n Dynamic Time: System will				
wake on the current time + Increase minute(s)				
Wake on LAN	Enabled	Optimal Default, Failsafe Default		
Enable	Disabled			
Enable/Disable integrated LAN to wake the system.				

# 3.5 Setup submenu: Chipset

Aptio Setup Utility – Copyright (C) 2019 American Main Advanced <mark>Chipset</mark> Security Boot Save & Exit	Megatrends, Inc.
<ul> <li>≻ System Agent (SA) Configuration</li> <li>▶ PCH-IO Configuration</li> </ul>	System Agent (SA) Parameters
	+: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version 2.20.1275. Copyright (C) 2019 American Me	gatrends, Inc.

# 3.5.1 System Agent (SA) Configuration

Aptio Setup Utility Chipset	) – Copyright (C) 2019 Americar	Megatrends, Inc.
Memory Configuration		
Memory Frequency	2133 MHz	
Channel O Slot O Size Number of Ranks Manufacturer Channel 1 Slot O	Populated & Enabled 4096 MB (DDR4) 1 Transcend Not Populated / Disabled	++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit

# 3.5.2 PCH-IO Configuration

Aptio Setup Chipset	Utility – Copyright (C) 2019 Am	erican Megatrends, Inc.
HD Audio PCH LAN Controller	[Enabled] [Enabled]	Control Detection of the HD-Audio device. Disabled = HDA will be unconditionally disabled Enabled = HDA will be unconditionally enabled.
		++: Select Screen <b>11</b> : Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit

Options Summary			
HD Audio	Disabled		
	Enabled	Optimal Default, Failsafe Default	
Control Detection of the HD-Audio device.			
Disabled = HDA will be unconditionally disabled			
Enabled = HDA will be unconditionally enabled.			
PCH Lan Controller	Disabled		
	Enabled	Optimal Default, Failsafe Default	
Enable/Disable onboard NIC			

#### 3.6 Setup submenu: Security

Aptio Setup Main Advanced Chipset	Utility – Copyright (C) 2019 Security Boot Save & Exit	American Megatrends, Inc.
Password Description		Set Administrator Password
If DNLY the Administrator' then this only limits acce only asked for when enteri If DNLY the User's password is a power on password and boot or enter Setup. In Se have Administrator rights. The password length must b in the following range: Minimum length	s password is set, ss to Setup and is ng Setup. d is set, then this must be entered to tup the User will e	
Maximum length	20	++: Select Screen 1↓: Select Item
Administrator Password User Password		Enter: Select +/-: Change Opt. F1: General Help
▶ Secure Boot		F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit

#### Change User/Administrator Password

You can set an Administrator Password or User Password. An Administrator Password must be set before you can set a User Password. The password will be required during boot up, or when the user enters the Setup utility. A User Password does not provide access to many of the features in the Setup utility.

Select the password you wish to set, and press Enter. In the dialog box, enter your password (must be between 3 and 20 letters or numbers). Press Enter and retype your password to confirm. Press Enter again to set the password.

#### Removing the Password

Select the password you want to remove and enter the current password. At the next dialog box press Enter to disable password protection.

### 3.6.1 Secure Boot

Aptio Setup U <sup>.</sup> Se	tility – Copyright (C) 2019 Ame ecurity	erican Megatrends, Inc.
System Mode	Setup	Secure Boot feature is Active if Secure Boot is Enabled.
	[Disabled] Not Active	Platform Key(PK) is enrolled and the System is in User mod The mode change requires
Secure Boot Mode Restore Factory Keys Reset To Setup Mode	[Custom]	platform reset
Key Management		
		++: Select Screen
		Enter: Select +/-: Change Opt.
		F1: General Help F2: Previous Values F3: Optimized Defaults
		F4: Save & Exit ESC: Exit

Options Summary				
Secure Boot	Disabled	Optimal Default, Failsafe Default		
	Enabled			
Secure Boot feature i	s Active if Secure Boot is Enable	ed, Platform Key(PK) is enrolled and		
the System is in User	mode. The mode change requ	ires platform reset		
Secure Boot Mode	Custom	Optimal Default, Failsafe Default		
	Standard			
Secure Boot mode options: Standard or Custom.				
In Custom mode, Secure Boot Policy variables can be configured by a physically				
present user without full authentication				
Restore Factory Keys				
Force System to User Mode. Install factory default Secure Boot key databases				
Reset To Setup Mode				
Delete all Secure Boo	ot key databases from NVRAM			

# 3.6.1.1 Key Management

Vendor Keys	Valid	Install factory default Secure
Factory Key Provision • Restore Factory Keys • Reset To Setup Mode • Export Secure Boot variab • Enroll Efi Image Device Guard Ready	[Disəbled] les	Boot keys after the platform reset and while the System is in Setup mode
Remove 'UEFI CA' from DB Restore DB defaults		
Secure Boot variable   Si Platform Key(PK)   key Exchange Keys   Authorized Signatures  Forbidden Signatures  Authorized TimeStamps  OsRecovery Signatures	ze  Keys  Key Source 0  0  No Keys 0  0  No Keys	<pre>++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit ESC: Exit</pre>

Options Summary				
Factory Key Provision	Disabled	Optimal Default, Failsafe Default		
	Enabled			
Secure Boot feature is Active if	Secure Boot is Enabled	d, Platform Key (PK) is enrolled and		
the System is in User mode. T	he mode change requi	res platform reset		
Restore Factory Keys				
Force System to User Mode. Install factory default Se		cure Boot key databases		
Reset To Setup Mode				
Delete all Secure Boot key databases from NVRAM				
Export Secure Boot variables				
Copy NVRAM content of Secure Boot variables to file		es in a root folder on a file system		
device				
Enroll Efi Image				
Allow the image to run in Secu	ure Boot mode. Enroll S	SHA256 Hash certificate of a PE		
image into Authorized Signature Database (db)				

Table continues on next page...

# Options Summary

Remove	'UEFI	CA'	from	DB
--------	-------	-----	------	----

Device Guard ready system must not list 'Microsoft UEFI CA' Certificate in Authorized
Signature database (db)
Restore DB defaults

Restore DB variable to facto	ry defaults			
Platform Key(PK)	Details			
	Export			
	Update			
	Delete			
Key Exchange Keys	Details			
	Export			
	Update			
	Append			
	Delete			
Authorized Signatures	Details			
	Export			
	Update			
	Append			
	Delete			
Forbidden Signatures	Details			
	Export			
	Update			
	Append			
	Delete			
Authorized TimeStamps	Update			
	Append			
OsRecovery Signatures	Update			
	Append			
Enroll Factory Defaults or Io 1.Public Key Certificate: a)EFI_SIGNATURE_LIST b)EFI_CERT_X509 (DER) c)EFI_CERT_RSA2048 (bin d)EFI_CERT_SHAXXX 2.Authenticated UEFI Variab	ad certificates from a file ) le	3.		
3.EFI PE/COFF Image(SHA256)				

Key Source: Factory,External,Mixed

# 3.7 Setup submenu: Boot

Aptio Setup Utility - Main Advanced Chipset Security	Copyright (C) 2019 American Boot Save & Exit	Megatrends, Inc.
Boot Configuration		Enables or disables Quiet Boot option
Quiet Boot LAN UEFI PXE Driver	[Enabled] [Disabled]	
FIXED BOOT ORDER Priorities		
Boot Option #1	[UEFI Hard Disk:Windows Boot Manager (P2: TS64GMTS400)]	
Boot Option #2	[UEFI USB Device:UEFI: SanDisk, Partition 1]	
Boot Option #3	[UEFI CD/DVD]	·
Boot Option #4	[UEFI Network]	++: Select Screen
N UEET Wood Dick Drive RRS Prioritics		II: Select Item
<ul> <li>UEFT Hard DISK Drive BBS Priorities</li> <li>UEET USB Drive BBS Priorities</li> </ul>		Enter: Select
• UEFT USD DELIVE DDS FETUETCIES		F/ Change opt. F1: General Helm
		F2: Previous Values
		F3: Optimized Defaults
		F4: Save & Exit
		ESC: Exit

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Options Summary				
Quiet Boot	Disabled			
	Enabled	Optimal Default, Failsafe Default		
Enable/Disable showing boot logo.				
LAN UEFI Pxe Driver	Disabled	Optimal Default, Failsafe Default		
	Enabled			
Enabled/Disable LAN UEF	PXE Driver			

### 3.7.1 BBS Priorities

Boot Ontion #1	
	Sets the system boot order
	++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit

# 3.8 Setup submenu: Save & Exit

Aptio Setup Utility – Copyright (C) 2019 American Main Advanced Chipset Security Boot <mark>Save &amp; Exit</mark>	Megatrends, Inc.
Save Options Save Changes and Reset Discard Changes and Exit Default Options	Reset the system after saving the changes.
RESIDITE DETAULIS	
	<pre>++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults</pre>
	F4: Save & Exit ESC: Exit

# Chapter 4

Drivers Installation

#### 4.1 Driver Download and Installation

Drivers for the ASDM-L-CFS can be downloaded from the product page on the AAEON website by following this link:

https://www.aaeon.com/en/p/smart-display-modules-asdm-l-cfs

Download the driver(s) you need and follow the steps below to install them.

Before beginning installation, use the following chart to determine if your operating system (OS) is compatible with the drivers AAEON provides for the ASDM-L-CFS. Some drivers are limited in their compatibility and will only work with certain operating systems. If you have any questions, contact your AAEON sales representative for assistance.

OS Compatibility Table				
Driver	Windows	Linux		
Step 1 – Chipset	Yes	No		
Step 2 – Graphics	Yes	No		
Step 3 – Network	Yes	No		
Step 4 – Serial IO	Yes	No		
Step 5 – ME	Yes	No		

Follow the steps below, in order, to install system drivers.

#### Step 1 – Install Chipset Drivers

- 1. Open the Step 1 CHIPSET folder
- 2. Run the SetupChipset.exe file in the folder
- 3. Follow the instructions
- 4. Drivers will be installed automatically

#### Step 2 – Install Graphics Drivers (Windows 10 only)

- 1. Open the Step 2 Graphic folder
- 2. Run the igxpin.exe file in the folder
- 3. Follow the instructions
- 4. Drivers will be installed automatically

#### Step 3 – Install Network Drivers

- 1. Open the Step 3 Network folder and select your OS
- 2. Run the ProWinx64.exe file in the folder
- 3. Follow the instructions
- 4. Drivers will be installed automatically

#### Step 4 – Install Serial IO Drivers

- 1. Open the Step 4 SerialIO folder
- 2. Run the SetupSeriallO.exe file in the folder
- 3. Follow the instructions
- 4. Drivers will be installed automatically

#### Step 5 – Install ME Drivers

- 1. Open the Step 5 ME folder
- 2. Run the SetupME.exe file in the folder
- 3. Follow the instructions
- 4. Drivers will be installed automatically

# Appendix A

Watchdog Timer Programming

## A.1 Watchdog Timer Initial Program

Table 1 : Embedded BRAM relative register table						
	Default Value	Note				
Index	0x284(Note1)	BRAM Index Register				
Data	0x285(Note2)	BRAM Data Register				
Logical Device Number	<b>0xA8</b> (Note3)	Watch dog Logical Device Number				
Function and Device Number	<b>0x00</b> (Note4)	Watch dog Function/Device Number				

Table 2 : Watchdog relative register table							
	Option Register	BitNum	Value	Note			
Timer Counter	<b>0x00</b> (Note5)		(Note10)	Time of watchdog			
				timer			
				(0~255)			
Counting Unit	<b>0x01</b> (Note6)	<b>0</b> (Note7)	<b>0</b> (Note11)	Select time unit.			
				0: second			
				1: minute			
Watchdog RST pulse width	<b>0x01</b> (Note8)	[ <b>3:2]</b> (Note9)	<b>0</b> (Note12)	0: 20ms			
				1: 60ms			
				2: 100ms			
				3: 250ms			

#### 

// Embedded BRAM relative definition (Please reference to Table 1)
#define byte EcBRAMIndex //This parameter is represented from Note1
#define byte EcBRAMData //This parameter is represented from Note2
#define byte BRAMLDNReg //This parameter is represented from Note3
#define byte BRAMFnDataReg //This parameter is represented from Note4
#define void EcBRAMWriteByte(byte Offset, byte Value);
#define byte EcBRAMReadByte(byte Offset);
#define void IOWriteByte(byte Offset, byte Value);
#define byte IOReadByte(byte Offset);
// Watch Dog relative definition (Please reference to Table 2)
#define byte TimerReg //This parameter is represented from Note5

#define byte TimerVal // This parameter is represented from Note10
#define byte UnitReg //This parameter is represented from Note6
#define byte UnitBit //This parameter is represented from Note7
#define byte UnitVal //This parameter is represented from Note11
#define byte RSTReg //This parameter is represented from Note8
#define byte RSTBit //This parameter is represented from Note9
#define byte RSTVal //This parameter is represented from Note12

#### \*\*\*\*\*

#### VOID Main(){

- // Procedure : AaeonWDTConfig
- // (byte)Timer : Time of WDT timer.(0x00~0xFF)
- // (boolean)Unit : Select time unit(0: second, 1: minute).

#### AaeonWDTConfig();

- // Procedure : AaeonWDTEnable
- // This procudure will enable the WDT counting.

#### AaeonWDTEnable();

}

}

}

}

VOID

WDTParameterSetting(){ By te TempByte;

// Procedure : AaeonWDTEnable
VOID AaeonWDTEnable (){
 WDTEnableDisable(1);

// Procedure : AaeonWDTConfig
VOID AaeonWDTConfig (){

// Disable WDT counting
WDTEnableDisable(0);

WDTParameterSetting();

VOID WDTEnableDisable(byte

// WDT relative parameter setting

Value){ ECBRAMWriteByte(TimerReg , Value);

// Watchdog Timer counter setting ECBRAMWriteByte(TimerReg , TimerVal); // WDT counting unit setting TempByte = ECBRAMReadByte(UnitReg); TempByte |= (UnitVal << UnitBit); ECBRAMWriteByte(UnitReg , TempByte); // WDT RST pulse width setting TempByte = ECBRAMReadByte(RSTReg); TempByte |= (RSTVal << RSTBit); ECBRAMWriteByte(RSTReg , TempByte);

۱
***************************************					
VOID ECBRAMWriteByte(byte OPReg, byte OPBit, byte Value){ IOWriteByte(EcBRAMIndex, 0x10); IOWriteByte(EcBRAMData, BRAMLDNReg); IOWriteByte(EcBRAMIndex, 0x11); IOWriteByte(EcBRAMData, BRAMFnDataReg);					
IOWriteByte(EcBRAMIndex, 0x13 + OPReg); IOWriteByte(EcBRAMData, Value);					
IOWriteByte(EcBRAMIndex, 0x12); IOWriteByte(EcBRAMData, 0x30); //Write start }					
Byte ECBRAMReadByte(byte OPReg){ IOWriteByte(EcBRAMIndex, 0x10); IOWriteByte(EcBRAMData, BRAMLDNReg); IOWriteByte(EcBRAMIndex, 0x11); IOWriteByte(EcBRAMData, BRAMFnDataReg); IOWriteByte(EcBRAMIndex, 0x12); IOWriteByte(EcBRAMIndex, 0x12); IOWriteByte(EcBRAMData, 0x10); //Read_start					
IOWriteByte(EcBRAMIndex, 0x13 + OPReg); Return IOReadByte(EcBRAMData, Value); } ***********************************					

# Appendix B

I/O Information

ASDM-L-CFS

#### B.1 I/O Address Map

✓ Input/output (IO)
Texpress Root Complex [0000000000000 - 000000000000000000000
🏣 [0000000000000020 - 000000000000021] Programmable interrupt controller
🏣 [000000000000024 - 000000000000025] Programmable interrupt controller
🏣 [000000000000028 - 000000000000029] Programmable interrupt controller
🏣 [00000000000002C - 00000000000002D] Programmable interrupt controller
🏣 [00000000000002E - 00000000000002F] Motherboard resources
🏣 [0000000000000030 - 000000000000031] Programmable interrupt controller
🏣 [000000000000034 - 00000000000035] Programmable interrupt controller
🏣 [000000000000038 - 00000000000039] Programmable interrupt controller
🏣 [00000000000003C - 0000000000003D] Programmable interrupt controller
🏣 [0000000000000040 - 000000000000043] System timer
🏣 [00000000000004E - 0000000000004F] Motherboard resources
🏣 [0000000000000050 - 000000000000053] System timer
🏣 [000000000000061 - 000000000000061] Motherboard resources
🏣 [000000000000063 - 00000000000063] Motherboard resources
🏣 [000000000000065 - 00000000000065] Motherboard resources
🏣 [000000000000067 - 00000000000067] Motherboard resources
🏣 [0000000000000070 - 00000000000000070] Motherboard resources
🏣 [000000000000080 - 00000000000080] Motherboard resources
🏣 [000000000000092 - 00000000000092] Motherboard resources
🏣 [00000000000000A0 - 0000000000000A1] Programmable interrupt controller
🏣 [0000000000000A4 - 000000000000A5] Programmable interrupt controller
🏣 [00000000000000A8 - 0000000000000A9] Programmable interrupt controller
🏣 [0000000000000AC - 000000000000AD] Programmable interrupt controller
Tai [00000000000000B0 - 000000000000B1] Programmable interrupt controller
Text [0000000000000B2 - 000000000000B3] Motherboard resources
🗽 [0000000000000B4 - 000000000000B5] Programmable interrupt controller
🔚 [000000000000088 - 00000000000089] Programmable interrupt controller
programmable interrupt controller
🏣 [00000000000000F0 - 0000000000000F0] Numeric data processor
[0000000000003F8 - 00000000003FF] Communications Port (COM1)
🗽 [00000000000004D0 - 000000000004D1] Programmable interrupt controller
Terrer [0000000000000680 - 00000000000069F] Motherboard resources
🚛 [0000000000000000 - 00000000000FFFF] PCI Express Root Complex
[000000000000164E - 00000000000164F] Motherboard resources
[000000000001800 - 00000000018FE] Motherboard resources
[000000000001854 - 00000000001857] Motherboard resources
[0000000000000000000 - 0000000000000000
🌆 [00000000000000000 - 000000000000303F] Intel(R) UHD Graphics 630
I0000000000003060 - 0000000000307E1 Standard SATA AHCI Controller

	P.		
Ê		[00000000000EEE8 - 00000000000EEEE]	Intel(R) Active Management Technology - SOL (COM3)
i.		[00000000000EFA0 - 00000000000EFBF]	Intel(R) SMBus - A323
1	r.	[000000000003090 - 000000000003097]	Standard SATA AHCI Controller
1	r'i	[00000000003080 - 000000000003083]	Standard SATA AHCI Controller
1	r.	[000000000003060 - 00000000000307F]	Standard SATA AHCI Controller

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#### B.2 Memory Address Map

~	Memory
	to [0000000000000000 - 000000000000000000
	to [0000000040000000 - 0000000403FFFF] Motherboard resources
	[0000000090000000 - 00000009FFFFFF] Intel(R) UHD Graphics 630
	to [00000000000000 - 00000000000000000000
	[000000000000000 - 00000000000000000000
	to [00000000A1000000 - 00000000A10FFFFF] High Definition Audio Controller
	🕎 [00000000A1100000 - 00000000A111FFFF] Intel(R) Ethernet Connection (7) I219-LM
	[00000000A1120000 - 00000000A112FFFF] Intel(R) USB 3.1 eXtensible Host Controller - 1.10 (Microsoft)
	🏣 [00000000A1130000 - 00000000A1133FFF] High Definition Audio Controller
	a [00000000A1134000 - 00000000A1135FFF] Standard SATA AHCI Controller
	te [0000000A1138000 - 0000000A11380FF] Intel(R) SMBus - A323
	a [00000000A1139000 - 00000000A11397FF] Standard SATA AHCI Controller
	a [00000000A113A000 - 00000000A113A0FF] Standard SATA AHCI Controller
	to [00000000000000 - 00000000000000000000
	to [00000000FC800000 - 00000000FE7FFFF] PCI Express Root Complex
	to the sources [000000000000000000000000000000000000
	🏣 [00000000FD6A0000 - 00000000FD6AFFFF] Intel(R) Serial IO GPIO Host Controller - INT3450
	to GPIO Host Controller - 100000000FD6BFFFF] Intel(R) Serial IO GPIO Host Controller - INT3450
	to [00000000FD6C0000 - 00000000FD6CFFFF] Motherboard resources
	to [00000000FD6D0000 - 00000000FD6DFFF] Intel(R) Serial IO GPIO Host Controller - INT3450
	to GPIO Host Controller - 100000000FD6EFFFF] Intel(R) Serial IO GPIO Host Controller - 1NT3450
	to the sources [000000000000000000000000000000000000
	to [00000000FE000000 - 00000000FE01FFF] Motherboard resources
	to [00000000FE010000 - 00000000FE010FFF] Intel(R) SPI (flash) Controller - A324
	[00000000FE1FD000 - 00000000FE1FDFFF] Intel(R) Active Management Technology - SOL (COM3)
	🏣 [00000000FE1FE000 - 00000000FE1FEFFF] Intel(R) Management Engine Interface
	to [00000000FE1FF000 - 00000000FE1FFFFF] Intel(R) Serial IO I2C Host Controller - A368
	to [00000000FE200000 - 00000000FE7FFFF] Motherboard resources
	timer [00000000FED00000 - 00000000FED003FF] High precision event timer
	to the sources [000000000000000000000000000000000000
	time [00000000FED45000 - 00000000FED8FFFF] Motherboard resources
	time [00000000FED90000 - 00000000FED93FFF] Motherboard resources
	time [00000000FEE00000 - 00000000FEEFFFFF] Motherboard resources
	to [00000000FF000000 - 00000000FFFFFFF] Motherboard resources

### B.3 IRQ Mapping Chart

~	Int	errupt request (IRQ)	
		(ISA) 0x00000000 (00)	System timer
	Ψ,	(ISA) 0x00000004 (04)	Communications Port (COM1)
		(ISA) 0x000000D (13)	Numeric data processor
		(ISA) 0x000000E (14)	Intel(R) Serial IO GPIO Host Controller - INT3450
		(ISA) 0x0000037 (55)	Microsoft ACPI-Compliant System
		(ISA) 0x0000038 (56)	Microsoft ACPI-Compliant System
		(ISA) 0x0000039 (57)	Microsoft ACPI-Compliant System
		(ISA) 0x000003A (58)	Microsoft ACPI-Compliant System
		(ISA) 0x000003B (59)	Microsoft ACPI-Compliant System
	1	(ISA) 0x000003C (60)	Microsoft ACPI-Compliant System
		(ISA) 0x000003D (61)	Microsoft ACPI-Compliant System
		(ISA) 0x000003E (62)	Microsoft ACPI-Compliant System
		(ISA) 0x000003F (63)	Microsoft ACPI-Compliant System
		(ISA) 0x00000040 (64)	Microsoft ACPI-Compliant System
	1	(ISA) 0x00000041 (65)	Microsoft ACPI-Compliant System
		(ISA) 0x00000042 (66)	Microsoft ACPI-Compliant System
		(ISA) 0x00000043 (67)	Microsoft ACPI-Compliant System
	-	(ISA) 0x00000044 (68)	Microsoft ACPI-Compliant System
	1	(ISA) 0x00000045 (69)	Microsoft ACPI-Compliant System
		(ISA) 0x00000046 (70)	Microsoft ACPI-Compliant System
		(ISA) 0x00000047 (71)	Microsoft ACPI-Compliant System
		(ISA) 0x00000048 (72)	Microsoft ACPI-Compliant System
		(ISA) 0x00000049 (73)	Microsoft ACPI-Compliant System
		(ISA) 0x0000004A (74)	Microsoft ACPI-Compliant System
		(ISA) 0x0000004B (75)	Microsoft ACPI-Compliant System
		(ISA) 0x0000004C (76)	Microsoft ACPI-Compliant System
		(ISA) 0x0000004D (77)	Microsoft ACPI-Compliant System
		(ISA) 0x0000004E (78)	Microsoft ACPI-Compliant System
		(ISA) 0x0000004F (79)	Microsoft ACPI-Compliant System
		(ISA) 0x00000000 (80)	Microsoft ACPI-Compliant System
	2	(ISA) 0x00000051 (81)	Microsoft ACPI-Compliant System
	2	(ISA) 0x00000052 (02)	Microsoft ACPI-Compliant System
	2	(ISA) 0x00000053 (03)	Microsoft ACPI-Compliant System
	2	(ISA) 0x00000055 (85)	Microsoft ACPI-Compliant System
	Ē.	(ISA) 0x00000056 (86)	Microsoft ACPI-Compliant System
		(ISA) 0x00000057 (87)	Microsoft ACPI-Compliant System
	Ē	(ISA) 0x00000058 (88)	Microsoft ACPI-Compliant System
	Ē	(ISA) 0x00000059 (89)	Microsoft ACPI-Compliant System
		(ISA) 0x0000005A (90)	Microsoft ACPI-Compliant System

(ISA)	0x0000005A (90)	Microsoft ACPI-Compliant System
(ISA)	0x0000005B (91)	Microsoft ACPI-Compliant System
(ISA)	0x0000005C (92)	Microsoft ACPI-Compliant System
(ISA)	0x0000005D (93)	Microsoft ACPI-Compliant System
(ISA)	0x0000005E (94)	Microsoft ACPI-Compliant System
(ISA)	0x0000005F (95)	Microsoft ACPI-Compliant System
(ISA)	0x0000060 (96)	Microsoft ACPI-Compliant System
(ISA)	0x00000061 (97)	Microsoft ACPI-Compliant System
(ISA)	0x0000062 (98)	Microsoft ACPI-Compliant System
(ISA)	0x0000063 (99)	Microsoft ACPI-Compliant System
(ISA)	0x0000064 (100)	Microsoft ACPI-Compliant System
(ISA)	0x0000065 (101)	Microsoft ACPI-Compliant System
(ISA)	0x0000066 (102)	Microsoft ACPI-Compliant System
(ISA)	0x0000067 (103)	Microsoft ACPI-Compliant System
(ISA)	0x0000068 (104)	Microsoft ACPI-Compliant System
(ISA)	0x0000069 (105)	Microsoft ACPI-Compliant System
(ISA)	0x000006A (106)	Microsoft ACPI-Compliant System
(ISA)	0x000006B (107)	Microsoft ACPI-Compliant System
(ISA)	0x000006C (108)	Microsoft ACPI-Compliant System
(ISA)	0x000006D (109)	Microsoft ACPI-Compliant System
(ISA)	0x000006E (110)	Microsoft ACPI-Compliant System
(ISA)	0x000006F (111)	Microsoft ACPI-Compliant System
(ISA)	0x00000070 (112)	Microsoft ACPI-Compliant System
(ISA)	0x00000071 (113)	Microsoft ACPI-Compliant System
(ISA)	0x00000072 (114)	Microsoft ACPI-Compliant System
(ISA)	0x00000073 (115)	Microsoft ACPI-Compliant System
(ISA)	0x00000074 (116)	Microsoft ACPI-Compliant System
(ISA)	0x00000075 (117)	Microsoft ACPI-Compliant System
(ISA)	0x00000076 (118)	Microsoft ACPI-Compliant System
(ISA)	0x00000077 (119)	Microsoft ACPI-Compliant System
(ISA)	0x00000078 (120)	Microsoft ACPI-Compliant System
(ISA)	0x00000079 (121)	Microsoft ACPI-Compliant System
(ISA)	0x000007A (122)	Microsoft ACPI-Compliant System
(ISA)	0x000007B (123)	Microsoft ACPI-Compliant System
(ISA)	0x0000007C (124)	Microsoft ACPI-Compliant System
(ISA)	0x0000007D (125)	Microsoft ACPI-Compliant System
(ISA)	0x000007E (126)	Microsoft ACPI-Compliant System
(ISA)	0x000007F (127)	Microsoft ACPI-Compliant System
(ISA)	0x0000080 (128)	Microsoft ACPI-Compliant System
(ISA)	0x0000081 (129)	Microsoft ACPI-Compliant System

ISA) 0x000001E3 (483) Microsoft ACPI-Compliant System Microsoft ACPI-Compliant System ISA) 0x00001E4 (484) ISA) 0x000001E5 (485) Microsoft ACPI-Compliant System (ISA) 0x000001E6 (486) Microsoft ACPI-Compliant System ISA) 0x000001E7 (487) Microsoft ACPI-Compliant System ISA) 0x000001E8 (488) Microsoft ACPI-Compliant System (ISA) 0x000001E9 (489) Microsoft ACPI-Compliant System (ISA) 0x000001EA (490) Microsoft ACPI-Compliant System Text (ISA) 0x000001EB (491) Microsoft ACPI-Compliant System Microsoft ACPI-Compliant System (ISA) 0x000001EC (492) Microsoft ACPI-Compliant System ISA) 0x000001ED (493) ISA) 0x000001EE (494) Microsoft ACPI-Compliant System (ISA) 0x000001EF (495) Microsoft ACPI-Compliant System Tal: (ISA) 0x000001F0 (496) Microsoft ACPI-Compliant System Microsoft ACPI-Compliant System ISA) 0x000001F1 (497) Microsoft ACPI-Compliant System ISA) 0x000001F2 (498) ISA) 0x000001F3 (499) Microsoft ACPI-Compliant System (ISA) 0x000001F4 (500) Microsoft ACPI-Compliant System Tal: (ISA) 0x000001F5 (501) Microsoft ACPI-Compliant System (ISA) 0x000001F6 (502) Microsoft ACPI-Compliant System ISA) 0x000001F7 (503) Microsoft ACPI-Compliant System Microsoft ACPI-Compliant System (ISA) 0x000001F8 (504) (ISA) 0x000001F9 (505) Microsoft ACPI-Compliant System ISA) 0x000001FA (506) Microsoft ACPI-Compliant System (ISA) 0x000001FB (507) Microsoft ACPI-Compliant System Microsoft ACPI-Compliant System (ISA) 0x000001FC (508) ISA) 0x000001FD (509) Microsoft ACPI-Compliant System (ISA) 0x000001FE (510) Microsoft ACPI-Compliant System ISA) 0x000001FF (511) Microsoft ACPI-Compliant System (PCI) 0x000000B (11) Intel(R) SMBus - A323 Text (PCI) 0x00000010 (16) High Definition Audio Controller Intel(R) Serial IO I2C Host Controller - A368 (PCI) 0x00000010 (16) (PCI) 0x00000013 (19) Intel(R) Active Management Technology - SOL (COM3) (PCI) 0xFFFFFFFA (-6) Intel(R) Management Engine Interface (PCI) 0xFFFFFFFB (-5) Intel(R) UHD Graphics 630 (PCI) 0xFFFFFFFC (-4) Intel(R) USB 3.1 eXtensible Host Controller - 1.10 (Microsoft) (PCI) 0xFFFFFFFD (-3) Intel(R) Ethernet Connection (7) I219-LM Standard SATA AHCI Controller

# Appendix C

Mating Connectors and Cables

## C.1 List of Mating Connectors and Cables

The table notes mating connectors and available cables.

Connector	Function	Mating Connector		Available	Cable P/N
Label		Vendor	Model No	Cable	
	External				
CN3	RTC	Molex	51021-0200	Battery Cable	1750113019
	Connector				