USER'S MANUAL

PICO318/319

Intel® Pentium® N4200/ Celeron®
N3350/ Atom® x5-E3940 Processor
Pico-ITX Board

User's Manual

AXIOMTEK

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CAUTION

If you replace wrong batteries, it causes the danger of explosion. It is recommended by the manufacturer that you follow the manufacturer's instructions to only replace the same or equivalent type of battery, and dispose of used ones.

ESD Precautions

Computer boards have integrated circuits sensitive to static electricity. To prevent chipsets from electrostatic discharge damage, please take care of the following jobs with precautions:

- Do not remove boards or integrated circuits from their anti-static packaging until you are ready to install them.

- Before holding the board or integrated circuit, touch an unpainted portion of the system unit chassis for a few seconds. It discharges static electricity from your body.

- Wear a wrist-grounding strap, available from most electronic component stores, when handling boards and components.

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Section 1
Introduction

PICO318

PICO319

The PICO318 is a Pico-ITX board with Intel® Pentium® N4200/ Celeron® N3350 processor and the PICO319 is with Intel® Atom® x5-E3940 that deliver outstanding system performance through high-bandwidth interfaces, multiple I/O functions for interactive applications and various embedded computing solutions.

Both of them have one 204-pin unbuffered SO-DIMM socket for DDR3L 1866MHz SO-DIMM memory with maximum capacity up to 8GB. It also features two Gigabit/Fast Ethernet, two USB 3.0 and two USB 2.0 high speed compliant, one M.2 Key B with SATA which transfer rates up to 6Gb/s, and built-in high definition audio codec that can achieve the best stability and reliability for industrial applications. Additionally, it provides you with unique embedded features such as two serial ports (COM1 supports RS-232/422/485, COM2 supports RS-232) and 2.5" form factor that applies an extensive array of PC peripherals. The board can be enhanced by its built-in watchdog timer function, a special industrial feature not commonly seen on other motherboards.

1.1   Features

- PICO318 - Intel® Pentium® quad core N4200 processor (1.1GHz) and Celeron® dual core N3350 processor (1.1GHz)
- PICO319 - Intel® Atom® quad core x5-E3940 processor (1.6GHz)
- 1 DDR3L SO-DIMM supports up to 8GB memory capacity
- 2 USB 3.0 ports and 2 USB 2.0 ports
- 2 Gigabit Ethernet ports
- 1 M.2 Key B for SATA storage (BOM optional for PCIex 1 & USB3.0 x1 to expansion card)
- 1 half-size PCI-Express Mini Card with mSATA supported

1.2   Specifications

- **CPU**
  - PICO318
    - Intel® Pentium® quad core N4200 1.1GHz.
    - Intel® Celeron® dual core N3350 1.1GHz.
  - PICO319
    - Intel® ATOM® quad core x5-E3940 1.6GHz.

- **Thermal Solution**
  - Passive.

- **Operating Temperaturepcie**
  - PICO318: -20°C~+60°C
  - PICO319: -40°C~+70°C.

- **BIOS**
  - American Megatrends Inc. UEFI (Unified Extensible Firmware Interface) BIOS.
  - 64Mbit SPI Flash, DMI, Plug and Play.
  - PXE Ethernet Boot ROM.

- **System Memory**
  - One 204-pin unbuffered DDR3L SO-DIMM socket.
  - Maximum up to 8GB DDR3L 1866MHz memory.

- **Onboard Multi I/O**
  - Controller: ITE8528.
  - Serial Ports: One RS-232/422/485 (COM1) and one RS-232 (COM2).

- **Serial ATA**
  - One M.2 Key B slot 22x42/3042.
  - mSATA supported.

- **USB Interface**
  - Two USB 3.0 ports in type A on the rear I/O.
  - Two USB 2.0 ports in 2x5-pin internal wafer connector.

- **Display**
  - A standard DisplayPort connector supports DP1.2a and DP++. The DP resolution is up to 3840x2160 @60Hz.
  - One 2x20-pin connector for 18/24-bit single and dual channel LVDS (with one 8-pin wafer connector for inverter control). LVDS resolution is up to 1920x1200 in 24-bit dual channel.

- **Watchdog Timer**
    - 1~65536 seconds or minutes; up to 65535 levels.

- **Ethernet**
    - Two 1000/100/10Mbps Gigabit/Fast Ethernet ports in RJ-45 connector.
    - Support Wake-on-LAN, PXE Boot ROM with Intel® I210-AT.

- **Audio**
    - HD audio compliant with Realtek ALC888S.
    - Line-out and line-in/MIC-in in 1x10-pin wafer connector.

- **Expansion Interface**
    - One half-size PCI-Express Mini Card socket complies with PCI-Express Mini Card Spec. V1.2.

- **Power Input**
    - One 2x2-pin connector.
    - +12V DC-in only at minimum 12V/2A
    - Auto power on function supported.

- **Power Management**
    - ACPI (Advanced Configuration and Power Interface).

- **Form Factor**
    - Pico-ITX form factor.

All specifications and images are subject to change without notice.

Note

1.3   Utilities

- Chipset and graphics driver
- Ethernet driver
- Audio driver
- TXE driver

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Section 2
Board and Pin Assignments

2.1 Board Dimensions and Fixing Holes
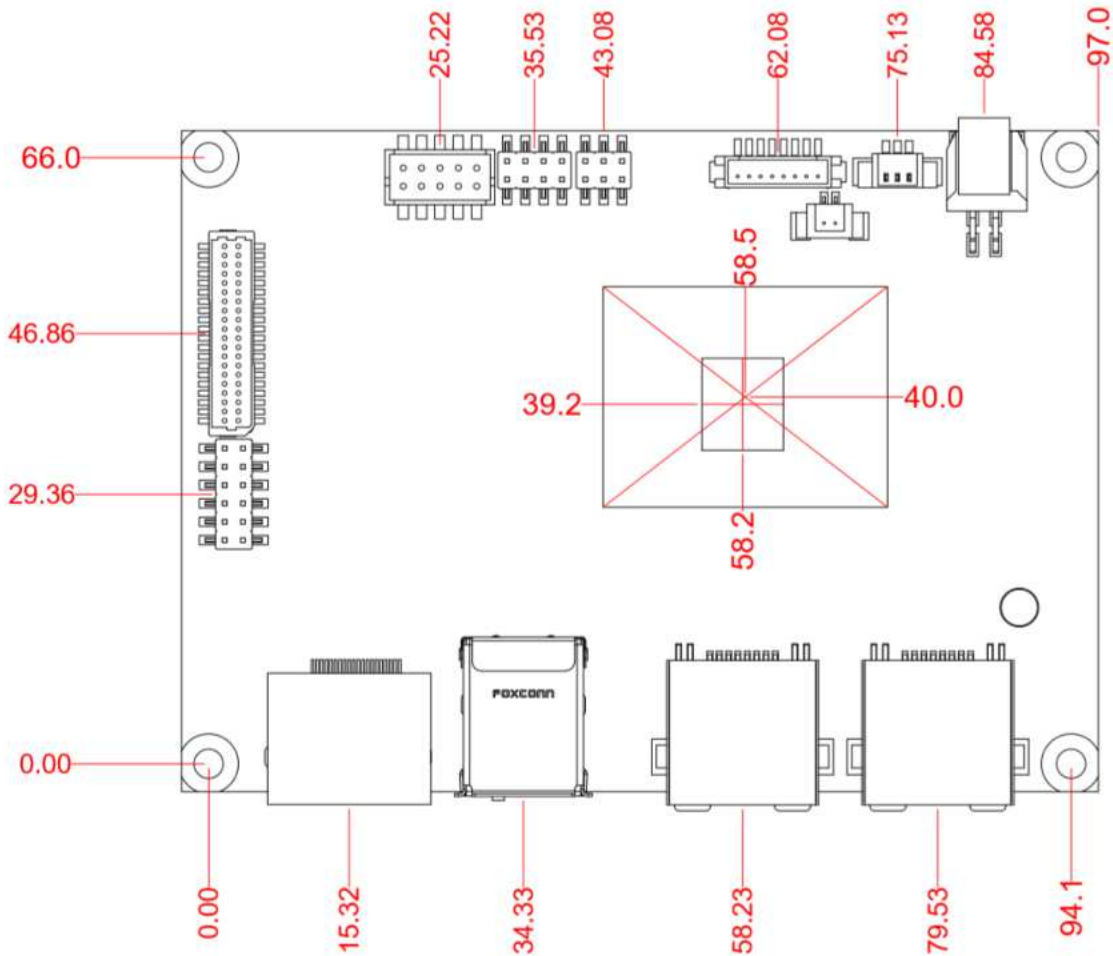
Top View
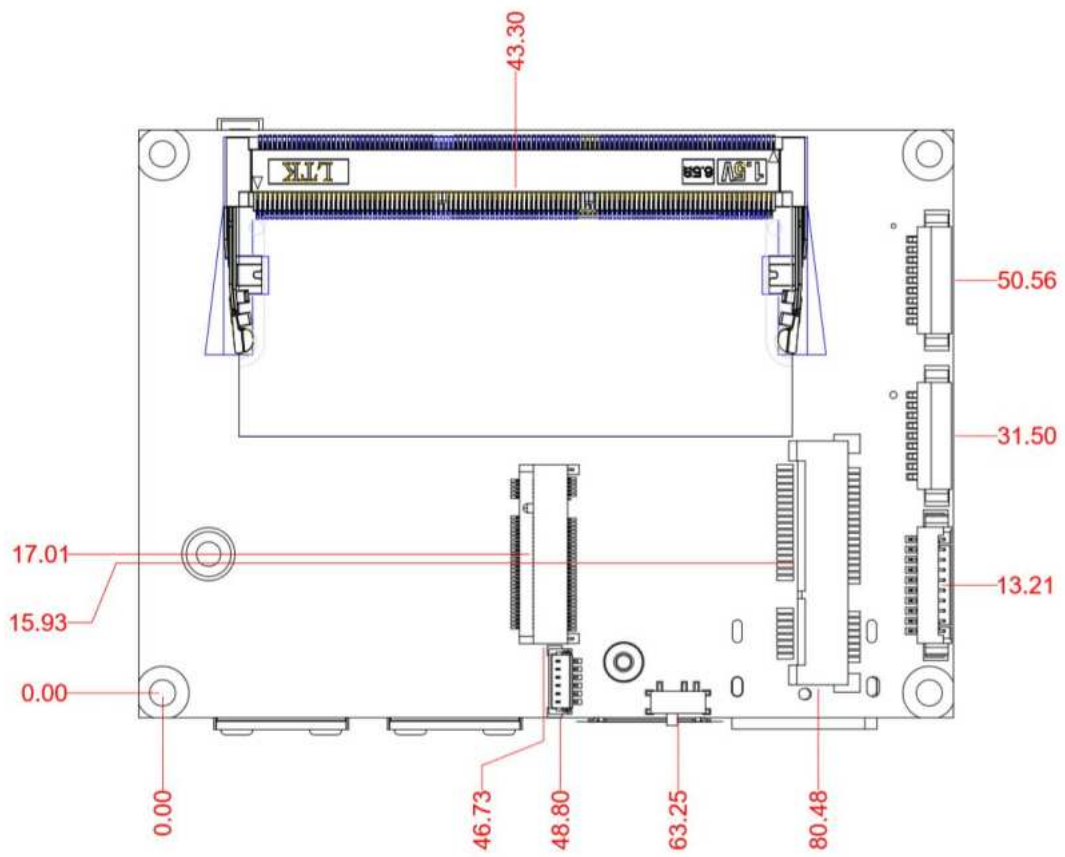
Bottom View
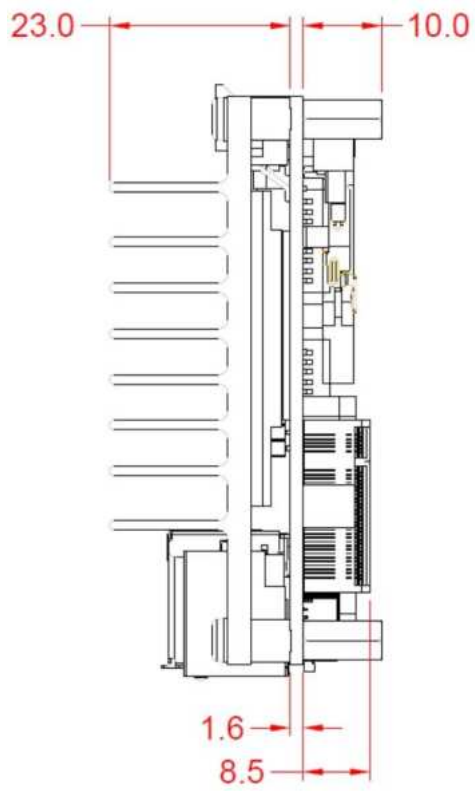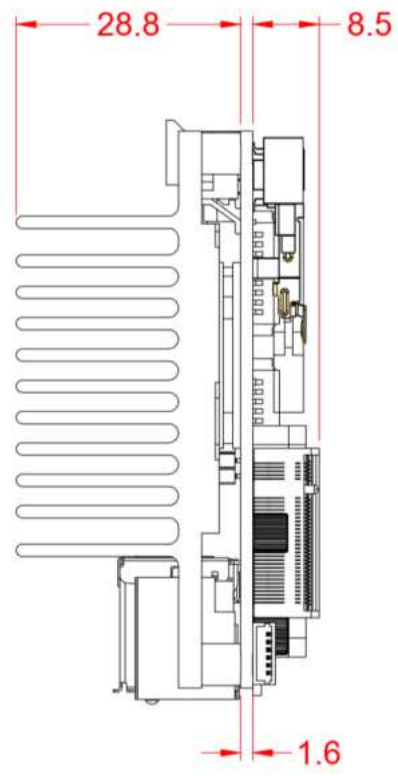
PICO318   **PICO319**

Side View

2.2 Board Layout
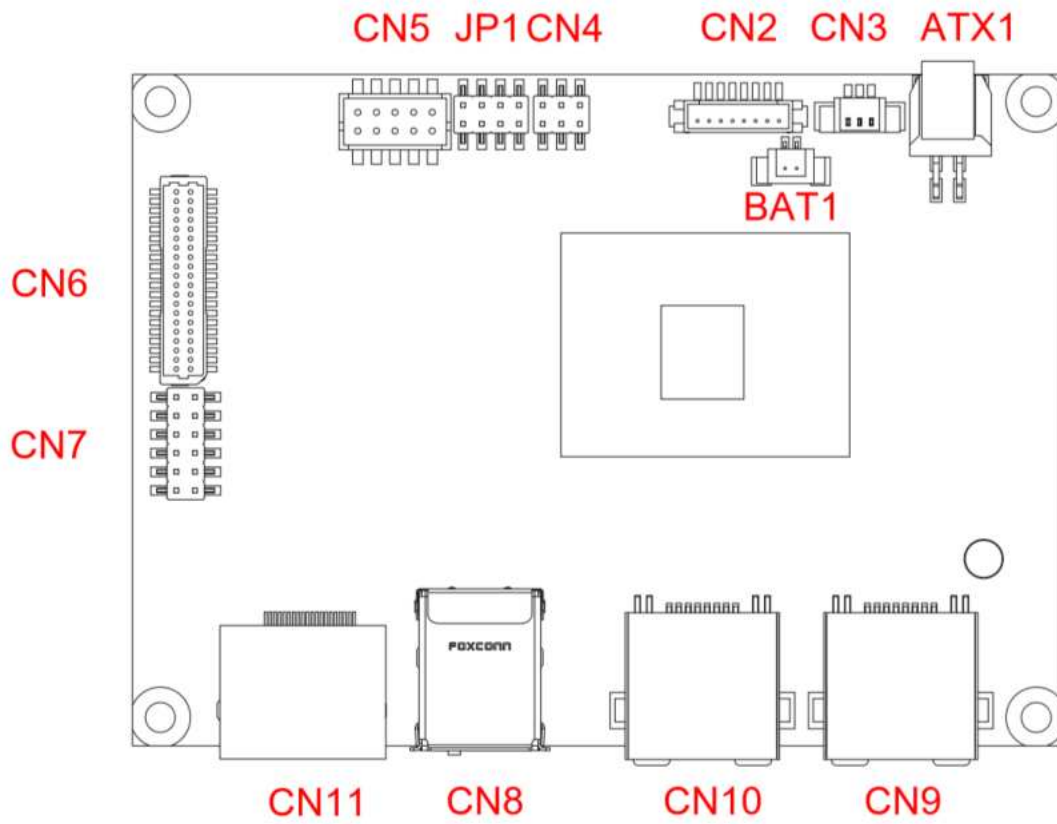
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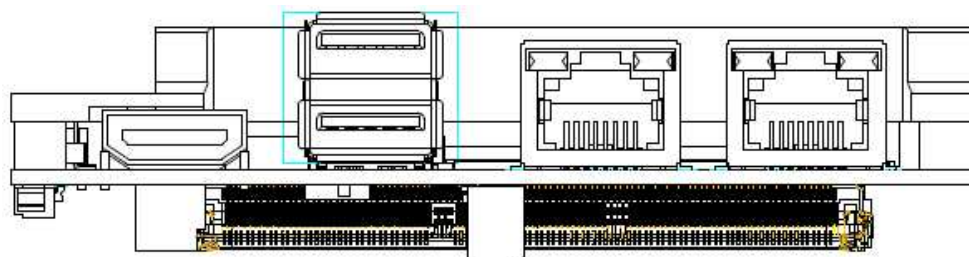
Side View
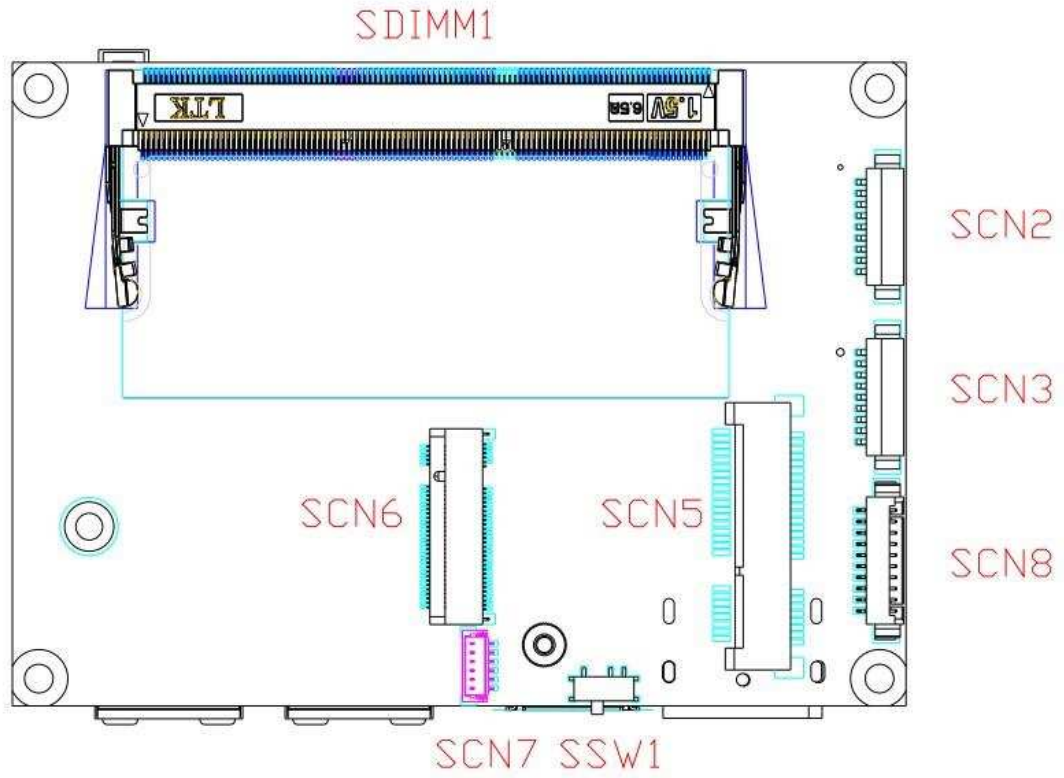
Bottom View

2.3   Assembly Drawing

For thermal dissipation, a thermal solution enables the PICO318/319's components to dissipate heat efficiently. All heat generating components are thermally conducted to the heatspreader in order to avoid hot spots. Images below illustrate how to install the thermal solution on PICO318/319.

1.   Standard -- Heatsink for PICO318/319 (see image below):
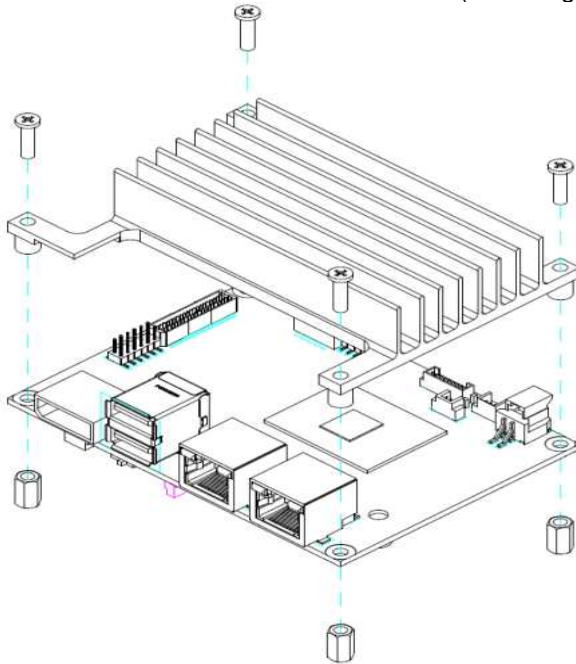
2.   Optional -- Heatspreader for PICO318/319 (see image below):
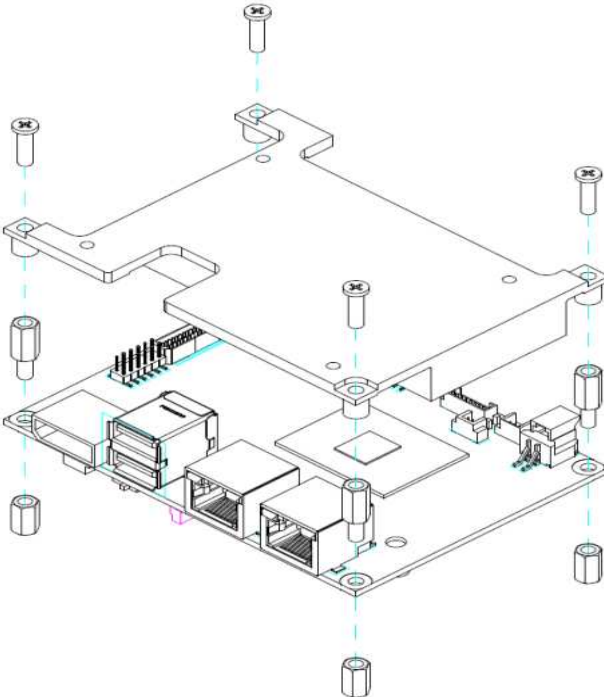
2.4   Jumper and Switch Settings

Jumper is a small component consisting of jumper clip and jumper pins. Install jumper clip on 2 jumper pins to close. And remove jumper clip from 2 jumper pins to open. Below illustration shows how to set up jumper.
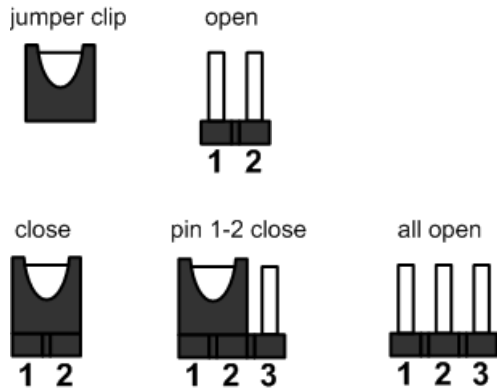
Properly configure jumper and switch settings on the PICO318/319 to meet your application purpose. Below you can find a summary table of jumper, switch and onboard default settings.

Note

Once the default jumper or switch setting needs to be changed, please do it under power-off condition.

Jumper and Switch	Description	Setting
JP1	LVDS +3.3V/+5V/+12V Voltage Selection Default: +3.3V Level	5-7 Close
	Restore BIOS Optimal Defaults Default: Normal Operation	4-6 Close
SSW1	Auto Power On Default: Enable	2-3 Close

2.4.1 LVDS +3.3V/+5V/+12V Voltage Selection (JP1)

The board supports voltage selection for flat panel displays. Use these jumpers to set LVDS connector (CN6) pin 1~6 VCCM to +3.3V, +5V or +12V. To prevent hardware damage, before connecting please make sure that the input voltage of flat panel is correct.

Function	JP1 Setting
+3.3V level (Default)	5-7 close
+5V level	3-5 close
+12V level	1-2 close
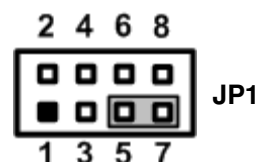
2.4.2 Restore BIOS Optimal Defaults (JP1)

Put jumper clip to pin 6-8 for a few seconds then move it back to pin 4-6. Doing this procedure can restore BIOS optimal defaults.

Function	JP1 Setting
Normal (Default)	4-6 close
Restore BIOS optimal defaults	6-8 close
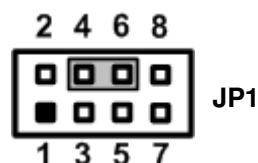
2.4.3 Auto Power On (SSW1)

If SSW1 is enabled for power input, the system will be automatically power on without pressing soft power button. If SSW1 is disabled for power input, it is necessary to manually press soft power button to power on the system.

Function	Setting
Disable auto power on	1-2 close
Enable auto power on (Default)	2-3 close
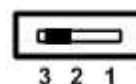
2.5   Connectors

Signals go to other parts of the system through connectors. Loose or improper connection might cause problems, please make sure all connectors are properly and firmly connected. Here is a summary table of connectors on the hardware.

Connector	Description
CN2	Inverter Connector
CN3	SMBus Connector
CN4	Digital I/O Connector
CN5	USB 2.0 Wafer Connector
CN6	LVDS Connector
CN7	Front Panel Connector
CN8	USB 3.0 Ports
CN9, CN10	Ethernet Ports
CN11	DisplayPort Connector
ATX1	Power Connector
BAT1	CMOS Battery Connector
SCN2, SCN3	COM1 and COM2 Wafer Connectors
SCN5	Half-size PCI-Express Mini Card and mSATA Connector
SCN6	M.2 2242 Key B Connector
SCN7	SIM Card Wafer Connector
SCN8	Audio Wafer Connector
SDIMM1	DDR3L SO-DIMM Connector

2.5.1   Inverter Connector (CN2)

This is an 8-pin (pitch=1.25mm) connector which is compliant with Hirose DF13-8P-1.25V for inverter interface. We strongly recommend you to use the matching connector, DF13-8S-1.25C, to avoid malfunction.

Pin	Signal
1	VBL1 (+12V level)
2	VBL1 (+12V level)
3	VBL2 (+5V level)
4	VBL_ENABLE
5	GND
6	GND
7	GND
8	VBL Brightness Control
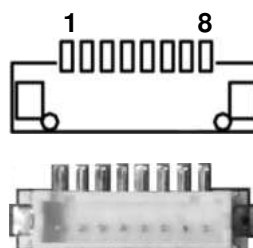
2.5.2   SMBus Connector (CN3)

This is a 3-pin (pitch=1.25mm) for SMBus interface which is compatible with I^2C.

Pin	Signal
1	SMB_CLK
2	SMB_DAT
3	GND

2.5.3   Digital I/O Connector (CN4)

This is a 2x3-pin (pitch=2.0mm) connector. The board is equipped with a 4-bit digital I/O that meets requirements for a system customary automation control. The digital I/O can be configured to control cash drawers and sense warning signals from an Uninterrupted Power System (UPS), or perform store security control. You may use software programming to control these digital signals, please refer to Appendix B.

Pin	Signal	Pin	Signal
1	GND	2	+5V
3	DIO 2	4	DIO 1
5	DIO 3	6	DIO 0
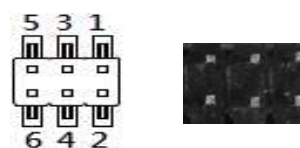
2.5.4   USB 2.0 Wafer Connector (CN5)

This 2x5-pin (pitch=2.0mm) wafer connector is compliant with Hirose DF11-10DP-2DSA and a Universal Serial Bus (USB) connector for installing versatile USB 2.0 compliant interface peripherals.

Pin	Signal	Pin	Signal
1	USB VCC (+5VSB)	2	USB VCC (+5VSB)
3	USB #7_D-	4	USB #5_D-
5	USB #7_D+	6	USB #5_D+
7	GND	8	GND
9	GND	10	GND
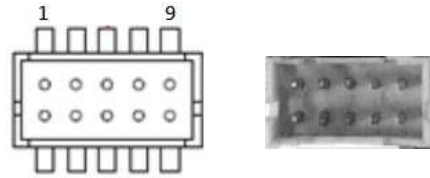
2.5.5   LVDS Connector (CN6)

This is a 2x20-pin (pitch=1.0mm) connector which is compliant with JST SM40B-SRDS-G-TF for LVDS LCD interface. It is strongly recommended to connect it with matching connector, SHDR-40VS-B. Pin 1~6 VCCM can be set to +3.3V, +5V or +12V by setting JP1 (see section 2.4.1).

18-bit single channel

Pin	Signal	Pin	Signal
1	VCCM	2	VCCM
3	VCCM	4	VCCM
5	VCCM	6	VCCM
7	N.C	8	N.C
9	GND	10	GND
11	N.C	12	N.C
13	N.C	14	N.C
15	GND	16	GND
17	N.C	18	N.C
19	N.C	20	N.C
21	GND	22	GND
23	Channel A D0-	24	N.C
25	Channel A D0+	26	N.C
27	GND	28	GND
29	Channel A D1-	30	N.C
31	Channel A D1+	32	N.C
33	GND	34	GND
35	Channel A D2-	36	Channel A CLK-
37	Channel A D2+	38	Channel A CLK+
39	GND	40	GND

24-bit single channel

Pin	Signal	Pin	Signal
1	VCCM	2	VCCM
3	VCCM	4	VCCM
5	VCCM	6	VCCM
7	N.C	8	N.C
9	GND	10	GND
11	N.C	12	N.C
13	N.C	14	N.C
15	GND	16	GND
17	N.C	18	N.C
19	N.C	20	N.C
21	GND	22	GND
23	Channel A D0-	24	N.C
25	Channel A D0+	26	N.C
27	GND	28	GND
29	Channel A D1-	30	Channel A D3-
31	Channel A D1+	32	Channel A D3+
33	GND	34	GND
35	Channel A D2-	36	Channel A CLK-
37	Channel A D2+	38	Channel A CLK+
39	GND	40	GND

18-bit dual channel

Pin	Signal	Pin	Signal
1	VCCM	2	VCCM
3	VCCM	4	VCCM
5	VCCM	6	VCCM
7	N.C	8	N.C
9	GND	10	GND
11	N.C	12	Channel B D0-
13	N.C	14	Channel B D0+
15	GND	16	GND
17	Channel B CLK-	18	Channel B D1-
19	Channel B CLK+	20	Channel B D1+
21	GND	22	GND
23	Channel A D0-	24	Channel B D2-
25	Channel A D0+	26	Channel B D2+
27	GND	28	GND
29	Channel A D1-	30	N.C
31	Channel A D1+	32	N.C
33	GND	34	GND
35	Channel A D2-	36	Channel A CLK-
37	Channel A D2+	38	Channel A CLK+
39	GND	40	GND

24-bit dual channel

Pin	Signal	Pin	Signal
1	VCCM	2	VCCM
3	VCCM	4	VCCM
5	VCCM	6	VCCM
7	N.C	8	N.C
9	GND	10	GND
11	Channel B D3-	12	Channel B D0-
13	Channel B D3+	14	Channel B D0+
15	GND	16	GND
17	Channel B CLK-	18	Channel B D1-
19	Channel B CLK+	20	Channel B D1+
21	GND	22	GND
23	Channel A D0-	24	Channel B D2-
25	Channel A D0+	26	Channel B D2+
27	GND	28	GND
29	Channel A D1-	30	Channel A D3-
31	Channel A D1+	32	Channel A D3+
33	GND	34	GND
35	Channel A D2-	36	Channel A CLK-
37	Channel A D2+	38	Channel A CLK+
39	GND	40	GND

2.5.6 Front Panel Connector (CN7)

This is a 2x6-pin header (pitch=2.0mm) for front panel interface.

Pin	Signal	Pin	Signal
1	EXT SPK-	2	EXT SPK+
3	GND	4	PWR_PSON
5	PWRLED-	6	PWRLED+
7	PWRSW-	8	PWRSW+
9	HW RST-	10	HW RST+
11	HDDLED-	12	HDDLED+
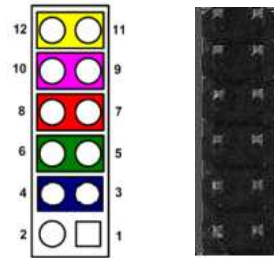
External Speaker
Pin 1(-) and 2(+) connect the case-mounted speaker unit or internal buzzer cable.

Power Status
Pin 4 and pin 3 are for power status button; letting user know the power status of this board.

Power LED
Pin 6 connects anode (+) of LED and pin 5 connects cathode (-) of LED. The power LED lights up when the system is powered on.

Power On/Off Button
Pin 8 and 7 connect the power button on front panel to CPU board, which allows users to turn on or off power supply.

System Reset Switch
Pin 10 and 9 connect the case-mounted reset switch that reboots your computer without turning off the power switch. It is a better way to reboot your system for a longer life of system power supply.

HDD Activity LED
This connection is linked to hard drive activity LED on the control panel. LED flashes when HDD is being accessed. Pin 12 and 11 connect the hard disk drive to the front panel HDD LED, pin 11 is assigned as cathode(-) and pin 12 is assigned as anode(+).

2.5.7 USB 3.0 Ports (CN8)

The board comes with two Universal Serial Bus (compliant with USB 3.0 (5Gb/s)) type A connectors for installing USB peripherals such as keyboard, mouse, scanner, etc.

Pin	Signal	Pin	Signal
1	USB_VCC (+5V power)	10	USB_VCC (+5V power)
2	USB_Data1-	11	USB_Data2-
3	USB_Data1+	12	USB_Data2+
4	GND	13	GND
5	SSRX1-	14	SSRX4-
6	SSRX1+	15	SSRX4+
7	GND	16	GND
8	SSTX1-	17	SSTX4-
9	SSTX1+	18	SSTX4+
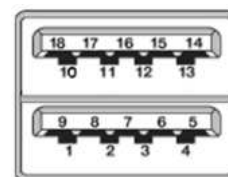
2.5.8 Ethernet Ports (CN9 and CN10)

The board has two RJ-45 connectors. Ethernet connection can be established by plugging one end of the Ethernet cable into this connector and the other end (phone jack) to a 1000/100/10-Base-T hub.

Pin	1000 Base-T	100/10 Base-T	Description
L1	BI_DA+	TX+	Bidirectional or Transmit Data+
L2	BI_DA-	TX-	Bidirectional or Transmit Data-
L3	BI_DB+	RX+	Bidirectional or Receive Data+
L4	BI_DC+	N.C.	Bidirectional or Not Connected
L5	BI_DC-	N.C.	Bidirectional or Not Connected
L6	BI_DB-	RX-	Bidirectional or Receive Data-
L7	BI_DD+	N.C.	Bidirectional or Not Connected
L8	BI_DD-	N.C.	Bidirectional or Not Connected
A	Active Link LED (Yellow) Off: No link Blinking: Data activity detected		
B	Speed LED 1000: Orange 100/10: Green/OFF		
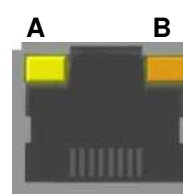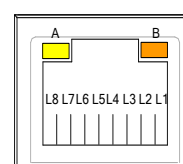
2.5.9   DisplayPort Connector (CN11)

The DisplayPort interface is available through connector CN11.

Pin	Signal
1	DPB_LANE0
2	GND
3	DPB_LANE0#
4	DPB_LANE1
5	GND
6	DPB_LANE1#
7	DPB_LANE2
8	GND
9	DPB_LANE2#
10	DPB_LANE3
11	GND
12	DPB_LANE3#
13	Detect Pin
14	GND
15	DPB_AUX
16	GND
17	DPB_AUX#
18	DPB_HPD
19	GND
20	+3.3V
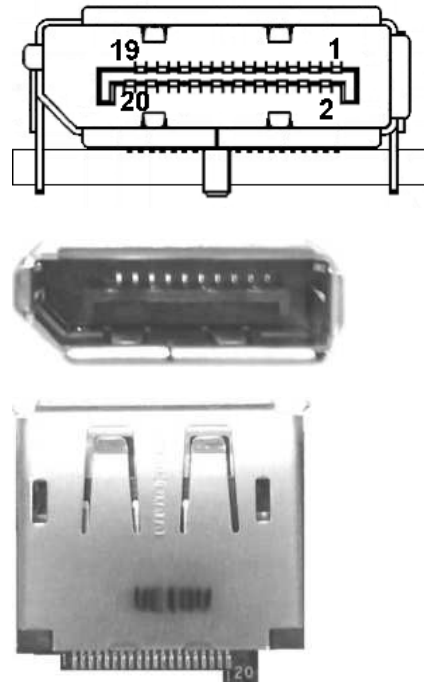
2.5.10   Power Connector (ATX1)

This is a 2x2pin (pitch=2.5mm) connector which is compliant with Molex 1054051104.

Pin	Signal
1	GND
2	GND
3	+12V
4	+12V
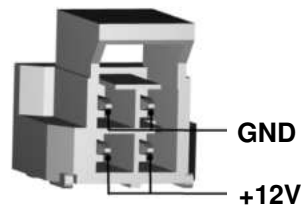
2.5.11   CMOS Battery Connector (BAT1)

This is a 2-pin (pitch=1.25mm) wafer connector for CMOS battery interface.

Pin	Signal
1	VBAT(+3V level)
2	GND

2.5.12   COM Wafer Connectors (SCN2 and SCN3)

This is a 9-pin (pitch=1.25mm) connector which is compliant with Molex 53047-0910. The SCN2 and SCN3 are for COM1 and COM2 interfaces, respectively. Only COM1 supports RS-232/422/485, for further information please refer to BIOS setting in section 4.4. The pin assignments of RS-232/422/485 are listed in table below.

COM1:

Pin	RS-232	RS-422	RS-485
1	GND	No use	No use
2	RI	No use	No use
3	DTR	RX-	No use
4	CTS	No use	No use
5	TXD	RX+	No use
6	RTS	No use	No use
7	RXD	TX+	Data+
8	DSR	No use	No use
9	DCD	TX-	Data-
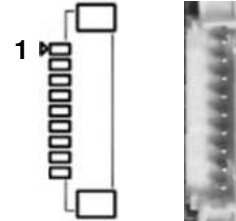
COM2:

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

2.5.13 Half-size PCI-Express Mini Card and mSATA Connector (SCN5)

This is a half-size PCI-Express Mini Card connector complying with PCI-Express Mini Card Spec. V1.2. It is located on the bottom side of the board and supports either PCI-Express, USB or mSATA. Since the default setting is PCI-Express, if mSATA is needed to insert, please refer to section 4.4 to change the setting.

Pin	Signal	Pin	Signal
1	WAKE#	2	+3.3VSB
3	No use	4	GND
5	No use	6	+1.5V
7	CLKREQ#	8	SIM_PWR
9	GND	10	SIM_I/O
11	REFCLK-	12	SIM_CLK
13	REFCLK+	14	SIM_RST
15	GND	16	SIM_VPP
17	No use	18	GND
19	No use	20	W_DISABLE#
21	GND	22	PERST#
23	PCIE_P5_RXN/SATA1_RX_DP	24	+3.3VSB
25	PCIE_P5_RXP/SATA1_RX_DN	26	GND
27	GND	28	+1.5V
29	GND	30	SMB_CLK
31	PCIE_P5_TXN/SATA1_TX_DN	32	SMB_DATA
33	PCIE_P5_TXP/SATA1_TX_DP	34	GND
35	GND	36	USB_DN6
37	GND	38	USB_DP6
39	+3.3VSB	40	GND
41	+3.3VSB	42	No use
43	GND	44	No use
45	No use	46	No use
47	No use	48	+1.5V
49	No use	50	GND
51	No use	52	+3.3VSB
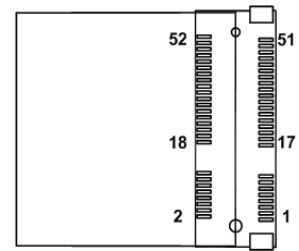
2.5.14 M.2 2242 Key B Connector (SCN6)

The SCN6 is a M.2 Key B connector. It is suggested to install the M.2 storage module via SATA with 22mm width and 42mm length or the M.2 cellular module via USB 2.0 with 30mm width and 42mm length. The M.2 storage module via PCIex2 and the M.2 cellular module via PCIex1& USB3.0 x 1 are supported by BOM option.

Pin	Signal	Pin	Signal
1	CONFIG_3	2	+3.3V
3	GND	4	+3.3V
5	GND	6	Full Card PWR OFF
7	USB_DP2	8	W_DISABLE#
9	USB_DN2	10	NC
11	GND	12	KEY B
13	KEY B	14	KEY B
15	KEY B	16	KEY B
17	KEY B	18	KEY B
19	KEY B	20	NC
21	CONFIG_0	22	NC
23	GPIO11(+1.8V)	24	NC
25	NC	26	NC
27	GND	28	NC
29	PCIE_P1_RXN/ USB3_P0_RX_DN	30	SIM_RST
31	PCIE_P1_RXP/ USB3_P0_RX_DP	32	SIM_CLK
33	GND	34	SIM_DATA
35	PCIE_P1_TXN/ USB3_P0_TX_DN	36	SIM_PWR
37	PCIE_P1_TXP/ USB3_P0_TX_DP	38	NC
39	GND	40	SMB_CLK(+1.8VSB)
41	SATA0_RX_DP/ PCIE_P0_RXN	42	SMB_DATA(+1.8VSB)
43	SATA0_RX_DN/ PCIE_P0_RXP	44	SMB_CLK(+1.8VSB)
45	GND	46	NC
47	SATA0_TX_DN/ PCIE_P0_TXN	48	NC
49	SATA0_TX_DP/ PCIE_P0_TXP	50	PERST#
51	GND	52	CLKREQ#
53	REFCLK-	54	PEWAKE#
55	REFCLK+	56	NC
57	GND	58	NC
59	NC	60	NC
61	NC	62	NC
63	NC	64	NC
65	NC	66	SIM_DET
67	PLTRST	68	SUSCLK
69	CONFIG_1	70	+3.3V
71	GND	72	+3.3V
73	GND	74	+3.3V
75	CONFIG_2		

2.5.15   SIM Card Wafer Connector (SCN7)

The SCN7 is a 6-pin (pitch=1.0mm) wafer connector for SIM card interface and is located on the bottom side of the board. AX93A19 is suggested to use for SCN7 to have SIM card slot.

Pin	Signal
1	PWR
2	RST
3	CLK
4	I/O
5	VPP
6	GND

2.5.16   Audio Wafer Connector (SCN8)

This is a 10-pin (pitch=1.25mm) wafer which is compliant with Molex 53047 for audio interface.

Pin	Signal	Pin	Signal
1	GND	2	AUDIO_OUT_R
3	GND	4	AUDIO_OUT_L
5	GND	6	LINE_IN_R
7	GND	8	LINE_IN_L
9	GND	10	MIC_IN
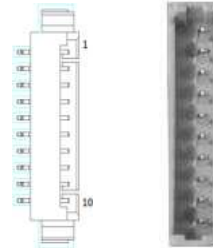
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Section 3
Hardware Description

3.1 Microprocessors

The PICO318 supports Intel® Pentium® N4200/ Celeron® N3350 processors and the PICO319 supports Intel® Atom® x5-E3940 which enable your system to operate under Windows® 10 environments. The system performance depends on the microprocessor. Make sure all correct settings are arranged for your installed microprocessor to prevent the CPU from damages.

3.2 BIOS

The PICO318/319 uses AMI Plug and Play BIOS with a single 64Mbit SPI Flash.

3.3 System Memory

The PICO318/319 supports one 204-pin DDR3L SO-DIMM socket for maximum memory capacity up to 8GB DDR3L SDRAMs. The memory module comes in sizes of 2GB, 4GB and 8GB.

3.4　　I/O Port Address Map

```
∨  Input/output (IO)
     [0000000000000000 - 000000000000006F]  PCI Express Root Complex
     [0000000000000020 - 0000000000000021]  Programmable interrupt controller
     [0000000000000024 - 0000000000000025]  Programmable interrupt controller
     [0000000000000028 - 0000000000000029]  Programmable interrupt controller
     [000000000000002C - 000000000000002D]  Programmable interrupt controller
     [000000000000002E - 000000000000002F]  Motherboard resources
     [0000000000000030 - 0000000000000031]  Programmable interrupt controller
     [0000000000000034 - 0000000000000035]  Programmable interrupt controller
     [0000000000000038 - 0000000000000039]  Programmable interrupt controller
     [000000000000003C - 000000000000003D]  Programmable interrupt controller
     [0000000000000040 - 0000000000000043]  System timer
     [000000000000004E - 000000000000004F]  Motherboard resources
     [0000000000000050 - 0000000000000053]  System timer
     [0000000000000060 - 0000000000000060]  Standard PS/2 Keyboard
     [0000000000000061 - 0000000000000061]  Motherboard resources
     [0000000000000062 - 0000000000000062]  Microsoft ACPI-Compliant Embedded Controller
     [0000000000000063 - 0000000000000063]  Motherboard resources
     [0000000000000064 - 0000000000000064]  Standard PS/2 Keyboard
     [0000000000000065 - 0000000000000065]  Motherboard resources
     [0000000000000066 - 0000000000000066]  Microsoft ACPI-Compliant Embedded Controller
     [0000000000000067 - 0000000000000067]  Motherboard resources
     [0000000000000070 - 0000000000000070]  Motherboard resources
     [0000000000000070 - 0000000000000077]  System CMOS/real time clock
     [0000000000000078 - 0000000000000CF7]  PCI Express Root Complex
     [0000000000000080 - 000000000000008F]  Motherboard resources
     [0000000000000092 - 0000000000000092]  Motherboard resources
     [00000000000000A0 - 00000000000000A1]  Programmable interrupt controller
     [00000000000000A4 - 00000000000000A5]  Programmable interrupt controller
     [00000000000000A8 - 00000000000000A9]  Programmable interrupt controller
     [00000000000000AC - 00000000000000AD]  Programmable interrupt controller
     [00000000000000B0 - 00000000000000B1]  Programmable interrupt controller
     [00000000000000B2 - 00000000000000B3]  Motherboard resources
     [00000000000000B4 - 00000000000000B5]  Programmable interrupt controller
     [00000000000000B8 - 00000000000000B9]  Programmable interrupt controller
     [00000000000000BC - 00000000000000BD]  Programmable interrupt controller
     [00000000000002F8 - 00000000000002FF]  Communications Port (COM2)
     [00000000000003F8 - 00000000000003FF]  Communications Port (COM1)
     [0000000000000400 - 000000000000047F]  Motherboard resources
     [00000000000004D0 - 00000000000004D1]  Programmable interrupt controller
     [0000000000000500 - 00000000000005FE]  Motherboard resources
     [0000000000000600 - 000000000000061F]  Motherboard resources
     [0000000000000680 - 000000000000069F]  Motherboard resources
     [0000000000000D00 - 000000000000FFFF]  PCI Express Root Complex
     [000000000000164E - 000000000000164F]  Motherboard resources
     [000000000000D000 - 000000000000DFFF]  Intel(R) Celeron(R)/Pentium(R) Processor PCI Express Root Port - 5AD6
     [000000000000E000 - 000000000000EFFF]  Intel(R) Celeron(R)/Pentium(R) Processor PCI Express Root Port - 5ADA
     [000000000000F000 - 000000000000F03F]  Intel(R) HD Graphics
     [000000000000F000 - 000000000000F03F]  Intel(R) HD Graphics
     [000000000000F040 - 000000000000F05F]  Intel(R) Celeron(R)/Pentium(R) Processor SMBUS - 5AD4
     [000000000000F060 - 000000000000F07F]  Standard SATA AHCI Controller
     [000000000000F080 - 000000000000F083]  Standard SATA AHCI Controller
     [000000000000F090 - 000000000000F097]  Standard SATA AHCI Controller
```

3.5 Interrupt Controller (IRQ) Map

The interrupt controller (IRQ) mapping list is shown as follows:

✓ 📇 Interrupt request (IRQ)	
📇 (ISA) 0x00000000 (00) System timer	📇 (ISA) 0x00000074 (116) Microsoft ACPI-Compliant System
⌨ (ISA) 0x00000001 (01) Standard PS/2 Keyboard	📇 (ISA) 0x00000075 (117) Microsoft ACPI-Compliant System
🖥 (ISA) 0x00000003 (03) Communications Port (COM2)	📇 (ISA) 0x00000076 (118) Microsoft ACPI-Compliant System
🖥 (ISA) 0x00000004 (04) Communications Port (COM1)	📇 (ISA) 0x00000077 (119) Microsoft ACPI-Compliant System
📇 (ISA) 0x00000008 (08) High precision event timer	📇 (ISA) 0x00000078 (120) Microsoft ACPI-Compliant System
📇 (ISA) 0x00000036 (54) Microsoft ACPI-Compliant System	📇 (ISA) 0x00000079 (121) Microsoft ACPI-Compliant System
📇 (ISA) 0x00000037 (55) Microsoft ACPI-Compliant System	📇 (ISA) 0x0000007A (122) Microsoft ACPI-Compliant System
📇 (ISA) 0x00000038 (56) Microsoft ACPI-Compliant System	📇 (ISA) 0x0000007B (123) Microsoft ACPI-Compliant System
📇 (ISA) 0x00000039 (57) Microsoft ACPI-Compliant System	📇 (ISA) 0x0000007C (124) Microsoft ACPI-Compliant System
📇 (ISA) 0x0000003A (58) Microsoft ACPI-Compliant System	📇 (ISA) 0x0000007D (125) Microsoft ACPI-Compliant System
📇 (ISA) 0x0000003B (59) Microsoft ACPI-Compliant System	📇 (ISA) 0x0000007E (126) Microsoft ACPI-Compliant System
📇 (ISA) 0x0000003C (60) Microsoft ACPI-Compliant System	📇 (ISA) 0x0000007F (127) Microsoft ACPI-Compliant System
📇 (ISA) 0x0000003D (61) Microsoft ACPI-Compliant System	📇 (ISA) 0x00000080 (128) Microsoft ACPI-Compliant System
📇 (ISA) 0x0000003E (62) Microsoft ACPI-Compliant System	📇 (ISA) 0x00000081 (129) Microsoft ACPI-Compliant System
📇 (ISA) 0x0000003F (63) Microsoft ACPI-Compliant System	📇 (ISA) 0x00000082 (130) Microsoft ACPI-Compliant System
📇 (ISA) 0x00000040 (64) Microsoft ACPI-Compliant System	📇 (ISA) 0x00000083 (131) Microsoft ACPI-Compliant System
📇 (ISA) 0x00000041 (65) Microsoft ACPI-Compliant System	📇 (ISA) 0x00000084 (132) Microsoft ACPI-Compliant System
📇 (ISA) 0x00000042 (66) Microsoft ACPI-Compliant System	📇 (ISA) 0x00000085 (133) Microsoft ACPI-Compliant System
📇 (ISA) 0x00000043 (67) Microsoft ACPI-Compliant System	📇 (ISA) 0x00000086 (134) Microsoft ACPI-Compliant System
📇 (ISA) 0x00000044 (68) Microsoft ACPI-Compliant System	📇 (ISA) 0x00000087 (135) Microsoft ACPI-Compliant System
📇 (ISA) 0x00000045 (69) Microsoft ACPI-Compliant System	📇 (ISA) 0x00000088 (136) Microsoft ACPI-Compliant System
📇 (ISA) 0x00000046 (70) Microsoft ACPI-Compliant System	📇 (ISA) 0x00000089 (137) Microsoft ACPI-Compliant System
📇 (ISA) 0x00000047 (71) Microsoft ACPI-Compliant System	📇 (ISA) 0x0000008A (138) Microsoft ACPI-Compliant System
📇 (ISA) 0x00000048 (72) Microsoft ACPI-Compliant System	📇 (ISA) 0x0000008B (139) Microsoft ACPI-Compliant System
📇 (ISA) 0x00000049 (73) Microsoft ACPI-Compliant System	📇 (ISA) 0x0000008C (140) Microsoft ACPI-Compliant System
📇 (ISA) 0x0000004A (74) Microsoft ACPI-Compliant System	📇 (ISA) 0x0000008D (141) Microsoft ACPI-Compliant System
📇 (ISA) 0x0000004B (75) Microsoft ACPI-Compliant System	📇 (ISA) 0x0000008E (142) Microsoft ACPI-Compliant System
📇 (ISA) 0x0000004C (76) Microsoft ACPI-Compliant System	📇 (ISA) 0x0000008F (143) Microsoft ACPI-Compliant System
📇 (ISA) 0x0000004D (77) Microsoft ACPI-Compliant System	📇 (ISA) 0x00000090 (144) Microsoft ACPI-Compliant System
📇 (ISA) 0x0000004E (78) Microsoft ACPI-Compliant System	📇 (ISA) 0x00000091 (145) Microsoft ACPI-Compliant System
📇 (ISA) 0x0000004F (79) Microsoft ACPI-Compliant System	📇 (ISA) 0x00000092 (146) Microsoft ACPI-Compliant System
📇 (ISA) 0x00000050 (80) Microsoft ACPI-Compliant System	📇 (ISA) 0x00000093 (147) Microsoft ACPI-Compliant System
📇 (ISA) 0x00000051 (81) Microsoft ACPI-Compliant System	📇 (ISA) 0x00000094 (148) Microsoft ACPI-Compliant System
📇 (ISA) 0x00000052 (82) Microsoft ACPI-Compliant System	📇 (ISA) 0x00000095 (149) Microsoft ACPI-Compliant System
📇 (ISA) 0x00000053 (83) Microsoft ACPI-Compliant System	📇 (ISA) 0x00000096 (150) Microsoft ACPI-Compliant System
📇 (ISA) 0x00000054 (84) Microsoft ACPI-Compliant System	📇 (ISA) 0x00000097 (151) Microsoft ACPI-Compliant System
📇 (ISA) 0x00000055 (85) Microsoft ACPI-Compliant System	📇 (ISA) 0x00000098 (152) Microsoft ACPI-Compliant System
📇 (ISA) 0x00000056 (86) Microsoft ACPI-Compliant System	📇 (ISA) 0x00000099 (153) Microsoft ACPI-Compliant System
📇 (ISA) 0x00000057 (87) Microsoft ACPI-Compliant System	📇 (ISA) 0x0000009A (154) Microsoft ACPI-Compliant System
📇 (ISA) 0x00000058 (88) Microsoft ACPI-Compliant System	📇 (ISA) 0x0000009B (155) Microsoft ACPI-Compliant System
📇 (ISA) 0x00000059 (89) Microsoft ACPI-Compliant System	📇 (ISA) 0x0000009C (156) Microsoft ACPI-Compliant System
📇 (ISA) 0x0000005A (90) Microsoft ACPI-Compliant System	📇 (ISA) 0x0000009D (157) Microsoft ACPI-Compliant System
📇 (ISA) 0x0000005B (91) Microsoft ACPI-Compliant System	📇 (ISA) 0x0000009E (158) Microsoft ACPI-Compliant System
📇 (ISA) 0x0000005C (92) Microsoft ACPI-Compliant System	📇 (ISA) 0x0000009F (159) Microsoft ACPI-Compliant System
📇 (ISA) 0x0000005D (93) Microsoft ACPI-Compliant System	📇 (ISA) 0x000000A0 (160) Microsoft ACPI-Compliant System
📇 (ISA) 0x0000005E (94) Microsoft ACPI-Compliant System	📇 (ISA) 0x000000A1 (161) Microsoft ACPI-Compliant System
📇 (ISA) 0x0000005F (95) Microsoft ACPI-Compliant System	📇 (ISA) 0x000000A2 (162) Microsoft ACPI-Compliant System
📇 (ISA) 0x00000060 (96) Microsoft ACPI-Compliant System	📇 (ISA) 0x000000A3 (163) Microsoft ACPI-Compliant System
📇 (ISA) 0x00000061 (97) Microsoft ACPI-Compliant System	📇 (ISA) 0x000000A4 (164) Microsoft ACPI-Compliant System
📇 (ISA) 0x00000062 (98) Microsoft ACPI-Compliant System	📇 (ISA) 0x000000A5 (165) Microsoft ACPI-Compliant System
📇 (ISA) 0x00000063 (99) Microsoft ACPI-Compliant System	📇 (ISA) 0x000000A6 (166) Microsoft ACPI-Compliant System
📇 (ISA) 0x00000064 (100) Microsoft ACPI-Compliant System	📇 (ISA) 0x000000A7 (167) Microsoft ACPI-Compliant System
📇 (ISA) 0x00000065 (101) Microsoft ACPI-Compliant System	📇 (ISA) 0x000000A8 (168) Microsoft ACPI-Compliant System
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📇 (ISA) 0x0000006B (107) Microsoft ACPI-Compliant System	📇 (ISA) 0x000000AE (174) Microsoft ACPI-Compliant System
📇 (ISA) 0x0000006C (108) Microsoft ACPI-Compliant System	📇 (ISA) 0x000000AF (175) Microsoft ACPI-Compliant System
📇 (ISA) 0x0000006D (109) Microsoft ACPI-Compliant System	📇 (ISA) 0x000000B0 (176) Microsoft ACPI-Compliant System
📇 (ISA) 0x0000006E (110) Microsoft ACPI-Compliant System	📇 (ISA) 0x000000B1 (177) Microsoft ACPI-Compliant System
📇 (ISA) 0x0000006F (111) Microsoft ACPI-Compliant System	📇 (ISA) 0x000000B2 (178) Microsoft ACPI-Compliant System
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📇 (ISA) 0x00000072 (114) Microsoft ACPI-Compliant System	📇 (ISA) 0x000000B5 (181) Microsoft ACPI-Compliant System
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	📇 (ISA) 0x000000B9 (185) Microsoft ACPI-Compliant System

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(ISA) 0x0000010E (270)	Microsoft ACPI-Compliant System
(ISA) 0x0000010F (271)	Microsoft ACPI-Compliant System
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(ISA) 0x00000112 (274)	Microsoft ACPI-Compliant System
(ISA) 0x00000113 (275)	Microsoft ACPI-Compliant System
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(ISA) 0x0000011C (284)	Microsoft ACPI-Compliant System
(ISA) 0x0000011D (285)	Microsoft ACPI-Compliant System
(ISA) 0x0000011E (286)	Microsoft ACPI-Compliant System
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(ISA) 0x0000012A (298)	Microsoft ACPI-Compliant System
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(ISA) 0x0000012C (300)	Microsoft ACPI-Compliant System
(ISA) 0x0000012D (301)	Microsoft ACPI-Compliant System
(ISA) 0x0000012E (302)	Microsoft ACPI-Compliant System
(ISA) 0x0000012F (303)	Microsoft ACPI-Compliant System
(ISA) 0x00000130 (304)	Microsoft ACPI-Compliant System
(ISA) 0x00000131 (305)	Microsoft ACPI-Compliant System
(ISA) 0x00000132 (306)	Microsoft ACPI-Compliant System
(ISA) 0x00000133 (307)	Microsoft ACPI-Compliant System
(ISA) 0x00000134 (308)	Microsoft ACPI-Compliant System
(ISA) 0x00000135 (309)	Microsoft ACPI-Compliant System
(ISA) 0x00000136 (310)	Microsoft ACPI-Compliant System
(ISA) 0x00000137 (311)	Microsoft ACPI-Compliant System
(ISA) 0x00000138 (312)	Microsoft ACPI-Compliant System
(ISA) 0x00000139 (313)	Microsoft ACPI-Compliant System
(ISA) 0x0000013A (314)	Microsoft ACPI-Compliant System
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(ISA) 0x0000013C (316)	Microsoft ACPI-Compliant System
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(ISA) 0x0000013E (318)	Microsoft ACPI-Compliant System
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(ISA) 0x00000144 (324)	Microsoft ACPI-Compliant System
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(ISA) 0x00000146 (326)	Microsoft ACPI-Compliant System
(ISA) 0x00000147 (327)	Microsoft ACPI-Compliant System
(ISA) 0x00000148 (328)	Microsoft ACPI-Compliant System
(ISA) 0x00000149 (329)	Microsoft ACPI-Compliant System
(ISA) 0x0000014A (330)	Microsoft ACPI-Compliant System
(ISA) 0x0000014B (331)	Microsoft ACPI-Compliant System
(ISA) 0x0000014C (332)	Microsoft ACPI-Compliant System
(ISA) 0x0000014D (333)	Microsoft ACPI-Compliant System
(ISA) 0x0000014E (334)	Microsoft ACPI-Compliant System
(ISA) 0x0000014F (335)	Microsoft ACPI-Compliant System
(ISA) 0x00000150 (336)	Microsoft ACPI-Compliant System
(ISA) 0x00000151 (337)	Microsoft ACPI-Compliant System
(ISA) 0x00000152 (338)	Microsoft ACPI-Compliant System
(ISA) 0x00000153 (339)	Microsoft ACPI-Compliant System
(ISA) 0x00000154 (340)	Microsoft ACPI-Compliant System
(ISA) 0x00000155 (341)	Microsoft ACPI-Compliant System
(ISA) 0x00000156 (342)	Microsoft ACPI-Compliant System
(ISA) 0x00000157 (343)	Microsoft ACPI-Compliant System
(ISA) 0x00000158 (344)	Microsoft ACPI-Compliant System
(ISA) 0x00000159 (345)	Microsoft ACPI-Compliant System
(ISA) 0x0000015A (346)	Microsoft ACPI-Compliant System
(ISA) 0x0000015B (347)	Microsoft ACPI-Compliant System
(ISA) 0x0000015C (348)	Microsoft ACPI-Compliant System
(ISA) 0x0000015D (349)	Microsoft ACPI-Compliant System
(ISA) 0x0000015E (350)	Microsoft ACPI-Compliant System
(ISA) 0x0000015F (351)	Microsoft ACPI-Compliant System
(ISA) 0x00000160 (352)	Microsoft ACPI-Compliant System
(ISA) 0x00000161 (353)	Microsoft ACPI-Compliant System
(ISA) 0x00000162 (354)	Microsoft ACPI-Compliant System
(ISA) 0x00000163 (355)	Microsoft ACPI-Compliant System
(ISA) 0x00000164 (356)	Microsoft ACPI-Compliant System
(ISA) 0x00000165 (357)	Microsoft ACPI-Compliant System
(ISA) 0x00000166 (358)	Microsoft ACPI-Compliant System
(ISA) 0x00000167 (359)	Microsoft ACPI-Compliant System
(ISA) 0x00000168 (360)	Microsoft ACPI-Compliant System
(ISA) 0x00000169 (361)	Microsoft ACPI-Compliant System

(ISA) 0x0000016A (362)   Microsoft ACPI-Compliant System
(ISA) 0x0000016B (363)   Microsoft ACPI-Compliant System
(ISA) 0x0000016C (364)   Microsoft ACPI-Compliant System
(ISA) 0x0000016D (365)   Microsoft ACPI-Compliant System
(ISA) 0x0000016E (366)   Microsoft ACPI-Compliant System
(ISA) 0x0000016F (367)   Microsoft ACPI-Compliant System
(ISA) 0x00000170 (368)   Microsoft ACPI-Compliant System
(ISA) 0x00000171 (369)   Microsoft ACPI-Compliant System
(ISA) 0x00000172 (370)   Microsoft ACPI-Compliant System
(ISA) 0x00000173 (371)   Microsoft ACPI-Compliant System
(ISA) 0x00000174 (372)   Microsoft ACPI-Compliant System
(ISA) 0x00000175 (373)   Microsoft ACPI-Compliant System
(ISA) 0x00000176 (374)   Microsoft ACPI-Compliant System
(ISA) 0x00000177 (375)   Microsoft ACPI-Compliant System
(ISA) 0x00000178 (376)   Microsoft ACPI-Compliant System
(ISA) 0x00000179 (377)   Microsoft ACPI-Compliant System
(ISA) 0x0000017A (378)   Microsoft ACPI-Compliant System
(ISA) 0x0000017B (379)   Microsoft ACPI-Compliant System
(ISA) 0x0000017C (380)   Microsoft ACPI-Compliant System
(ISA) 0x0000017D (381)   Microsoft ACPI-Compliant System
(ISA) 0x0000017E (382)   Microsoft ACPI-Compliant System
(ISA) 0x0000017F (383)   Microsoft ACPI-Compliant System
(ISA) 0x00000180 (384)   Microsoft ACPI-Compliant System
(ISA) 0x00000181 (385)   Microsoft ACPI-Compliant System
(ISA) 0x00000182 (386)   Microsoft ACPI-Compliant System
(ISA) 0x00000183 (387)   Microsoft ACPI-Compliant System
(ISA) 0x00000184 (388)   Microsoft ACPI-Compliant System
(ISA) 0x00000185 (389)   Microsoft ACPI-Compliant System
(ISA) 0x00000186 (390)   Microsoft ACPI-Compliant System
(ISA) 0x00000187 (391)   Microsoft ACPI-Compliant System
(ISA) 0x00000188 (392)   Microsoft ACPI-Compliant System
(ISA) 0x00000189 (393)   Microsoft ACPI-Compliant System
(ISA) 0x0000018A (394)   Microsoft ACPI-Compliant System
(ISA) 0x0000018B (395)   Microsoft ACPI-Compliant System
(ISA) 0x0000018C (396)   Microsoft ACPI-Compliant System
(ISA) 0x0000018D (397)   Microsoft ACPI-Compliant System
(ISA) 0x0000018E (398)   Microsoft ACPI-Compliant System
(ISA) 0x0000018F (399)   Microsoft ACPI-Compliant System
(ISA) 0x00000190 (400)   Microsoft ACPI-Compliant System
(ISA) 0x00000191 (401)   Microsoft ACPI-Compliant System
(ISA) 0x00000192 (402)   Microsoft ACPI-Compliant System
(ISA) 0x00000193 (403)   Microsoft ACPI-Compliant System
(ISA) 0x00000194 (404)   Microsoft ACPI-Compliant System
(ISA) 0x00000195 (405)   Microsoft ACPI-Compliant System
(ISA) 0x00000196 (406)   Microsoft ACPI-Compliant System
(ISA) 0x00000197 (407)   Microsoft ACPI-Compliant System
(ISA) 0x00000198 (408)   Microsoft ACPI-Compliant System
(ISA) 0x00000199 (409)   Microsoft ACPI-Compliant System
(ISA) 0x0000019A (410)   Microsoft ACPI-Compliant System
(ISA) 0x0000019B (411)   Microsoft ACPI-Compliant System
(ISA) 0x0000019C (412)   Microsoft ACPI-Compliant System
(ISA) 0x0000019D (413)   Microsoft ACPI-Compliant System
(ISA) 0x0000019E (414)   Microsoft ACPI-Compliant System
(ISA) 0x0000019F (415)   Microsoft ACPI-Compliant System
(ISA) 0x000001A0 (416)   Microsoft ACPI-Compliant System
(ISA) 0x000001A1 (417)   Microsoft ACPI-Compliant System
(ISA) 0x000001A2 (418)   Microsoft ACPI-Compliant System
(ISA) 0x000001A3 (419)   Microsoft ACPI-Compliant System
(ISA) 0x000001A4 (420)   Microsoft ACPI-Compliant System
(ISA) 0x000001A5 (421)   Microsoft ACPI-Compliant System
(ISA) 0x000001A6 (422)   Microsoft ACPI-Compliant System
(ISA) 0x000001A7 (423)   Microsoft ACPI-Compliant System
(ISA) 0x000001A8 (424)   Microsoft ACPI-Compliant System
(ISA) 0x000001A9 (425)   Microsoft ACPI-Compliant System
(ISA) 0x000001AA (426)   Microsoft ACPI-Compliant System
(ISA) 0x000001AB (427)   Microsoft ACPI-Compliant System
(ISA) 0x000001AC (428)   Microsoft ACPI-Compliant System
(ISA) 0x000001AD (429)   Microsoft ACPI-Compliant System
(ISA) 0x000001AE (430)   Microsoft ACPI-Compliant System
(ISA) 0x000001AF (431)   Microsoft ACPI-Compliant System
(ISA) 0x000001B0 (432)   Microsoft ACPI-Compliant System

(ISA) 0x000001B1 (433)   Microsoft ACPI-Compliant System
(ISA) 0x000001B2 (434)   Microsoft ACPI-Compliant System
(ISA) 0x000001B3 (435)   Microsoft ACPI-Compliant System
(ISA) 0x000001B4 (436)   Microsoft ACPI-Compliant System
(ISA) 0x000001B5 (437)   Microsoft ACPI-Compliant System
(ISA) 0x000001B6 (438)   Microsoft ACPI-Compliant System
(ISA) 0x000001B7 (439)   Microsoft ACPI-Compliant System
(ISA) 0x000001B8 (440)   Microsoft ACPI-Compliant System
(ISA) 0x000001B9 (441)   Microsoft ACPI-Compliant System
(ISA) 0x000001BA (442)   Microsoft ACPI-Compliant System
(ISA) 0x000001BB (443)   Microsoft ACPI-Compliant System
(ISA) 0x000001BC (444)   Microsoft ACPI-Compliant System
(ISA) 0x000001BD (445)   Microsoft ACPI-Compliant System
(ISA) 0x000001BE (446)   Microsoft ACPI-Compliant System
(ISA) 0x000001BF (447)   Microsoft ACPI-Compliant System
(ISA) 0x000001C0 (448)   Microsoft ACPI-Compliant System
(ISA) 0x000001C1 (449)   Microsoft ACPI-Compliant System
(ISA) 0x000001C2 (450)   Microsoft ACPI-Compliant System
(ISA) 0x000001C3 (451)   Microsoft ACPI-Compliant System
(ISA) 0x000001C4 (452)   Microsoft ACPI-Compliant System
(ISA) 0x000001C5 (453)   Microsoft ACPI-Compliant System
(ISA) 0x000001C6 (454)   Microsoft ACPI-Compliant System
(ISA) 0x000001C7 (455)   Microsoft ACPI-Compliant System
(ISA) 0x000001C8 (456)   Microsoft ACPI-Compliant System
(ISA) 0x000001C9 (457)   Microsoft ACPI-Compliant System
(ISA) 0x000001CA (458)   Microsoft ACPI-Compliant System
(ISA) 0x000001CB (459)   Microsoft ACPI-Compliant System
(ISA) 0x000001CC (460)   Microsoft ACPI-Compliant System
(ISA) 0x000001CD (461)   Microsoft ACPI-Compliant System
(ISA) 0x000001CE (462)   Microsoft ACPI-Compliant System
(ISA) 0x000001CF (463)   Microsoft ACPI-Compliant System
(ISA) 0x000001D0 (464)   Microsoft ACPI-Compliant System
(ISA) 0x000001D1 (465)   Microsoft ACPI-Compliant System
(ISA) 0x000001D2 (466)   Microsoft ACPI-Compliant System
(ISA) 0x000001D3 (467)   Microsoft ACPI-Compliant System
(ISA) 0x000001D4 (468)   Microsoft ACPI-Compliant System
(ISA) 0x000001D5 (469)   Microsoft ACPI-Compliant System
(ISA) 0x000001D6 (470)   Microsoft ACPI-Compliant System
(ISA) 0x000001D7 (471)   Microsoft ACPI-Compliant System
(ISA) 0x000001D8 (472)   Microsoft ACPI-Compliant System
(ISA) 0x000001D9 (473)   Microsoft ACPI-Compliant System
(ISA) 0x000001DA (474)   Microsoft ACPI-Compliant System
(ISA) 0x000001DB (475)   Microsoft ACPI-Compliant System
(ISA) 0x000001DC (476)   Microsoft ACPI-Compliant System
(ISA) 0x000001DD (477)   Microsoft ACPI-Compliant System
(ISA) 0x000001DE (478)   Microsoft ACPI-Compliant System
(ISA) 0x000001DF (479)   Microsoft ACPI-Compliant System
(ISA) 0x000001E0 (480)   Microsoft ACPI-Compliant System
(ISA) 0x000001E1 (481)   Microsoft ACPI-Compliant System
(ISA) 0x000001E2 (482)   Microsoft ACPI-Compliant System
(ISA) 0x000001E3 (483)   Microsoft ACPI-Compliant System
(ISA) 0x000001E4 (484)   Microsoft ACPI-Compliant System
(ISA) 0x000001E5 (485)   Microsoft ACPI-Compliant System
(ISA) 0x000001E6 (486)   Microsoft ACPI-Compliant System
(ISA) 0x000001E7 (487)   Microsoft ACPI-Compliant System
(ISA) 0x000001E8 (488)   Microsoft ACPI-Compliant System
(ISA) 0x000001E9 (489)   Microsoft ACPI-Compliant System
(ISA) 0x000001EA (490)   Microsoft ACPI-Compliant System
(ISA) 0x000001EB (491)   Microsoft ACPI-Compliant System
(ISA) 0x000001EC (492)   Microsoft ACPI-Compliant System
(ISA) 0x000001ED (493)   Microsoft ACPI-Compliant System
(ISA) 0x000001EE (494)   Microsoft ACPI-Compliant System
(ISA) 0x000001EF (495)   Microsoft ACPI-Compliant System
(ISA) 0x000001F0 (496)   Microsoft ACPI-Compliant System
(ISA) 0x000001F1 (497)   Microsoft ACPI-Compliant System
(ISA) 0x000001F2 (498)   Microsoft ACPI-Compliant System
(ISA) 0x000001F3 (499)   Microsoft ACPI-Compliant System
(ISA) 0x000001F4 (500)   Microsoft ACPI-Compliant System
(ISA) 0x000001F5 (501)   Microsoft ACPI-Compliant System
(ISA) 0x000001F6 (502)   Microsoft ACPI-Compliant System
(ISA) 0x000001F7 (503)   Microsoft ACPI-Compliant System
(ISA) 0x000001F8 (504)   Microsoft ACPI-Compliant System
(ISA) 0x000001F9 (505)   Microsoft ACPI-Compliant System

(ISA) 0x000001FA (506)   Microsoft ACPI-Compliant System
(ISA) 0x000001FB (507)   Microsoft ACPI-Compliant System
(ISA) 0x000001FC (508)   Microsoft ACPI-Compliant System
(ISA) 0x000001FD (509)   Microsoft ACPI-Compliant System
(ISA) 0x000001FE (510)   Microsoft ACPI-Compliant System
(ISA) 0x000001FF (511)   Microsoft ACPI-Compliant System
(PCI) 0x00000019 (25)   High Definition Audio Controller
(PCI) 0xFFFFFFEB (-21)   Intel(R) HD Graphics
(PCI) 0xFFFFFFEC (-20)   Intel(R) I211 Gigabit Network Connection #2
(PCI) 0xFFFFFFED (-19)   Intel(R) I211 Gigabit Network Connection #2
(PCI) 0xFFFFFFEE (-18)   Intel(R) I211 Gigabit Network Connection #2
(PCI) 0xFFFFFFEF (-17)   Intel(R) I211 Gigabit Network Connection #2
(PCI) 0xFFFFFFF0 (-16)   Intel(R) I211 Gigabit Network Connection #2
(PCI) 0xFFFFFFF1 (-15)   Intel(R) I211 Gigabit Network Connection #2
(PCI) 0xFFFFFFF2 (-14)   Intel(R) I211 Gigabit Network Connection
(PCI) 0xFFFFFFF3 (-13)   Intel(R) I211 Gigabit Network Connection
(PCI) 0xFFFFFFF4 (-12)   Intel(R) I211 Gigabit Network Connection
(PCI) 0xFFFFFFF5 (-11)   Intel(R) I211 Gigabit Network Connection
(PCI) 0xFFFFFFF6 (-10)   Intel(R) I211 Gigabit Network Connection
(PCI) 0xFFFFFFF7 (-9)   Intel(R) I211 Gigabit Network Connection
(PCI) 0xFFFFFFF8 (-8)   Intel(R) Trusted Execution Engine Interface
(PCI) 0xFFFFFFF9 (-7)   Intel(R) USB 3.0 eXtensible Host Controller - 1.0 (Microsoft)
(PCI) 0xFFFFFFFA (-6)   Standard SATA AHCI Controller
(PCI) 0xFFFFFFFB (-5)   Intel(R) Celeron(R)/Pentium(R) Processor PCI Express Root Port - 5AD7
(PCI) 0xFFFFFFFC (-4)   Intel(R) Celeron(R)/Pentium(R) Processor PCI Express Root Port - 5AD8
(PCI) 0xFFFFFFFD (-3)   Intel(R) Celeron(R)/Pentium(R) Processor PCI Express Root Port - 5AD6
(PCI) 0xFFFFFFFE (-2)   Intel(R) Celeron(R)/Pentium(R) Processor PCI Express Root Port - 5ADA

3.6   Memory Map

The memory mapping list is shown as follows:

```
Memory
    [000000007B800001 - 000000007BFFFFFF]  PCI Express Root Complex
    [000000007C000001 - 000000007FFFFFFF]  PCI Express Root Complex
    [0000000080000000 - 000000008FFFFFFF]  Intel(R) HD Graphics
    [0000000080000000 - 000000008FFFFFFF]  Intel(R) HD Graphics
    [0000000080000000 - 00000000CFFFFFFF]  PCI Express Root Complex
    [0000000090000000 - 0000000090FFFFFF]  Intel(R) HD Graphics
    [0000000090000000 - 0000000090FFFFFF]  Intel(R) HD Graphics
    [0000000091000000 - 00000000910FFFFF]  High Definition Audio Controller
    [0000000091100000 - 00000000911FFFFF]  Intel(R) Celeron(R)/Pentium(R) Processor PCI Express Root Port - 5AD6
    [00000000911DC000 - 00000000911DFFFF]  Intel(R) I211 Gigabit Network Connection
    [00000000911E0000 - 00000000911FFFFF]  Intel(R) I211 Gigabit Network Connection
    [0000000091200000 - 00000000912FFFFF]  Intel(R) Celeron(R)/Pentium(R) Processor PCI Express Root Port - 5ADA
    [00000000912DC000 - 00000000912DFFFF]  Intel(R) I211 Gigabit Network Connection #2
    [00000000912E0000 - 00000000912FFFFF]  Intel(R) I211 Gigabit Network Connection #2
    [0000000091300000 - 000000009130FFFF]  Intel(R) USB 3.0 eXtensible Host Controller - 1.0 (Microsoft)
    [0000000091310000 - 0000000091313FFF]  High Definition Audio Controller
    [0000000091314000 - 0000000091315FFF]  Standard SATA AHCI Controller
    [0000000091316000 - 00000000913160FF]  Intel(R) Celeron(R)/Pentium(R) Processor SMBUS - 5AD4
    [0000000091317000 - 00000000913177FF]  Standard SATA AHCI Controller
    [0000000091318000 - 00000000913180FF]  Standard SATA AHCI Controller
    [000000009131B000 - 000000009131BFFF]  Intel(R) Trusted Execution Engine Interface
    [00000000E0000000 - 00000000EFFFFFFF]  Motherboard resources
    [00000000E0000000 - 00000000EFFFFFFF]  PCI Express Root Complex
    [00000000FEA00000 - 00000000FEAFFFFF]  Motherboard resources
    [00000000FED00000 - 00000000FED003FF]  High precision event timer
    [00000000FED01000 - 00000000FED01FFF]  Motherboard resources
    [00000000FED03000 - 00000000FED03FFF]  Motherboard resources
    [00000000FED06000 - 00000000FED06FFF]  Motherboard resources
    [00000000FED08000 - 00000000FED09FFF]  Motherboard resources
    [00000000FED1C000 - 00000000FED1CFFF]  Motherboard resources
    [00000000FED80000 - 00000000FEDBFFFF]  Motherboard resources
    [00000000FEE00000 - 00000000FEEFFFFF]  Motherboard resources
```

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Section 4
AMI BIOS Setup Utility

The AMI UEFI BIOS provides users with a built-in setup program to modify basic system configuration. All configured parameters are stored in a flash chip to save the setup information whenever the power is turned off. This chapter provides users with detailed description about how to set up basic system configuration through the AMI BIOS setup utility.

4.1   Starting

To enter the setup screens, follow the steps below:

1.   Turn on the computer and press the <Del> key immediately.
2.   After you press the <Del> key, the main BIOS setup menu displays. You can access the other setup screens from the main BIOS setup menu, such as the Advanced and Chipset menus.

> **Note**
>
> *If your computer cannot boot after making and saving system changes with BIOS setup, you can restore BIOS optimal defaults by setting JP1 (see section 2.4.2).*

It is strongly recommended that you should avoid changing the chipset's defaults. Both AMI and your system manufacturer have carefully set up these defaults that provide the best performance and reliability.

4.2   Navigation Keys

The BIOS setup/utility uses a key-based navigation system called hot keys. Most of the BIOS setup utility hot keys can be used at any time during the setup navigation process. These keys include <F1>, <F2>, <Enter>, <ESC>, <Arrow> keys, and so on.

> **Note**
>
> *Some of the navigation keys differ from one screen to another.*

Hot Keys	Description
→← **Left/Right**	The Left and Right <Arrow> keys allow you to select a setup screen.
↑↓ **Up/Down**	The Up and Down <Arrow> keys allow you to select a setup screen or sub-screen.
+– Plus/Minus	The Plus and Minus <Arrow> keys allow you to change the field value of a particular setup item.
Tab	The <Tab> key allows you to select setup fields.
F1	The <F1> key allows you to display the General Help screen.
F2	The <F2> key allows you to Load Previous Values.
F3	The <F3> key allows you to Load Optimized Defaults.
F4	The <F4> key allows you to save any changes you have made and exit Setup. Press the <F4> key to save your changes.
Esc	The <Esc> key allows you to discard any changes you have made and exit the Setup. Press the <Esc> key to exit the setup without saving your changes.
Enter	The <Enter> key allows you to display or change the setup option listed for a particular setup item. The <Enter> key can also allow you to display the setup sub- screens.

4.3 Main Menu

When you first enter the setup utility, you will enter the Main setup screen. You can always return to the Main setup screen by selecting the Main tab. System Time/Date can be set up as described below. The Main BIOS setup screen is shown below.

```
           Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
  Main   Advanced   Chipset   Security   Boot   Save & Exit

  BIOS Information                                        Set the Date. Use Tab to
  Project Version              PICO318 X007               switch between Date elements.
  Build Date and Time          06/29/2018 10:01:16        Default Ranges:
                                                          Year: 2005~2099
  EC Information                                          Months: 1-12
  Firmware Version             PICO318 X02                Days: dependent on month

  System Date                  [Fri 09/21/2018]
  System Time                  [19:44:46]

  Access Level                 Administrator
                                                          ++: Select Screen
                                                          ↑↓: Select Item
                                                          Enter: Select
                                                          +/-: Change Opt.
                                                          F1: General Help
                                                          F2: Previous Values
                                                          F3: Optimized Defaults
                                                          F4: Save & Exit
                                                          ESC: Exit

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```

- **BIOS and EC Information**
  Display BIOS and EC firmware information.

- **System Date/Time**
  Use this option to change the system time and date. Highlight System Time or System Date using the <Arrow> keys. Enter new values through the keyboard. Press the <Tab> key or the <Arrow> keys to move between fields. The date must be entered in MM/DD/YY format. The time is entered in HH:MM:SS format.

- **Access Level**
  Display the access level of current user.

4.4 Advanced Menu

The Advanced menu also allows users to set configuration of the CPU and other system devices. You can select any of the items in the left frame of the screen to go to the sub menus:

- ► Ec DIO Configuration
- ► Serial Port Configuration
- ► Hardware Monitor
- ► ACPI Settings
- ► CPU Configuration
- ► SATA Configuration
- ► USB Configuration
- ► Utility Configuration

For items marked with "►", please press <Enter> for more options.

```
           Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
    Main   Advanced   Chipset   Security   Boot   Save & Exit

 ▶ Ec DIO Configuration                                          Ec DIO status
 ▶ Serial Port Configuration
 ▶ Hardware Monitor
 ▶ ACPI Settings
 ▶ CPU Configuration
 ▶ SATA Configuration
 ▶ USB Configuration
 ▶ Utility Configuration


                                                         →←: Select Screen
                                                         ↑↓: Select Item
                                                         Enter: Select
                                                         +/-: Change Opt.
                                                         F1: General Help
                                                         F2: Previous Values
                                                         F3: Optimized Defaults
                                                         F4: Save & Exit
                                                         ESC: Exit



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```

● **Ec DIO Configuration**
You can use this screen to select options for the 4-bit Digital I/O Configuration. A description of selected item appears on the right side of the screen. For items marked with "►", please press <Enter> for more options.

```
           Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
     Advanced

    Ec DIO Configuration                                  Enabled or Disabled DIO
    DIO Modification                  [Disabled]          Modification
  ► EC DIO port 1-4




                                                          →←: Select Screen
                                                          ↑↓: Select Item
                                                          Enter: Select
                                                          +/-: Change Opt.
                                                          F1: General Help
                                                          F2: Previous Values
                                                          F3: Optimized Defaults
                                                          F4: Save & Exit
                                                          ESC: Exit



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```
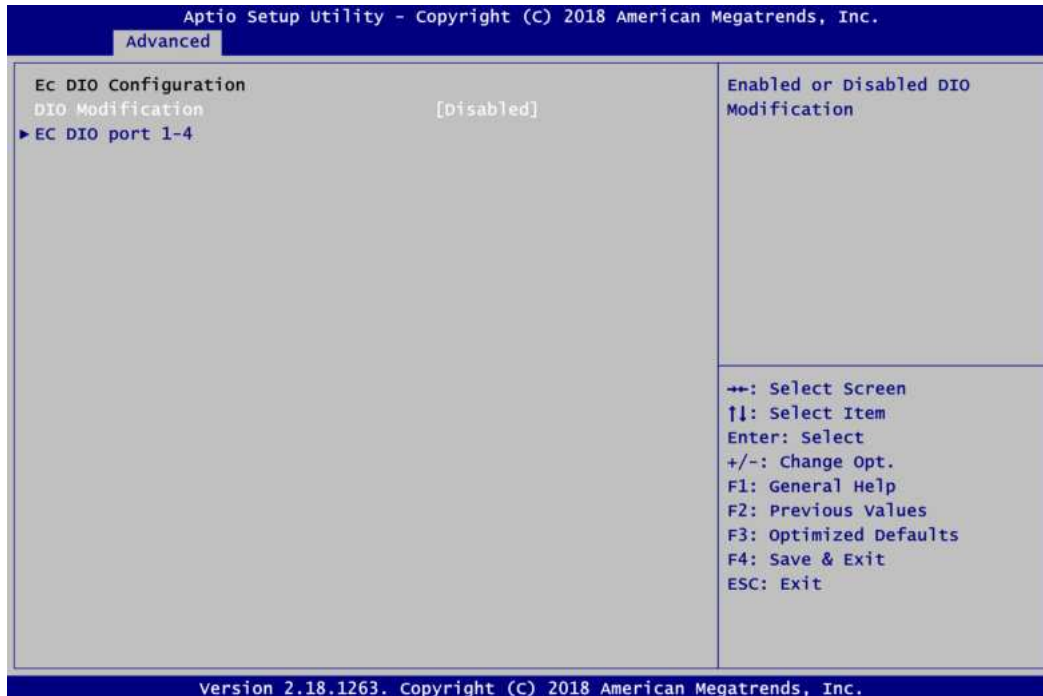
DIO Modification
Enable or disable digital I/O modification. The default is Disabled.

EC DIO port 1-4
Use this item to set parameters of DIO1~4, and change the DIO type of the selected option.

If DIO Modification is disabled, you are not allowed to change inputs/outputs setting. The DIO status sub screen is as follows:

```
     Advanced

    DIO Status
    1. Input/Output Status            Out & Low
    2. Input/Output Status             In & High
    3. Input/Output Status            Out & Low
    4. Input/Output Status             In & High
```
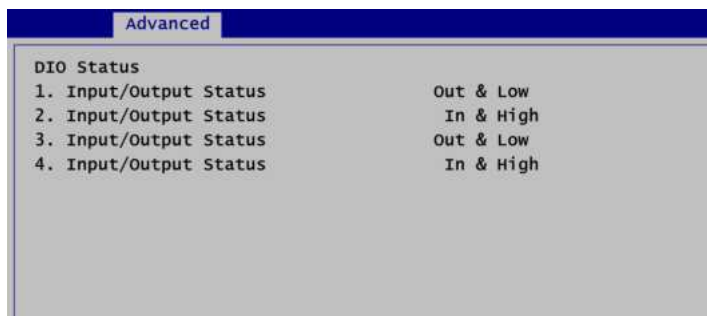
If DIO Modification is enabled, you can load manufacture default and access to the DIO status sub screen to change inputs/outputs setting, see images below.

```
         Advanced

 Ec DIO Configuration
 DIO Modification                [Enabled]
▶ Load Manufacture Default
▶ EC DIO port 1-4
```

```
         Advanced

 DIO Status
 1. Input/Output Status          Out & High
    Input/Output Setting          [Output]
    High/Low Setting              [High]
 2. Input/Output Status           In & High
    Input/Output Setting          [Input]
 3. Input/Output Status          Out & High
    Input/Output Setting          [Output]
    High/Low Setting              [High]
 4. Input/Output Status           In & High
    Input/Output Setting          [Input]
```

● **Serial Port Configuration**
You can use this screen to select options for the Serial Port Configuration, and change the value of the selected option. A description of the selected item appears on the right side of the screen. For items marked with "►", please press <Enter> for more options.

```
            Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
        Advanced

   Serial Port Configuration                                  Set Parameters of Serial Port
                                                              1 (COMA)
     Super IO Chip                    ECSUPERIO
   ► Serial Port 1 Configuration
   ► Serial Port 2 Configuration




                                                              →←: Select Screen
                                                              ↑↓: Select Item
                                                              Enter: Select
                                                              +/-: Change Opt.
                                                              F1: General Help
                                                              F2: Previous Values
                                                              F3: Optimized Defaults
                                                              F4: Save & Exit
                                                              ESC: Exit



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```
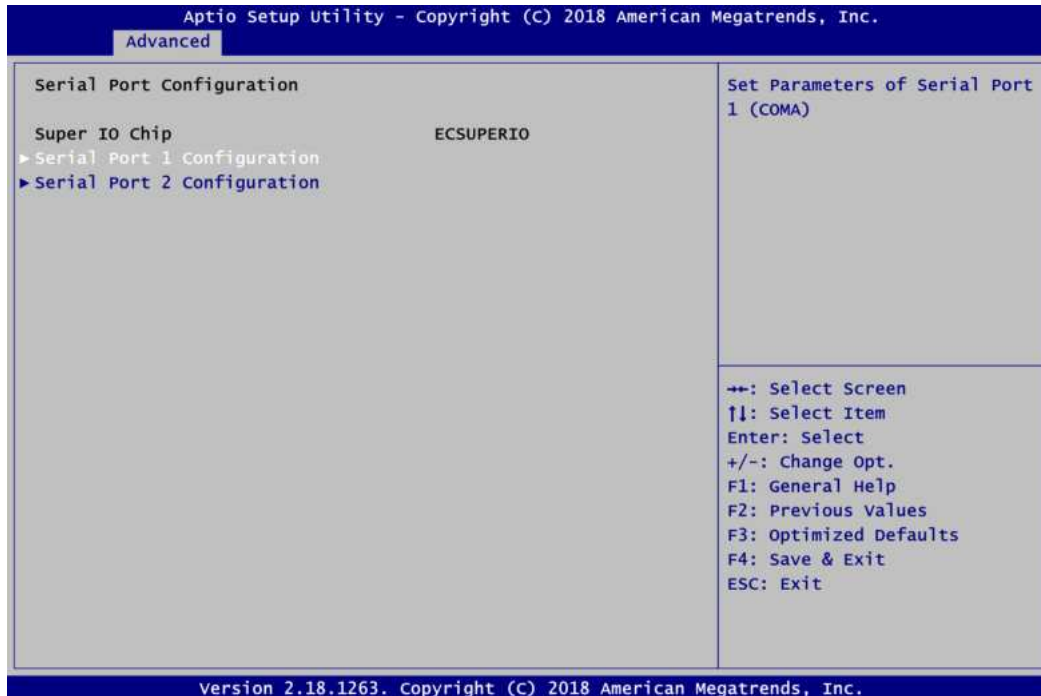
Serial Port 1~2 Configuration
Use these items to set parameters related to serial port 1~2.

● **Serial Port 1 Configuration**
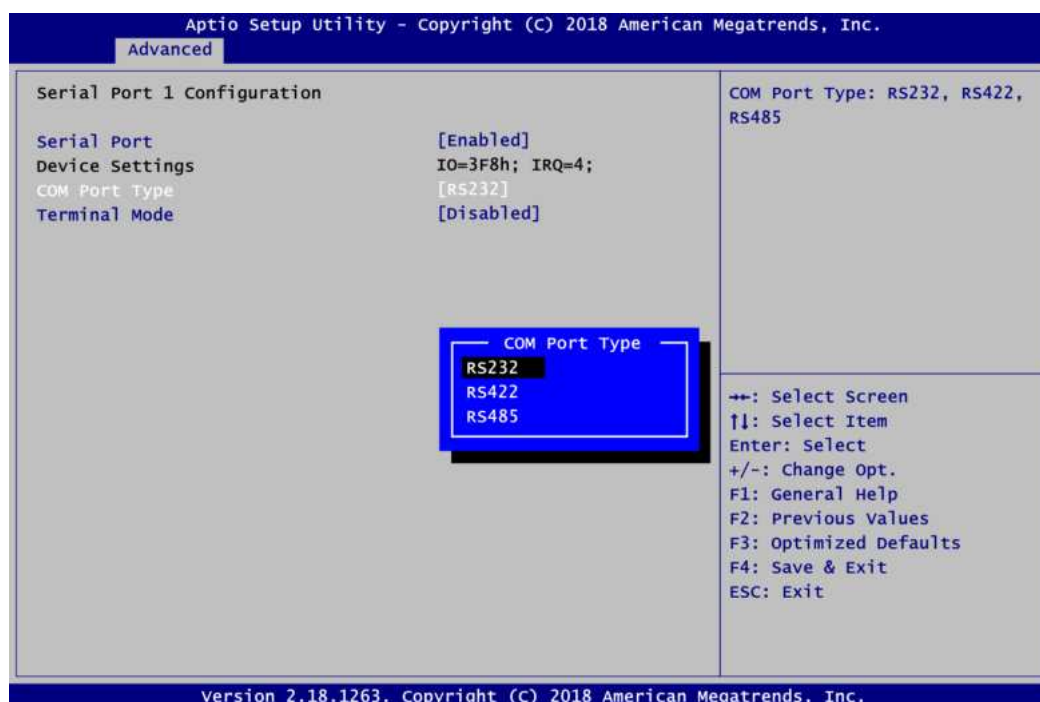
Serial Port
Enable or disable serial port 1. The optimal setting for base I/O address is 3F8h and for interrupt request address is IRQ4.

COM Port Type
Use this item to set RS-232/422/485 communication mode.

Terminal Mode
Enable terminal mode to enable the RS-422/485 termination resistor to enhance the signal.

● **Serial Port 2 Configuration**

```
Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
  Advanced

Serial Port 2 Configuration                        Enable or Disable Serial Port
                                                   (COM)
Serial Port                      [Enabled]
Device Settings                  IO=2F8h; IRQ=3;

                          ┌──── Serial Port ────┐
                          │ Disabled            │
                          │ Enabled             │
                          └─────────────────────┘

                                                   →←: Select Screen
                                                   ↑↓: Select Item
                                                   Enter: Select
                                                   +/-: Change Opt.
                                                   F1: General Help
                                                   F2: Previous Values
                                                   F3: Optimized Defaults
                                                   F4: Save & Exit
                                                   ESC: Exit

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```

Serial Port
Enable or disable serial port 2. The optimal setting for base I/O address is 2F8h and for interrupt request address is IRQ3.

● **Hardware Monitor**
This screen monitors hardware health status.

```
Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
  Advanced

PC Health Status

CPU Temperature                  : +57 ºC
System Temperature               : +43 ºC
VBAT                             : +2.96 V
+3.3V                            : +3.26 V
+3.3VSB                          : +3.26 V
+5VSB                            : +5.02 V

                                                   →←: Select Screen
                                                   ↑↓: Select Item
                                                   Enter: Select
                                                   +/-: Change Opt.
                                                   F1: General Help
                                                   F2: Previous Values
                                                   F3: Optimized Defaults
                                                   F4: Save & Exit
                                                   ESC: Exit

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```

This screen displays the temperature of system and CPU, system voltages (VBAT, +3.3V, +3.3VSB and +5VSB).

● **ACPI Settings**
You can use this screen to select options for the ACPI configuration, and change the value of the selected option. A description of the selected item appears on the right side of the screen.

```
             Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
      Advanced

  ACPI Settings                                                Select the highest ACPI sleep
                                                               state the system will enter
  ACPI Sleep State                    [S3 (Suspend to RAM)]    when the SUSPEND button is
                                                               pressed.

                                                               →←: Select Screen
                                                               ↑↓: Select Item
                                                               Enter: Select
                                                               +/-: Change Opt.
                                                               F1: General Help
                                                               F2: Previous Values
                                                               F3: Optimized Defaults
                                                               F4: Save & Exit
                                                               ESC: Exit

             Version 2.18.1263. Copyright (C) 2018 American Megatrends, Inc.
```
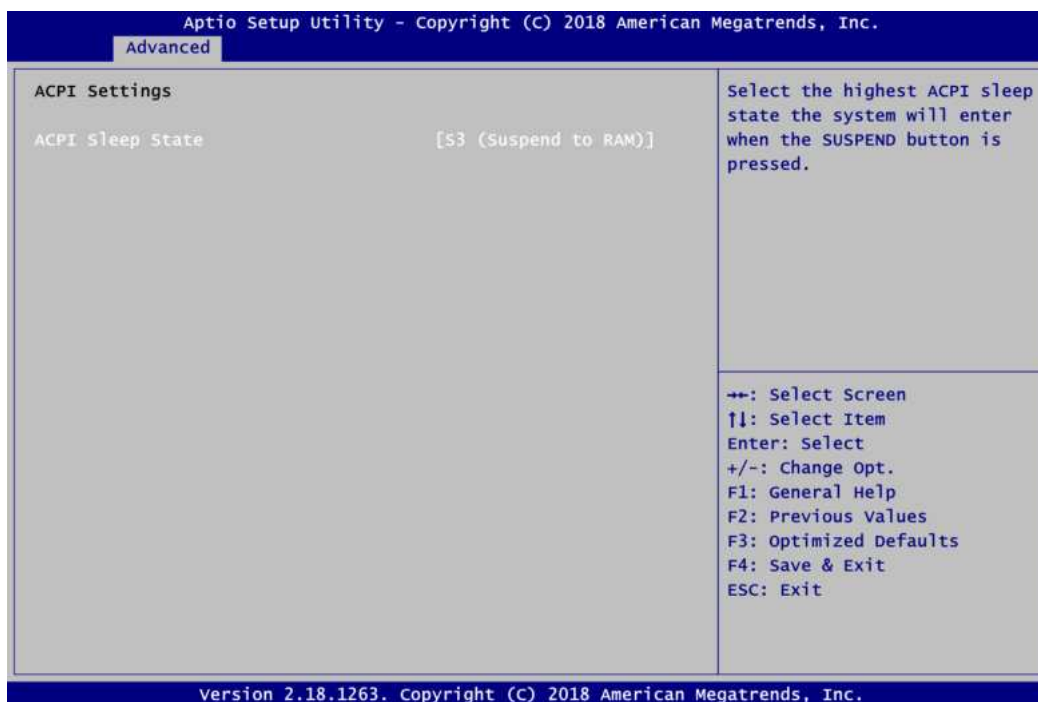
ACPI Sleep State
Select the ACPI (Advanced Configuration and Power Interface) sleep state. Configuration options are Suspend Disabled and S3 (Suspend to RAM). The S3 (Suspend to RAM) option selects ACPI sleep state the system will enter when suspend button is pressed.

● **CPU Configuration**
This screen shows the CPU Configuration and you can change the value of the selected option.
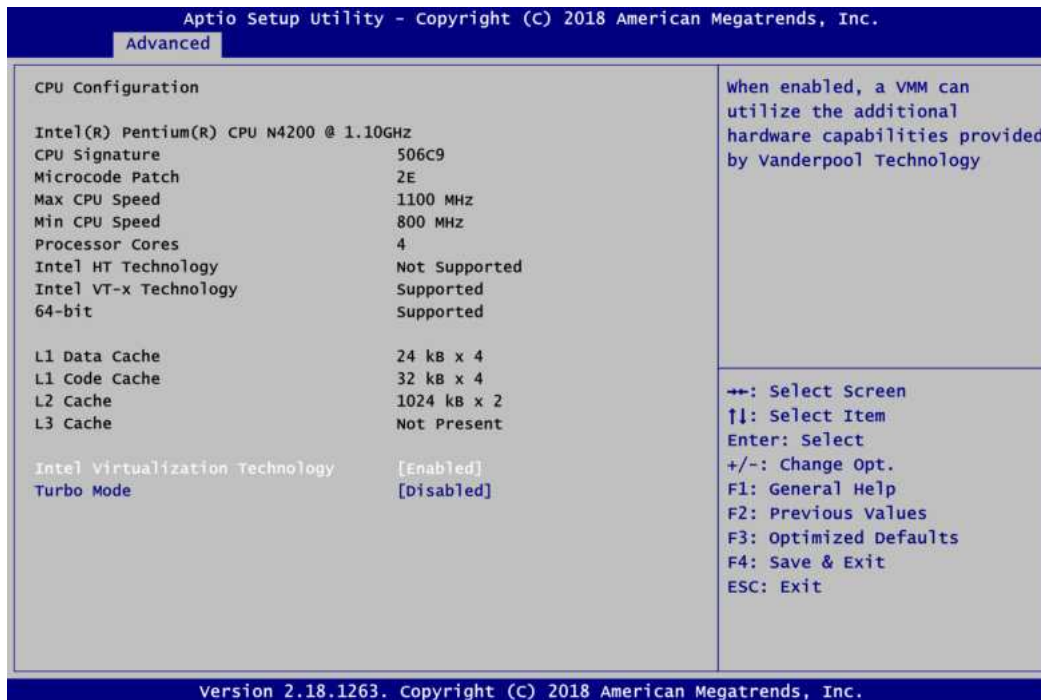
Intel Virtualization Technology
Enable or disable Intel® Virtualization Technology. When enabled, a VMM (Virtual Machine Mode) can utilize the additional hardware capabilities. It allows a platform to run multiple operating systems and applications independently, hence enabling a computer system to work as several virtual systems.

Turbo Mode
Enable or disable Intel® turbo boost mode allowing processor cores to run faster but not exceed CPU defined frequency limits.

- **SATA Configuration**
  During system boot up, BIOS automatically detects the presence of SATA devices. In SATA Configuration menu, you can see the current installed hardware in SATA ports.
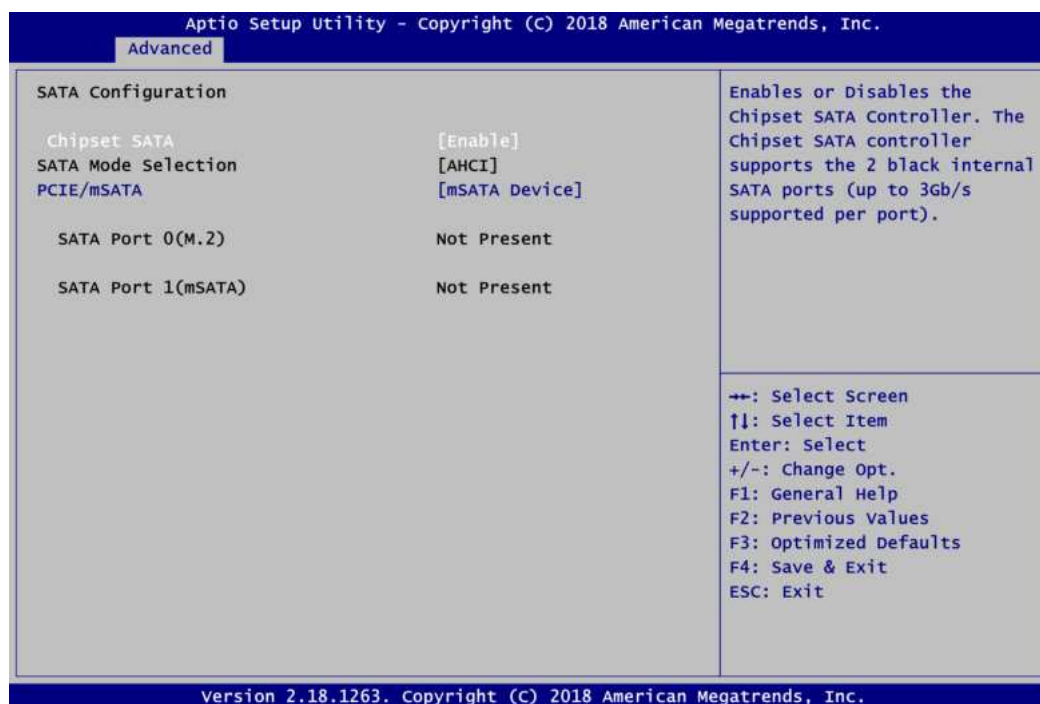
Chipset SATA
Enable or disable Chipset SATA Controller. The default is Enable.

SATA Mode Selection
The SATA operation mode is AHCI (Advanced Host Controller Interface).
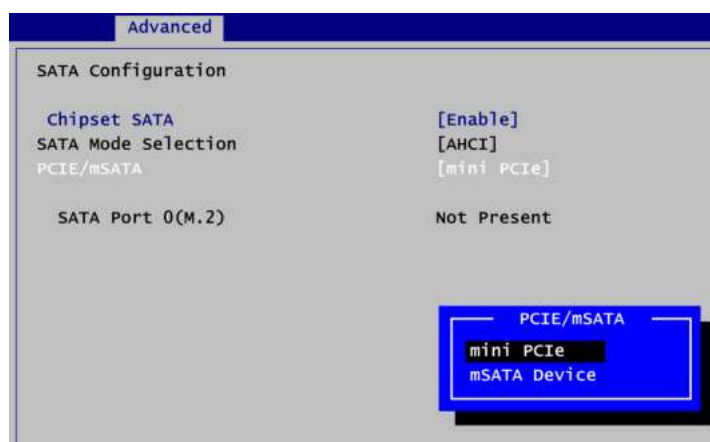
PCIE/mSATA
Choose mini PCIe or mSATA Device for PCI-Express Mini Card. The default is mini PCIe. If mSATA is needed to insert to SCN5 (see section 2.5.14), please change setting to mSATA Device.

● **USB Configuration**

```
              Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
    Advanced

 USB Configuration                                         Mass storage device emulation
                                                           type. 'AUTO' enumerates
 USB Module Version                      17                devices according to their
                                                           media format. Optical drives
 USB Controllers:                                          are emulated as 'CDROM',
       1 XHCI                                              drives with no media will be
 USB Devices:                                              emulated according to a drive
       1 Drive, 1 Keyboard, 1 Mouse                        type.

 Mass Storage Devices:
  1.00                                  [Auto]


                                                           →←: Select Screen
                                                           ↑↓: Select Item
                                                           Enter: Select
                                                           +/-: Change Opt.
                                                           F1: General Help
                                                           F2: Previous Values
                                                           F3: Optimized Defaults
                                                           F4: Save & Exit
                                                           ESC: Exit


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```

USB Devices
Display all detected USB devices.

● **Utility Configuration**

```
          Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
      Advanced

   Utility Configuration                            Update system BIOS only.
                                                    Please pull the BIOS ROM file
 ▶ BIOS Flash Utility                               in the USB flash disk before
 ▶ EC Flash Utility                                 execute this utility.




                                                    ↔: Select Screen
                                                    ↑↓: Select Item
                                                    Enter: Select
                                                    +/-: Change Opt.
                                                    F1: General Help
                                                    F2: Previous Values
                                                    F3: Optimized Defaults
                                                    F4: Save & Exit
                                                    ESC: Exit



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```

BIOS Flash Utility
BIOS flash utility configuration. For more detailed information, please refer to Appendix C.

EC Flash Utility
EC flash utility configuration. For more detailed information, please refer to Appendix C

4.5   Chipset Menu

The Chipset menu allows users to change the advanced chipset settings. You can select any of the items in the left frame of the screen to go to the sub menus:

> ► North Bridge
> ► South Bridge

For items marked with "►", please press <Enter> for more options.

```
              Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
     Main    Advanced   Chipset   Security    Boot    Save & Exit

  ► North Bridge                                      North Bridge Parameters
  ► South Bridge




                                                 →←: Select Screen
                                                 ↑↓: Select Item
                                                 Enter: Select
                                                 +/-: Change Opt.
                                                 F1: General Help
                                                 F2: Previous Values
                                                 F3: Optimized Defaults
                                                 F4: Save & Exit
                                                 ESC: Exit



              Version 2.18.1263. Copyright (C) 2018 American Megatrends, Inc.
```
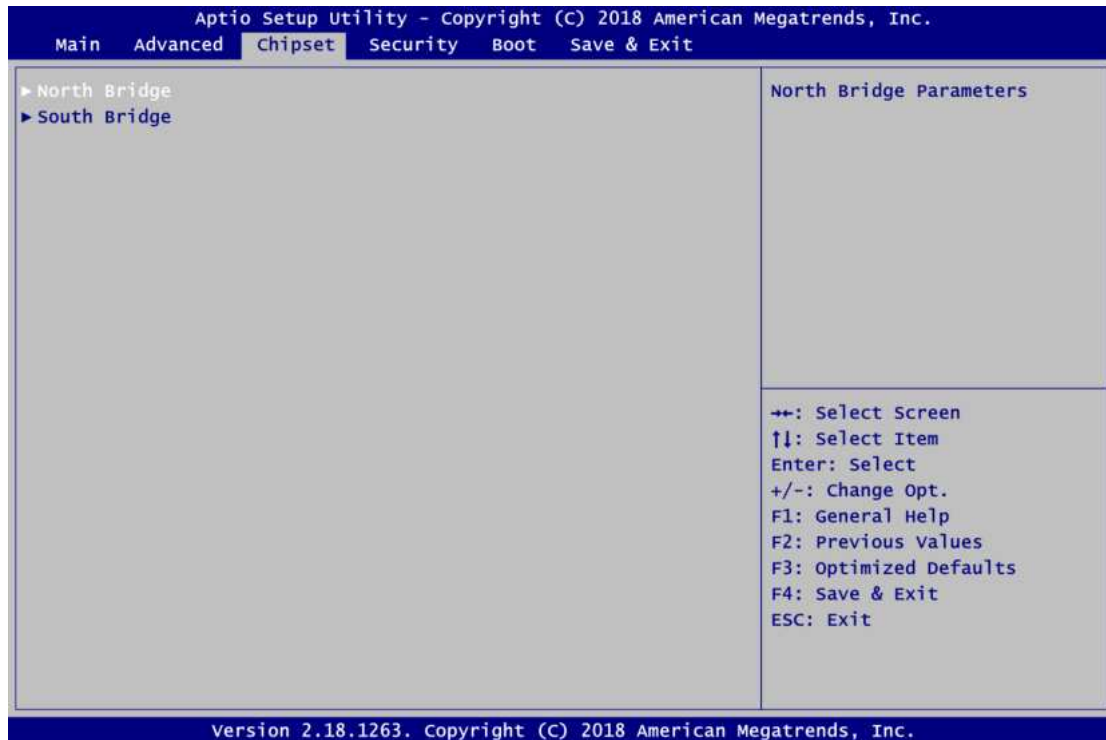
● **North Bridge**
This screen allows users to configure parameters of North Bridge chipset.
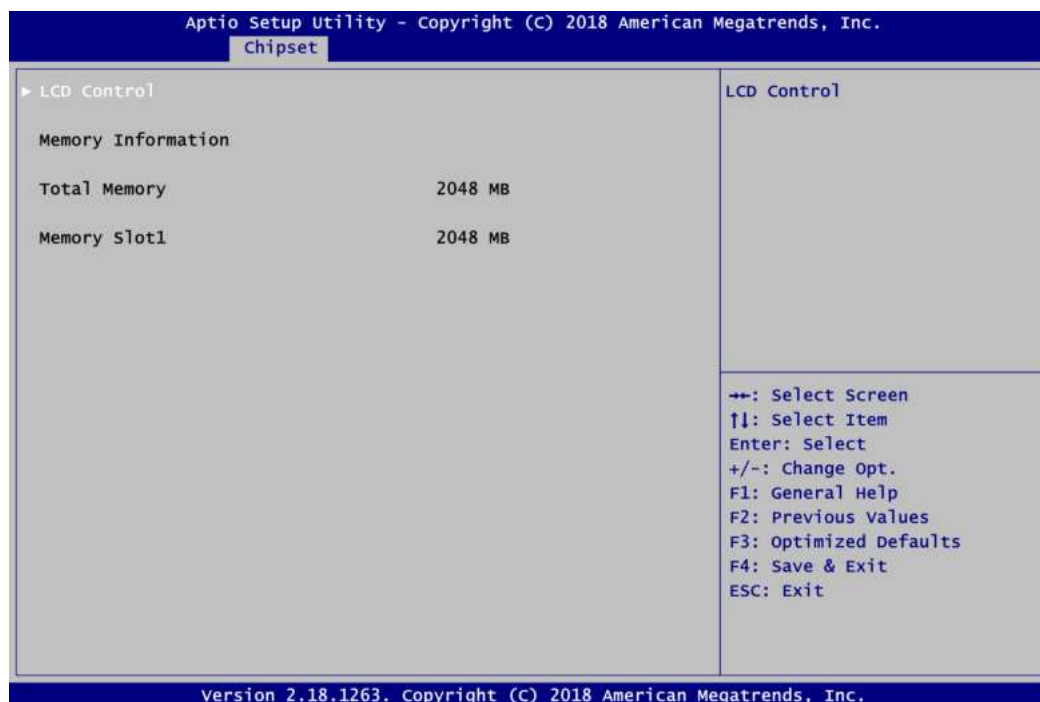
LCD Control
This item allows you to select LCD panel control options. Please press <Enter> to go to the sub menus.

Memory Information
Display system memory information.

```
Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
                           Chipset

 LCD Control                                      Enable/Disable LVDS Panel
                                                  support.
 LVDS Panel Device              [Enable]
 LVDS Panel Type                [1920x1080   48Bit]


                 ┌──── LVDS Panel Device ────┐
                 │ Enable                     │
                 │ Disable                    │
                 └────────────────────────────┘
                                                  →←: Select Screen
                                                  ↑↓: Select Item
                                                  Enter: Select
                                                  +/-: Change Opt.
                                                  F1: General Help
                                                  F2: Previous Values
                                                  F3: Optimized Defaults
                                                  F4: Save & Exit
                                                  ESC: Exit



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```

LVDS Panel Device
Enable or disable LVDS panel device.

```
Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
                           Chipset

 LCD Control                                      Select LCD panel used by DP
                                                  Device by selecting the
 LVDS Panel Device              [Enable]          appropriate setup item.
 LVDS Panel Type          ┌──── LVDS Panel Type ────┐
                          │ 800x600      18Bit       │
                          │ 1024x768     18Bit       │
                          │ 1024x768     24Bit       │
                          │ 1280x768     18Bit       │
                          │ 1280x800     18Bit       │
                          │ 1280x960     18Bit       │
                          │ 1280x1024    48Bit       │
                          │ 1366x768     18Bit       │
                          │ 1366x768     24Bit       │      →←: Select Screen
                          │ 1440x900     48Bit       │      ↑↓: Select Item
                          │ 1440x1050    48Bit       │      Enter: Select
                          │ 1600x900     48Bit       │      +/-: Change Opt.
                          │ 1680x1050    48Bit       │      F1: General Help
                          │ 1600x1200    48Bit       │      F2: Previous Values
                          │ 1920x1080    48Bit       │      F3: Optimized Defaults
                          │ 1920x1200    48Bit       │      F4: Save & Exit
                          └──────────────────────────┘      ESC: Exit



       Version 2.18.1263. Copyright (C) 2018 American Megatrends, Inc.
```
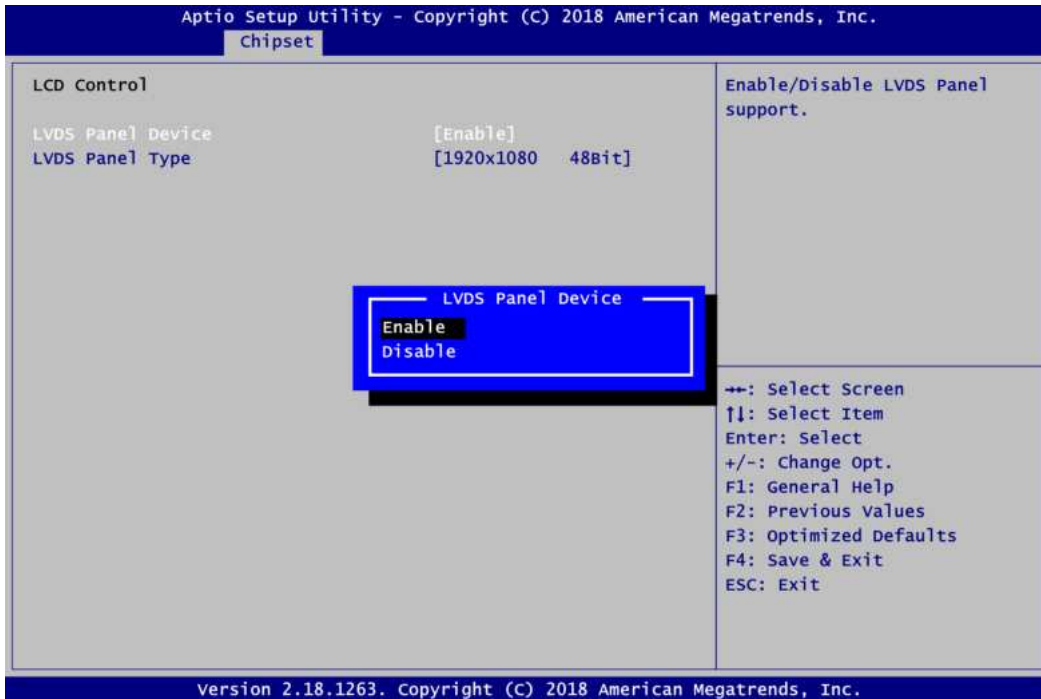
LVDS Panel Type
Select the appropriate LVDS panel resolution; see the selection options in image above.

- **South Bridge**
  This screen shows Intel® MRC/PMC/TXE FW version.

```
          Aptio Setup Utility – Copyright (C) 2018 American Megatrends, Inc.
            Chipset

 TXE Information

 MRC Version                            0.56
 PMC FW                                 03.29
 TXE FW                                 3.1.50.2222




                                                   ←→: Select Screen
                                                   ↑↓: Select Item
                                                   Enter: Select
                                                   +/-: Change Opt.
                                                   F1: General Help
                                                   F2: Previous Values
                                                   F3: Optimized Defaults
                                                   F4: Save & Exit
                                                   ESC: Exit



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```

4.6　　　Security Menu

The Security menu allows users to change the security settings for the system.

```
          Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
   Main   Advanced   Chipset   Security   Boot   Save & Exit

  Password Description                                  Set Setup Administrator
                                                        Password
  If ONLY the Administrator's password is set,
  then this only limits access to Setup and is
  only asked for when entering Setup.
  If ONLY the User's password is set, then this
  is a power on password and must be entered to
  boot or enter Setup. In Setup the User will
  have Administrator rights.
  The password length must be
  in the following range:
  Minimum length                    3
  Maximum length                    20             →←: Select Screen
                                                   ↑↓: Select Item
                                                   Enter: Select
  Setup Administrator Password                     +/-: Change Opt.
  User Password                                    F1: General Help
                                                   F2: Previous Values
                                                   F3: Optimized Defaults
                                                   F4: Save & Exit
                                                   ESC: Exit


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```

- **Setup Administrator Password**
  Set setup administrator password.

- **User Password**
  Set user password.

4.7   Boot Menu

The Boot menu allows users to change boot options of the system.

```
              Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
     Main   Advanced   Chipset   Security   Boot   Save & Exit

   Boot Configuration                                        Number of seconds to wait for
                                                             setup activation key.
   Setup Prompt Timeout              1                       65535(0xFFFF) means indefinite
   Bootup Numlock State              [On]                    waiting.

   Quiet Boot                        [Disabled]
   Launch UEFI PXE OpROM policy      [Disabled]

   Boot Option Priorities
   Boot Option #1                    [UEFI: 1.00, Partit...]

   Boot Mode                         [UEFI Mode]
                                                             →←: Select Screen
                                                             ↑↓: Select Item
                                                             Enter: Select
                                                             +/-: Change Opt.
                                                             F1: General Help
                                                             F2: Previous Values
                                                             F3: Optimized Defaults
                                                             F4: Save & Exit
                                                             ESC: Exit



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```

- **Setup Prompt Timeout**
  Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.

- **Bootup Numlock State**
  Use this item to select the power-on state for the keyboard NumLock.

- **Quiet Boot**
  Select to display either POST output messages or a splash screen during boot-up.

- **Launch UEFI PXE OpROM policy**
  Control the execution of UEFI PXE OpROM.

- **Boot Option Priorities**
  These are settings for boot priority. Specify the boot device priority sequence from the available devices.

● **Boot Mode**
Use this option for boot mode settings.
- UEFI Boot: Select support to boot any UEFI-capable OS.
- Legacy Boot: Select support to boot non UEFI-capable OS that expects a legacy BIOS interface.

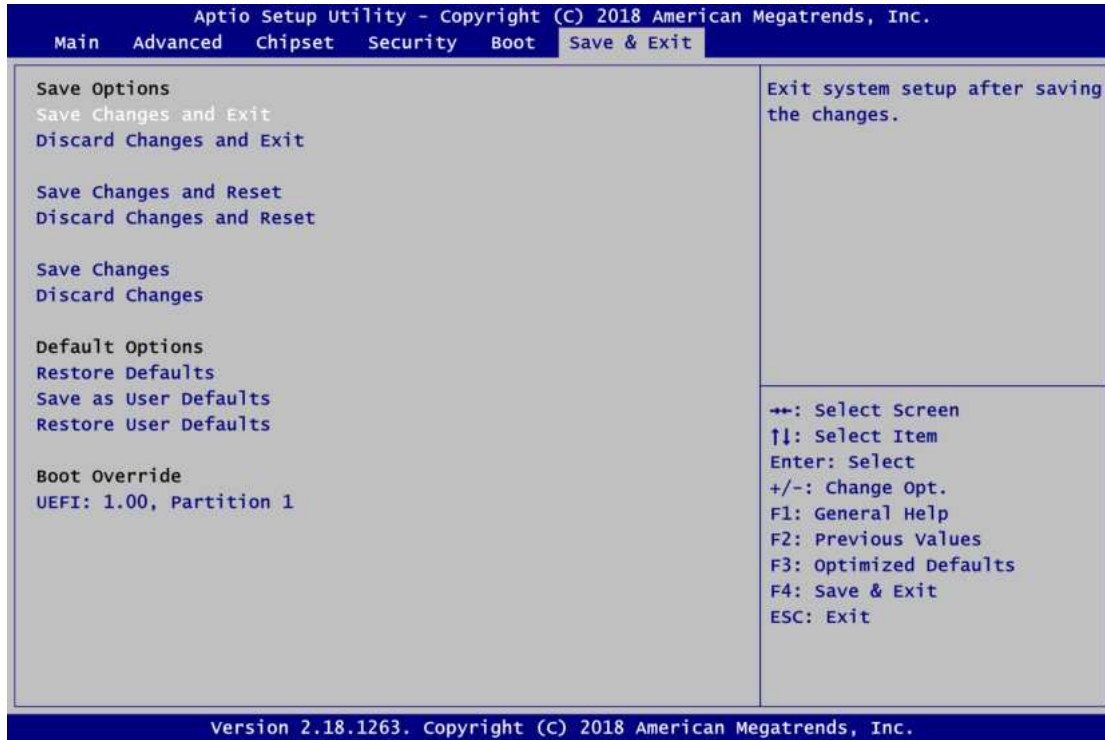Note that the Primary IGFX Boot Display option appears only if Legacy Mode is selected, see image below.
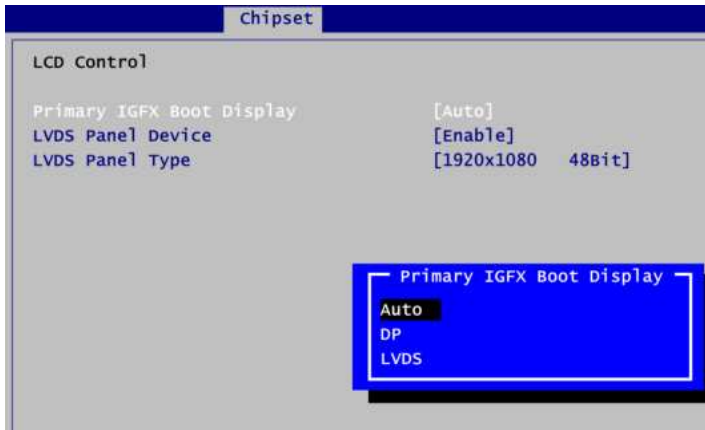
Primary IGFX Boot Display (Legacy mode use only)
Select the video device which will be activated during POST (Power-On Self Test). Default is "Auto". The image above shows option list in Primary IGFX Boot Display.

4.8   Save & Exit Menu

The Save & Exit menu allows users to load your system configuration with optimal or fail-safe default values.

```
            Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
      Main   Advanced   Chipset   Security   Boot   Save & Exit

     Save Options                                    Exit system setup after saving
     Save Changes and Exit                           the changes.
     Discard Changes and Exit

     Save Changes and Reset
     Discard Changes and Reset

     Save Changes
     Discard Changes

     Default Options
     Restore Defaults
     Save as User Defaults                           ↔: Select Screen
     Restore User Defaults                           ↑↓: Select Item
                                                     Enter: Select
     Boot Override                                   +/-: Change Opt.
     UEFI: 1.00, Partition 1                         F1: General Help
                                                     F2: Previous Values
                                                     F3: Optimized Defaults
                                                     F4: Save & Exit
                                                     ESC: Exit


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```

- **Save Changes and Exit**
  When you have completed the system configuration changes, select this option to leave Setup and return to Main Menu. Select Save Changes and Exit from the Save & Exit menu and press <Enter>. Select Yes to save changes and exit.

- **Discard Changes and Exit**
  Select this option to quit Setup without making any permanent changes to the system configuration and return to Main Menu. Select Discard Changes and Exit from the Save & Exit menu and press <Enter>. Select Yes to discard changes and exit.

- **Save Changes and Reset**
  When you have completed the system configuration changes, select this option to leave Setup and reboot the computer so the new system configuration parameters can take effect. Select Save Changes and Reset from the Save & Exit menu and press <Enter>. Select Yes to save changes and reset.

- **Discard Changes and Reset**
  Select this option to quit Setup without making any permanent changes to the system configuration and reboot the computer. Select Discard Changes and Reset from the Save & Exit menu and press <Enter>. Select Yes to discard changes and reset.

- **Save Changes**
  When you have completed the system configuration changes, select this option to save changes. Select Save Changes from the Save & Exit menu and press <Enter>. Select Yes to save changes.

● **Discard Changes**
Select this option to quit Setup without making any permanent changes to the system configuration. Select Discard Changes from the Save & Exit menu and press <Enter>. Select Yes to discard changes.

● **Restore Defaults**
It automatically sets all Setup options to a complete set of default settings when you select this option. Select Restore Defaults from the Save & Exit menu and press <Enter>.

● **Save as User Defaults**
Select this option to save system configuration changes done so far as User Defaults. Select Save as User Defaults from the Save & Exit menu and press <Enter>.

● **Restore User Defaults**
It automatically sets all Setup options to a complete set of User Defaults when you select this option. Select Restore User Defaults from the Save & Exit menu and press <Enter>.

● **Boot Override**
Select a drive to immediately boot that device regardless of the current boot order.

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Appendix A
Watchdog Timer

A.1   About Watchdog Timer

After the system stops working for a while, it can be auto-reset by the watchdog timer. The integrated watchdog timer can be set up in the system reset mode by program.

A.2   How to Use Watchdog Timer

```
Assembly sample code :
mov     dx,fa10          ; 5 seconds (Maximum is 65535 seconds; fill in
                         ; 0xFA10 and 0xFA11 register, ex: 0xFA11=0x01,
                         ; 0xFA10=0x68 means 360 seconds)
mov     al,05
out     dx,al

mov     dx,fa12          ; Enable WDT
mov     al,01
out     dx,al
```

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Appendix B
Digital I/O

B.1   About Digital I/O

The onboard GPIO or digital I/O has 4 bits (DIO1~4). Each bit can be set to function as input or output by software programming. In default, all pins are pulled high with +5V level (according to main power). The BIOS default settings are 2 inputs and 2 outputs.

CN4

Pin	Signal	Pin	Signal
1	GND	2	+5V
3	DIO 2	4	DIO 1
5	DIO 3	6	DIO 0
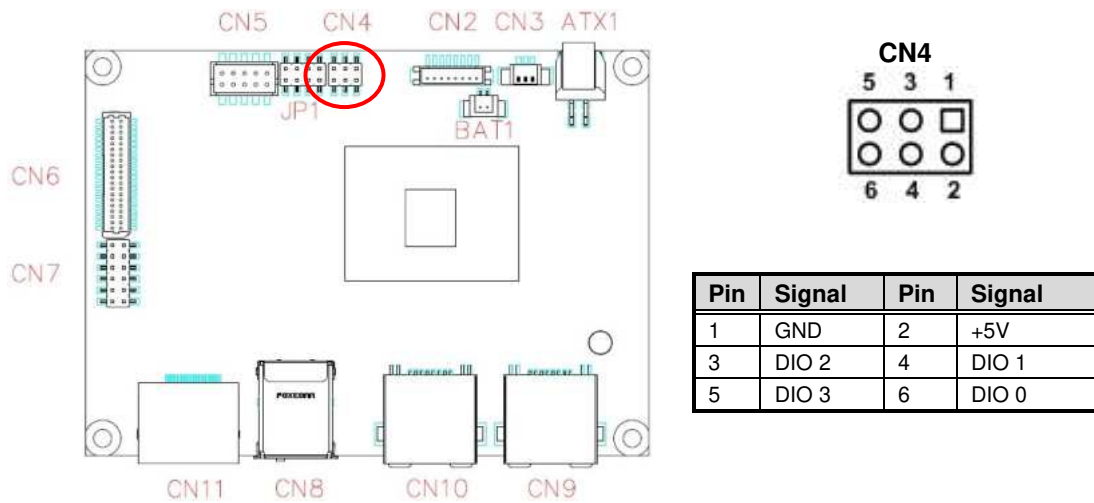
B.2   Digital I/O Programming

```
Assembly sample code :
mov     dx,fa31         ; Set DIO 0-3 to Output
mov     al,00
out     dx,al

mov     dx,fa32         ; Set DIO 2-3 to High
mov     al,0c
out     dx,al

mov     dx,fa31         ; Set DIO 0-3 to Input
mov     al,0f
out     dx,al

mov     dx,fa32         ; Get DIO 0-3 status
in      al,dx

mov     dx,fa31         ; Set DIO 0-1 to Input, 2-3 to Output
mov     al,03           ; al = 03 => 00000011
out     dx,al

mov     dx,fa32         ; Set DIO 3 to High
mov     al,08           ; al = 08 => 00001000
out     dx,al

in      al,dx           ; Get DIO 0-2 status
```

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