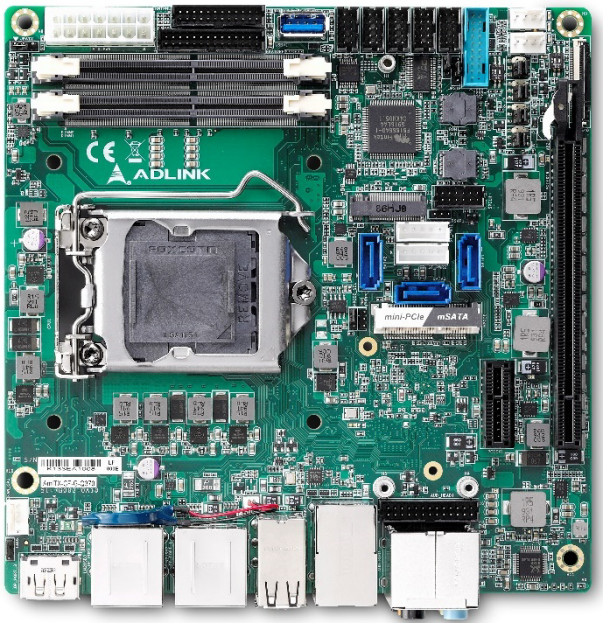
AmITX-CF-G

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.: 2.0
Revision Date: September 23, 2022
Part Number: 50M-00093-1000

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Preface

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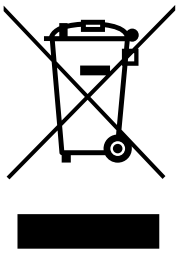
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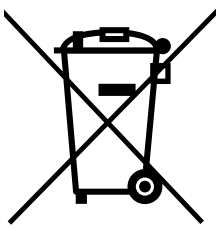
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Battery Labels (for products with battery)









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Revision History

Revision	Description	Date
1.0	Initial release	February 26, 2021
2.0	General update, changed LAN chip and SER1 pinout	September 23, 2022

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1. Introduction

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

The AmITX-CF-G features three DisplayPorts, dual Gigabit Ethernet ports, USB 3.0 ports, USB 2.0 ports, SATA 6 Gb/s ports, and High Definition Audio with 7.1 channels. Expansion is provided by one PCIe x16, one PCIe x1, one M.2 and one mini-PCIe slot. The onboard feature connector provides GPIO, SMBus, and I²C support. The board is equipped with SPI AMI EFI BIOS, supporting embedded features such as hardware monitor and watchdog timer.

Table 1: AmITX-CF-G Model Numbers

Model Number	Chipset Implemented
AmITX-CF-G-Q370	Intel® Q370
AmITX-CF-G-H310	Intel® H310

Latest revision 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-G Mini-ITX motherboard
- ATX/AT power cable (P/N: 30-20872-1000)
- SATA dual power cable (P/N: 30-20875-0000)
- SATA cable (P/N: 30-10057-0600)
- Rear I/O shield (P/N: 34-25314-0000)

1.2. Optional Accessories

- COM port cable, 1 port (P/N: 30-20876-0000)
- USB 2.0 cable, 2 ports for AmITX-CF-G-H310 (P/N: 30-20874-1000)
- USB 3.0 cable, 2 ports for AmITX-CF-G-Q370 (P/N: 30-20963-0000)
- ADi-SCOT (Software Chain of Trust) for gaming customization BIOS requirement (RSA-2048 private key)

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2. Specifications

2.1. Core System

CPU	Embedded 9th Gen. Intel® Core™ i7/i5/i3 and Pentium®/Celeron® Processor, LGA1151 socket Intel® Core™ i7-9700TE Processor, 8C, 1.8/3.8GHz, 12M, 35W Intel® Core™ i7-9700E Processor, 8C, 2.6/4.4GHz, 12M, 65W Intel® Core™ i5-9500TE Processor, 6C, 2.2/3.6GHz, 9M, 35W Intel® Core™ i5-9500E Processor, 6C, 3.0/4.2GHz, 9M, 65W Intel® Core™ i3-9100E Processor, 4C, 3.1/3.7GHz, 6M, 65W Intel® Core™ i3-9100TE Processor, 4C, 2.2/3.2GHz, 6M, 35W Embedded 8th Gen. Intel® Core™ i7/i5/i3 and Pentium®/Celeron® Processor, LGA1151 socket Intel® Core™ i7-8700 Processor, 6C, 3.2/4.6GHz, 12M, 65W Intel® Core™ i7-8700T Processor, 6C, 2.4/4.0GHz, 12M, 35W Intel® Core™ i5-8500 Processor, 6C, 3.0/4.1GHz, 9M, 65W Intel® Core™ i5-8500T Processor, 6C, 2.1/3.5GHz, 9M, 35W Intel® Core™ i3-8100 Processor, 4C, 3.6GHz, 6M, 65W Intel® Core™ i3-8100T Processor, 4C, 3.1GHz, 6M, 35W Intel® Pentium® Gold G5400 Processor, 2C, 3.7GHz, 4M, 58W Intel® Pentium® Gold G5400T Processor, 2C, 3.1GHz, 4M, 35W Intel® Celeron® G4900 Processor, 2C, 3.1GHz, 2M, 54W Intel® Celeron® G4900T Processor, 2C, 2.9GHz, 2M, 35W **Note:** The availability of features may vary between processor SKUs and operating systems.
Chipset	Intel® Q370/H310 Chipset
Memory	Dual-channel non-ECC 2400 MHz DDR4 memory up to 32GB in dual SODIMM sockets
Embedded BIOS	AMI EFI in 16MB SPI BIOS

2.2. Rear I/O Connectors

Display	3x DisplayPort (Q370) , 2x DisplayPort (H310)
LAN	Dual GbE RJ-45
USB	4x USB 3.0; 4x USB 2.0
Audio	7.1 channel audio via 5 jacks and S/PDIF output on rear I/O

2.3. Debug Connector

40-pin Multipurpose Flat Cable Connector: used in combination with DB-40 debug module providing BIOS POST code LED, BMC access, SPI BIOS flashing, Power Testpoints, Debug LEDs

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2.4. Internal Headers and Connectors

PCI Express Slots	PCIe x16 (Gen3) PCIe x1 (Gen2) 1x full-size Mini-PCIe slot (Q370: PCIe x1, mSATA and USB 2.0 / H310: PCIe x1) 1x M.2 (M key, 2242, NVMe support; H310: PCIe x1 Gen2 signal)
USB	2x USB 3.0 onboard header (Q370) 1x USB 2.0 onboard header (H310) 1x USB 3.0 vertical connector (H310 only supports USB2.0)
SATA	3x SATA 6 Gbps ports (Jumper select NA/3.3V/5V for SATA1 and SATA2 to deliver power by SATA pin7; Default is NA) 2x SATA power connectors
Serial	3x RS-232 headers, 1x RS-232/422/485 header (supports NC/5V/12V power by jumper selection) 1x CCTALK x2 on internal header
Other	Front Panel Header Audio Header Feature Connector Header SPI Header ATX Power Connector (14-pin)

2.5. Form Factor

Mini-ITX: 170mm x 170mm

2.6. SEMA Board Controller

ADLINK Smart Embedded Management Agent (SEMA)

- Voltage/Current monitoring
- Logistics and Forensic information
- Flat Panel Control
- General Purpose I2C
- Failsafe BIOS (dual BIOS)
- Watchdog Timer and Fan Control

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2.7. Video

GPU Feature Support	Intel® 9th generation LP graphics core architecture with up to 18 execution units supporting DirectX 11/12, OGL4.3/4.4, and up to three independent, simultaneous displays
Display Interface Support	3x DisplayPort v1.2 with resolution up to 4096 x 2304 @ 60Hz (3x DisplayPort (Q370) , 2x DisplayPort (H310))

2.8. Audio

Integrated	Intel® HD Audio on chipset
Audio Codec	Realtek ALC888
Interfaces	• 7.1 channel audio via 5 jacks and S/PDIF output on rear I/O • 7.1 channel audio signals and S/PDIF output via internal header

2.9. LAN

Realtek	2x Realtek RTL8119-CG Ethernet controller
Interface	10/100/1000 GbE connection

2.10. Trusted Platform Module (TPM)

Chipset	Infineon SLB9665XT
Type	TPM2.0

2.11. Power Specification

Power Modes	AT and ATX mode
Standard Voltage Input	ATX = 12VDC ±5%, 5Vsb ±5% or AT = 12V ±5%
Power Management	ACPI 4.0 compliant
Power States	Supports C1-C6, S0, S1, S4, S3, S5, (Wake-on-USB S3/S4, WoL S3/S4/S5)

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2.11.1. Power Consumption

ATX mode (with standard power supply 24-pin)

Processor	i3-8100T 3.1 35W	i5-8500T 2.10 35W	i7-9700TE 1.8 35W	i5-9500E 3.0 65W	i7-8700 3.2 65W
Chipset	Q370	Q370	Q370	Q370	Q370
Memory	16G 2400MHz	16G 2400MHz	16G 2400MHz	16G 2400MHz	16G 2400MHz
Graphics	Q370	Q370	Q370	Q370	Q370
HDD	M.2 (S42) 3TG6-P	M.2 (S42) 3TG6-P	M.2 (S42) 3TG6-P	M.2 (S42) 3TG6-P	M.2 (S42) 3TG6-P
OS	Win 10 Enterprise	Win 10 Enterprise	Win 10 Enterprise	Win 10 Enterprise	Win 10 Enterprise
Windows Idle mode/Enable EIST/Enable Turbo boost					
3.3A(A)orange	0.1	0.11	0.11	0.12	0.1
5V(A)red	0.13	0.13	0.13	0.13	0.13
+12V(A)yellow	1.08	1.18	1.1	1.37	1.21
5VSB(A)purple	0.01	0.01	0.01	0.01	0.01
Power Consumption(W)	13.99	15.223	14.263	17.536	15.55
Windows Idle mode/Disable EIST/Disable Turbo boost					
3.3A(A)orange	0.11	0.1	0.1	0.12	0.1
5V(A)red	0.15	0.14	0.13	0.13	0.13
+12V(A)yellow	1.47	1.49	1.5	1.64	1.87
5VSB(A)purple	0.01	0.01	0.01	0.02	0.01
Power Consumption(W)	18.803	18.96	19.03	20.826	23.47
Windows Typical mode/Enable EIST/Enable Turbo boost					
3.3A(A)orange	0.1	0.11	0.11	0.11	0.11
5V(A)red	0.17	0.16	0.17	0.16	0.17
+12V(A)yellow	13.34	14.54	16.67	20.1	21.43
5VSB(A)purple	0.01	0.01	0.02	0.01	0.01
Power Consumption(W)	161.31	175.693	201.353	242.413	258.423
Windows Typical mode/Disable EIST/Disable Turbo boost					
3.3A(A)orange	0.1	0.11	0.11	0.1	0.1
5V(A)red	0.17	0.16	0.17	0.16	0.17
+12V(A)yellow	13.66	13.39	13.82	15.65	16.5
5VSB(A)purple	0.01	0.01	0.01	0.01	0.01
Power Consumption(W)	165.15	161.893	167.103	188.98	199.23

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ATX mode (with standard power supply 24-pin)

Windows Max mode/Enable EIST/Enable Turbo boost					
3.3A(A)orange	0.1	0.1	0.12	0.09	0.11
5V(A)red	0.17	0.16	0.18	0.16	0.17
+12V(A)yellow	13.65	16.31	16.86	22.33	24.13
5VSB(A)purple	0.01	0.01	0.02	0.01	0.01
Power Consumption(W)	165.03	196.9	203.716	269.107	290.823
Windows Max mode/Disable EIST/Disable Turbo boost					
3.3A(A)orange	0.1	0.1	0.11	0.1	0.11
5V(A)red	0.17	0.16	0.17	0.16	0.16
+12V(A)yellow	14.09	14.49	14.07	16.52	19.58
5VSB(A)purple	0.01	0.01	0.01	0.01	0.01
Power Consumption(W)	170.31	175.06	170.103	199.42	236.173
System S3 mode					
3.3A(A)orange	0.01	0.01	0.01	0.01	0.02
5V(A)red	0.01	0	0.01	0.02	0.01
+12V(A)yellow	0.01	0.01	0.02	0.01	0.01
5VSB(A)purple	0.21	0.22	0.22	0.24	0.21
Power Consumption(W)	1.253	1.253	1.423	1.453	1.286
System S4 mode					
3.3A(A)orange	0.01	0.01	0.01	0.01	0.01
5V(A)red	0.01	0.01	0	0.01	0.01
+12V(A)yellow	0.01	0.01	0.01	0.02	0.01
5VSB(A)purple	0.16	0.17	0.18	0.19	0.18
Power Consumption(W)	1.003	1.053	1.053	1.273	1.103
System S5 mode with ECO disabled					
3.3A(A)orange	0.01	0.01	0.01	0.01	0.02
5V(A)red	0.01	0.01	0.01	0.01	0.01
+12V(A)yellow	0.01	0.01	0.01	0.02	0.01
5VSB(A)purple	0.17	0.17	0.18	0.2	0.16
Power Consumption (W)	1.053	1.053	1.103	1.323	1.036

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ATX mode (with standard power supply 24-pin)

System S5 mode with ECO enabled					
3.3A(A)orange	0.01	0.01	0.01	0.01	0.02
5V(A)red	0.01	0.01	0.01	0.01	0.02
+12V(A)yellow	0.01	0.01	0.01	0.01	0
5VSB(A)purple	0.02	0.02	0.03	0.04	0.01
Power Consumption(W)	0.303	0.303	0.353	0.403	0.216

ATX mode (with 12V adapter)

Processor	i3-8100T 3.1 35W	i5-8500T 2.10 35W	i7-9700TE 1.8 35W	i5-9500E 3.0 65W	i7-8700 3.2 65W
Chipset	Q370	Q370	Q370	Q370	Q370
Memory	16G 2400MHz	16G 2400MHz	16G 2400MHz	16G 2400MHz	16G 2400MHz
Graphics	Q370	Q370	Q370	Q370	Q370
HDD	M.2 (S42) 3TG6-P	M.2 (S42) 3TG6-P	M.2 (S42) 3TG6-P	M.2 (S42) 3TG6-P	M.2 (S42) 3TG6-P
OS	Win 10 Enterprise	Win 10 Enterprise	Win 10 Enterprise	Win 10 Enterprise	Win 10 Enterprise
Windows Idle mode/Enable EIST/Enable Turbo boost					
3.3A(A)	N/A	N/A	N/A	N/A	N/A
5V(A)	N/A	N/A	N/A	N/A	N/A
12V(A)	1.32	1.19	1.1	1.49	1.51
5VSB(A)	N/A	N/A	N/A	N/A	N/A
Power Consumption(W)	15.84	14.28	13.2	17.88	18.12
Windows Idle mode/Disable EIST/Disable Turbo boost					
3.3A(A)	N/A	N/A	N/A	N/A	N/A
5V(A)	N/A	N/A	N/A	N/A	N/A
12V(A)	1.55	1.48	1.35	1.73	1.88
5VSB(A)	N/A	N/A	N/A	N/A	N/A
Power Consumption(W)	18.6	17.76	16.2	20.76	22.56
Windows Typical mode/Enable EIST/Enable Turbo boost					
3.3A(A)	N/A	N/A	N/A	N/A	N/A
5V(A)	N/A	N/A	N/A	N/A	N/A
12V(A)	13.77	14.41	16.35	19.35	21.66
5VSB(A)	N/A	N/A	N/A	N/A	N/A
Power Consumption(W)	165.24	172.92	196.2	232.2	259.92

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ATX mode (with 12V adapter)

Windows Typical mode/Disable EIST/Disable Turbo boost					
3.3A(A)	N/A	N/A	N/A	N/A	N/A
5V(A)	N/A	N/A	N/A	N/A	N/A
12V(A)	12.71	13.03	13.48	15.6	15.99
5VSB(A)	N/A	N/A	N/A	N/A	N/A
Power Consumption(W)	152.52	156.36	161.76	187.2	191.88
Windows Max mode/Enable EIST/Enable Turbo boost					
3.3A(A)	N/A	N/A	N/A	N/A	N/A
5V(A)	N/A	N/A	N/A	N/A	N/A
12V(A)	14.21	16.12	18.31	21.6	22.5
5VSB(A)	N/A	N/A	N/A	N/A	N/A
Power Consumption(W)	170.52	193.44	219.72	259.2	270
Windows Max mode/Disable EIST/Disable Turbo boost					
3.3A(A)	N/A	N/A	N/A	N/A	N/A
5V(A)	N/A	N/A	N/A	N/A	N/A
12V(A)	13.06	14.3	14.46	16.49	18.62
5VSB(A)	N/A	N/A	N/A	N/A	N/A
Power Consumption(W)	156.72	171.6	173.52	197.88	223.44
System S3 mode					
3.3A(A)	N/A	N/A	N/A	N/A	N/A
5V(A)	N/A	N/A	N/A	N/A	N/A
12V(A)	0.17	0.17	0.17	0.15	0.14
5VSB(A)	N/A	N/A	N/A	N/A	N/A
Power Consumption(W)	2.04	2.04	2.04	1.8	1.68
System S4 mode					
3.3A(A)	N/A	N/A	N/A	N/A	N/A
5V(A)	N/A	N/A	N/A	N/A	N/A
12V(A)	0.15	0.16	0.15	0.15	0.13
5VSB(A)	N/A	N/A	N/A	N/A	N/A
Power Consumption(W)	1.8	1.92	1.8	1.8	1.56

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ATX mode (with 12V adapter)

System S5 mode with ECO disable					
3.3A(A)	N/A	N/A	N/A	N/A	N/A
5V(A)	N/A	N/A	N/A	N/A	N/A
12V(A)	0.15	0.16	0.12	0.15	0.13
5VSB(A)	N/A	N/A	N/A	N/A	N/A
Power Consumption(W)	1.8	1.92	1.44	1.8	1.56
System S5 mode with ECO Enable					
3.3A(A)	N/A	N/A	N/A	N/A	N/A
5V(A)	N/A	N/A	N/A	N/A	N/A
12V(A)	0.07	0.07	0.06	0.07	0.09
5VSB(A)	N/A	N/A	N/A	N/A	N/A
Power Consumption(W)	0.84	0.84	0.72	0.84	1.08

2.12. Temperatures

Standard Operating Temperature	0°C to 60°C
Storage Temperature	-20°C to 80°C

2.13. Environmental

Humidity	40° C @ 95% RH non-condensing
Shock and Vibration	IEC 60068-2-64 and IEC-60068-2-27 Vibration: 1Grms (5~500 Hz) operating, 3Grms (5~500 Hz) non-operating Shock: 20G (with 11 ms duration, half sine wave) operating, 20G(with 11 ms duration, half sine wave) non-operating
HALT	Thermal Stress, Vibration Stress, Thermal Shock and Combined Test

2.14. Operating Systems

Standard Support	Windows 10 64-bit Ubuntu 18.04.x 64-bit
Extended Support (BSP)	On request

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2.15. Functional Block Diagram

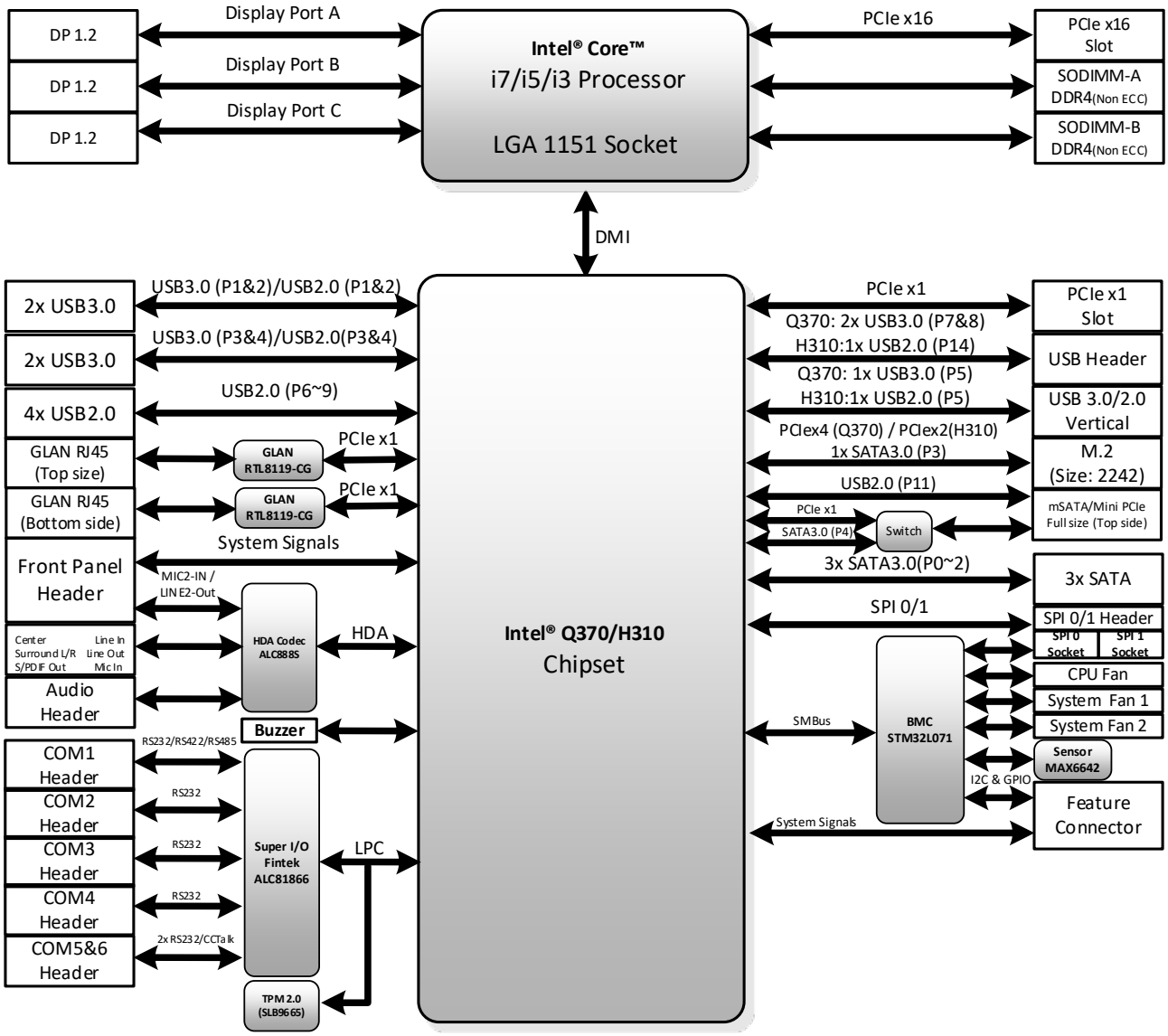


Figure 1: AmITX-CF-G Functional Block Diagram

Note: Full-size Mini-PCIe slot (Q370: PCIe x1, mSATA and USB 2.0 / H310: PCIe x1)

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3. Mechanical Layout

3.1. Connector Locations

3.1.1. Rear I/O Connectors



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

3.1.2. Component-Side Connectors

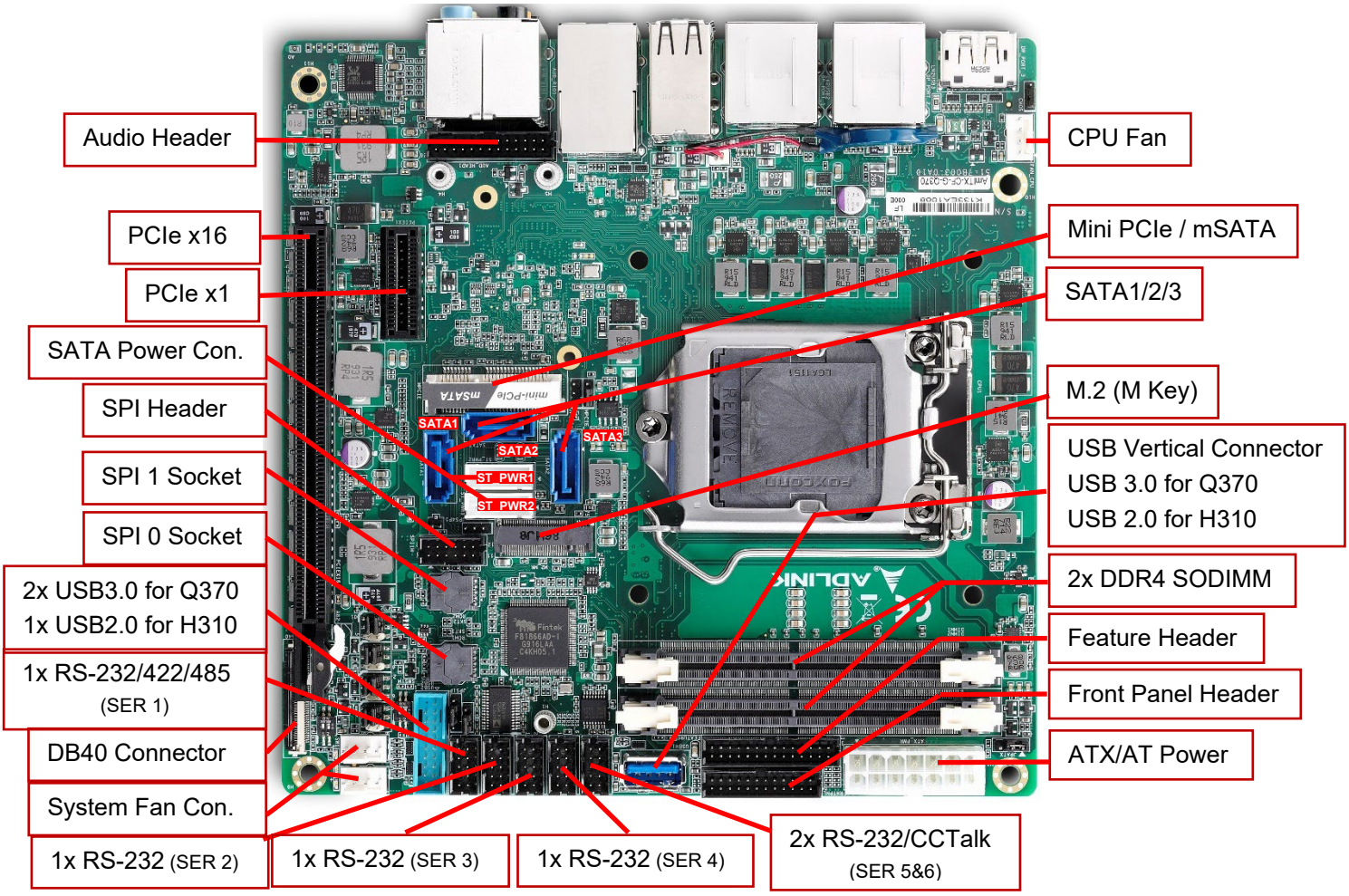
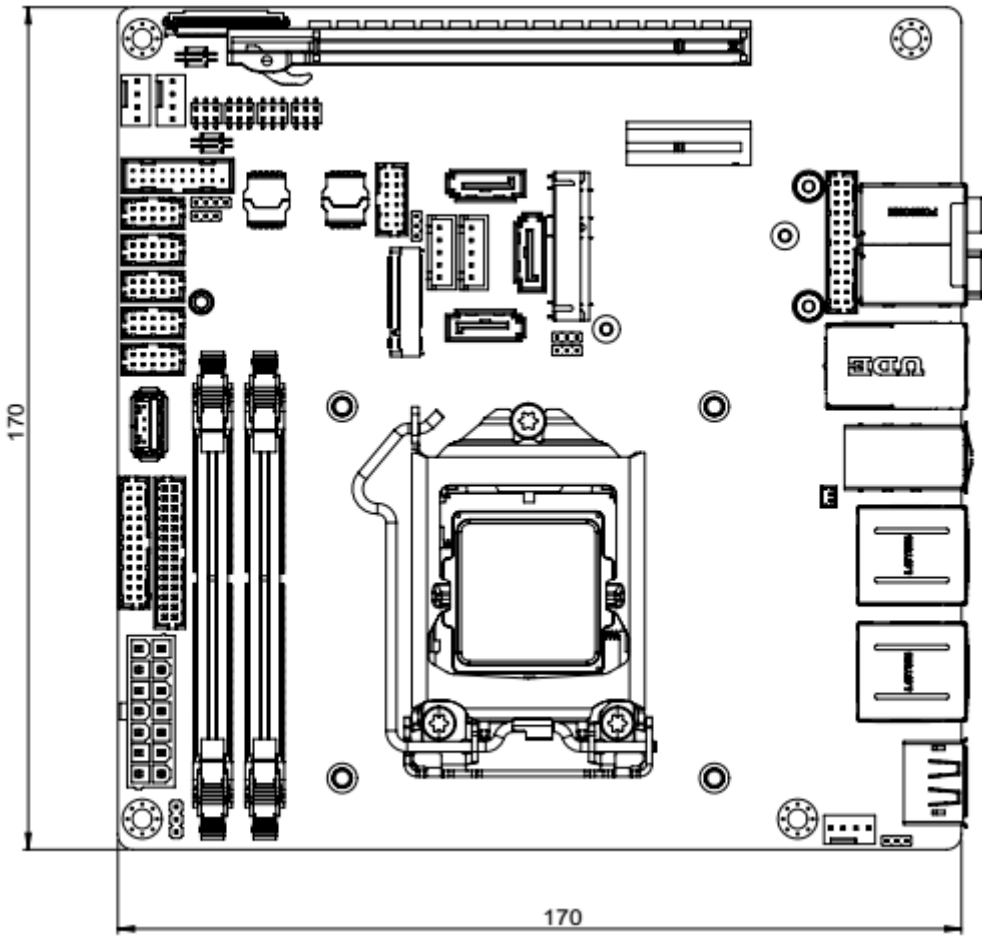


Figure 3: AmITX-CF-G Component-Side Connectors

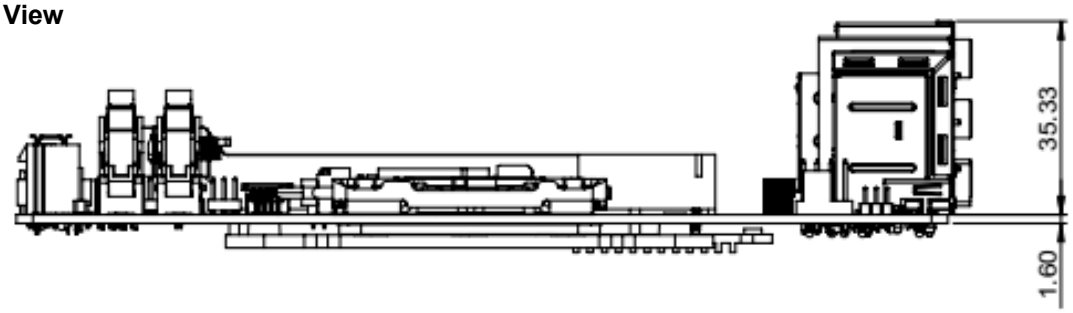
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3.2. Mechanical Dimensions

Top View



Side View



Dimensions: mm

Figure 4: AmITX-CF-G Mechanical Dimensions

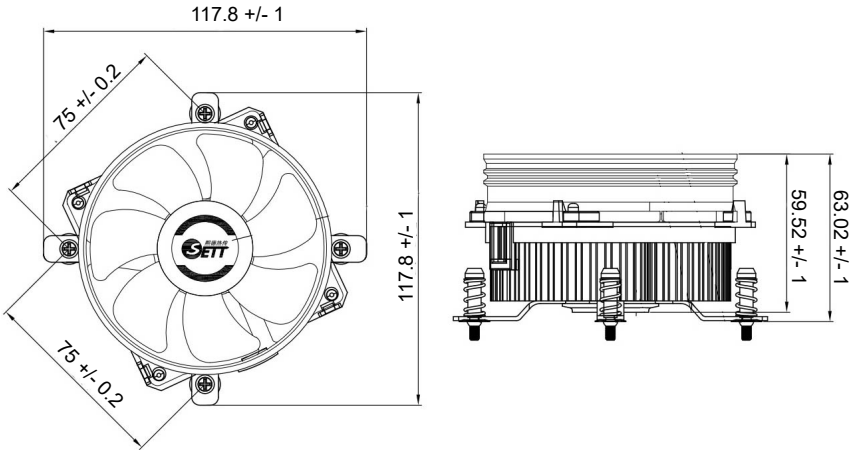
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3.3. Thermal Solutions

LGA1150 CPU Cooler, H=59.52mm, for 35W TPD CPU

P/N: 32-20581-0000

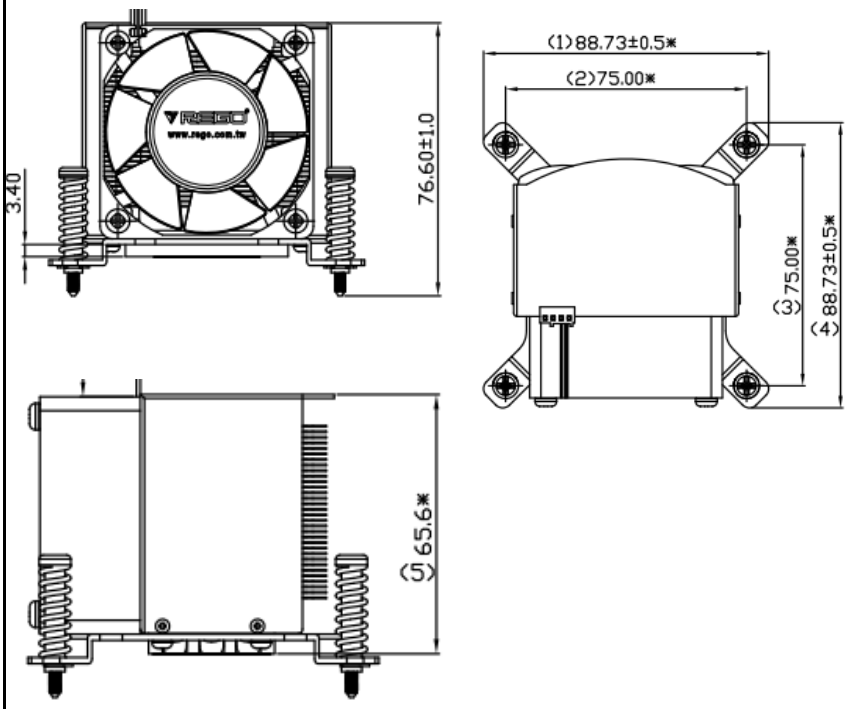
Standard Temp.: 0°C to 60°C



LGA1150 CPU Cooler, H=65.6 mm, for 54W ~ 65W TDP CPU

P/N: 32-20818-1000-A0

Standard Temp.: 0°C to 60°C



NOTICE: Risk of damage!

These coolers are designed for the ADi-SAXX Box PC (worst case), and thermal performance will change with differences in cabinet spaces. In no event may the chassis ventilation holes be obstructed. Always ensure that sufficient clearance (at least 50 mm to each direction except fo the base) exists around the cooling vents for unrestricted airflow.
Failure to comply with this instruction could result in damage to the ADi-SAXX or AmITX-CF-G.

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4. Connectors and Jumpers

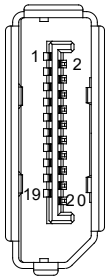
See Section 3.1 Connector Locations

4.1. Rear IO Connectors

4.1.1. DisplayPort Connectors

Three DisplayPort v1.2 specification connectors up to 3840x2160 @ 60 Hz

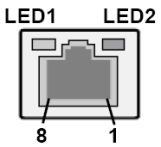
Pin #	Signal	Pin #	Signal
1	CN_DP0_P	2	Ground
3	CN_DP0_N	4	CN_DP1_P
5	Ground	6	CN_DP1_N
7	CN_DP2_P	8	Ground
9	CN_DP2_N	10	CN_DP3_P
11	Ground	12	CN_DP3_N
13	CN_CAD-L	14	CN_CEC
15	CN_AUX_P	16	Ground
17	CN_AUX_N	18	DDP_HPD
19	Ground	20	P3V3



4.1.2. Ethernet Connectors (LAN1, LAN2)

Dual 10/100/1000Mbit/s LAN Ethernet controllers based on Realtek RTL8119-CG, 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-



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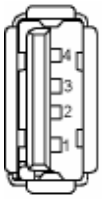
LED1 (Link/Activity)		LED2 (Speed)	
Status	**Description**	**Status**	**Description**
Off	No Link	Off	10 Mb connection
Green	Link	Orange	100 Mb connection
Orange	Data Activity	Blinking	1 Gb connection

4.1.3. USB Connectors

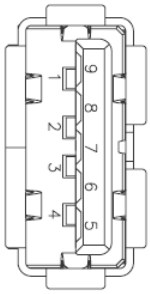
4x USB 3.0, 4x USB 2.0

- 5V supply for external devices
- 5Vsb is supplied during power down to allow wakeup on USB device activity during S3~S4 state
- For USB 2.0 port: 1A for device power supply protected by a resettable 1.5A fuse
- For USB 3.1 port: 1.8A for device power supply protected by a resettable 2.6A fuse

Pin #	Signal
1	VCC
2	UV0-
3	UV0+
4	GND



Pin #	Signal
1	USB3.0_P5VA
2	USB2_CMAN
3	USB2_CMAP
4	GND
5	USB3A_CMRXN
6	USB3A_CMRXP
7	GND
8	USB3A_CMTXN
9	USB3A_CMTXP



4.1.4. Audio Connectors

- 7.1 channel audio via 5 jacks and S/PDIF output on rear I/O
- Realtek ALC888 codec

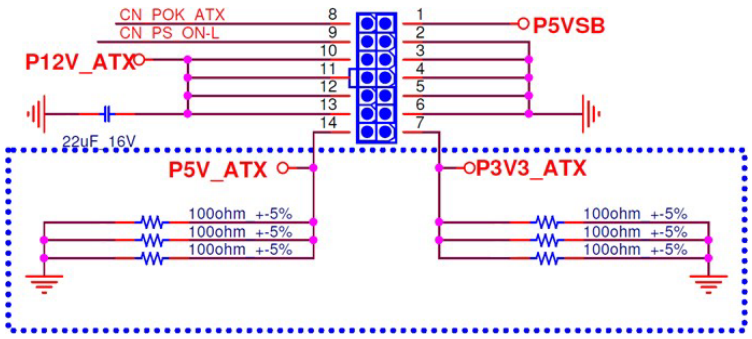
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4.2. Internal Connectors

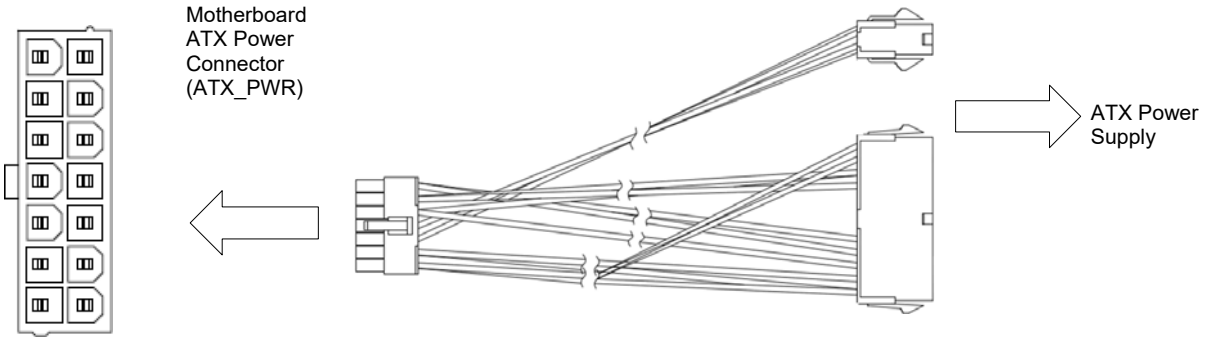
4.2.1. ATX Power Connector (ATX_PWR, proprietary)

AmITX-CF-G supports a proprietary internal ATX Power Connector (ATX_PWR). An adapter cable is provided for conection to a standard ATX power supply.

Pin #	Signal	Pin #	Signal
1	SB5V	8	P_OK
2	GND	9	PS_ON#
3	GND	10	+12V
4	GND	11	+12V
5	GND	12	+12V
6	GND	13	+12V
7	3.3V	14	+5V



ATX Adapter Cable: ADLINK Part. No. 30-20872-1000 (length 250 mm)





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4.2.2. SATA Connectors (SATA1/2/3)

Three SATA 6 Gbps ports are available on the AmITX-CF-G.

- **Option function:** Jumper select NA/3.3V/5V for SATA1 and SATA2 to deliver power by SATA pin 7; default is NA.

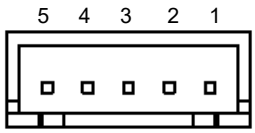
Pin #	Signal
1	GND
2	TXP
3	TXN
4	GND
5	RXN
6	RXP
7	N/A(default), (option)SATA1/2 SATA DOM PWR



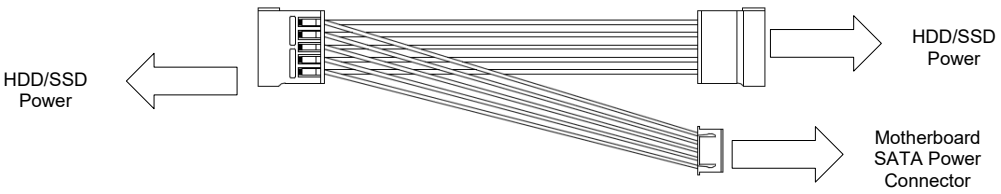
4.2.3. SATA Power Connectors (ST_PWR1/2)

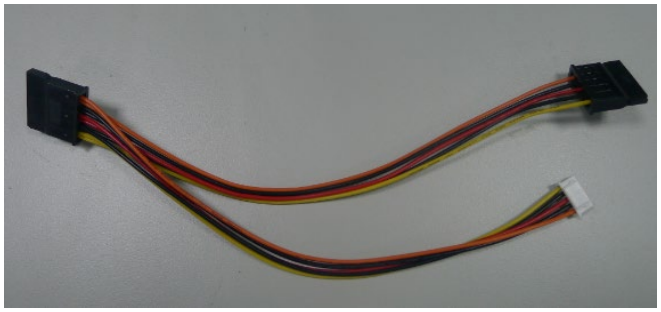
Two 5-pin SATA power connectors for SATA drive power cable.

Pin #	Signal
1	12V
2	GND
3	5V
4	GND
5	3.3V



SATA Power Cable: ADLINK Part. No.: 30-20875-0000 (length 200 mm)





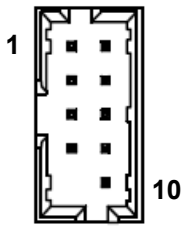
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4.2.4. USB Headers

5V/SB5V: 5V supplies for external devices. SB5V is supplied during power-down to allow wakeup on USB device activity during S3~S4 state.

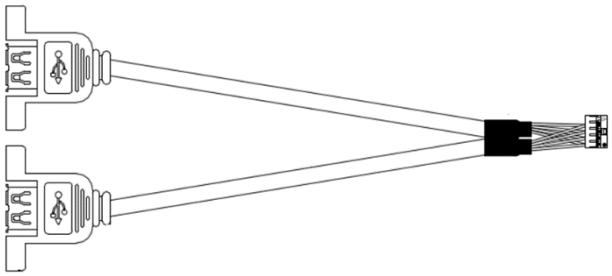
H310: 1xUSB2.0:

Pin #	Signal	Pin #	Signal
1	USB2_10_14_PWR	2	USB2_10_14_PWR
3	NC	4	USB2_P14
5	NC	6	USB2_N14
7	GND	8	GND
9	KEY	10	NC



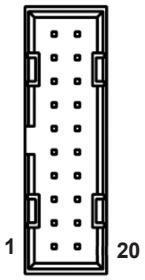
USB Cable (optional):

USB 2.0 Header to 2x Female Type-A Cable (length 200mm), P/N: 30-20874-1000



Q370: 2xUSB3.0:

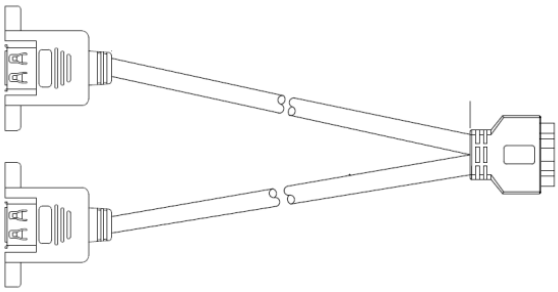
Pin #	Signal	Pin #	Signal
1	NC	20	Key
2	USB3_TX_P7	19	USB3_TX_P8
3	USB3_TX_N7	18	USB3_TX_N8
4	GND	17	GND
5	USB3_RX_P7	16	USB3_RX_P8
6	USB3_RX_N7	15	USB3_RX_N8
7	GND	14	GND
8	USB2_P10	13	USB2_P14
9	USB2_N10	12	USB2_N14
10	USB2_10_14_PWR	11	USB2_10_14_PWR



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USB Cable (optional):

USB 3.0 Header to 2x Female Type-A Cable (length 200mm), P/N: 30-20963-0000

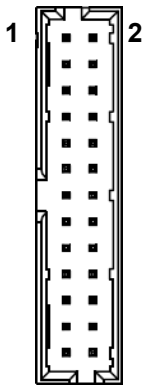


4.2.5. Audio Header

2x13-pin 2.0 pitch standard wafer connector

Note: Signals shared with Audio Header on Rear I/O

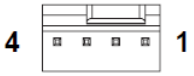
Signal	Pin #	Pin #	Signal
LFE-OUT	1	2	CEN-OUT
AAGND	3	4	AAGND
FRONT-OUT-L	5	6	FRONT-OUT-R
AAGND	7	8	AAGND
REAR-OUT-L	9	10	REAR-OUT-R
SIDE-OUT-L	11	12	SIDE-OUT-R
AAGND	13	14	AAGND
MIC1-L	15	16	MIC1-R
AAGND	17	18	AAGND
LINE1-L	19	20	LINE1-R
MUTE	21	22	AAGND
GND	23	24	NC
SPDIF-OUT	25	26	GND



4.2.6. CPU Fan and System Fan Connectors

Pins 3 and 4 are connected (monitored and managed) by SEMA controller.

Pin #	Signal
1	GND
2	Fan Power (+12V)
3	Fan Sense
4	Fan Speed Control

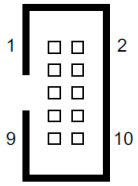


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4.2.7. Serial COM Port Connectors

Six internal Serial Ports (SER1-6)

Serial Port	Functions
SER1	Supports RS-232 / RS-422 / RS-485, 5V/12V power support by jumper select (JPS3P, default NC). **SWS1M**: Switch for mode selection of SER1 (default RS-232).
SER2	Supports only RS-232
SER3	Supports only RS-232
SER4	Supports only RS-232
SER5-6	Supports RS-232 with CTS# RTS# or ccTalk via one physical connector



RS-232

Pin #	Signal	Pin #	Signal
1	DCD	2	DSR
3	RxD	4	RTS
5	TxD	6	CTS
7	DTR	8	RI
9	GND	10	5V / 12V

RS-422 (SER1 only)

Pin #	Signal	Pin #	Signal
1	Tx-	2	—
3	Tx+	4	—
5	Rx+	6	—
7	Rx-	8	—
9	GND	10	5V / 12V

RS-485 (SER1 only)

Pin #	Signal	Pin #	Signal
1	Tx/Rx-	2	—
3	Tx/Rx+	4	—
5	—	6	—
7	—	8	—
9	GND	10	5V / 12V

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RS-232 (SER5_6 only)

Pin #	Signal	Pin #	Signal
1	RxD5	2	RTS5
3	TxD5	4	CTS5
5	GND	6	GND
7	RxD6	8	RTS6
9	TxD6	10	CTS6

ccTalk (SER5_6 only)

Pin #	Signal	Pin #	Signal
1	ccTalk_RX5	2	—
3	ccTalk_TX5	4	—
5	GND	6	GND
7	ccTalk_RX6	8	—
9	ccTalk_TX6	10	—

SER1 Mode Switch (SWS1M)

SWS1M (SER1 Mode Select)			
	RS-232 (default)	RS-422	RS-485
1	ON	ON	OFF
2	OFF	ON	ON

Note: See Section 4.3 COM Port (SER1) Mode Selection (SWS1M). Use JPS1P for SER1 power selection.

SER5-6 Mode Select (JPS5M1/ JPS5M2 ; JPS6M1/ JPS6M2)

SER5-6 Mode Select	
RS-232 (default)	ccTalk
1-3	3-5
2-4	4-6

COM Cable (optional):
COM Port Cable (length 250mm), P/N: 30-20876-0000



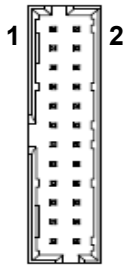
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4.2.8. Front Panel Header

2x12-pin 2.0 pitch standard wafer connector

The front panel connector provides Audio Mic-In / Line Out, ATX power switch, Reset, HDD LED, and SUS LED (System Power LED).

Pin #	Signal	Ioh/ Iol	Type	Note	Pin #	Signal	Type	Ioh/ Iol	Note
1	N/A	-			2	N/A		-	
3	N/A	-			4	N/A		-	
5	N/A	-			6	N/A		-	
7	GND	-	PWR		8	GND	PWR	-	
9	Mute	-	Mute		10	LINE2-L		-	
11	+5V	-	PWR	1	12	+5V	PWR	-	1
13	SATA_LED#	25/25mA	O		14	SUS_LED	O		2
15	GND	-	PWR		16	PWRBTN_IN#	I		
17	RSTIN#	-	I		18	GND	PWR	-	
19	SB3V3	-	PWR		20	LINE2-R		-	
21	AGND	-	PWR		22	AGND	PWR	-	
23	MIC2-L	-	AI		24	MIC2-R	AI	-	



Note 1: Maximum load is 1A.

Note 2: Connect SUS_LED (System Power LED) to the power status indicator on the chassis front panel. The LED is on when the system is operating. The LED keeps blinking when the system is in S1/S3 sleep state. The LED is off when the system is in S4 sleep state or powered off (S5).

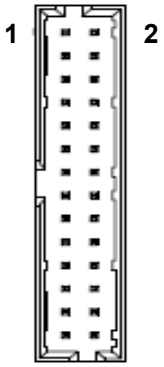
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4.2.9. Feature Header

2x14-pin 2.0 pitch standard wafer connector

The feature connector provides Case Open, I2C, SMBus, and GPIO (10pin).

Signal	Description
TEMPS	Analogue temp sensor, connect to analog input of BMC
EXT_BAT	Connect to RTC power
CASE_OPEN#	Any time case open occurs, system will notice/show case open alert in POST during the next boot.
I2CC / I2CD	Connect to BMC (I2C Master)
I2C	SEMA



Pin #	Signal	Pull U/D	IOH/IOL	Type	Note	Pin #	Signal	Type	IOH/IOL	Pull U/D	Note
1	CASE_OPEN#	PU 2M	-	I		2	SMBC	OT	/4mA	PU 10K	1
3	GND	-	-	PWR		4	SMBD	OT	/4mA	PU 10K	1
5	TEMPS	-		I	2	6	I2CC	OT	-	PU 10K	1
7	EXT_BAT	-		PWR		8	I2CD	OT	-	PU 10K	1
9	SB3V3	-	-	PWR		10	5V	PWR	-	-	
11	GND	-	-	PWR		12	GND	PWR	-	-	
13	GPIO0	-	PU10K3V3	IOT		14	GPIO1	IOT		PU10K3V3	
15	GPIO2	-	PU10K3V3	IOT		16	GPIO3	IOT		PU10K3V3	
17	GPIO4	-	PU10K3V3	IOT		18	GPIO5	IOT		PU10K3V3	
19	GPIO6	-	PU10K3V3	IOT		20	GPIO7	IOT		PU10K3V3	
21	GPIO8		PU10K3V3	IOT		22	GPIO9	IOT		PU10K3V3	
23	GND	-		PWR		24	SUS_S3#	O	25/25mA	-	
25	12V	-	-	PWR		26	SUS_S4#	O	25/25mA	-	
27	PWR_OK	-	25/25mA	O		28	SUS_S5#	O	25/25mA	-	

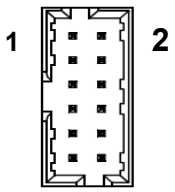
Note 1: Pull-up to +3V3Dual (+3V3 or SB3V3).

Note 2: Input to SEMA.

4.2.10. SPI Header

2x6-pin 2.0 pitch standard wafer connector

Type	Signal	Pin #	Pin #	Signal	Type
	CLK	1	2	SB3V3	PWR
I	CS0#	3	4	ADDIN	IO
I	CS1#	5	6	NC	-
I	MOSI	7	8	ISOLATE	IO
O	MISO	9	10	GND	PWR
IO	SPI_IO2_#WP	11	12	SPI_IO3_#HOLD	IO



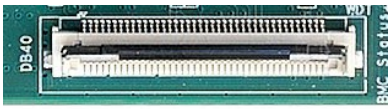
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Signal	Description
CLK	Serial Clock
SB3V3	3.3V Standby Voltage power line. Normally output power, but when Motherboard is turned off then the on-board SPI Flash can be 3.3V power sourced via this pin.
CS0#	CS0# Chip Select 0, active low.
ADDIN	ADDIN input signal must be NC.
MOSI	Master Output, Slave Input
ISOLATE#	The ISOLATE# input, active low, is normally NC, but must be connected to GND when loading SPI flash. Power Supply to the Motherboard must be turned off when loading SPI flash. The pull up resistor is connected via diode to 5VSB.
MISO	Master Input, Slave Output
SPI_IO2_#WP	SPI Data I/O: A bidirectional signal used to support the new Dual IO Fast Read, Quad IO Fast Read and Quad Output Fast Read modes. This signal is not used in Dual Output Fast Read mode.
SPI_IO3_#HOLD	SPI Data I/O: A bidirectional signal used to support the new Dual IO Fast Read, Quad IO Fast Read and Quad Output Fast Read modes. This signal is not used in Dual Output Fast Read mode.

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4.2.11. DB40 Debug Connector

FPC Connector Type: FCI 59GF Flex 10042867



1 40

Pin	Interface	Signal	Remark	Pin	Interface	Signal	Remark
40	SPI Program interface	VCC_SPI_IN	SPI Power Input from flash tool to module. HW need add MOS FET to switch SPI power for SPI ROM	20	BMC Program interface (continued)	TXD6	
39		GND		19		RXD6	
38		SPI_BIOS_CS0#		18		FUMD0	
37		SPI_BIOS_CS1#		17		RESET_IN#	
36		SPI_BIOS_MISO		16		DATA	
35		SPI_BIOS_MOSI		15		CLK	
34		SPI_BIOS_CLK		14		OCD0A	Include a jumper to connect OCD0A via 1K0 pull-up to 3.3V_BMC
33	LPC Bus	3V3_LPC		13		OCD0B	Include a jumper to connect OCD0A via 1K0 pull-up to 3.3V_BMC
32		GND		12	Test points	PWRBTN#	
31		CB_RESET#	Platform Reset	11		SYS_RESET#	
30		RST#		10		CB_RESET#	
29		CLK33_LPC		9		CB_PWROK	
28		LPC_FRAME#		8		SUS_S3#	
27		LPC_AD3		7		SUS_S4#	
26		LPC_AD2		6		SUS_S5#	
25		LPC_AD1		5	BMC Debug signals	POSTWDT_DIS#	Connect to Jumper for Debug
24		LPC_AD0		4		SEL_BIOS	Connect to Jumper for Debug
23	BMC Program interface	3.3V_BMC		3		BIOS_MODE	Connect to Jumper for Debug
22		3.3V_BMC		2		BMC_STATUS	
21		GND		1	Reserved		

Note: The pin description on the Debug Module is the inverse of that on the motherboard.

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4.3. Jumper and Switch Settings

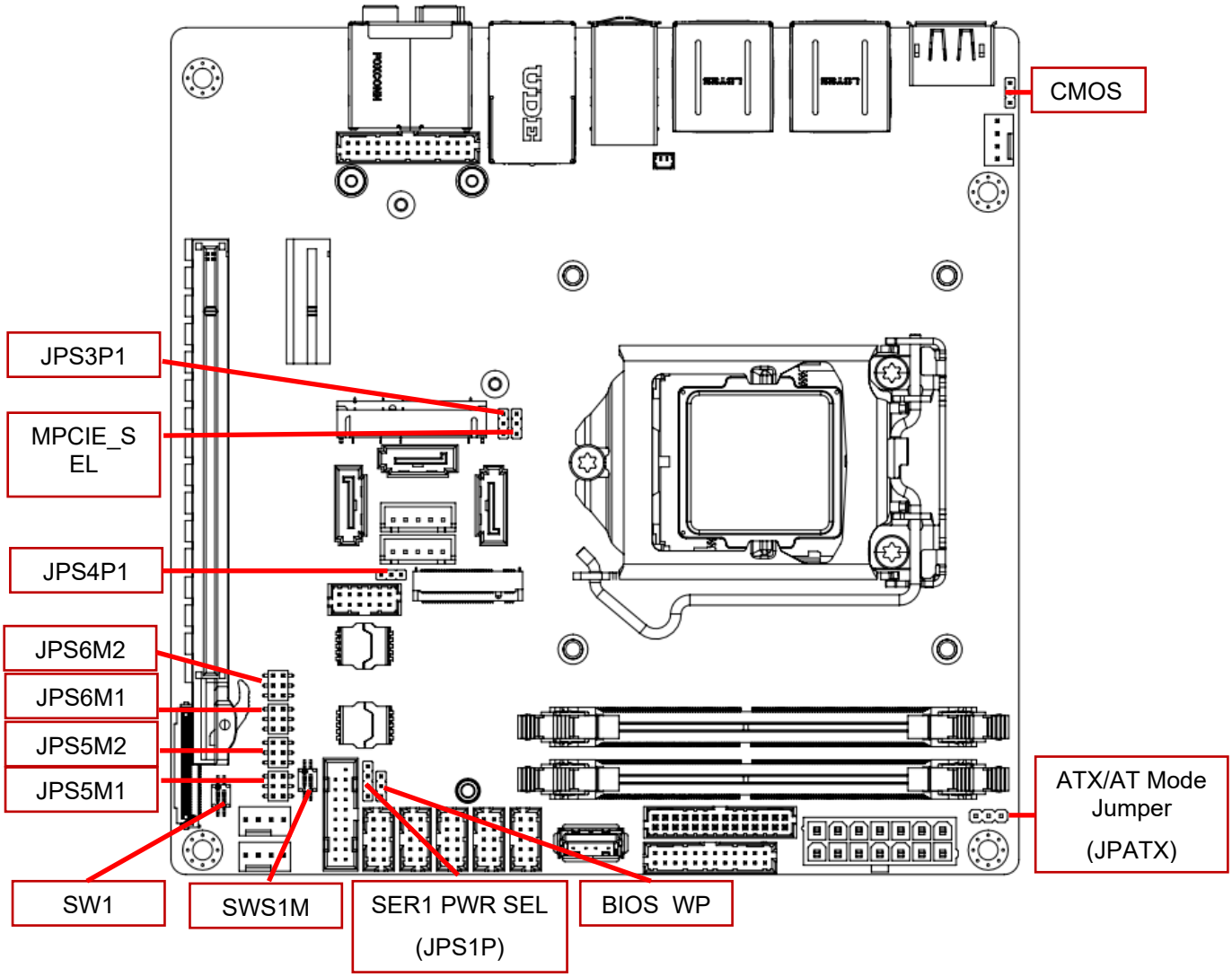


Figure 5: Jumper and Switch Locations

4.3.1. ATX/AT Mode Jumper Selection (JPATX)

JP1	ATX/AT Mode
1-2	ATX (default)
2-3	AT

4.3.2. Clear CMOS (CMOS)

JP6	Clear CMOS
1-2	Normal (default)
2-3	Clear CMOS

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4.3.3. COM Port (SER1) Mode Selection Switch (SWS1M)

SWS1M (SER1 Mode Select)			
	RS-232 (default)	RS-422	RS-485
1	ON	ON	OFF
2	OFF	ON	ON

4.3.4. COM Port (SER1) Power Selection Jumper (JPS1P)

JPS1P	SER1 Power
1-2	5V
2-3	NC (default)
3-4	12V

4.3.5. SER5-6 Mode Select (JPS5M1/ JPS5M2 ; JPS6M1/ JPS6M2)

SER5-6 Mode Select	
RS-232 (default)	ccTalk
1-3	3-5
2-4	4-6

4.3.6. BIOS Switch Setting (SW1)

Fail Safe SPI0 + SPI1 (default)		
	ON	OFF
1	Boot from on board BIOS (Default)	Boot from socket BIOS
2	Normal BIOS Mode	Failsafe BIOS Mode (Default)

Default: 1 ON and 2 OFF (Boot from onboard BIOS and enable failsafe.)

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4.3.7. BIOS Write Protect Selection (BIOS_WP)

BIOS_WP BIOS Write Protect Selection	
1-2	BMC Control(Default)
2-3	Enable

Note: There will be the following limitations with write protect enabled:

A. S3 and S4 will not be supported under OS.

B. IAMT cannot be supported

C. ME version information in the BIOS menu will show “zero”

D. Do not install OS when BIOS Write Protect is enabled.

E. Intel GbE LAN cannot update MAC address

F. User cannot refresh the BIOS.

4.3.8. SATA1 DOM Power Selection (JPS3P1)

JPS3P1 SATA1 DOM Power Selection	
1-2	3.3V
2-3	5V
N/C	Default

4.3.9. SATA2 DOM Power Selection (JPS4P1)

JPS4P1 SATA2 DOM Power Selection	
1-2	3.3V
2-3	5V
N/C	Default

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4.4. Onboard Connector Information

Table 2: AmITX-CF-G Onboard Connector Information

Connector	CN#	Onboard Connector Manufacturer	Part No.	Mating Connector Manufacturer	Part No.	ADLINK Cable
COM Port	SER1-6	JVE	21-65310-2050	YOUNG YAK	YY-1970H-2*5P (PH2.0)	30-20876-0000(optional)
ATX power	ATX_PW	Molex	20-65703-2070	E.C.I	E.C.I 5016H-2*7P (PH4.2)	30-20872-0000(standard)
USB (H310)	USB2	CST	21-65350-0090	YOUNG YAK	YY-1970H-2*5P (PH2.0)	30-20874-1000(optional)
USB (Q370)	USB2	LOTES	21-653A0-2100	ALLPASS Elec	A37-0903-113	30-20963-0000(optional)
SATA Power	ST_PWR1-2	JVE	20-65210-1050	YOUNG YAK	YY-1970H-2*5P (PH2.0)	30-20875-0000(standard)
SATA	SATA1-3	WIN WIN	21-H14A0-0070	N/A	N/A	30-10057-0600(standard)
DB-40	DB1	Molex	61-02603-0400	N/A	N/A	30-30016-0000(optional)
Feature	FEATURE1	JVE	21-65320-2140	JWT	JWT A2005H00-2C*14 (PH2.0)	N/A
Audio	AUD_HEAD1	JVE	21-F2000-0250	JWT	JWT A2005H00-2CX13P (PH2.0)	N/A
Front Panel	FRNTPNL1	JVE	21-65310-2120	YY	YY-1970H-2*12P (PH2.0)	N/A

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5. Driver Installation

Drivers can be downloaded through the following link:

https://www.adlinktech.com/en/Industrial_Motherboards_SBCs_Mini-ITX_Embedded_Boards

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6. Smart Embedded Management Agent (SEMA)

The onboard microcontroller (BMC) implements power sequencing and Smart Embedded Management Agent (SEMA) functionality.

The microcontroller communicates via the System Management Bus with the CPU/chipset. The following functions are implemented.

- Total operating hours counter. Counts the number of hours the module has been run in minutes.
- On-time minutes counter. Counts the seconds since last system start.
- Temperature monitoring of CPU and board temperature. Minimum and maximum temperature values of CPU and board are stored in flash.
- Power cycles counter
- Boot counter. Counts the number of boot attempts.
- Watchdog Timer (Type-II). Set / Reset / Disable Watchdog Timer. Features auto-reload at power-up.
- System Restart Cause. Power loss / BIOS Fail / Watchdog / Internal Reset / External Reset
- Fail-safe BIOS support. In case of a boot failure, hardware signals tell external logic to boot from fail-safe BIOS.
- Flash area. 1kB Flash area for customer data
- 128 Bytes Protected Flash area. Keys, IDs, etc. can be stored in a write- and clear-protectable region.
- Board Identify. Vendor / Board / Serial number / Production Date
- Main-current & voltage. Monitors drawn current and main voltages

For a detailed description of SEMA features and functionality, please refer to the **SEMA Technical Manual** and **SEMA Software Manual**, downloadable on the ADLINK web site: www.adlinktech.com.

6.1. Board Specific SEMA Functions

6.1.1. Voltages

The BMC implements a voltage monitor and samples several onboard voltages. The voltages can be read by calling the SEMA function “Get Voltages”. The function returns a 16-bit value divided into high-byte (MSB) and low-byte (LSB).

Table 3: SEMA Onboard Voltage Monitor

ADC Channel	Voltage Name
0	N/A
1	VIN
2	5VSB
3	RTC

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6.1.2. Main Current

The BMC implements a current monitor. The current can be read by calling the SEMA function “Get Main Current”. The function returns four 16-bit values divided in high-byte (MSB) and low-byte (LSB). These 4 values represent the last 4 currents drawn by the board. The values are sampled every 250ms. The order of the 4 values is NOT in chronological order. Access by the BMC may increase the drawn current of the whole system. In this case, there are still 3 samples not influenced by the read access.

$$\text{Main Current} = (\text{MSB_n} << 8 + \text{LSB_n}) \times 8.06\text{mA}$$

6.1.3. BMC Status

This register shows the status of BMC controlled signals on the AmITX-CF-G.

Table 4: SEMA BMC Status

Status Bit	Signal
0	WDT_OUT
3	BIOS_MODE
4	POSTWDT_DISn
5	SEL_BIOS
6	BMC_SPI0_WPn

6.1.4. Exception Codes

In case of an error, the BMC drives a blinking code on the blue Status LED (LED1). The same error code is also reported by the BMC Flags register. The Exception Code is not stored in the Flash Storage and is cleared when the power is removed. Therefore, a “Clear Exception Code” command is not needed or supported.

Table 5: SEMA Exception Codes

Exception Code	Error Message
0	NOERROR
2	NO_SUSCLK
3	NO_SLP_S5
4	NO_RSMRST
5	NO_SLP_S3
6	BIOS_FAIL
7	PLTRST_FAIL
8	NO_SYS_PWRGD
9	NO_VCORE_PWRGD
10	CRITICAL_TEMP
11	NO_VIN
12	NO_V5SBY
13	NO_VRTC

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6.1.5. BMC Flags

The BMC Flags register returns the last detected Exception Code since power-up and shows the BIOS in use and the power mode.

Table 6: SEMA BMC Flags

Bit	Description
[0 ~ 4]	Exception Code
[6]	0 = AT mode 1 = ATX mode
[7]	0 = Standard BIOS 1 = Fail-safe BIOS.

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7. System Resources

7.1. System Memory Map

Table 7: System Memory Map

Address Range (decimal)	Address Range (hex)	Size	Description
(4GB-2MB)	FFE00000 – FFFFFFFF	2 MB	High BIOS Area
(4GB-18MB) – (4GB-17MB-1)	FEE00000 – FEEFFFFF	1 MB	MSI Interrupts
(4GB-20MB) – (4GB-19MB-1)	FEC00000 – FECFFFFF	1 MB	APIC Configuration Space
15MB – 16MB	F00000 – FFFFFF	1 MB	ISA Hole
1MB -15MB	100000 - EFFFFF	14MB	Main Memory
0K –1MB	00000 – FFFFFF	1MB	DOS Compatibility Memory

7.2. I/O Map

Table 8: I/O Map

Hex Range	Device
020h – 02Dh & 030h – 03Dh	Interrupt controller 1, 8259 equivalent
02Eh – 02Fh	Motherboard resource
040h – 043h & 050h – 053h	System Timer
04Eh – 04Fh	Super IO
060h, 062h, 064h, 066h, 068h – 06Fh	8042 equivalent (keyboard)
061h, 063h, 065h, 067h	NMI control and status
070h – 077h	Real Time Clock Controller (bit 7 – NMI mask)
092h	Reset(Bit 0)/Fast Gate A20 (Bit 1)
0A0h – 0B1h & 0B4h – 0BDh	Interrupt Controller 2, 8259 equivalent
0B2h and 0B3h	APM control and status port respectively
0E0h – 0EFh	Available
0F0h	Co-processor error register
2E0h – 2E7h	Serial Port 6
2E8h – 2EFh	Serial Port 4
2F8h – 2FFh	Serial Port 2
3E0h – 3E7h	Serial Port 5
3E8h – 3EFh	Serial Port 3
3F8h – 3FFh	Serial Port 1
378h – 37Fh	Available

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Hex Range	Device
380h – 3AFh	Available
4D0h	Master PIC Edge/Level Trigger register
4D1h	Slave PIC Edge/Level Trigger register
0A00h – 0A2Fh	Reserved for SIO functions base address (ex: PME/GPIO etc.)
0CF8h – 0CFBh	PCI configuration address register (32bit I/O only)
0CF9h	Reset Controller register (8 bit I/O)
0CFCh – 0CFFh	PCI configuration data register
1C00h	GPIO Base Address for SB
1800h	PM (ACPI) Base Address for SB
1860h	Alias for ICH TCO base address
0D000h – 0EFFFh	PCIe Root Port
0F000h – 0F03Fh	VGA
0F040h – 0F05Fh	SMBus controller
0F060h – 0F07Fh	SATA controller

7.3. Interrupt Request (IRQ) Lines

7.3.1. IRQ Lines PIC Mode

Table 9: IRQ Lines PIC Mode

IRQ#	Typical Interrupt Resource	Connected to Pin	Available
0	Counter 0	N/A	No
1	Keyboard controller	N/A	No
2	Cascade interrupt from slave PIC	N/A	No
3	Serial Port 2 (COM2)	IRQ3 via SERIRQ / PIRQ	Note (1)
4	Serial Port 1 (COM1)	IRQ4 via SERIRQ / PIRQ	Note (1)
5	Generic	N/A	No
6	Serial Port 3~6 (COM3~6)	IRQ6 via SERIRQ / PIRQ	Note (1)
7	Generic	N/A	No
8	Real-time clock	N/A	No
9	Generic	N/A	No
10	Generic	N/A	No
11	Generic	N/A	No
12	PS/2 Mouse	IRQ12 via SERIRQ/PIRQ	No

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IRQ#	Typical Interrupt Resource	Connected to Pin	Available
13	Math Processor	N/A	No
14	Generic	N/A	No
15	Intel SD Host Controller	N/A	Note

Note (1): These IRQs can be used for PCI devices when onboard device is disabled.

7.3.2. IRQ Lines APIC Mode

Table 10: IRQ Lines APIC Mode

IRQ#	Typical Interrupt Resource	Connected to Pin	Available
0	Counter 0	N/A	No
1	Keyboard Controller	N/A	No
2	Cascade Interrupt from slave PIC	N/A	No
3	Serial Port 2 (COM2)	IRQ3 via SERIRQ/PIRQ	No
4	Serial Port 1 (COM1)	IRQ4 via SERIRQ/PIRQ	No
5	Serial Port 3 (COM3)	IRQ5 via SERIRQ/PIRQ	No
6	Serial Port 5 (COM5)	IRQ6 via SERIRQ/PIRQ	No
7	Serial Port 4 (COM4)	IRQ7 via SERIRQ/PIRQ	No
8	Real-Time Clock	N/A	No
9	Generic	N/A	No
10	Serial Port 6 (COM6)	IRQ10 via SERIRQ/PIRQ	No
11	N/A	IRQ11 via SERIRQ/PIRQ	No
12	PS/2 Mouse	IRQ12 via SERIRQ/PIRQ	No
13	Math Processor	N/A	No
14	Generic	N/A	No
15	Intel SD Host Controller	N/A	No
16-511	Microsoft ACPI-Compliant System	N/A	Yes

Note (1): These IRQs can be used for PCI devices when onboard device is disabled.

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7.4. PCI Configuration Space Map

Table 11: PCI Configuration Space Map

Bus Number	Device Number	Function Number	Routing	Description
00h	00h	00h	N/A	Intel Host Bridge
00h	01h	00h	N/A	Intel PEG port
00h	02h	00h	Internal	Intel I.G.D.
00h	08h	00h	Internal	System device
00h	14h	00h	Internal	xHCI Controller
00h	14h	02h	Internal	Data Acquisition
00h	16h	00h	Internal	Intel Management Engine Interface #1
00h	17h	00h	Internal	Intel AHCI controller
00h	1Ch	00h	Internal	Intel PCI Express Root port 1
00h	1Ch	06h	Internal	Intel PCI Express Root port 7
00h	1Ch	07h	Internal	Intel PCI Express Root port 8
00h	1Fh	00h	Internal	Intel ISA Bridge
00h	1Fh	03h	Internal	Intel Multimedia
00h	1Fh	04h	Internal	Intel SMBUS
00h	1Fh	05h	Internal	SPI (flash) Controller
01h(Note 1)	00h	00h	Internal	Intel PEG Slot
02h(Note 1)	00h	00h	Internal	Realtek Ethernet controller
03h(Note 1)	00h	00h	Internal	Realtek Ethernet controller

Note (1): The bus number will be changed if the PEG/PCIE port has device.

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7.5. PCI Interrupt Routing Map

Table 12: PCI Interrupt Routing Map

INT Line	P.E.G Root Port	Intel PEG port	Intel I.G.D.	System device	xHCI Controller	Data Acquisition
Int0	INTA:16	INTA:16	INTA:16	INTA:16	INTA:16	INTA:16
Int1	INTB:17	INTB:17	INTB:17	INTB:17	INTB:17	INTB:17
Int2	INTC:18	INTC:18	INTC:18	INTC:18	INTC:18	INTC:18
Int3	INTD:19	INTD:19	INTD:19	INTD:19	INTD:19	INTD:19

INT Line	Intel ME Controller	Intel AHCI controller	PCIE port 1	PCIE port 7	PCIE port 8	ISA Bridge
Int0	INTA:16	INTB:17	INTA:16	INTC:18	INTD:19	INTA:16
Int1	INTB:17	INTC:18	INTB:17	INTD:19	INTA:16	INTB:17
Int2	INTC:18	INTD:19	INTC:18	INTA:16	INTB:17	INTC:18
Int3	INTD:19	INTA:16	INTD:19	INTB:17	INTC:18	INTD:19

INT Line	Memory controller	Multimedia	SMBus Controller	Intel Ethernet controller	PEG Slot
Int0	INTA:16	INTA:16	INTA:16	INTA:16	INTA:16
Int1	INTB:17	INTB:17	INTB:17	INTB:17	INTB:17
Int2	INTC:18	INTC:18	INTC:18	INTC:18	INTC:18
Int3	INTD:19	INTD:19	INTD:19	INTD:19	INTD:19

INT Line	Realtek Ethernet Controller	Realtek Ethernet Controller
Int0	INTB:17	INTC:18
Int1	INTC:18	INTD:19
Int2	INTD:19	INTA:16
Int3	INTA:16	INTB:17

7.6. SMBus Slave Address

Table 13: SMBus Slave Address

Device	Address
DIMM A	A0h
DIMM B	A4h
BMC	50h

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8. BIOS Setup

The AmITX-CF-G is provided with a pre-installed AMI EFI BIOS firmware configurable via a setup utility that is invoked during the BIOS boot phase. The BIOS configuration is stored in the NVRAM part of the SPI Flash chip. All settings will remain valid after the system is powered down. The following sections describe the BIOS setup menu and the setting options for each menu item.

8.1. BIOS Setup Menu

The BIOS setup utility is invoked by pressing the <ESC> or <DEL> key. Users can change the BIOS settings when the setup utility runs. A reset of the system is required in order for the new settings to take effect.

8.1.1. Hot Keys

In the BIOS setup utility, there are several hot keys designed for specific purposes. The hot keys are listed below:

- <F1>: General help in setup menu
- <F8>: Load previous BIOS values
- <F9>: Load BIOS default in setup utility
- <F10>: Save & Exit setup utility

8.1.2. Menu Selection Bar

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

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

8.1.3. Menu Conventions

The appearance of the setup menu is a sample to describe the item list. It is shown on the VT100 terminal via serial console. The followings are the menu conventions.

- **Using color**
  The mandatory BIOS setup fields are in black. The BIOS setup fields currently not used are in grey. The display-only strings are in black.

- **Using brackets**
  Editable menu options are marked with squares '[' and ']' to distinguish them from display-only fields that cannot be modified.

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8.2. 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 ▪ System Information ▪ Board Information ▶ ▪ System Date ▪ System Time ▪ Access Level	▪ CPU Configuration ▶ ▪ Power Management ▶ ▪ System Management ▶ ▪ Thermal Management ▶ ▪ Watchdog Timer ▶ ▪ Super IO Configuration ▶ ▪ Serial Console Redirection ▶ ▪ Hardware Monitor ▶ ▪ TPM 2.0 Configuration ▶ ▪ S5 RTC Wake Settings ▶ ▪ NVMe Configuration ▶ ▪ LAN Configuration ▶ ▪ USB Configuration ▶ ▪ Miscellaneous ▶ ▪ Network Stack Configuration ▶ ▪ Realtek PCIe GBE Family Controller (MAC address1) ▶ ▪ Realtek PCIe GBE Family Controller (MAC address2) ▶	▪ System Agent (SA) Configuration ▶ ▪ PCH-IO Configuration ▶	▪ Password Description ▪ Administrator Password ▪ User Password ▪ Secure Boot menu ▶	▪ Boot Config-uration ▶ ▪ Setup Prompt Timeout ▪ Bootup NumLock State ▪ Quiet Boot ▪ Fast Boot ▪ Boot Option ▶ ▪ Boot Option #1 ▪ Boot Option #2 ▪ Boot Option #3 ▪ Boot Option #4 ▪ Boot Option #5 ▪ Boot Option #6 ▪ Boot Option #7 ▪ Boot Option #8	▪ Save Changes and Exit ▪ Discard Changes and Exit ▪ Save Changes and Reset ▪ Discard Charges and Reset ▪ Save Options ▶ ▪ Save Changes ▪ Discard Changes ▪ Restore Defautles ▪ Save as User Defaults ▪ Restore User Defaults ▪ Boot Override ▶ ▪ Launch EFI shell from filesystem device

Note: ▶ indicates a submenu.
Gray text indicates info only.

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8.3. Main Menu

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.

8.3.1. Main

Feature	Options	Description
BIOS Information	Info only	
System Information	Info only	
Board Information ►	Submenu	Display board information
Board Information	Info only	
System Date	Weekday, MM/DD/YYYY	Requires the alpha-numeric entry of the day of the week, day of the month, calendar month, and all 4 digits of the year, indicating the century and year (Fri XX/XX/20XX)
System Time	HH/MM/SS	Presented as a 24-hour clock setting in hours, minutes, and seconds
Access Level	Info Only	BIOS setup utility access level

8.4. Advanced

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

8.4.1. Advanced > CPU Configuration

Feature	Options	Description
CPU Configuration ►	Submenu	CPU Configuration
CPU Configuration	Info only	
Active Processor Core	**All** 1 2 3	Number of cores to enable in each processor package.
Intel (VMX) Virtualization Technology	Disabled **Enabled**	When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.
Intel Trusted Execution Technology	**Disabled** Enabled	Enables utilization of additional hardware capabilities provided by Intel (R) Trusted Execution Technology.
Intel(R) SpeedStep(tm)	Disabled **Enabled**	Allows more than two frequency ranges to be supported.
Intel(R) Speed Shift Technology	Disabled **Enabled**	Enable/Disable Intel(R) Speed Shift Technology support. Enabling will expose the CPPC v2 interface to allow for hardware controlled P-states.
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.

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Feature	Options	Description
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.

8.4.2. Advanced > Power Management

Feature	Options	Description
Power Management ►	Submenu	Power Management
Enable ACPI Auto Configuration	**Disabled** Enabled	Enables or Disables BIOS ACPI Auto Configuration.
Enable Hibernation	Disabled **Enabled**	Enables 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.
Restore On AC Power Loss	**Power On** Power Off Last State	Select AC power state when power is re-applied after a power failure.
Emulate AT Mode	Emulate AT **ATX**	Select Emulate AT or ATX function. If this option is set to [Emulation AT], BIOS will report no suspend functions (S3 & S4) to ACPI OS. In Windows XP, it will make OS show a shutdown message during system shutdown. ATX: OS will turn off system power when shut down.
ECO Mode	**Disabled** Enabled	Reduces the power consumption of the system, but after a shut down, you have to wait at least 5 seconds before you can restart the system.

8.4.3. Advanced > System Management

Feature	Options	Description
System Management ►	Submenu	Display System Management
System Management	Info only	
SEMA Features ►	Submenu	Display SEMA Features
SEMA Features:	Info only	
Flags ►	Submenu	Display Flags
BMC Flags	Info only	

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8.4.4. Advanced > Thermal Management

Feature	Options	Description
Thermal Management ►	Submenu	Thermal Management
CPU Temperature	Info only	
Board Temperatures	Info only	
CPU Fan Speed	Info only	Display CPU fan speed
System Fan1 Speed	Info only	Display system fan 1 speed
System Fan2 Speed	Info only	Display system fan 2 speed
Smart Fan ►	Submenu	Smart Fan
CPU Smart Fan Temperature Source	**CPU Sensor** Board Sensor	CPU Smart FanTemperature Source
CPU Fan Mode	**AUTO (Smart Fan)** Fan Off Fan On	CPU Fan Mode
System Smart Fan1Temperature Source	**CPU Sensor** Board Sensor	System Smart Fan1Temperature Source
System Fan1 Mode	**AUTO (Smart Fan)** Fan Off Fan On	System Fan1 Mode
System Smart Fan2Temperature Source	CPU Sensor **Board Sensor**	System Smart Fan2Temperature Source
System Fan2 Mode	**AUTO (Smart Fan)** Fan Off Fan On	System Fan2 Mode
Critical Trip Point	**Disabled** 80 C 90 C 95 C	This value is the temperature threshold of the Critical Trip Point.
Passive Cooling Trip Point	**Disabled** 70 C 80 C 90 C	This value is the temperature threshold of the Passive Cooling Trip Point.

8.4.5. Advanced > Watchdog Timer

Feature	Options	Description
Watchdog Timer ►	Submenu	Watchdog Timer
Power-Up Watchdog ATTENTION: Pressing F12 during start up disables the Power Up Watchdog.	**Disabled** Enabled	The Power Up Watchdog resets the system after a certain amount of time after power-up.
RunTime Watchdog	**Disabled** Enabled	The RunTime Watchdog resets the system after a certain amount of time after power-up.

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8.4.6. Advanced > Super IO Configuration

Feature	Options	Description
Super IO Configuration ►	Submenu	Super IO Configuration
COM1 Device Settings COM1 Control	Info only	IO Address & IRQ Info COM mode
COM2 Device Settings	Info only	IO Address & IRQ Info
COM3 Device Settings	Info only	IO Address & IRQ Info
COM4 Device Settings	Info only	IO Address & IRQ Info
COM5 Device Settings	Info only	IO Address & IRQ Info
COM6 Device Settings	Info only	IO Address & IRQ Info

Note: COM1-6 in BIOS correspond to the serial ports SER1-6 on the AmITX-CF-G board.

8.4.7. Advanced > Serial Console Redirection

Feature	Options	Description
Serial Console Redirection ►	Submenu	Serial Console Redirection
COM1	Info only	
Console Redirection	**Disabled** Enabled	Console Redirection Enable or Disable.
Console Redirection Settings ►	Submenu (see Section 8.4.7.1)	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.
COM2	Info only	
Console Redirection	**Disabled** Enabled	Console Redirection Enable or Disable.
Console Redirection Settings ►	Submenu (see Section 8.4.7.1)	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.
COM3	Info only	
Console Redirection	**Disabled** Enabled	Console Redirection Enable or Disable.
Console Redirection Settings ►	Submenu (see Section 8.4.7.1)	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.
COM4	Info only	
Console Redirection	**Disabled** Enabled	Console Redirection Enable or Disable.
Console Redirection Settings ►	Submenu (see Section 8.4.7.1)	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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Feature	Options	Description
Serial Console Redirection ►	Submenu	Serial Console Redirection
COM5	Info only	
Console Redirection	**Disabled** Enabled	Console Redirection Enable or Disable.
Console Redirection Settings ►	Submenu (see Section 8.4.7.1)	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.
COM6	Info only	
Console Redirection	**Disabled** Enabled	Console Redirection Enable or Disable.
Console Redirection Settings ►	Submenu (see Section 8.4.7.1)	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.

8.4.7.1. Advanced > Serial Console Redirection > Console Redirection Settings COM[1-6]

Feature	Options	Description
COM[1-6] Console Redirection Settings	Info only	
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. Even: parity bit is 0 if the num of 1's in the data bits is even. Odd: parity bit is 0 if num of 1's in the data bits is odd. Mark: parity bit is always 1. Space: Parity bit is always 0. Mark and Space Parity do not allow for error detection
Stop Bits	**1** 2	Stop bits indicate the end of a serial data packet. (A start bit indicates the beginning). The standard setting is 1 stop bit. Communication with slow devices may require more than 1 stop bit.
Flow Control	**None** Hardware RTS/CTS	Flow control can prevent data loss from buffer overflow. When sending data, if the receiving buffers are full, a 'stop' signal can be sent to stop the data flow. Once the buffers are empty, a 'start' signal can be sent to re-start the flow. Hardware flow control uses two wires to send start/stop signals.

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Feature	Options	Description
VT-UTF8 Combo Key Support	Disabled **Enabled**	Enable VT-UTF8 Combination Key Support for ANSI/VT100 terminals
Recorder Mode	**Disabled** Enabled	With this mode enabled only text will be sent. This is to capture Terminal data.
Resolution 100x31	**Disabled** Enabled	Enables or disables extended terminal resolution
Putty KeyPad	**VT100** LINUX XTERMR6 SCO ESCN VT400	Select FunctionKey and KeyPad on Putty.

8.4.8. Advanced > Hardware Monitor

Feature	Options	Description
Hardware Monitor ►	Submenu	Hardware Monitor
Power Consumption	Info only	

8.4.9. Advanced > TPM 2.0 Configuration

Feature	Options	Description
TPM 2.0 Configuration ►	Submenu	TPM 2.0 Configuration
TPM 2.0 Configuration	Info only	
TPM20 Device Found	Info only	
Firmware Version:	Info only	
Vendor:	Info only	
Security Device Support	Disabled **Enabled**	Enable or Disable BIOS support for security device. O.S. will not show Security Device. TCG EFI protocol and INT1A interface will not be available.
Active PCR banks	Info only	
Available PCR banks	Info only	
SHA-1 PCR Bank	Disabled **Enabled**	Enable or Disable SHA-1 PCR Bank
SHA256 PCR Bank	Disabled **Enabled**	Enable or Disable SHA256 PCR Bank
Pending operation	**None** TPM Clear	Schedule an Operation for the Security Device. NOTE: Your Computer will reboot during restart in order to change State of Security Device.
Platform Hierarchy	**Enabled** Disabled	Enable or Disable Platform Hierarchy

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Feature	Options	Description
Storage Hierarchy	**Enabled** Disabled	Enable or Disable Storage Hierarchy
Endorsement Hierarchy	**Enabled** Disabled	Enable or Disable Endorsement Hierarchy
TPM2.0 UEFI Spec Version	TCG_1_2 **TCG_2**	Select the TCG2 Spec Version Support, TCG_1_2: the Compatible mode for Win8/Win10, TCG_2: Support for new TCG2 protocol and event format for Win10 or later
Physical Presence Spec Version	1.2 **1.3**	Select to Tell O.S. to support PPI Spec Version 1.2 or 1.3. Note some HCK tests might not support 1.3
PH Randomization	Disabled **Enabled**	Enables or Disables Platform Hierarchy randomization. DO NOT ENABLE THIS QUESTION IN PRODUCTION PLATFORMS. THIS IS FOR DEVELOPMENT TESTING. OVERRIDE ChangePlatformAuth ELINK for production platforms supporting TXT.

8.4.10. Advanced > S5 RTC Wake Settings

Feature	Options	Description
S5 RTC Wake Settings ►	Submenu	S5 RTC Wake Settings
RTC Wake system from S5	**Disabled** Fixed Time Dynamic Time	Enable or disable System wake on alarm event. FixedTime: system will wake on the hr::min::sec specified. DynamicTime: system will wake on the current time + Increase minute(s)

8.4.11. Advanced > NVMe Configuration

Feature	Options	Description
NVMe Configuration ►	Submenu	NVMe Configuration
NVMe Configuration	Info only	

8.4.12. Advanced > LAN Configuration

Feature	Options	Description
LAN Configuration ►	Submenu	LAN Configuration
LAN Configuration	Info only	
LAN1 Enable	Disabled **Enabled**	Enable or Disable LAN1
LAN2 Enable	Disabled **Enabled**	Enable or Disable LAN2
LAN Wake	Disabled **Enabled**	Enable or Disable LAN Wake function

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8.4.13. Advanced > USB Configuration

Feature	Options	Description
USB Configuration ►	Submenu	USB Configuration
USB Configuration	Info only	
USB Module version	Info only	
USB Controllers:	Info only	
USB Devices:	Info only	
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	**Enabled** Disabled	Enable/Disable USB Mass Storage Driver Support.
USB hardware delays and time-outs:	Info only	
USB transfer time-out	1 sec 5 sec 10 sec **20 sec**	The time-out value for Control, Bulk, and Interrupt transfers.
Device reset time-out	10 sec **20 sec** 30 sec 40 sec	USB mass storage device Start Unit command time-out.
Device power-up delay	**Auto** Manual	Maximum time the device will take before it properly reports itself to the Host Controller. 'Auto' uses default value: for a Root port it is 100 ms, for a Hub port the delay is taken from Hub descriptor.

8.4.14. Advanced > Miscellaneous

Feature	Options	Description
Miscellaneous ►	Submenu	Miscellaneous
Miscellaneous	Info only	
SPI ROM WP ►	Submenu	SPI ROM Write Protection
SPI ROM Write Protect	**Disabled** Enabled	Enable/Disable SPI ROM Write Protect
Chassis Intrusion Support	**Disabled** Enabled	Enable or Disable Chassis Intrusion Support

8.4.15. Advanced > Network Stack Configuration

Feature	Options	Description
Network Stack Configuration ►	Submenu	Network Stack Configuration
Network Stack	**Disabled** Enabled	Enable/Disable UEFI Network Stack

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8.4.16. Advanced > Realtek PCIe GBE Family Controller (MAC address1)

Feature	Options	Description
Realtek PCIe GBE Family Controller (MAC address1) ►	Submenu	Realtek PCIe GBE Family Controller (MAC address1)
Driver Information	Info only	
Device Information	Info only	
Patent Information	Info only	

8.4.17. Advanced > Realtek PCIe GBE Family Controller (MAC address2)

Feature	Options	Description
Realtek PCIe GBE Family Controller (MAC address2) ►	Submenu	Realtek PCIe GBE Family Controller (MAC address2)
Driver Information	Info only	
Device Information	Info only	
Patent Information	Info only	

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8.5. Chipset

8.5.1. Chipset > System Agent (SA) Configuration

Feature	Options	Description
System Agent (SA) Configuration ►	Submenu	System Agent (SA) Configuration
System Agent (SA) Configuration	Info only	
SA PCIe Code Version	Info only	
VT-d	Info only	
Memory Configuration ►	Submenu	Memory Configuration parameters
Memory Configuration	Info only	
Max TOLUD	**Dynamic** 1 GB 1.25 GB 1.5 GB 1.75 GB 2 GB 2.25 GB 2.5 GB 2.75 GB 3 GB 3.25 GB 3.5 GB	Maximum Value of TOLUD. Dynamic assignment would adjust TOLUD automatically based on largest MMIO length of installed graphics controller.
MRC Fast Boot	Disabled **Enabled**	Enable/Disable fast path through the MRC
Memory Remap	Disabled **Enabled**	Enable/Disable Memory Remap above 4GB
Memory Thermal Management	**Disabled** Enabled	Enable/Disable Memory Thermal Management
SPD Write Protect	Disabled **Enabled**	Enable/Disable setting SPD Write Protect. For security recommendations, SPD write disable bit must be set.
Graphics Configuration ►	Submenu	Graphics Configuration
Graphics Configuration	Info only	
Primary Display	Auto **IGFX** PEG	Select which of IGFX/PEG/PCI Graphics device should be Primary Display or select SG for Switchable Gfx.
Internal Graphics	Auto Disabled **Enabled**	Keep IGFX enabled based on the setup options.
GTT Size	2MB 4MB **8MB**	Select the GTT Size
DVMT Total Gfx Mem	128M **256M** MAX	Select DVMT5.0 Total Graphic Memory size used by the Internal Graphics Device.
PEG Port Configuration ►	Submenu	PEG Port Options

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Feature	Options	Description
PEG Port Configuration	Info only	
VT-d	Disabled **Enabled**	Enable or Disable VT-d capability
Above 4GB MMIO BIOS assignment	**Disabled** Enabled	Enable or disable above 4GB MemoryMappedIO BIOS assignment This is enabled automatically when Aperture Size is set to 2048MB.

8.5.2. Chipset > PCH-IO Configuration

Feature	Options	Description
PCH-IO Configuration ►	Submenu	
PCH-IO Configuration	Info only	
PCI Express Configuration ►	Submenu	PCI Express Configuration settings
PCI Express Configuration	Info only	
PCI Express Clock Gating	Disabled **Enabled**	PCI Express Clock Gating Enable/Disable for each root port.
Pcie Pll SSC	**Auto** 0.0% 0.1% 0.2% 0.3% 0.4% 0.5% 0.6% 0.7% 0.8% 0.9% 1.0% 1.1% 1.2% 1.3% 1.4% 1.5% 1.6% 1.7% 1.8% 1.9% 2.0%	Pcie Pll SSC percentage. AUTO - Keep hw default, no BIOS override. Range is 0.0%-2.0%.
SATA Configuration ►	Submenu	SATA Device Options Settings
SATA Configuration	Info only	
SATA Controller(s)	Disabled **Enabled**	Enable/Disable SATA Device
SATA Mode Selection	**AHCI** Intel RST Premium With Intel Optane System Acceleration	Determines how SATA controller(s) operate

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Feature	Options	Description
SATA Controller Speed	**Default** Gen1 Gen2 Gen3	Indicates the maximum speed the SATA controller can support.
Serial ATA Port 0	Info only	
Port 0	Disabled **Enabled**	Enable or Disable SATA Port
Hot Plug	**Disabled** Enabled	Designates this port as Hot Pluggable.
Serial ATA Port 1	Info only	
Port 1	Disabled **Enabled**	Enable or Disable SATA Port
Hot Plug	**Disabled** Enabled	Designates this port as Hot Pluggable.
Serial ATA Port 2	Info only	
Port 2	Disabled **Enabled**	Enable or Disable SATA Port
Hot Plug	**Disabled** Enabled	Designates this port as Hot Pluggable.
Serial ATA Port 3	Info only	
Port 3	Disabled **Enabled**	Enable or Disable SATA Port
Serial ATA Port 4	Info only	
Port 4	Disabled **Enabled**	Enable or Disable SATA Port
USB Configuration ►	Submenu	USB Configuration settings
USB Configuration	Info only	
USB Port Disable Override	**Disable Link** Select Per-Pin	Selectively Enable/Disable the corresponding USB port from reporting a Device Connection to the controller.
Security Configuration ►	Submenu	Security Configuration settings
Security Configuration	Info only	
RTC Lock	Disabled **Enabled**	Enable will lock bytes 38h-3Fh in the lower/upper 128-byte bank of RTC RAM.
BIOS Lock	**Disabled** Enabled	Enable/Disable the PCH BIOS Lock Enable feature. Required to be enabled to ensure SMM protection of flash.
HD Audio Configuration ►	Submenu	HD Audio Subsystem Configuration Settings
HD Audio Subsystem Configuration Setting	Info only	
HD Audio	Disabled **Enabled**	Control Detection of the HD-Audio device Disabled = HDA will be unconditionally disabled Enabled = HDA will be unconditionally enabled.

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Feature	Options	Description
Audio Output Selection	AD7.1 for Audio Jack **AD5.1 for Audio Jack**	AD7.1 or AD5.1 for Audio Jack

8.6. Security

Feature	Options	Description
Password Description	Info only	
Administrator Password	Enter password	
User Password	Enter password	
Secure Boot menu ►	Submenu	Secure Boot configuration
Secure Boot	Info only	
System Mode	Info only	
Secure Boot	Info only	
Secure Boot Control	**Disabled** Enabled	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.

8.7. Boot

Feature	Options	Description
Boot Configuration ►	Info only	
Setup Prompt Timeout	Input Range 1~15	Number of seconds to wait for setup activation key. The maximum value is 15.
Bootup NumLock State	On **Off**	Select the keyboard NumLock state.
Quiet Boot	Disabled **Enabled**	Enable or disables Quiet Boot option.
Fast Boot	**Disabled** Enabled	Enables or disables boot with initialization of a minimal set of devices required to launch active boot option. Has no effect for BBS boot options.
Boot Option ►	Info only	
Boot Option #1	**Hard Disk** CD/DVD USB Hard Disk USB CD/DVD USB Key USB Floppy USB Lan Network Disabled	Sets the system boot order

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Feature	Options	Description
Boot Option #2	Hard Disk **CD/DVD** USB Hard Disk USB CD/DVD USB Key USB Floppy USB Lan Network Disabled	Sets the system boot order
Boot Option #3	Hard Disk CD/DVD **USB Hard Disk** USB CD/DVD USB Key USB Floppy USB Lan Network Disabled	Sets the system boot order
Boot Option #4	Hard Disk CD/DVD USB Hard Disk **USB CD/DVD** USB Key USB Floppy USB Lan Network Disabled	Sets the system boot order
Boot Option #5	Hard Disk CD/DVD USB Hard Disk USB CD/DVD **USB Key** USB Floppy USB Lan Network Disabled	Sets the system boot order
Boot Option #6	Hard Disk CD/DVD USB Hard Disk USB CD/DVD USB Ke USB Floppy USB Lan Network Disabled	Sets the system boot order

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Feature	Options	Description
Boot Option #7	Hard Disk CD/DVD USB Hard Disk USB CD/DVD USB Key **USB Floppy** USB Lan Network Disabled	Sets the system boot order
Boot Option #8	Hard Disk CD/DVD USB Hard Disk USB CD/DVD USB Key USB Floppy **USB Lan** Network Disabled	Sets the system boot order

8.8. Save & Exit

Feature	Options	Description
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.
Discard Changes and Reset	Yes No	Reset system setup without saving any changes.
Save Options ►	Info only	
Save Changes	Yes No	Save Changes done so far to any of the setup options.
Discard Changes	Yes No	Discard Changes done so far to any of the setup options.
Restore Defaults	Yes No	Restore/Load Default values for all the setup options.
Save as User Defaults	Yes No	Save the changes done so far as User Defaults.
Restore User Defaults	Yes No	Restore the User Defaults to all the setup options.
Boot Override ►	Info only	
Launch EFI Shell from filesystem device	Enter	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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