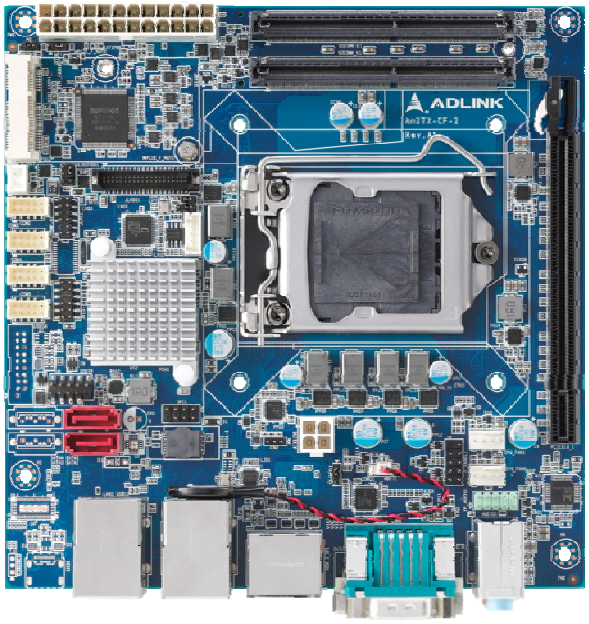
AmITX-CF-I

User's Manual

Mini-ITX Embedded Motherboard with
8th and 9th Gen Intel® Core™ i7/i5/i3 Processors
and Intel® Q370/H310 Chipset



Manual Rev.: 1.0
Revision Date: November 3, 2020
Part Number: 50-1X017-1000

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Leading EDGE COMPUTING

Preface

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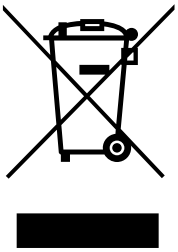
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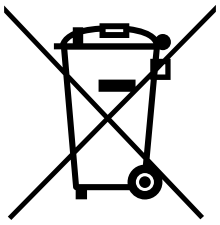
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Revision History

Revision	Description	Date	By
1.0	Initial release	2020-11-03	JC

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1 Introduction

The AmITX-CF-I is a Mini-ITX motherboard supporting the Desktop 8th and 9th Generation Intel® Core™ i7/i5/i3 and Pentium®/Celeron® Processor with Intel® Q370/H310 Chipset. The AmITX-CF-I is specifically designed for customers who need high-level processing and graphics performance with a long product life solution.

The AmITX-CF-I features one DisplayPort, one HDMI, one DVI-D, dual Gigabit Ethernet ports, USB 3.0 ports, USB 2.0 ports, and SATA 6 Gb/s ports. Expansion is provided by one PCIe x16, and one mini-PCIe slot. The onboard feature connector provides GPIO, SMBus, and I^2C support. The board is equipped with SPI AMI EFI BIOS, supporting embedded features such as hardware monitor and watchdog timer

Table 1: AmITX-CF-I Processors

Model Number	Chipset
AmITX-CF-I-Q370	Q370
AmITX-CF-I-H310	H310

Latest revisions of the datasheet, user's manual, BIOS, drivers, and board support packages, can be downloaded from the product webpage on the ADLINK web site: www.adlinktech.com

1.1 Packing List

- AmITX-CF-I Mini-ITX motherboard
- Rear I/O shield

1.2 Optional Accessories

- COM port cable, 1 port (P/N: 30-10297-0000-B0)
- USB 2.0 cable, 2 ports for AmITX-CF-I-Q370/H310 (P/N: 30-21625-0000-B0)
- USB 3.0 cable, 2 ports for AmITX-CF-I-Q370 (P/N: 30-21597-1000-A0)

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2 Specifications

2.1 Core System

CPU	**Desktop 8th Generation Intel® Core™ i7/i5/i3 and Pentium®/Celeron® Processor, LGA1151 socket** Intel® Core™ i7-8700, 3.2GHz, 12M Cache, 65W TDP, LGA1151, DDR4 2666MHz support (6C/12T) Intel® Core™ i7-8700T, 2.4GHz 12M Cache, 35W TDP, LGA1151, DDR4 2666MHz support (6C/12T) Intel® Core™ i5-8500, 3.0GHz, 9M Cache, 65W TDP, LGA1151, DDR4 2666MHz support (6C/6T) Intel® Core™ i5-8500T, 2.1GHz, 9M Cache, 35W TDP, LGA1151, DDR4 2666MHz support (6C/6T) Intel® Core™ i3-8100, 3.6GHz, 6M Cache, 65W TDP, LGA1151, DDR4 2400MHz support (4C/4T) Intel® Core™ i3-8100T, 3.1GHz, 6M Cache, 35W TDP, LGA1151, DDR4 2400MHz support (4C/4T) Intel® Pentium® G5400, 3.7GHz, 4M Cache, 58W TDP, LGA1151, DDR4 2400MHz support (2C/4T) Intel® Pentium® G5400T, 3.1GHz, 4M Cache, 35W TDP, LGA1151, DDR4 2400MHz support (2C/4T) Intel® Celeron® G4900, 3.1GHz, 2M Cache, 54W TDP, LGA1151, DDR4 2400MHz support (2C/2T) Intel® Celeron® G4900T, 2.9GHz, 2M Cache, 35W TDP, LGA1151, DDR4 2400MHz support (2C/2T) **Desktop 9th Generation Intel® Core™ i7/i5/i3 and Pentium®/Celeron® Processor, LGA1151 socket** Intel® Core™ i7-9700E, 2.6GHz, 12M Cache, 65W TDP, LGA1151, DDR4 2666MHz support (8C/8T) Intel® Core™ i7-9700TE, 1.8GHz, 12M Cache, 35W TDP, LGA1151, DDR4 2666MHz support (8C/8T) Intel® Core™ i5-9500E, 3.0GHz, 9M Cache, 65W TDP, LGA1151, DDR4 2666MHz support (6C/6T) Intel® Core™ i5-9500TE, 2.2GHz, 9M Cache, 35W TDP, LGA1151, DDR4 2666MHz support (6C/6T) Intel® Core™ i3-9100E, 3.1GHz, 6M Cache, 65W TDP, LGA1151, DDR4 2400MHz support (4C/4T) Intel® Core™ i3-9100TE, 2.2GHz, 6M Cache, 35W TDP, LGA1151, DDR4 2400MHz support (4C/4T) **Note:** Availability of features may vary between processor SKUs and operating systems
Chipset	Intel® Q370/H310 Chipset
Memory	Two 260-pin DDR4 non-ECC SODIMM slots, DDR4 2400/2666 MHz, up to 32 GB (CPU dependent)
Embedded BIOS	AMI® UEFI BIOS, 256Mb SPI flash memory (H310: 128Mb)

2.2 Rear I/O Connectors

Display	1x DisplayPort, 1x HDMI, 1x DVI-D
LAN	Dual GbE RJ-45
USB	4x USB 3.1 Gen2 connectors (H310: USB 3.1 Gen1)
Audio	1x Line-out, 1x Line-in, 1x Mic-in connector
Serial	1x RS-232/422/485 with auto flow control connector

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2.3 Internal Headers and Connectors

PCI Express Slots	PCIe x16 (Gen3) 1x Mini PCIe (full/half size), supports PCIe x1 Gen2, USB 2.0
USB	2x USB 3.1 Gen1 onboard header (H310: not available) 2x USB 2.0 onboard header
SATA	4x SATA 6.0 Gb/s connectors. Software RAID support 0/1/5/10 (H310: 2x SATA, no RAID support) 1x M.2 (2280)
Serial	4x RS-232 headers
LVDS	1x LVDS pin header, supports single/dual channel 24-bit LVDS up to 1920x1080 @ 60 Hz
DIO	1x 8-bit GPIO pin header
Other	CPU Fan Header Sys Fan Header Audio Header Front Panel Header SPI Header Case Open Header CPU 12V Power Connector (4-pin) ATX Power Connector (24-pin)

2.4 Form Factor

Mini-ITX: 170mm x 170mm

2.5 Video

GPU Feature Support	Integrated Gen 9.5 Intel® Graphics with up to 24 execution units supporting the latest graphics APIs DirectX 12 and OpenGL 4.5 for improved 3D rendering performance at low power.
Display Interface Support	• 1x DVI-D, resolution up to 1920 x 1200 @ 60 Hz • 1x DP, resolution up to 4096 x 2304 @ 60 Hz • 1x HDMI, resolution up to 4096 x 2160 @ 30 Hz • 1x LVDS, supports single/dual channel 24-bit LVDS up to 1920x1080 @ 60 Hz

2.6 Audio

Audio Codec	Realtek ALC888S
Interfaces	1x Line-out, 1x Line-in, 1x Mic-in connector

2.7 LAN

LAN1/2	Realtek RTL8111G Ethernet controllers
Interface	10/100/1000 Mbps RJ45 connectors

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2.8 Trusted Platform Module (TPM)

TPM 2.0	Infineon SLB9665TT2.0 (optional)

2.9 Power Specification

Power Modes	AT and ATX mode
Power Requirement	+12V (5.51A), +5V (1.466A), +3.3V (2.09A), 5VSB (0.6A)
Power Management	ACPI 5.0 compliant
Power States	Supports S0, S4, S3, S5, (Wake-on-USB S3/S4, WoL S3/S4/S5)
Power Connector	1x 24-pin ATX connector; 1x 4-pin ATX 12V connector

2.10 Power Consumption

Motherboard		AmITX-CF-I-Q370			
Processor		Intel® Core™ i7-8700, 3.2GHz, 12M Cache, 65W TDP			
DRAM		ADATA 16GB DDR4 2666 MHz SO-DIMM			
HDD		SanDisk X400 SATA 2.5” SSD 256GB			
Power Supply Unit		FSP700-80PSA			
OS		Windows 10 Pro			
Test Software		BurnIn Test V8.0 Pro (1043) for 64-bit Windows (CPU, RAM, 2D/3D Graphics, and storage with 100%)			
Input power		Measurement			Measure Point
		V	**A**	**W**	
Standby mode					
+5Vsb	**5.0V**	5.036	0.180	0.906	EATXPWR1
Idle mode					
+3.3V	**3.3V**	3.318	0.416	1.380	EATXPWR1
+5V	**5.0V**	5.187	0.004	0.021	EATXPWR1
+5Vsb	**5.0V**	5.035	0.070	0.352	EATXPWR1
+12V	**12.0V**	12.304	0.587	7.222	EATXPWR1
-12V	**-12.0V**	-12.301	0.036	0.443	EATXPWR1
+12V_4P	**12.0V**	12.219	0.332	4.057	ATX12V1
Max Load					
+3.3V	**3.3V**	3.305	0.677	2.237	EATXPWR1
+5V	**5.0V**	5.135	0.274	1.407	EATXPWR1
+5Vsb	**5.0V**	5.022	0.122	0.613	EATXPWR1
+12V	**12.0V**	12.222	0.713	8.714	EATXPWR1
-12V	**-12.0V**	-11.983	0.060	0.719	EATXPWR1
+12V_4P	**12.0V**	12.262	6.137	75.252	ATX12V1

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2.11 Temperatures

Standard Operating Temperature	0°C to 60°C
Storage Temperature	-40°C to 85°C

2.12 Environmental

Humidity	60°C @ 95% RH non-condensing
Vibration	3.5Grms, 5-500Hz, Non-operation

2.13 Operating Systems

Standard Support	Microsoft Windows 10 64bit, Fedora 30 64-bit, Ubuntu 18.10 LTS 64bit

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2.14 Functional Block Diagram

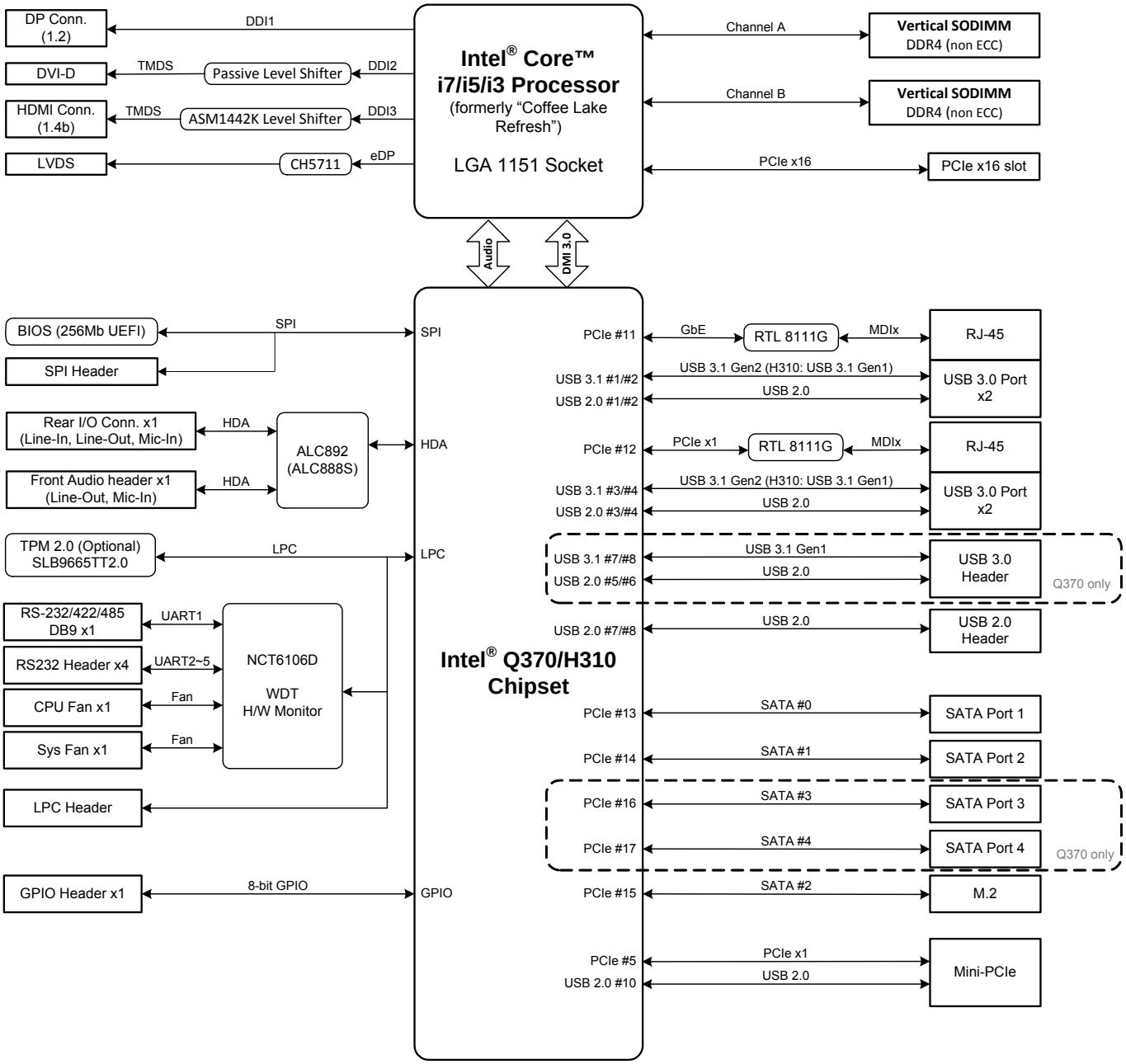


Figure 1: AmITX-CF-I Functional Block Diagram

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3 Mechanical Layout

3.1 Connector Locations

3.1.1 Rear I/O Connectors

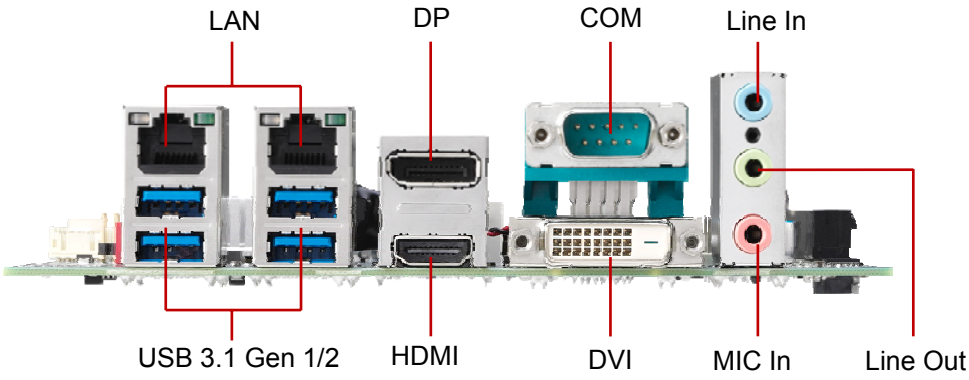
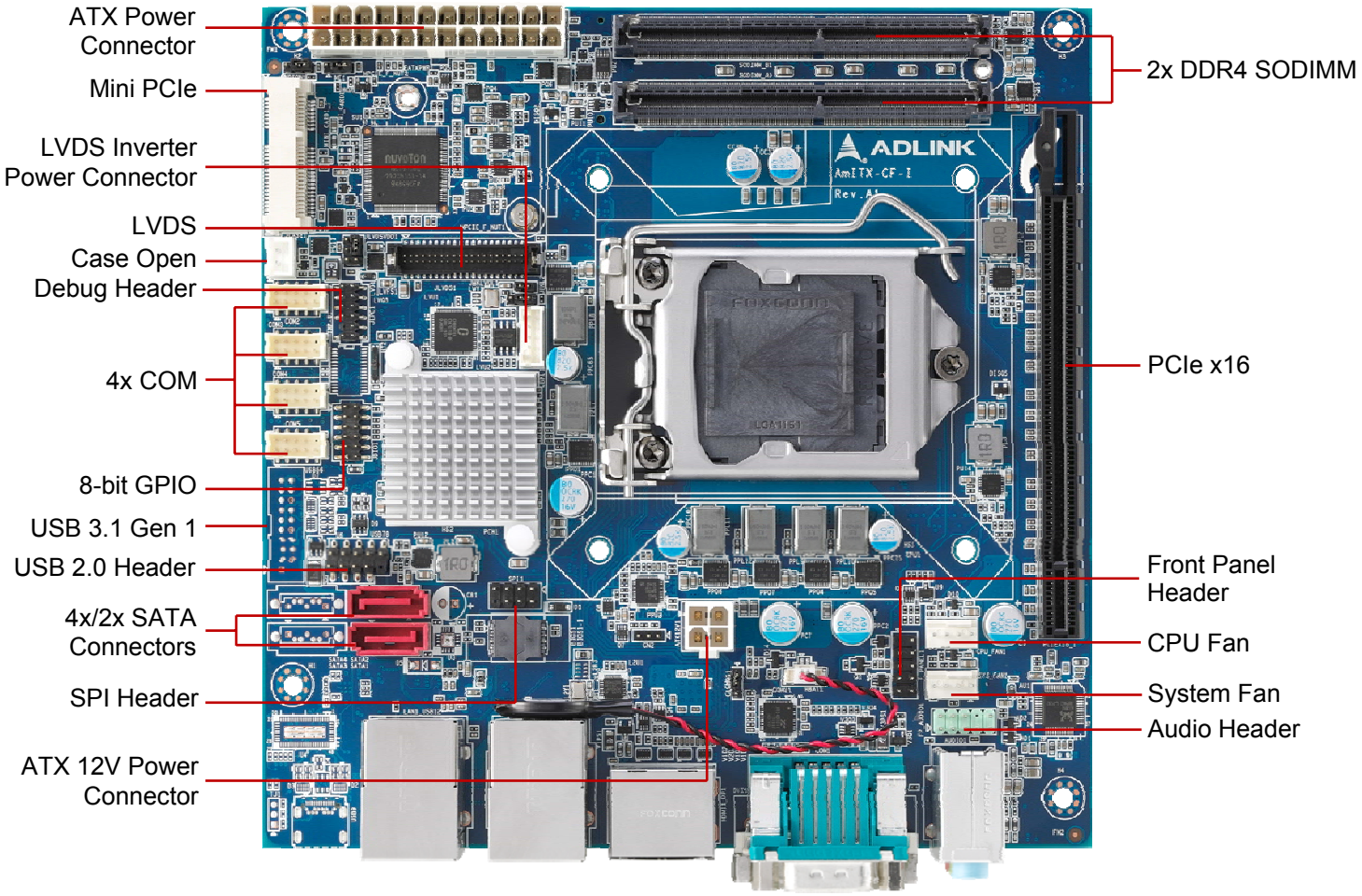


Figure 2: AmITX-CF-I Rear I/O

3.1.2 Component-Side Connectors



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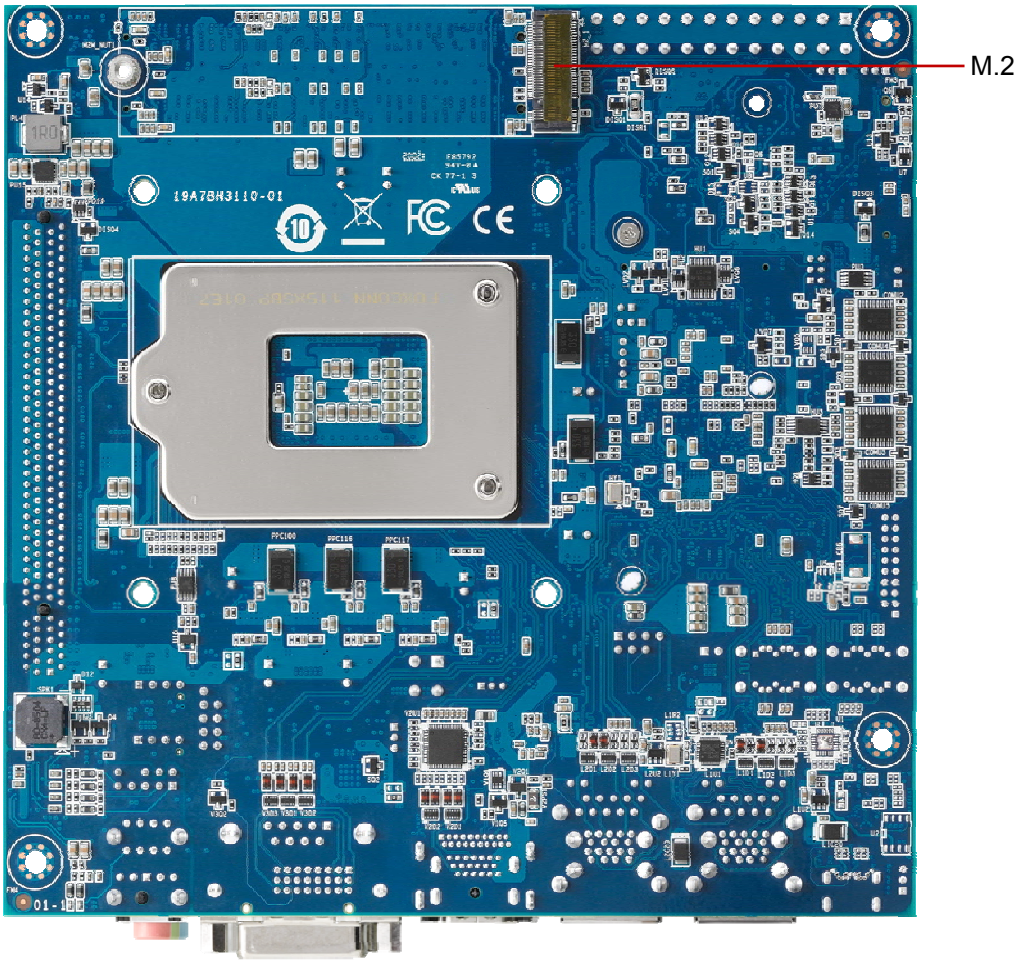
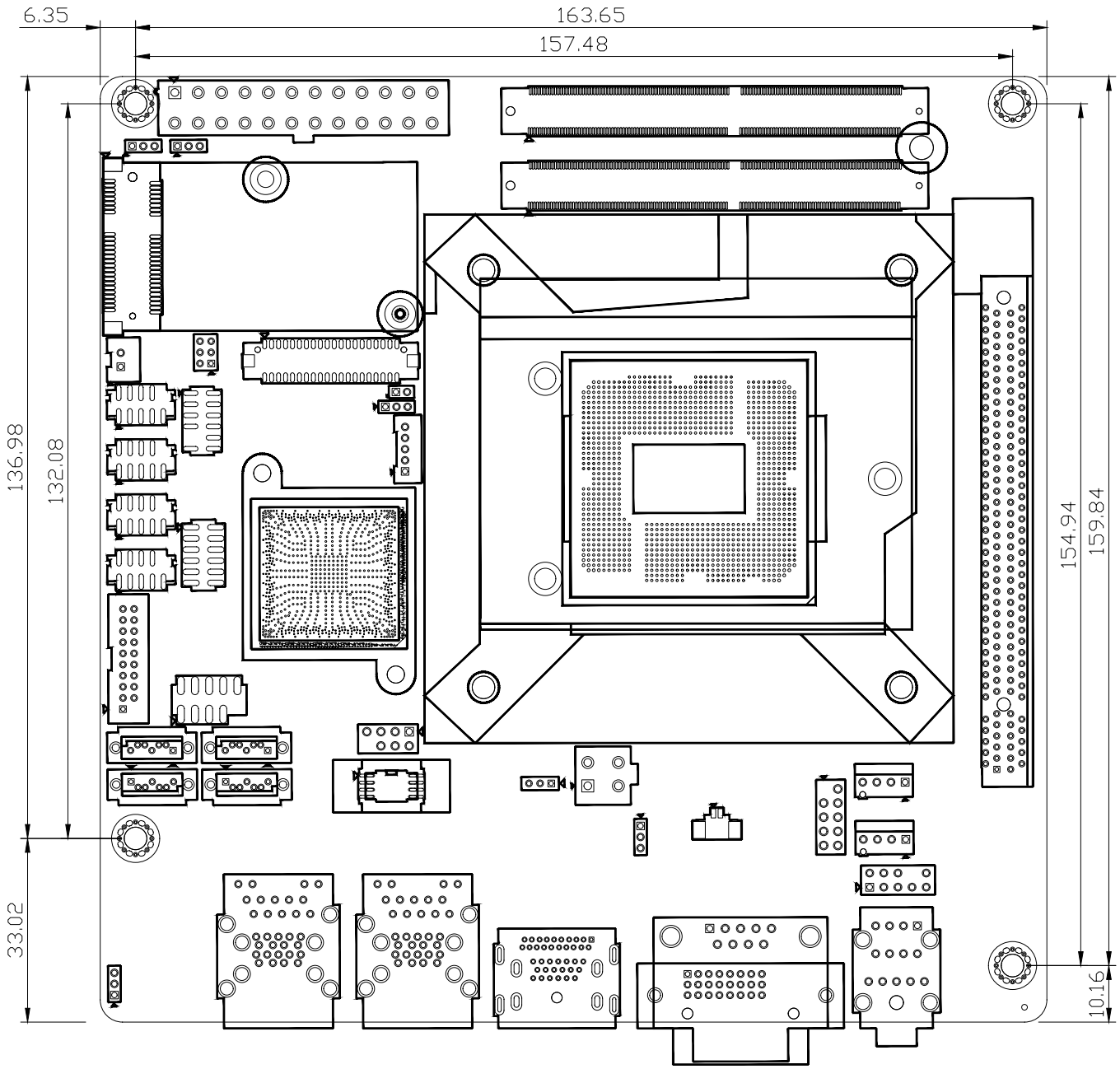


Figure 3: AmITX-CF-I Component-Side Connectors

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3.2 Mechanical Dimensions

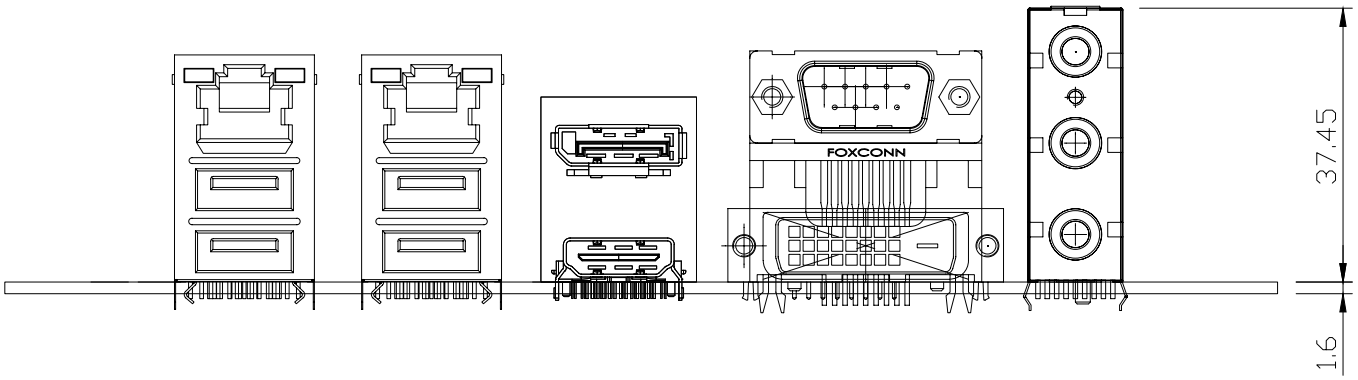
Top View



Dimensions: mm

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Rear View

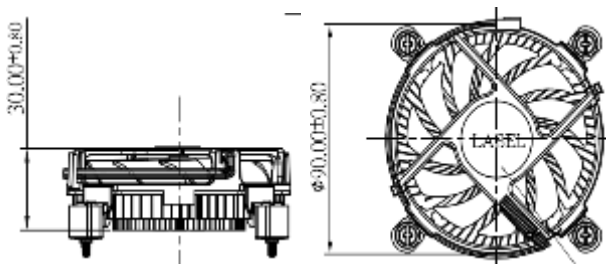
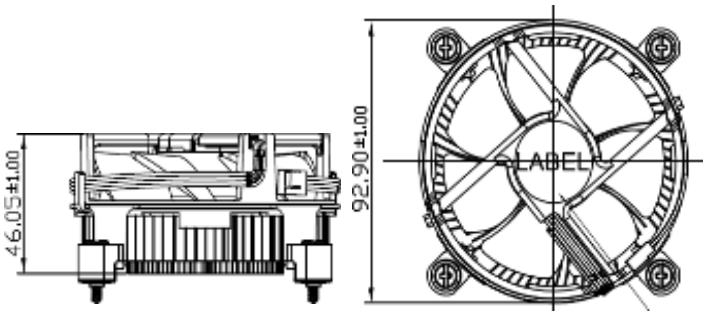
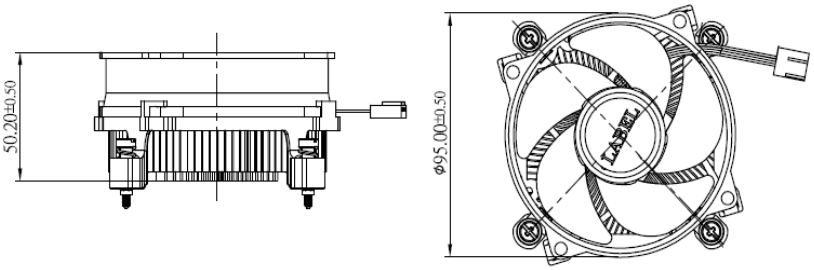


Dimensions: mm

Figure 4: AmITX-CF-I Mechanical Dimensions

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3.3 Thermal Solutions

LGA1150 CPU Cooler, H=30.0mm, 45W Standard Temp.: 0°C to 60°C P/N: 32-20513-0000	
LGA1150 CPU Cooler, H=46.05mm, 45W Standard Temp.: 0°C to 60°C P/N: 32-20512-0000	
LGA1150 CPU Cooler, H=50.2mm, 95W Standard Temp.: 0°C to 60°C P/N: 32-20113-0000	
LGA1150 CPU Cooler, H=61.4mm, 95W Standard Temp.: 0°C to 60°C P/N: 32-20495-0000	

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4 Connectors and Jumpers

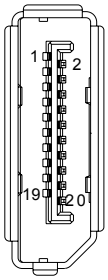
See 3.1 Connector Locations on page 9.

4.1 Rear IO Connectors

4.1.1 DisplayPort

One DisplayPort v1.2 specification port1 up to 4096 x 2304 @ 60Hz

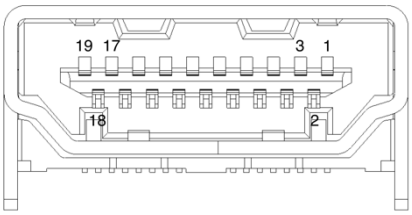
Pin	Signal	Pin	Signal
1	DP1_CON_DP0	2	GND
3	DP1_CON_DN0	4	DP1_CON_DP1
5	GND	6	DP1_CON_DN1
7	DP1_CON_DP2	8	GND
9	DP1_CON_DN2	10	DP1_CON_DP3
11	GND	12	DP1_CON_DN3
13	DP1_HDMI_DNG_DET	14	DP_CFG2
15	DP1_CON_AUXP	16	GND
17	DP1_CON_AUXN	18	DP1_CON_HPD
19	GND	20	+3.3V



4.1.2 HDMI

One HDMI 1.4 specification port up to 4096 x 2160 @ 30 Hz

Pin	Signal	Pin	Signal
1	HDMI1_CON_DP2	2	GND
3	HDMI1_CON_DN2	4	HDMI1_CON_DP1
5	GND	6	HDMI1_CON_DN1
7	HDMI1_CON_DP0	8	GND
9	HDMI1_CON_DN0	10	HDMI1_CON_CKP
11	GND	12	HDMI1_CON_CKN
13	N/C	14	N/C
15	HDMI1_DDC_CLK	16	HDMI1_DDC_DATA
17	GND	18	+5V
19	HDMI1_CON_HPD		

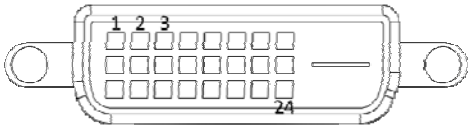


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4.1.3 DVI

One DVI-D port up to 1920 x 1200 @ 60 Hz

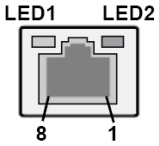
Pin	Signal	Pin	Signal
1	DVI1_CON_DN2	13	N/C
2	DVI1_CON_DP2	14	+5V
3	GND	15	GND
4	N/C	16	DVI1_B_HPD
5	N/C	17	DVI1_CON_DN0
6	DVI1_DDC_CLK	18	DVI1_CON_DP0
7	DVI1_DDC_DATA	19	GND
8	N/C	20	N/C
9	DVI1_CON_DN1	21	N/C
10	DVI1_CON_DP1	22	GND
11	GND	23	DVI1_CON_CKP
12	N/C	24	DVI1_CON_CKN



4.1.4 Ethernet Connectors (LAN1, LAN2)

Dual 10/100/1000Mbit/s LAN Ethernet controllers based on Realtek RTL8111G, supporting PXE and WOL over both LANs

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



LED Behavior

LED1 (Link/Activity)		LED2 (Speed)	
Status	**Description**	**Status**	**Description**
Off	10 Mb connection	Off	No Link
Orange	100 Mb connection	Green	Linked
Green	1 Gb connection	Blanking	Data Activity

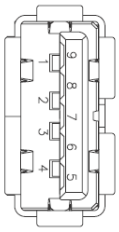
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4.1.5 USB Connectors (USB12, USB34)

4x USB 3.1 Gen2 (H310: USB 3.1 Gen1)

- 5V supply for external devices
- 5Vsb is supplied during power down to allow wakeup on USB device activity during S3~S4 state
- 1.5A for device power supply protected by a resettable 2A fuse

Pin	Signal
1	+5VDC
2	USB_N
3	USB_P
4	GND
5	USB3_RX_N
6	USB3_RX_P
7	GND
8	USB3_TX_N
9	USB3_TX_P



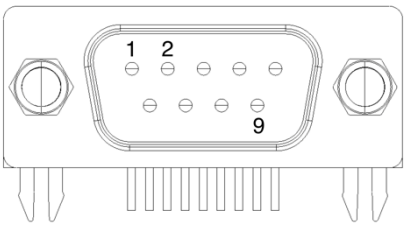
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4.1.6 Serial COM Port Connector (COM1)

COM1 supports RS-232/422/485, selected in BIOS.

RS-232

Pin	Signal	Pin	Signal
1	DCD#	6	DSR#
2	RXD	7	RTS#
3	TXD	8	CTS#
4	DTR#	9	RI#
5	GND		



RS-422

Pin	Signal	Pin	Signal
1	TXD422-	6	N/S
2	TXD422+	7	N/S
3	RXD422+	8	N/S
4	RXD422-	9	N/S
5	N/S		

RS-485

Pin	Signal	Pin	Signal
1	485DATA-	6	N/S
2	485DATA+	7	N/S
3	N/S	8	N/S
4	N/S	9	N/S
5	N/S		

4.1.7 Audio Connectors

- One Line-out, one Line-in, and one Mic-in on rear I/O
- Realtek ALC892 codec

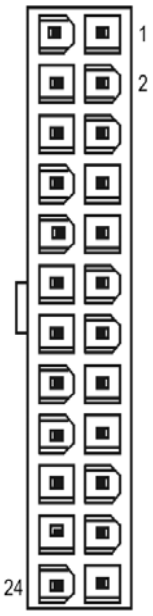
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4.2 Internal Connectors

4.2.1 ATX Power Connector (EATXPWR1)

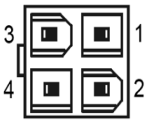
AmITX-CF-I supports a standard 24-pin ATX Power Connector (EATXPWR1).

Pin	Signal	Pin	Signal
1	+3.3V	13	+3.3V
2	+3.3V	14	-12V
3	GND	15	GND
4	+5V	16	PS-ON# (power supply remote on/off)
5	GND	17	GND
6	+5V	18	GND
7	GND	19	GND
8	PWRGD (Power Good)	20	-5V
9	+5V (Standby)	21	+5V
10	+12V	22	+5V
11	+12V	23	+5V
12	+3.3V	24	GND



4.2.2 ATX 12V Power Connector (ATX12V1)

Pin	Signal	Pin	Signal
2	GND	3	+12V or 16V~24V DC
1	GND	4	+12V or 16V~24V DC



4.2.3 SATA Connectors (SATA1/2/3/4)

Four SATA 6 Gbps ports are available on AmITX-CF-I (H310: 2x SATA).

Pin	Signal
1	GND
2	TXP
3	TXN
4	GND
5	RXN
6	RXP
7	GND



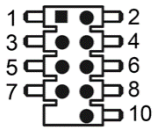
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4.2.4 USB 2.0 Header (USB78)

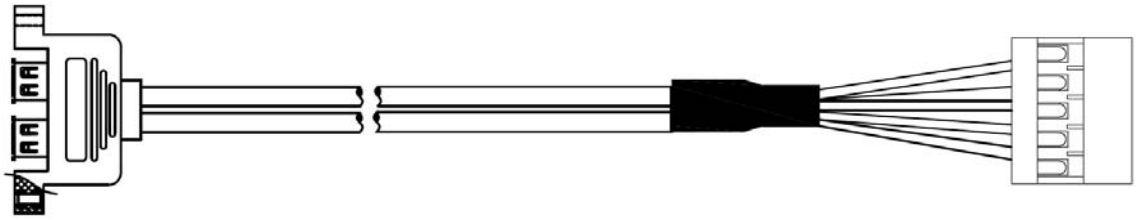
2x USB 2.0.

2x5-pin 2.54mm pitch header.

Pin	Signal	Pin	Signal
1	+5VDC	2	+5VDC
3	D-	4	D-
5	D+	6	D+
7	GND	8	GND
9	KEY (no pin)	10	GND



USB Cable (optional):
USB 2.0 Header to 2x Female Type-A Cable (length 150mm), P/N: 30-21625-0000-B0



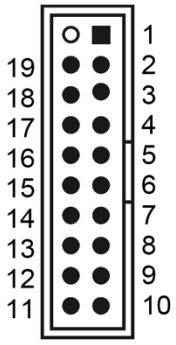
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4.2.5 USB 3.0 Connector (USB56)

2x USB 3.1 Gen1 (H310: not available).

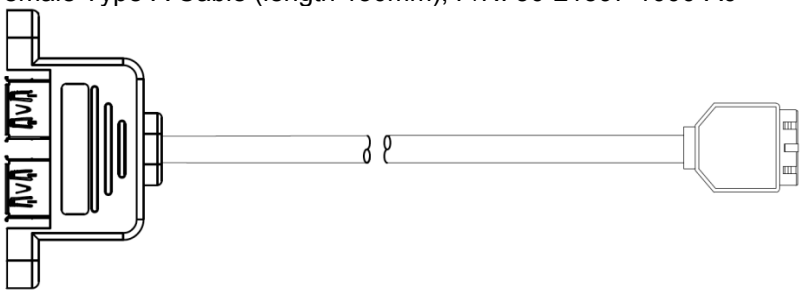
2x10-pin 2.00mm pitch standard wafer connector.

Pin	Signal	Pin	Signal
1	+5VDC	11	USB_P6
2	USB3_RX_N7	12	USB_N6
3	USB3_RX_P7	13	GND
4	GND	14	USB3_TX_P8
5	USB3_TX_N7	15	USB3_TX_N8
6	USB3_TX_P7	16	GND
7	GND	17	USB3_RX_P8
8	USB_N5	18	USB3_RX_N8
9	USB_P5	19	+5VDC
10	N/C	20	KEY (no pin)



USB Cable (optional):

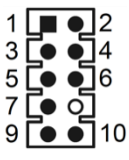
USB 3.0 Header to 2x Female Type-A Cable (length 150mm), P/N: 30-21597-1000-A0



4.2.6 Internal Audio Header (FP_AUDIO1)

2x5-pin 2.54mm pitch header

Pin	Signal	Pin	Signal
1	MIC2L	2	GND
3	MIC2R	4	PRESENCE# (Dongle present)
5	INE2R	6	MIC2-JD
7	SENSE_SEND (Jack detection)	8	KEY (no pin)
9	LINE2L	10	LINE2-JD



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4.2.7 CPU Fan and System Fan Connectors (CPU_FAN1, SYS_FAN1)

Pin	Signal	Description
1	GND	Ground
2	+12 V	FAN Power
3	Tach	FAN Tachometer
4	PWM	FAN PWM



4.2.8 Serial COM Port Connector (COM2/3/4/5)

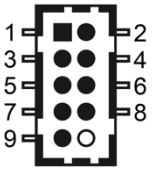
Four internal Serial Port (COM2-4). Serial Ports are over-current protected.

2x5-pin 2.00mm pitch standard wafer connector.

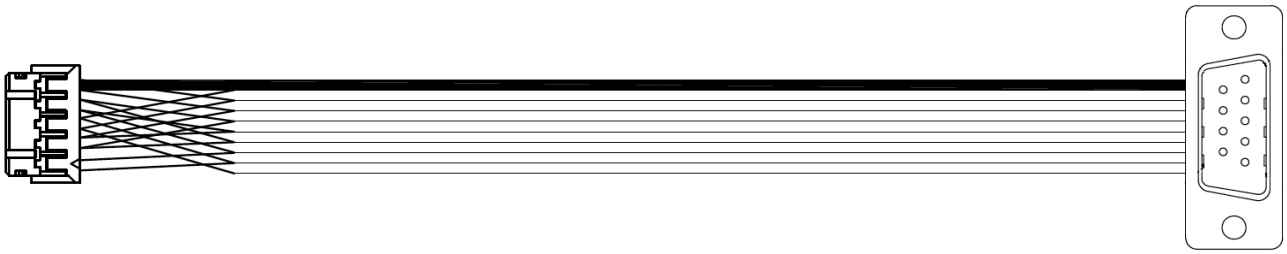
Serial Port	Functions
COM2	Supports RS-232
COM3	Supports RS-232
COM4	Supports RS-232
COM5	Supports RS-232

RS-232

Pin	Signal	Pin	Signal
1	DCD	2	RXD#
3	TXD#	4	DTR
5	GND	6	DSR
7	RTS	8	CTS
9	RI	10	KEY



COM Cable (optional):
COM Port Cable (length 200mm), P/N: 30-10297-0000-B0

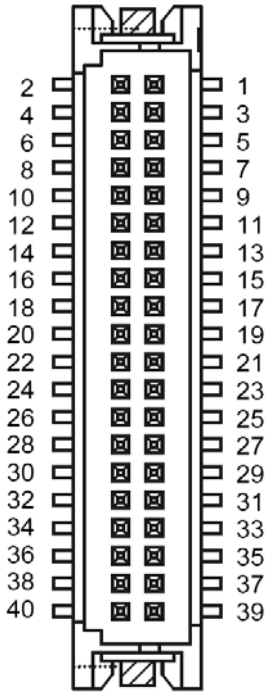


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4.2.9 LVDS (JLVDS1)

2x20-pin 1.25mm pitch connector

Pin	Signal	Pin	Signal
1	VDD_LVDS	2	VDD_LVDS
3	GND	4	GND
5	VDD_LVDS	6	VDD_LVDS
7	LVDS_A0-	8	LVDS_B0-
9	LVDS_A0+	10	LVDS_B0+
11	GND	12	GND
13	LVDS_A1-	14	LVDS_B1-
15	LVDS_A1+	16	LVDS_B1+
17	GND	18	GND
19	LVDS_A2-	20	LVDS_B2-
21	LVDS_A2+	22	LVDS_B2+
23	GND	24	GND
25	LVDS_A_CLK-	26	LVDS_B_CLK-
27	LVDS_A_CLK+	28	LVDS_B_CLK+
29	GND	30	GND
31	DDC_CLK	32	DDC_DATA
33	GND	34	GND
35	LVDS_A3-	36	LVDS_B3-
37	LVDS_A3+	38	LVDS_B3+
39	LCDS_VDD_EN	40	N/C



4.2.10 LVDS Inverter Power Connector (JBKL1)

1x5-pin 2.00 mm pitch standard wafer connector

Pin	Signal
1	+12V
2	GND
3	BKL_EN
4	BRIGHT
5	+5V



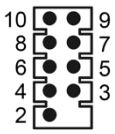
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4.2.11 Front Panel Header (F_PANEL1)

2x5-pin 2.54mm pitch header

The front panel connector provides Audio Mic-In / Line Out, ATX power switch, Reset, HDD LED, and active LED, and system LED.

Pin	Signal	In/Out	Description	Pin	Signal	In/Out	Description
HDD Activity LED				Power LED			
10	HD_PWR	Out	Hard disk LED Pull-up to +5V	9	PLED_PWR	Out	Power LED Pull-up to +5V
8	HDA#	Out	Hard disk active LED	7	SUPLED	Out	Front panel active LED
Reset Switch				On/Off Switch			
6	GND		Ground	5	PANSWIN#	In	Power switch
4	FP_RESET#	In	Reset switch	3	GND		Ground
Not connected				Not connected			
2	N/C			1	KEY		No Pin



4.2.12 Case Open Connector (JCASE1)

1x2-pin 2.5mm pitch standard wafer connector

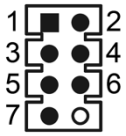
Pin	Signal	Description
1	CASEOP#	Case open signal
2	GND	Ground



4.2.13 SPI Header (SPI1)

2x4-pin 2.54mm pitch header

Pin	Signal	Pin	Signal
1	VCC3	2	GND
3	SPI_CS#	4	SPI_CLK
5	SPI_MISO	6	SPI_MOSI
7	HOLD#	8	KEY

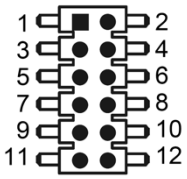


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4.2.14 8-bit GPIO (JDIO1)

2x6-pin 2.00mm pitch header

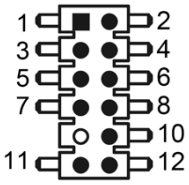
Pin	Signal	Pin	Signal
1	GPIO0	2	GPIO4
3	GPIO1	4	GPIO5
5	GPIO2	6	GPIO6
7	GPIO3	8	GPIO7
9	SMBCLK	10	SMBDATA
11	GND	12	+3.3VDC



4.2.15 Debug Header (JLPC1)

2x6-pin 2.00mm pitch header

Pin	Signal	Pin	Signal
1	N/C	2	VCC3
3	LPC_AD3	4	PLTRST
5	LPC_AD1	6	LPC_AD2
7	LPC_FRAME	8	LPC_AD0
9	KEY	10	GND
11	CLK24M	12	GND



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4.3 Jumper and Switch Settings

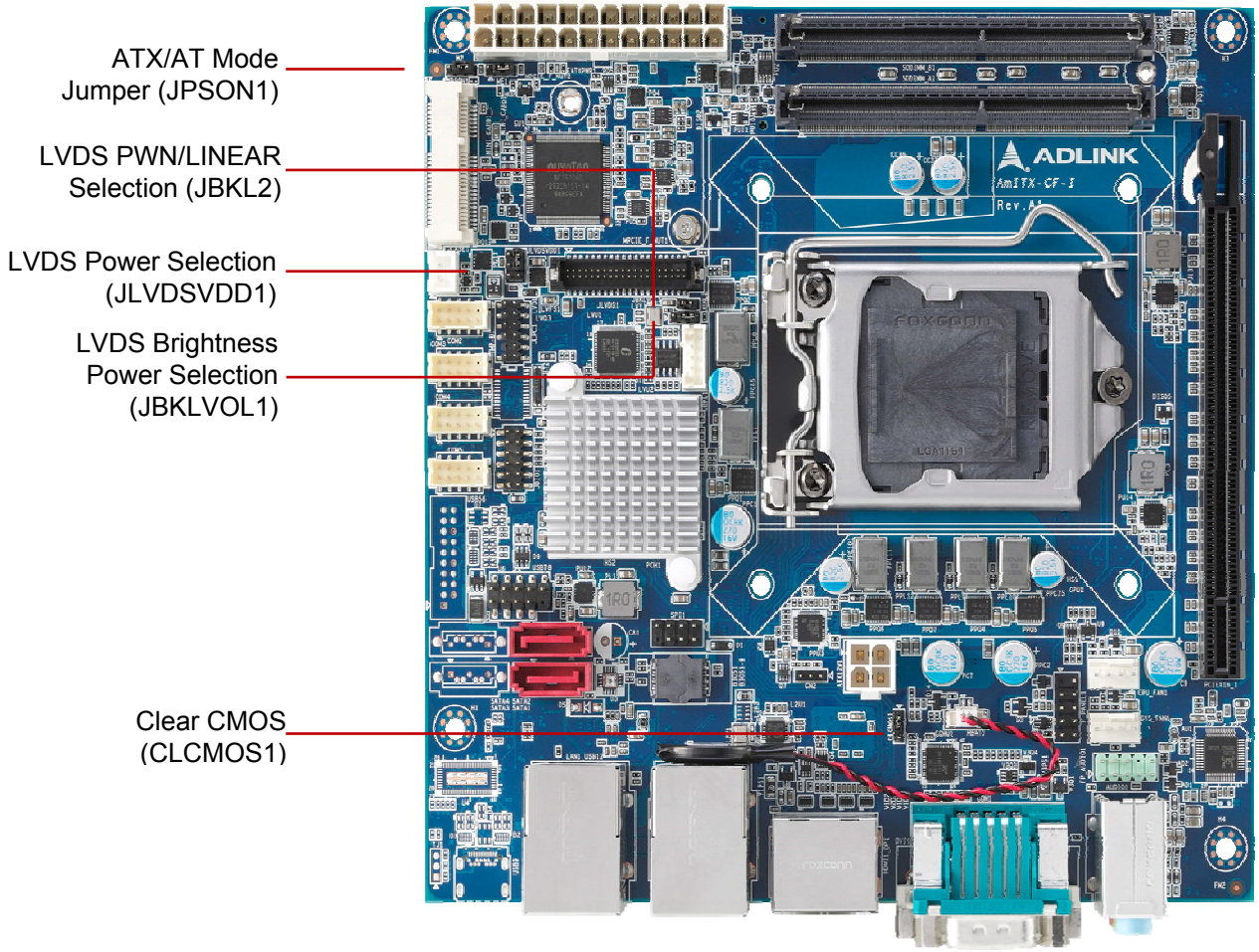


Figure 5: Jumper and Switch Locations

4.3.1 ATX/AT Mode Jumper Selection (JPSON1)

JPSON1	ATX/AT Mode
1-2	AT
2-3	ATX (default)

4.3.2 Clear CMOS (CLCMOS1)

CLCMOS1	Clear CMOS
1-2	Normal (default)
2-3	Clear CMOS

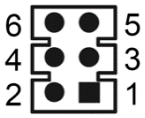
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4.3.3 LVDS Brightness Power Selection (JBKLVOL1)

JBKLVOL1	Brightness
1-2	5V
2-3	3.3V (default)

4.3.4 LVDS Power Selection (JLVDSVDD1)

JLVDSVDD1	Signal
3-5	3.3V (default)
1-3	5V
3-4	12V



4.3.5 LVDS PWM/LINEAR Selection (JBKL2)

JBKL2	LVDS PWM/LINEAR
1-2	Linear mode (default)
No	PWM mode

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5 Driver Installation

Drivers can be downloaded through the following link.

https://www.adlinktech.com/Products/Industrial_Motherboards_SBCs/Mini-ITXEmbeddedBoards/AmITX-CF-I

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6 System Resources

6.1 System Memory Map

Table 2: System Memory Map

Hex Range	Device
A0000-BFFFF	Intel UHD Graphic 630
A0000-BFFFF	PCI Express Root Complex
40000000-403FFFFF	Motherboard resources
90000000-9FFFFFFF	Intel UHD Graphic 630
90000000-DFFFFFFF	PCI Express Root Complex
A0000000-A0003FFF	Realtek PCIe GbE Family Controller
A0000000-A00FFFFF	Intel PCI Express Root Port #12
A0100000-A0103FFF	Realtek PCIe GbE Family Controller #2
A0100000-A01FFFFF	Intel PCI Express Root Port #11
A1000000-A1FFFFFF	Intel UHD Graphic 630
A2000000-A20FFFFF	High Definition Audio Controller
A2100000-A2100FFF	Realtek PCIe GbE Family Controller
A2100000-A21FFFFF	Intel PCI Express Root Port #12
A2200000-A2200FFF	Realtek PCIe GbE Family Controller #2
A2200000-A22FFFFF	Intel PCI Express Root Port #11
A2300000-A230FFFF	Intel USB3.1 eXtensible Host Controller
A2310000-A2313FFF	High Definition Audio Controller
A2314000-A2315FFF	Intel 300 Series Chipset Family SATA AHCI Controller
A2316000-A2317FFF	PCI standard RAM Controller
A2318000-A23180FF	Intel SMBus
A2319000-A23197FF	Intel 300 Series Chipset Family SATA AHCI Controller
A231A000-A231A0FF	Intel 300 Series Chipset Family SATA AHCI Controller
A231B000-A231BFFF	Intel Management Engine Interface
A231C000-A231CFFF	PCI standard RAM Controller
A231D000-A231DFFF	Intel Thermal Subsystem
E0000000-EFFFFFFF	Mother resources
FC800000-FE7FFFFF	PCI Express Root Complex
FD000000-FD69FFFF	Mother resources
FD6A0000-FD6AFFFF	Intel Serial IO GPIO Host Controller
FD6B0000-FD6BFFFF	Intel Serial IO GPIO Host Controller
FD6C0000-FD6CFFFF	Mother resources
FD6D0000-FD6DFFFF	Intel Serial IO GPIO Host Controller
FD6E0000-FD6EFFFF	Intel Serial IO GPIO Host Controller

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Hex Range	Device
FD6F0000-FDFFFFFF	Mother resources
FE000000-FE01FFFF	Mother resources
FE010000-FE010FFF	Intel SPI Controller
FE200000-FE7FFFFF	Mother resources
FED00000-FED003FF	High precision event timer
FED10000-FED17FFF	Mother resources
FED18000-FED18FFF	Mother resources
FED19000-FED19FFF	Mother resources
FED20000-FED3FFFF	Mother resources
FED45000-FED8FFFF	Mother resources
FED90000-FED93FFF	Mother resources
FED90000-FED93FFF	Mother resources
FEE00000-FEEFFFFF	Mother resources
FF000000-FFFFFFFF	Mother resources

6.2 I/O Map

Table 3: I/O Map

Hex Range	Device
0000-0C7F	PCI Express Root Complex
0020-0021	Programmable interrupt controller
0024-0025	Programmable interrupt controller
0028-0029	Programmable interrupt controller
002C-002D	Programmable interrupt controller
002E-002F	Motherboard Resources
0030-0031	Programmable interrupt controller
0034-0035	Programmable interrupt controller
0038-0039	Programmable interrupt controller
003C-003D	Programmable interrupt controller
0040-0043	System Timer
004E-004F	Motherboard Resources
0050-0053	System Timer
0061-0061	Motherboard Resources
0063-0063	Motherboard Resources
0065-0065	Motherboard Resources

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Hex Range	Device
0067-0067	Motherboard Resources
0070-0070	Motherboard Resources
0080-0080	Motherboard Resources
0092-0092	Motherboard Resources
00A0-00A1	Programmable interrupt controller
00A4-00A5	Programmable interrupt controller
00A8-00A9	Programmable interrupt controller
00AC-00AD	Programmable interrupt controller
00B0-00B1	Programmable interrupt controller
00B2-00B3	Motherboard resources
00B4-00B5	Programmable interrupt controller
00B8-00B9	Programmable interrupt controller
00BC-00BD	Programmable interrupt controller
00F0-00F0	Numeric data processor
0280-028F	Motherboard resources
0290-029F	Motherboard resources
02A0-02AF	Motherboard resources
02B0-02BF	Motherboard resources
02E0-02E7	COM5
02E8-02EF	COM4
02F8-02FF	COM2
03B0-03BB	Intel UHD Graphic 630
03C0-03DF	Intel UHD Graphic 630
03E8-03EF	COM3
03F8-03FF	COM1
04D0-04D1	Programmable interrupt controller
0680-069F	Motherboard resource
0D00-FFFF	PCI Express Root Complex
164E-164F	Motherboard resource
1800-18FE	Motherboard resource
1854-1857	Motherboard resource
2000-20FE	Motherboard resource

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Hex Range	Device
3000-30FF	Realtek PCIe GbE Family Controller
3000-3FFF	Intel PCI Express Root Port #12
4000-40FF	Realtek PCIe GbE Family Controller #2
4000-4FFF	Intel PCI Express Root Port #11
5000-503F	Intel UHD Graphic 630
5060-507F	Intel 300 Series Chipset Family SATA AHCI Controller
5080-5083	Intel 300 Series Chipset Family SATA AHCI Controller
5090-5097	Intel 300 Series Chipset Family SATA AHCI Controller
EFA0-EFBF	Intel SMBus

6.3 Interrupt Request (IRQ) Map

Table 4: IRQ Map

IRQ#	Device
0	System timer
3	COM2
4	COM1
5	COM3
5	COM4
10	COM5
11	Intel SMBus
11	Intel Thermal Subsystem
13	Numeric data processor
14	Intel Serial IO GPIO Host Controller
16	HD Audio Controller

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7 BIOS Setup

7.1 Menu Structure

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

Main	Advanced	Chipset	Security	Boot	Save & Exit
- BIOS Information - Memory Information - Power Type - System Date - System Time	►CPU Configuration ►PCH-FW Configuration ►ACPI Settings ►NCT6106D Super IO Configuration ►NCT6106D HW Monitor ►S5 RTC Wake Settings ►Serial Port Console Redirection ►Intel TXT Information ►USB Configuration ►CSM Configuration ►Network Stake Configuration	►System Agent (SA) Configuration ►PCH-IO Configuration	- Administrator Password - User Password ►Secure Boot	- Setup Prompt Timeout - Bootup NumLock State - Quiet Boot - Support Native Resolution - Boot Mode - Boot Option #1 - Boot Option #2 - Boot Option #3 - Boot Option #4 - Boot Option #5 - Boot Option #6 - Boot Option #7	- Save Changes and Exit - Discard Changes and Exit - Save Changes and Reset - Restore Defaults - Launch EFI Shell from filesystem device

Notes:

► indicates a submenu
Gray text indicates info only
Bold italics font indicates default setting

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7.2 Main

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

7.2.1 System Information

Feature	Options	Description
BIOS Information		
BIOS Vendor	American Megatrends	
Core Version	5.13 0.45 x64	
Compliancy	UEFI 2.7; PI 1.6	
Project Version	AmITX-CF-I-xxxx_xxxxx	
Build Date and Time	Info only	
Access Level	Administrator	
Memory Information		
Total Memory	Info only	
Memory Frequency	Info only	
Power Type	x Mode	
System date	xxx mm/dd/yyyy	Set the Data. Use Tab to switch between Data elements.
System Time	hh:mm:ss	Set the Time. Use Tab to switch between Time elements.

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7.3 Advanced

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

Feature	Options	Description
CPU Configuration		CPU Configuration Parameters.
PCH-FW Configuration		Configure Management Engine Technology Parameters.
ACPI Setting		System ACPI Parameters.
NCT6106D Super IO Configuration		System Super IO Chip Parameters.
NCT6106D HW Monitor		Monitor hardware status.
S5 RTC Wake Settings		Enable system to wake from S5 using RTC alarm.
Serial Port Console Redirection		Serial Port Console Redirection.
Intel TXT Information		Display Intel TXT Information.
USB Configuration		USB Configuration Parameters.
CSM Configuration		CSM configuration: Enable/Disable, Option ROM execution settings, etc.
Network Stack Configuration		Network Stack Setting.

7.3.1 CPU Configuration

Feature	Options	Description
CPU Configuration		
Type	Info only	
ID	Info only	
Speed	Info only	
L1 Data Cache	Info only	
L1 Instruction Cache	Info only	
L2 Cache	Info only	
L3 Cache	Info only	
L4 Cache	Info only	
VMX	Info only	
SMX/TXT	Info only	
C6DRAM	Disabled ***Enabled***	Enabled/Disabled moving of DRAM contents to PRM memory when CPU is in C6 state.
Software Guard Extensions	Disabled	Enabled/Disabled Software Guard Extensions (SGX)..

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Feature	Options	Description
(SGX)	Enabled ***Software Controlled***	
Select Owner EPOCH input type	***No Change in Owner ECOPHs*** Change to New Random Owner ECOPHs Manual User Defined Owner OPCHs	There are three Owner EPOCH modes (Each EPOCH is 64bit): no change in owner epoch, change to new random owner epoch and manually entered by user. After generating new epoch via 'Change to New Random Owner EPOCHs', the selection reverts back to 'No Change in Owner Epochs', this is to ensure Epoch stays same.
Intel (VMX) Virtualization Technology	Disabled ***Enabled***	When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.
Active Processor Cores	***All*** 1 2 3 4 5	Number of cores to enable in each processor package.
Hyper-Threading	Disabled ***Enabled***	Enabled for Windows and Linux (OS optimized for Hyper-Threading Technology) and Disabled for other OS (OS not optimized for Hyper-Threading Technology)
Intel Trusted Execution Technology	***Disabled*** Enabled	Enable utilization of additional hardware capabilities provided by Intel Trusted Execution Technology. Changes require a full power cycle to take effect.
Intel(R) SpeedStep(tm)	Disabled ***Enabled***	Allows more than two frequency ranges to be supported.
Turbo Mode	Disabled ***Enabled***	Enable/Disable processor Turbo Mode (requires Intel Speed Step or Intel Speed Shift to be available and enabled)
C states	Disabled ***Enabled***	Enable/Disable CPU Power Management. Allows CPU to go to C States when it's not 100% utilized.
Enhanced C-state	Disabled ***Enabled***	Enable/Disable C1E. When enabled, CPU will switch to minimum speed when all cores enter C-State.
Package C state limit	C0/C1 C2 C3 C6 C7 C7S C8 C9 C10 Cpu Default ***Auto***	Maximum Package C State Limit Setting. CPU Default: Leaves to Factory default value. Auto: Initializes to deepest available Package C State Limit.

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7.3.2 PCH-FW Configuration

Feature	Options	Description
ME Firmware Version	Info only	
ME Firmware Mode	Info only	
ME Firmware SKU	Info only	
ME Firmware Status 1	Info only	
ME Firmware Status 2	Info only	
ME State	Enabled	
ME Lock Control	***Lock*** UnLock	ME UnLock switch function. Note: This function will automatic recover setting from UnLock to Lock after power-on system.

7.3.3 ACPI Settings

Feature	Options	Description
ACPI Settings		
Enable Hibernation	Disabled ***Enabled***	Enable s or Disables System ability to Hibernate (OS/S4 Sleep State). This option may not be effective with some operating systems.
ACPI Sleep State	Suspend Disabled ***S3 (Suspend to RAM)***	Select the highest ACPI sleep state the system will enter when the SUSPEND button is pressed.
S3 Video Repost	***Disabled*** Enabled	Enable or Disable S3 Video Repost.
PCIE# Wake from S5	***Disabled*** Enabled	Enable or disable PCIE to wake the system from S5.

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7.3.4 NCT6106D Super IO Configuration

Feature	Options	Description
NCT6106D Super IO Configuration		
Super IO Chip	NCT6106D	
Serial Port 1 Configuration		Set Parameters of Serial Port 1.
Serial Port 2 Configuration		Set Parameters of Serial Port 2.
Serial Port 3 Configuration		Set Parameters of Serial Port 3.
Serial Port 4 Configuration		Set Parameters of Serial Port 4.
Serial Port 5 Configuration		Set Parameters of Serial Port 5.
WatchDog Count Mode	***Second*** Minute	WatchDog Count Mode Selection.
WatchDog TimeOut Value	0	Fill WatchDog Timeout Value, 0 means disabled.
Chassis Opened Warning	***Disabled*** Enabled	Select whether to enable Chassis Intrusion Detection. Chassis Intrusion Detection is a utility that can tell whether someone has opened the case (intruded into the chassis). Note: If chassis tamper occurs, you can only enter setup to clear this error.
ErP/EuP S5 Support	***Disabled*** Enabled	Enable/Disable ErP/EuP S5 Support. Note: When MEBx is enable Activate Network Access, this function can not set enable that will cause ME fail on next boot.

7.3.4.1 Serial Port 1 Configuration

Feature	Options	Description
Serial Port 1 Configuration		
Serial Port	Disabled ***Enabled***	Enable or Disable Serial Port (COM).
Device Setting	IO=3F8h; IRQ=4;	
Change Settings	***Auto*** IO=3F8h; IRQ=4 IO=3F8h; IRQ=3,4,5,6,7,9,10,11,12; IO=2F8h; IRQ=3,4,5,6,7,9,10,11,12; IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12; IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12;	Select optimal settings for Super IO Device.
COM Mode Select	***RS232*** RS485 Half Duplex RS422 Full Duplex	Configure the COM Port Mode.

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7.3.4.2 Serial Port 2 Configuration

Feature	Options	Description
Serial Port 2 Configuration		
Serial Port	Disabled ***Enabled***	Enable or Disable Serial Port (COM).
Device Setting	IO=2F8h; IRQ=3;	
Change Settings	***Auto*** IO=2F8h; IRQ=3 IO=3F8h; IRQ=3,4,5,6,7,9,10,11,12; IO=2F8h; IRQ=3,4,5,6,7,9,10,11,12; IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12; IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12;	Select optimal settings for Super IO Device.

7.3.4.3 Serial Port 3 Configuration

Feature	Options	Description
Serial Port 3 Configuration		
Serial Port	Disabled ***Enabled***	Enable or Disable Serial Port (COM).
Device Setting	IO=3E8h; IRQ=5;	
Change Settings	***Auto*** IO=3E8h; IRQ=5 IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12; IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12; IO=3E0h; IRQ=3,4,5,6,7,9,10,11,12; IO=2E0h; IRQ=3,4,5,6,7,9,10,11,12;	Select optimal settings for Super IO Device.

7.3.4.4 Serial Port 4 Configuration

Feature	Options	Description
Serial Port 4 Configuration		
Serial Port	Disabled ***Enabled***	Enable or Disable Serial Port (COM).
Device Setting	IO=2E8h; IRQ=5;	
Change Settings	***Auto*** IO=2E8h; IRQ=5 IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12; IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12; IO=3E0h; IRQ=3,4,5,6,7,9,10,11,12; IO=2E0h; IRQ=3,4,5,6,7,9,10,11,12;	Select optimal settings for Super IO Device.

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7.3.4.5 Serial Port 5 Configuration

Feature	Options	Description
Serial Port 5 Configuration		
Serial Port	Disabled ***Enabled***	Enable or Disable Serial Port (COM).
Device Setting	IO=2E0h; IRQ=10;	
Change Settings	***Auto*** IO=2E0h; IRQ=10 IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12; IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12; IO=3E0h; IRQ=3,4,5,6,7,9,10,11,12; IO=2E0h; IRQ=3,4,5,6,7,9,10,11,12;	Select optimal settings for Super IO Device.

7.3.5 NCT6106D HW Monitor

Feature	Options	Description
PC Health Status		
Smart Fan		Smart Fan Function page.
SYS temperature	Info only	
CPU temperature (PECI)	Info only	
SYS_Fan Speed	Info only	
CPU_Fan Speed	Info only	
VCORE	Info only	
+12V	Info only	
+5V	Info only	
+5VSB	Info only	
AVCC	Info only	
3VSB	Info only	
3VCC	Info only	
VBAT	Info only	

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7.3.5.1 Smart Fan

Feature	Options	Description
Smart Fan Function	Disabled ***Enabled***	Smart Fan Function Enable/Disable.
Smart Fan Mode Configuration		Smart Fan Mode Configuration.

Smart Fan Mode Configuration – SMART FAN IV Mode

Feature	Options	Description
Smart Fan Mode Configuration		
SYS Smart Fan Mode	SMART FAN IV Mode	SYS Smart Fan Mode.
FAN Temperature 1	25	Input the SYS Smart Fan IV Temperature 1.
FAN PWM 1	80	Input the SYS Smart Fan IV PWM 2 Value.
FAN Temperature 2	40	Input the SYS Smart Fan IV Temperature 2.
FAN PWM 2	130	Input the SYS Smart Fan IV PWM 2 Value.
FAN Temperature 3	55	Input the SYS Smart Fan IV Temperature 3.
FAN PWM 3	190	Input the SYS Smart Fan IV PWM 3 Value.
FAN Temperature 4	62	Input the SYS Smart Fan IV Temperature 4.
FAN PWM 4	255	Input the SYS Smart Fan IV PWM 4 Value.
FAN Tolerance of Target Temp	5	Fan Tolerance of Target Temp.
FAN Critical Temperature	90	Input the SYS Smart IV Critical Temperature.
FAN Critical Temperature Tolerance	1	Input Tolerance of Critical Temperature (Range:0-7).
CPU Smart Fan Mode	SMART FAN IV Mode	CPU Smart Fan Mode.
FAN Temperature 1	25	Input the CPU Smart Fan IV Temperature 1.
FAN PWM 1	80	Input the CPU Smart Fan IV PWM 2 Value.
FAN Temperature 2	40	Input the CPU Smart Fan IV Temperature 2.
FAN PWM 2	130	Input the CPU Smart Fan IV PWM 2 Value.
FAN Temperature 3	55	Input the CPU Smart Fan IV Temperature 3.
FAN PWM 3	190	Input the CPU Smart Fan IV PWM 3 Value.
FAN Temperature 4	62	Input the CPU Smart Fan IV Temperature 4.
FAN PWM 4	255	Input the CPU Smart Fan IV PWM 4 Value.
FAN Tolerance of Target Temp	5	Fan Tolerance of Target Temp.
FAN Critical Temperature	90	Input the CPU Smart IV Critical Temperature.
FAN Critical Temperature Tolerance	1	Input Tolerance of Critical Temperature (Range:0-7).

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Smart Fan Mode Configuration – Manual Mode

Feature	Options	Description
Smart Fan Mode Configuration		
SYS Smart Fan Mode	Manual Mode	SYS Smart Fan Mode.
SYS expect PWM Output Voltage	255	SYS Fan expect PWM Output Voltage.
CPU Smart Fan Mode	Manual Mode	SYS Smart CPU Mode.
CPU expect PWM Output Voltage	255	SYS CPU expect PWM Output Voltage.

7.3.6 S5 RTC Wake Settings

Feature	Options	Description
Wake System From S5	***Disabled*** Enabled	Enable or disable System wake on alarm event.

7.3.7 Serial Port Console Redirection

Feature	Options	Description
COM1		
Console Redirection	***Disabled*** Enabled	Console Redirection Enable or Disable.
Console Redirection Settings		The settings specify how the host computer and the remote computer (which the user is using) will exchange data. Both computers should have the same or compatible settings.

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7.3.7.1 Console Redirection Settings

Feature	Options	Description
COM1		
Console Redirection Settings		
Terminal Type	VT100 VT100+ VT-UTF8 ***ANSI***	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	9600 19200 38400 57600 ***115200***	Selects serial port transmission speed. The speed must be matched on the other side. Long or noisy lines may require lower speeds.
Data Bits	7 ***8***	Data Bits.
Parity	***None*** Even Odd Mark Space	A parity bit can be sent with the data bits to detect some transmission errors.
Stop Bits	***1*** 2	Stop bits indicate the end of a serial data packet.
Flow Control	***None*** Hardware RTS/CTS	Flow control can prevent data loss from buffer overflow.
VT-UTF8 Combo Key Support	Disabled ***Enabled***	Enable VT-UTF8 Combination Key Support for ANSI/VT100 terminals.
Recorder Mode	***Disabled*** Enabled	With the mode enabled only text will be sent. This is to capture Terminal data.
Resolution 100x31	***Disabled*** Enabled	Enables or disables extended terminal resolution.
Putty KeyPad	***VT100*** LINUX XTERMR6 SCO ESCN VT400	Select FunctionKey and KeyPad on Putty.

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7.3.8 Intel TXT Information

Feature	Options	Description
Intel TXT information		
Chipset	Info only	
BiosAcm	Info only	
CPU Txt	Info only	
Error Code	Info only	
Class Code	Info only	
Major Code	Info only	
Minor Code	Info only	

7.3.9 USB Configuration

Feature	Options	Description
USB Configuration		
USB Module Version	Info only	
USB Controllers	Info only	
USB Devices	Info only	
Legacy USB Support	Disabled ***Enabled*** Auto	Enable/Disable Legacy USB support. AUTO option disables legacy support if no USB devices are connected. DISABLE option will keep SUB devices available only for EFI applications.
XHCI Hand-Off	Disabled ***Enabled***	This is a workaround for OSes without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.
USB Mass Storage Driver Support	Disabled ***Enabled***	Enable/Disable USB Mass Storage Driver Support.

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7.3.10 CSM Configuration

Feature	Options	Description
Compatibility Support Module Configuration		
CSM Support	Disabled ***Enabled***	Enable/Disable CSM Support.
CSM16 Module Version	Info only	
Option ROM execution		
Network	Do not launch ***UEFI*** Legacy	Controls the execution of UEFI and Legacy PXE OpROM.
Storage	Do not launch ***UEFI*** Legacy	Controls the execution of UEFI and Legacy Storage OpROM.
Video	Do not launch ***UEFI*** Legacy	Controls the execution of UEFI and Legacy Video OpROM.
Other PCI device	Do not launch ***UEFI*** Legacy	Controls the execution of UEFI and Legacy other device OpROM.

7.3.11 Network Stack Configuration

Feature	Options	Description
Network Stack	***Disabled*** Enabled	Enable/Disable UEFI Network Stack.
Ipv4 PXE Support	***Disabled*** Enabled	Enable/Disable IPv4 PXE boot support. If disabled, IPv4 PXE boot support will not be available.
Ipv6 PXE Support	***Disabled*** Enabled	Enable/Disable IPv6 PXE boot support. If disabled, IPv4 PXE boot support will not be available.
PXE boot wait time	0	Wait time in seconds to press ESC key to abort the PXE boot. Use either +/- or numeric keys to set the values.
Media detect count	1	Number of times the presence of media will be checked. Use either +/- or numeric keys to set the values.

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7.4 Chipset

Feature	Options	Description
System Agent (SA) Configuration		System Agent(SA) Parameters.
PCH-IO Configuration		PCH Parameters.

7.4.1 System Agent (SA) Configuration

Feature	Options	Description
System Agent (SA) Configuration		
SA PCIe Code Version	Info only	
VT-d	Info only	
Memory Configuration		Memory Configuration Parameters.
Graphics Configuration		Graphics Configuration.
PEG Port Configuration		PEG Port Options.
VT-d	Disabled ***Enabled***	VT-d capability

7.4.1.1 Memory Configuration

Feature	Options	Description
Memory Configuration		
Memory RC Version	Info only	
Memory Frequency	Info only	
Memory Timings (tCL-tRCD-tRP-tRAS)	Info only	
DIMM_A1	Info only	
DIMM_B1	Info only	
Max TOLUD	***Dynamic*** 1GB 1.25GB 1.5GB 1.75GB 2GB 2.25GB 2.5GB 2.75GB 3GB 3.25GB 3GB	Maximum Value of TOLUD. Dynamic assignment would adjust TOLUD automatically based on largest MMIO length of installed graphic controller.

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7.4.1.2 Graphic Configuration

Feature	Options	Description
Graphic Configuration		
Primary Display	***Auto*** IGFX PEG PCIE	Select which of IGFX/PEG/PCIE Graphics device should be Primary Display.
Internal Graphics	***Auto*** Disabled Enabled	Keep IGFX enabled based on the setup options.
PSMI Support	***Disabled*** Enabled	PSMI Enable/Disable.
DVMT Pre-Allocated	0M ***32M*** 64M 4M 8M 12M 16M 20M 24M 28M 32M/F7 36M 40M 44M 48M 52M 56M	Select DVMT5.0 Pre-Allocated (Fixed) Total Graphic Memory size used by the Internal Graphics Device.
DVMT Total Gfx Mem	128M ***256M*** MAX	Select DVMT5.0 Total Graphic Memory size used by the Internal Graphics Device.
LCD Control		LCD Control.

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LCD Control

Feature	Options	Description
LCD Control		
LVDS Control	Enabled ***Disabled***	Enable/Disable LVDS.
LVDS Panel Type	640x480@60Hz 18bits Single 800x480@60Hz 18bits Single 800x600@60Hz 18bits Single ***1024x768@60Hz 18bits Single*** 1280x1024@60Hz 24bits Dual 1366x768@60Hz 18bits Single 1440x900@60Hz 24bits Dual 1680x1050@60Hz 24bits Dual 1920x1080@60Hz 24bits Dual 1920x1200@60Hz 24bits Dual	Select LCD Panel Type.
LVDS Brightness Control	255	Adjust Brightness of LVDS (from 1~225).
LVDS Back Light PWM Frequency	***200 Hz*** 250 Hz 333 Hz 500 Hz 1K Hz 11.6K Hz 15.6K Hz 23.3K Hz	Adjust LVDS Back Light PWM Frequency.

7.4.1.3 PEG Port Configuration

Feature	Options	Description
PEG Port Configuration		
PEG 0:1:0	Not Present	
Enable Root Port	Disabled Enabled ***Auto***	Enable or Disable the Root Port.
Max Link Speed	***Auto*** Gen1 Gen2 Gen3	Configure PEG 0:1:0 Max Speed.
PEG0 Hotplug	***Disabled*** Enabled	Enable or Disable PCI Express hot plugging.
Extra Bus Reserved	0	Extra bus reserved (0-7) for bridges behind this Root Bridge
Reserved Memory	10	Reserved Memory for this Root Bridge.
Reserved I/O	4	Reserved I/O (4K/8K/12K/16K/20K) Range for this Root Bridge
Detect Non-Compliance Device	***Disabled*** Enabled	Detect Non-Compliance PCI Express Device in PEG.

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7.4.2 PCH IO Configuration

Feature	Options	Description
PCH-IO Configuration		
PCI Express Configuration		PCI Express Configuration settings.
SATA And RST Configuration		SATA Device Options Setting.
USB Configuration		USB Configuration settings.
HD Audio Configuration		HD Audio Subsystem Configuration Settings.
LAN1 Controller	Disabled ***Enabled***	Control the PCI Express Root Port.
LAN1 PXE OpROM	Enabled ***Disabled***	Enable or disable boot option for LAN1 Controller.
LAN2 Controller	Disabled ***Enabled***	Control the PCI Express Root Port.
LAN O PXE OpROM	Enabled ***Disabled***	Enable or disable boot option for LAN2 Controller.
Restore AC Power Loss	Power On ***Power Off*** Last State	Specify what state to go to when power is re-applied after a power failure (G3 state).
GPIO Group Control	Enabled ***Disabled***	Configure the digital GPIO pins.
GPIO 1 Control	***Input*** Output High Output Low	Configure Digital I/O Pin.
GPIO 2 Control	***Input*** Output High Output Low	Configure Digital I/O Pin.
GPIO 3 Control	***Input*** Output High Output Low	Configure Digital I/O Pin.
GPIO 4 Control	***Input*** Output High Output Low	Configure Digital I/O Pin.
GPIO 5 Control	***Input*** Output High Output Low	Configure Digital I/O Pin.
GPIO 6 Control	***Input*** Output High Output Low	Configure Digital I/O Pin.
GPIO 7 Control	***Input*** Output High Output Low	Configure Digital I/O Pin.
GPIO 8 Control	***Input*** Output High Output Low	Configure Digital I/O Pin.

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7.4.2.1 PCI Express Configuration

Feature	Options	Description
PCI Express Configuration		
PCIE Device Initial Delay	0	The PCIE device initial delay mini second.
PCI Express Root Port 5 (Mini-PCIe)		
PCI Express Root Port 5 (Mini-PCIe)	Disabled ***Enabled***	Control the PCI Express Root Port.
ASPM 5	***Disabled*** L0s L1 L0sL1 Auto	Set the ASPM Level: Force L0s – Force all links to L0s State Auto – BIOS auto configure Disable – Disables ASPM
PCIe Speed	***Auto*** Gen1 Gen2 Gen3	Configure PCIe Speed.
PCI Express Root Port 11 (LAN1)		
PCI Express Root Port 12 (LAN2)		

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7.4.2.2 SATA And RST Configuration

Feature	Options	Description
SATA Configuration		
SATA Controller(s)	***Enabled*** Disabled	Enable/Disable SATA Device.
SATA Mode Selection	***AHCI*** Intel RST Premium	Determines how SATA controllers operate.
Serial ATA Port 1	Info only	
Software Preserve	Info only	
Port 1	Disabled ***Enabled***	Enable or Disable SATA Port.
Serial ATA Port 2	Info only	
Software Preserve	Info only	
Port 2	Disabled ***Enabled***	Enable or Disable SATA Port.
Serial ATA Port 3	Info only	
Software Preserve	Info only	
Port 3	Disabled ***Enabled***	Enable or Disable SATA Port.
Serial ATA Port 4	Info only	
Software Preserve	Info only	
Port 4	Disabled ***Enabled***	Enable or Disable SATA Port.
Serial ATA Port 5	Info only	
Software Preserve	Info only	
Port 5	Disabled ***Enabled***	Enable or Disable SATA Port.

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7.4.2.3 USB Configuration

Feature	Options	Description
USB Configuration		
XHCI Compliance Mode	***Disabled*** Enabled	Options to disable Compliance Mode. Default is to disable Compliance Mode. Change to enabled for Compliance Mode testing.
USB12 Standby Power	Disabled ***Enabled***	Enable/Disable USB Standby Power.
USB34 Standby Power	Disabled ***Enabled***	Enable/Disable USB Standby Power.
USB78 Standby Power	Disabled ***Enabled***	Enable/Disable USB Standby Power.

7.4.2.4 HD Audio Configuration

Feature	Options	Description
HD Audio Configuration		
HD Audio	Disable ***Enable***	Control Detection of the HD-Audio device. Disabled = HAD will be unconditionally disabled. Enabled = HAD will be unconditionally enabled.

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7.5 Security

Feature	Options	Description
Administrator Password		Set Administrator Password.
User Password		Set User Password.
Secure Boot		Secure Boot configuration.

7.5.1 Secure Boot

Feature	Options	Description
System Mode	Setup	
Secure Boot	***Disable*** Enable	Secure Boot Feature is Active if Secure Boot is Enabled, Platform Key (PK) is enrolled and the System is in User mode. The mode change requires platform reset.
Secure Boot Mode	Standard ***Custom***	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	Yes No	Force System to User Mode. Install factory default Secure Boot key databases.
Reset to Setup Mode	Yes No	Delete all Secure key databases from NVRAM.
Key Management		Enables expert users to modify Secure Boot Policy variables without full authentication.

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7.5.1.1 Key Management

Feature	Options	Description
Vendor Keys	Modified	
Factory Key Provision	***Disable*** Enable	Install factory default Secure Boot keys after the platform reset and while the System is in Setup mode.
Restore Factory Keys	Yes No	Force System to User Mode. Install factory default Secure Boot key databases
Reset to Setup Mode	Yes No	Delete all Secure key databases from NVRAM.
Export Secure Boot variables	Ok	Copy NVRAM content of Secure Boot variables to files in a root folder on a file system device.
Enroll Efi Image	Ok	Allow the image to run in Secure Boot mode. Enroll SHA256 Hash certificate of a PE image into Authorized Signature Database (db).
Device Guard Ready		
Remove “UEFI CA” from DB	Yes No	Device Guard ready system must not list ‘Microsoft UEFI CA’ Certificate in Authorized Signature database (db).
Restore DB defaults	Yes No	Restore DB variable to factory defaults.
Secure Boot variable	Size | Keys | Key Source	
Platform Key (PA)	0 | 0 | No Keys	Enroll Factory Defaults or load certificates from a file: 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 Variables 3. EFI PE/COFF Image (SHA256) Key Source: Factory, External, Mixed
Key Exchange Keys	0 | 0 | No Keys	
Authorized Signatures	0 | 0 | No Keys	
Forbidden Signatures	0 | 0 | No Keys	
Authorized TimeStamps	0 | 0 | No Keys	
OsRecovery Signatures	0 | 0 | No Keys	

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7.6 Boot

Feature	Options	Description
Boot Configuration		
Setup Prompt Timeout	1	Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.
Bootup NumLock State	***On*** Off	Select the keyboard NumLock state.
Quiet Boot	Disabled ***Enabled***	Enable or disables Quiet Boot option.
Support Native Resolution	Disabled ***Enabled***	Enable or disable Support Native Resolution.
Driver Option Priorities		
Boot Mode	LEGACY ***UEFI***	Automatically set CSM's item so LEGACY or UEFI.
FIXED BOOT ORDER Priorities		
Boot Option #1	Hard Disk	Set the system boot order.
Boot Option #2	CD/DVD	Set the system boot order.
Boot Option #3	USB Hard Disk	Set the system boot order.
Boot Option #4	USB CD/DVD	Set the system boot order.
Boot Option #5	USB Key	Set the system boot order.
Boot Option #6	USB Floppy	Set the system boot order.
Boot Option #7	Network	Set the system boot order.

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7.7 Save & Exit

Feature	Options	Description
Save Options		
Save Changes and Exit	Yes No	Exit system setup after saving the changes.
Discard Changes and Exit	Yes No	Exit system setup without saving any changes.
Save Changes and Reset	Yes No	Reset the system after saving the changes.
Default Options		
Restore Defaults	Yes No	Restore/Load Default values for all the setup options.
Boot Override		
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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Safety Instructions

Read and follow all instructions marked on the product and in the documentation before you operate your system. Retain all safety and operating instructions for future use.

- Please read these safety instructions carefully.
- Please keep this User‘s Manual for later reference.
- Read the specifications section of this manual for detailed information on the operating environment of this equipment.
- When installing/mounting or uninstalling/removing equipment, turn off the power and unplug any power cords/cables.
- To avoid electrical shock and/or damage to equipment:
  - Keep equipment away from water or liquid sources.
  - Keep equipment away from high heat or high humidity.
  - Keep equipment properly ventilated (do not block or cover ventilation openings).
  - Make sure to use recommended voltage and power source settings.
  - Always install and operate equipment near an easily accessible electrical socket-outlet.
  - Secure the power cord (do not place any object on/over the power cord).
  - Only install/attach and operate equipment on stable surfaces and/or recommended mountings.
  - If the equipment will not be used for long periods of time, turn off and unplug the equipment from its power source.
- Never attempt to fix the equipment. Equipment should only be serviced by qualified personnel.

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Getting Service

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