FPC-7600 Series

Robust Box PC with 3rd Generation Intel® Core™ i5/i3 or Celeron® Processor Platform

User's Manual

Version 1.1

P/N: 4012760000110P 2015.10

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Revision History

Version	Release Time	Description
1.0	2015 August	Initial release
1.1	2015 October	Add FPC-7600 model

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Copyright Notice

The information in this document is subject to change without prior notice in order to improve the reliability, design and function. It does not represent a commitment on the part of the manufacturer.

Under no circumstances will the manufacturer be liable for any direct, indirect, special, incidental, or consequential damages arising from the use or inability to use the product or documentation, even if advised of the possibility of such damages.

Declaration of Conformity

CE

The CE symbol on the computer indicates that it is in compliance with the directives of the Union European (EU). A Certificate of Compliance is available by contacting Technical Support.

This product has passed the CE test for environmental specifications when shielded cables are used for external wiring. We recommend the use of shielded cables. This kind of cable is available from ARBOR. Please contact your local supplier for ordering information.

Warning
This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

FCC Class A

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and

(2) This device must accept any interference received, including interference that may cause undesired operation.

NOTE:

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

RoHS

ARBOR Technology Corp. certifies that all components in its products are in compliance and conform to the European Union's Restriction of Use of Hazardous Substances in Electrical and Electronic Equipment (RoHS) Directive 2002/95/EC.

The above mentioned directive was published on 2/13/2003. The main purpose of the directive is to prohibit the use of lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBB), and polybrominated diphenyl ethers (PBDE) in electrical and electronic products. Member states of the EU are to enforce by 7/1/2006.

ARBOR Technology Corp. hereby states that the listed products do not contain unintentional additions of lead, mercury, hex chrome, PBB or PBDB that exceed a maximum concentration value of 0.1% by weight or for cadmium exceed 0.01% by weight, per homogenous material. Homogenous material is defined as a substance or mixture of substances with uniform composition (such as solders, resins, plating, etc.). Lead-free solder is used for all terminations (Sn(96-96.5%), Ag(3.0-3.5%) and Cu(0.5%)).

SVHC / REACH

To minimize the environmental impact and take more responsibility to the earth we live, Arbor hereby confirms all products comply with the restriction of SVHC (Substances of Very High Concern) in (EC) 1907/2006 (REACH --Registration, Evaluation, Authorization, and Restriction of Chemicals) regulated by the European Union.

All substances listed in SVHC < 0.1 % by weight (1000 ppm)

Important Safety Instructions

Read these safety instructions carefully

1. Read all cautions and warnings on the equipment.
2. Place this equipment on a reliable surface when installing. Dropping it or letting it fall may cause damage
3. Make sure the correct voltage is connected to the equipment.
4. For pluggable equipment, the socket outlet should be near the equipment and should be easily accessible.
5. Keep this equipment away from humidity.
6. The openings on the enclosure are for air convection and protect the equipment from overheating. DO NOT COVER THE OPENINGS.
7. Position the power cord so that people cannot step on it. Do not place anything over the power cord.
8. Never pour any liquid into opening. This may cause fire or electrical shock.
9. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
10. If one of the following situations arises, get the equipment checked by service personnel:
    a. The power cord or plug is damaged.
    b. Liquid has penetrated into the equipment.
    c. The equipment has been exposed to moisture.
    d. The equipment does not work well, or you cannot get it to work according to the user's manual.
    e. The equipment has been dropped or damaged.
    f. The equipment has obvious signs of breakage.
11. Keep this User's Manual for later reference.

Warning

The Box PC and its components contain very delicately Integrated Circuits (IC). To protect the Box PC and its components against damage caused by static electricity, you should always follow the precautions below when handling it:

1. Disconnect your Box PC from the power source when you want to work on the inside.
2. Use a grounded wrist strap when handling computer components.
3. Place components on a grounded antistatic pad or on the bag that came with the Box PC, whenever components are separated from the system.

Replacing Lithium Battery

Incorrect replacement of the lithium battery may lead to a risk of explosion.

The lithium battery must be replaced with an identical battery or a battery type recommended by the manufacturer.

Do not throw lithium batteries into the trash can. It must be disposed of in accordance with local regulations concerning special waste.

Technical Support

If you have any technical difficulties, please consult the user's manual first at:

http://www.arbor.com.tw

Please do not hesitate to call or e-mail our customer service when you still cannot find out the answer.

http://www.arbor.com.tw

E-mail:info@arbor.com.tw

Warranty

This product is warranted to be in good working order for a period of one year from the date of purchase. Should this product fail to be in good working order at any time during this period, we will, at our option, replace or repair it at no additional charge except as set forth in the following terms. This warranty does not apply to products damaged by misuse, modifications, accident or disaster.

Vendor assumes no liability for any damages, lost profits, lost savings or any other incidental or consequential damage resulting from the use, misuse of, or inability to use this product. Vendor will not be liable for any claim made by any other related party.

Vendors disclaim all other warranties, either expressed or implied, including but not limited to implied warranties of merchantability and fitness for a particular purpose, with respect to the hardware, the accompanying product's manual(s) and written materials, and any accompanying hardware. This limited warranty gives you specific legal rights.

Return authorization must be obtained from the vendor before returned merchandise will be accepted. Authorization can be obtained by calling or faxing the vendor and requesting a Return Merchandise Authorization (RMA) number. Returned goods should always be accompanied by a clear problem description.

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Chapter 1

Introduction

1.1. The Computer

- Fanless Design
- Wide Range DC Power Input (9~36V)
- Triple Independent display (DisplayPort x2 + VGA x 1) supported
- Two-mPCIe for Optional WiFi, GPS or I/O Expansion supported
- Optional WiFi or HSUPA Wireless Connectivity supported
- Rugged Design for Shock / Vibration Protection
- Memory Support up to 16GB (DDR3)

1.2. About this Manual

This manual is meant for the experienced users and integrators with hardware knowledge of personal computers. If you are not sure about the description herein, consult your vendor before further handling.

We recommend that you keep one copy of this manual for the quick reference for any necessary maintenance in the future. Thank you for choosing ARBOR products.

1.3. Specifications

System Kernel	
Processor	3rd Generation Intel® Core™ i5/i3 or Celeron® Processors in rPGA988 socket, TDP under 35W
BIOS	AMI UEFI BIOS
Chipset	Intel® HM76
Graphics	Integrated Intel® HD 4000
System Memory	2 x 204-pin DDR3 SO-DIMM sockets, supporting 1333/1600MHz SDRAM up to 16GB
Serial ATA	2 x Serial ATA ports with 600MB/s HDD transfer rate
Ethernet Controller	2 x Intel® WGI210AT GbE controllers
Watchdog Timer	1 ~ 255 levels reset
I/O Ports	
Serial Port	COM1/ COM2 RS-232
	COM3/COM4 RS-232/422/485 Selectable
***Selectable Port**	1 x DB25 connector for 1 x digital I/O, 8-in/8-out or I/O Expansion (either one)
USB Port	2 x USB 2.0 ports, 4 x USB 3.0/ 2.0 ports
	Internal USB dongle (Optional)
LAN Port	2 x RJ-45 ports for GbE
Video Port	2 x Display ports
	1 x DB-15 Female connector for Analog RGB
Audio	Mic-in/Line-out
Expansion Bus	2 x Mini-card for optional WiFI, GPS or I/O Expansion
Storage	
Type	2 x 2.5” drive bays
Qualification	
Certification	CE, FCC Class A
Environment	
Operating Temp.	-20 ~ 55°C (-4 ~ 131°F), ambience w/ air flow
Storage Temp.	-40 ~ 85°C (-40 ~ 185°F)
Operating Humidity	10 ~ 95% @ 55°C (non-condensing)

Vibration	3 Grms/5 ~ 500Hz/random operation w/ SSD
Shock	Operating 40G (11ms); Non-operating 60G w/ SSD
Mechanical	
Construction	Aluminum alloy
Mounting	Wall mounting
Weight	4.0 kg (8.81 lb) for FPC-7600 4.9 kg (10.80 lb) for FPC-7601/7602/7603 4.5 kg (9.92 lb) for FPC-7604
Dimensions (W x D x H)	195 x 268 x 75 mm for FPC-7600 195 x 268 x 110 mm for FPC-7601/7602/7603 195 x 268 x 90 mm for FPC-7604
Power Requirement	
Power Input	DC 9~36V input w/ 4-pin terminal block
Power Consumption	Max.65W(w/o I/O Card)

1.4. Inside the Package

Upon opening the package, carefully inspect the contents. If any of the items is missing or appears damaged, contact your local dealer or distributor. The package should contain the following items:

FPC-7600

FPC-7601/7602/7603

or

FPC-7604

1 x FPC-7600 Series Robust System

1 x Driver CD
1 x User's Manual

1.5. Ordering Information

FPC-7600	Fanless system w/o expansion
FPC-7601	Fanless system w/ 1 x PCI and 1 x PCIe x16
FPC-7602	Fanless system w/ 1 x PCIe x8 and 1 x PCIe x16
FPC-7603	Fanless system w/ 2 x PCI
FPC-7604	Fanless system w/ 1 x PCIe x16

1.5.1. Optional Accessories

The following items are normally optional, but some vendors may include them as a standard package, or some vendors may not carry all the items.

PAC-B120W-FSP	19V/6.32A 120W AC/DC adapter kit	
WMK-7000	Wall-mount kit for FPC-7XXX Series	

1.5.2. Configure-to-Order Service

Make the computer more tailored to your needs by selecting one or more components from the list below to be fabricated to the computer.

80GB SSD
Intel® 2.5” 80GB SATAIII SSD kit

WIFI-AT2300
Atheros AR9462 Wi-Fi module w/ 20cm internal wiring

ANT-D11
1 x Wi-Fi Dual-band 2.4G/5G antenna

3rd Generation Intel® Core™ i3-3120ME, L2/3M, 2.4G

3rd Generation Intel® Core™ i5-3610ME, L2/3M, 2.4G

MK-3C-4G-1
DDR3-1600 4GB SDRAM DIMM1 kit

MK-3C-4G-2
DDR3-1600 4GB SDRAM DIMM2 kit

MK-3C-8G-1
DDR3-1600 8GB SDRAM DIMM1 kit

MK-3C-8G-2
DDR3-1600 8GB SDRAM DIMM2 kit

UDK-7702
Internal USB dongle kit for FPC-7601/7602/7603

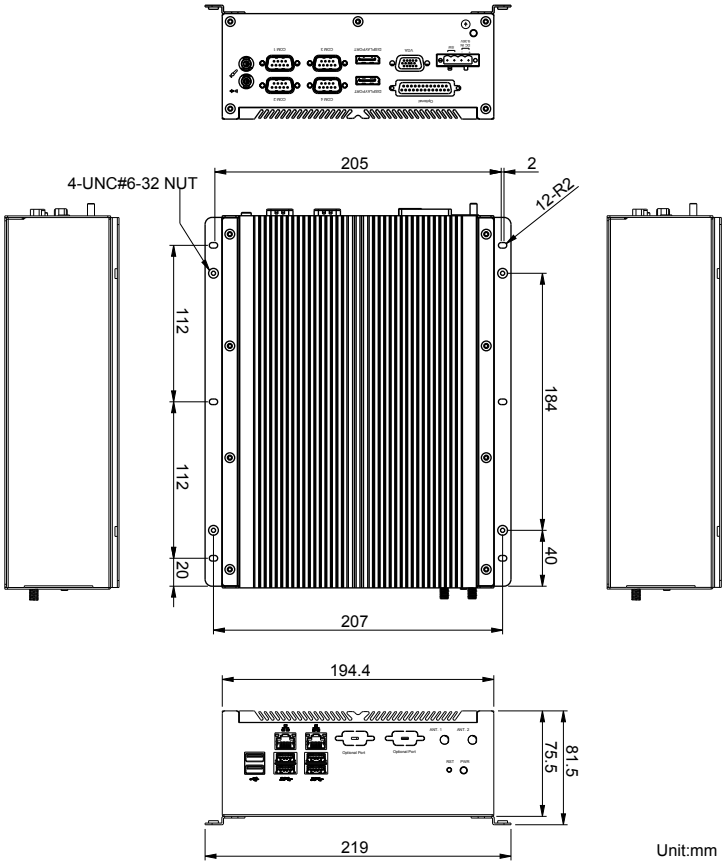
Chapter 2

System Overview

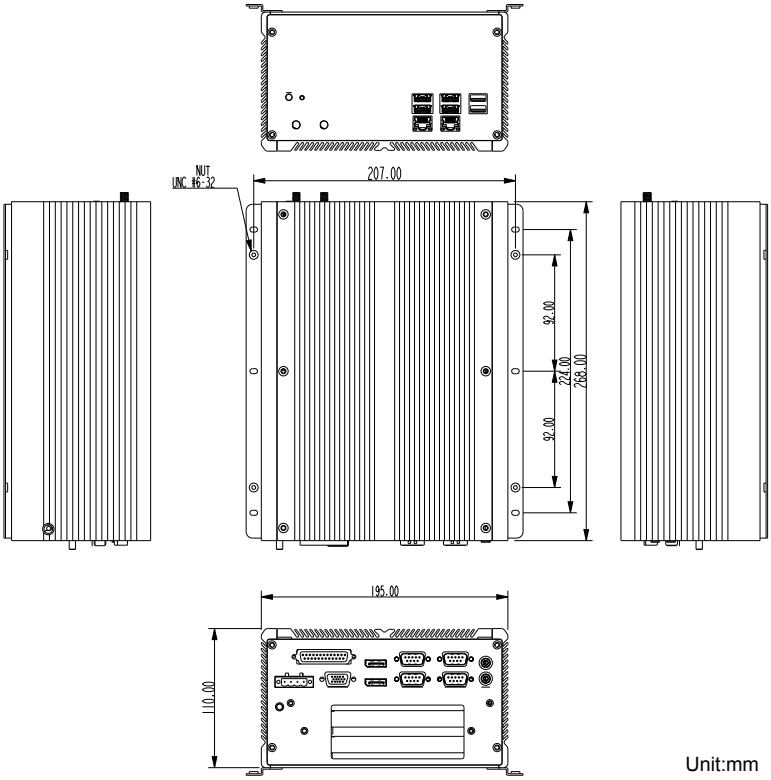
2.1. Dimensions

The following illustration shows the dimensions of each FPC-7601/7602/7603 and FPC-7604, with the measurements in width, depth, and height called out.

2.1.1. FPC-7600

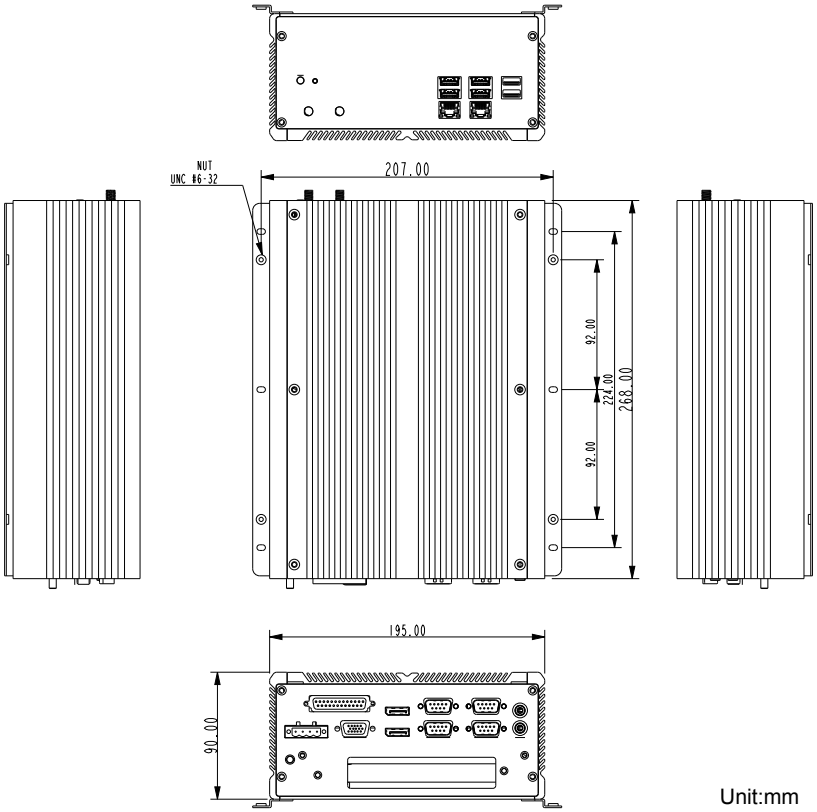


2.1.2. FPC-7601/7602/7603



Unit:mm

2.1.3. FPC-7604



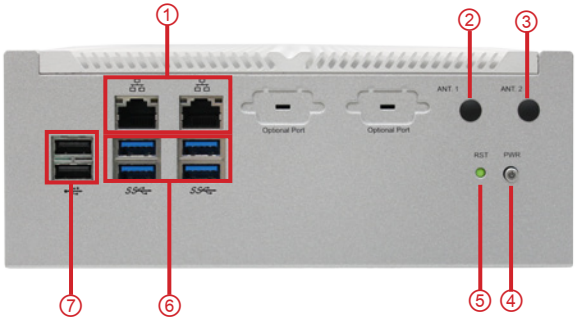
Unit:mm

2.2. Take A Tour

The computer has some I/O ports and controls on the front and rear panels. The following illustrations show all the components called out for all FPC-7600 Series.

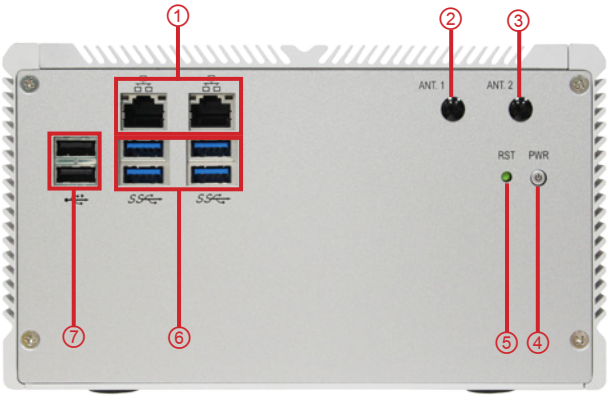
2.2.1. Front Views

- FPC-7600 Front



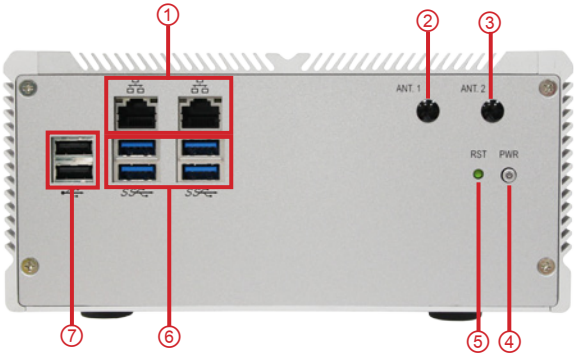
No.	Description
①	LAN ports
②	Antenna hole
③	Antenna hole
④	Power button
⑤	Reset toggle
⑥	USB 3.0 ports
⑦	USB 2.0 ports

- FPC-7601/7602/7603 Front



No.	Description
①	LAN ports
②	Antenna hole
③	Antenna hole
④	Power button
⑤	Reset toggle
⑥	USB 3.0 ports
⑦	USB 2.0 ports

- FPC-7604 Front

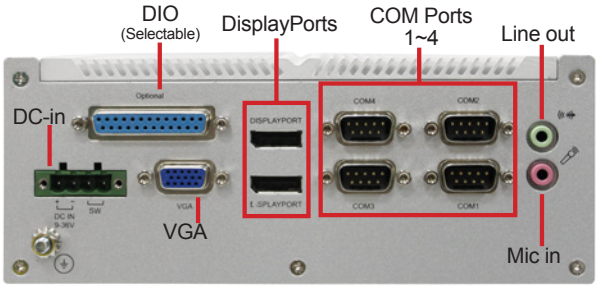


No.	Description
①	LAN ports
②	Antenna hole
③	Antenna hole
④	Power button
⑤	Reset toggle
⑥	USB 3.0 ports
⑦	USB 2.0 ports

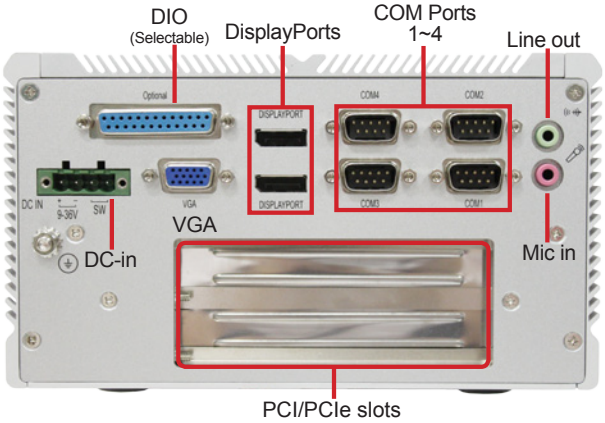
2.2.2. Rear Views

Take a look at the rear sides of FPC-7600 Series.

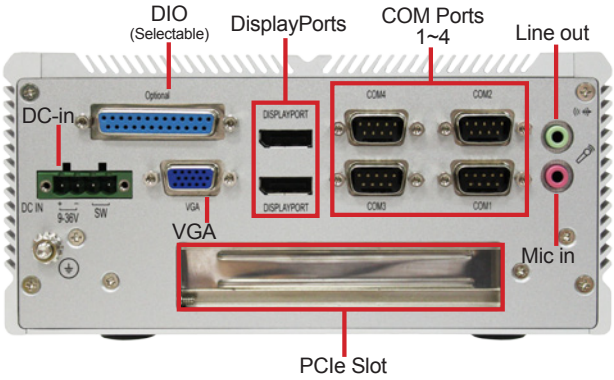
- FPC-7600 Rear



- FPC-7601/7602/7603 Rear



- FPC-7604 Rear



2.3. Driver Installation Notes

The FPC-7600 Series support the operating systems of Windows 7, Windows 8 and Linux. For Windows O.S., find the necessary device drivers on the CD that comes with your purchase. For different O.S., the installation of drivers/ utilities may vary slightly, but generally they are similar.

To install AHCI driver, the system's SATA configuration needs to change to AHCI first. See 5.2.4. SATA Configuration on page 71 to know how to change the setting.

This computer supports Intel® Management Engine, a microcontroller embedded in the PCH chipset, which joins the associated firmware to form the architecture of Intel® AMT (Active Management Technology) for a remote management console to connect to a client through the network. Intel® Management Engine is able to work even in the absence of the O.S. (the "out-of-band" capability) To make Intel® ME work correctly on the computer, install the driver included on the CD.

Paths to find various drivers on the CD:

Windows 7

Driver	Path	
Chipset	\\Chipset\Windows\v10.0.13\SetupChipset.exe	
USB 3.0	\USB3.0\Setup.exe	
VGA	32Bit	\\Graphic\WIN7_32bit_V_36_15_0_1073\Setup.exe
	64Bit	\\Graphic\ WIN7_64bit_V_37_15_0_1073\Setup.exe
LAN	32Bit	\\Eithernet\Win7-32bit\PROWin32.exe
	64Bit	\\Eithernet\Win7-64bit\PROWinx64.exe
Audio	\\AUDIO\win7_win8_win10_r279.exe	

Windows 8

Driver	Path	
Chipset	\\Chipset\Windows\v10.0.13\SetupChipset.exe	
USB 3.0	\USB3.0\Setup.exe	
VGA	32Bit	\\Graphic\WIN8_8.1_32bit_V15.33.22.3621\Setup.exe
	64Bit	\\Graphic\WIN8_8.1_64bit_V15.33.22.64.3621\Setup.exe
LAN	32Bit	\\Eithernet\Win8-32bit\PROWin32.exe
	64Bit	\\Eithernet\Win8-64bit\PROWinx64.exe
Audio	\\AUDIO\win7_win8_win10_r279.exe	

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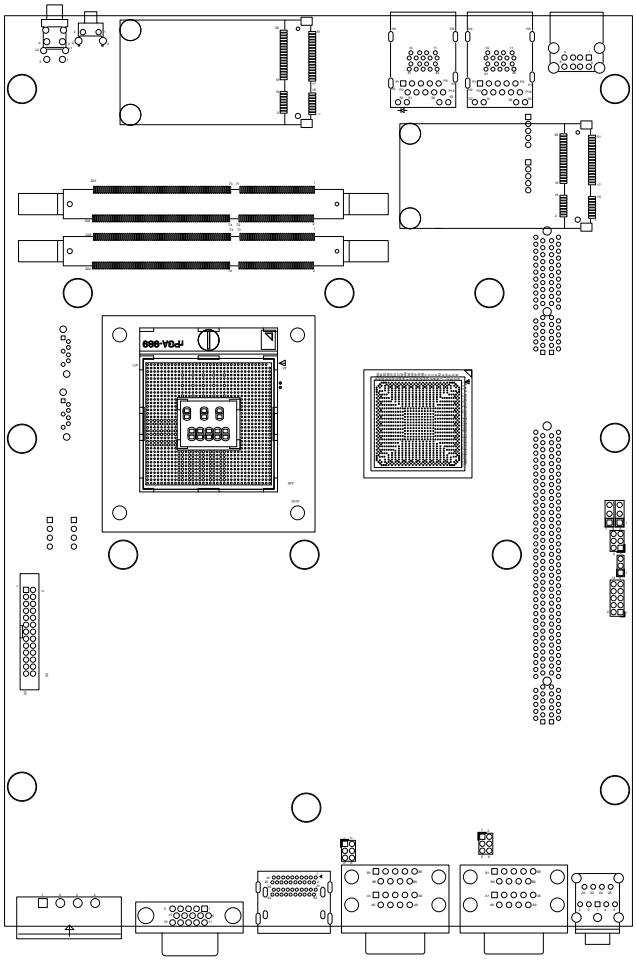
Chapter 3

System Configuration

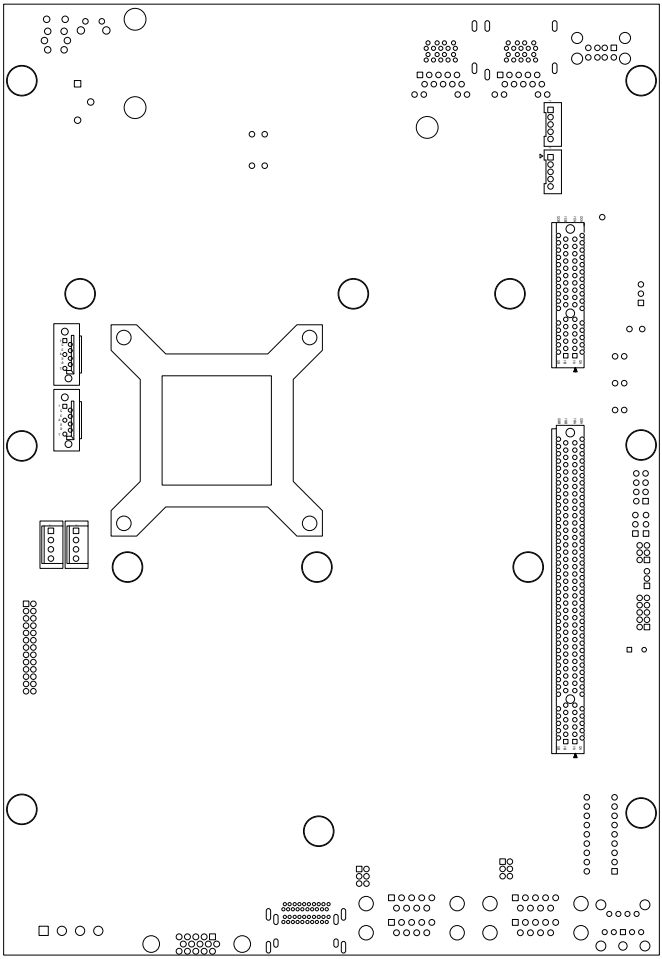
3.1. Board Layout

The main board FMB-i76M1 forms the engine of the FPC-7600 Series computers. This section will provide an thorough view of this board.

FMB-i76M1: Board Top



FMB-i76M1: Board Bottom



3.2. Jumpers and Connectors

The main board FMB-i76M1 comes with some connectors to join cables to other devices and some jumpers and DIP switches to alter hardware configuration. The following in this chapter will explicate each of the components one-by-one.

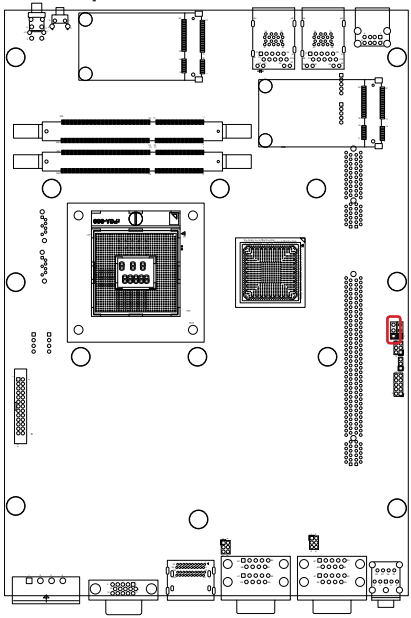
3.2.1. Jumpers

JBAT1

Function: CMOS Setting
Jumper Type: Onboard 2.54mm pitch 1x3-pin header
Setting:

Pin	Function	Setting
1-2	Keeps CMOS (Default)	
2-3	Clears CMOS	

Board Top



JME1

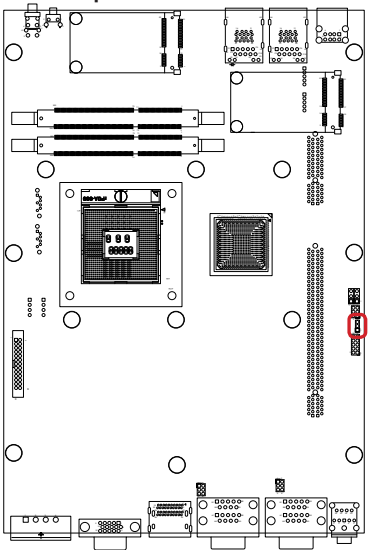
Function: BIOS Programing MODE Selection

Jumper Type: Onboard 2.00mm pitch 1x3-pin header

Setting:

Pin	Description	Setting
1-2	BIOS Programing Disable	
2-3	BIOS Programing Enable (default)	

Board Top



J1

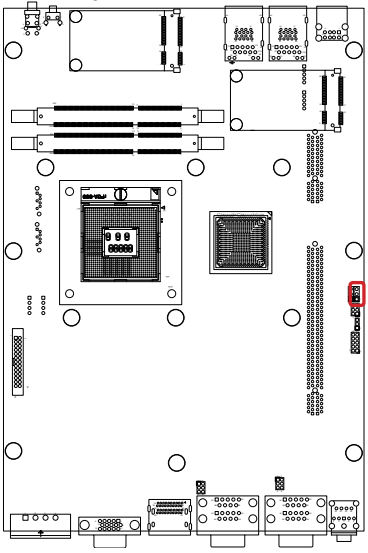
Function: AT/ATX MODE Selection

Jumper Type: Onboard 2.00mm pitch 1x3-pin header

Setting:

Pin	Description	Setting
1-2	AT	
2-3	ATX (default)	

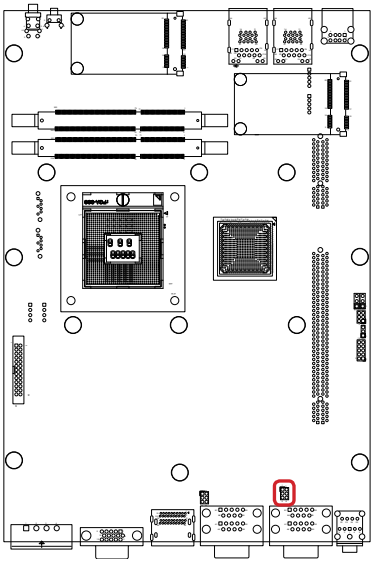
Board Top



JTERM1

Description: COM3 RS422 & RS485 Terminator Selector
Jumper Type: Onboard 2.00mm pitch 2x3-pin header

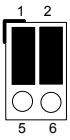
Pin	Description
1-3	RS-485 Normal Mode
3-5	RS-485 120 ohm Terminal Mode
1-3, 2-4	RS-422 Normal Mode (default)
3-5, 4-6	RS-422 120 ohm Terminal Mode

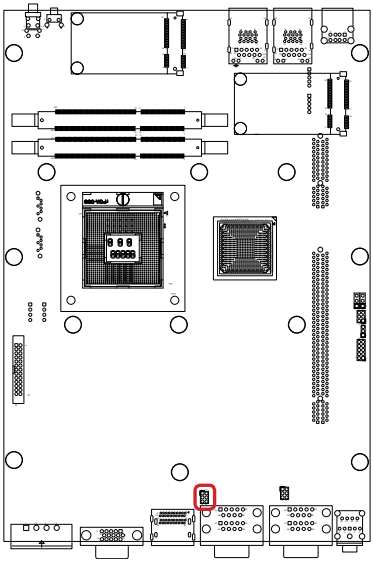


JTERM2

Description: COM4 RS422 & RS485 Terminator Selector
Jumper Type: Onboard 2.00mm pitch 2x3-pin header

Pin	Description
1-3	RS-485 Normal Mode
3-5	RS-485 120 ohm Terminal Mode
1-3, 2-4	RS-422 Normal Mode (default)
3-5, 4-6	RS-422 120 ohm Terminal Mode



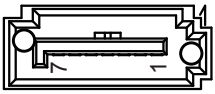


3.2.2. Connectors

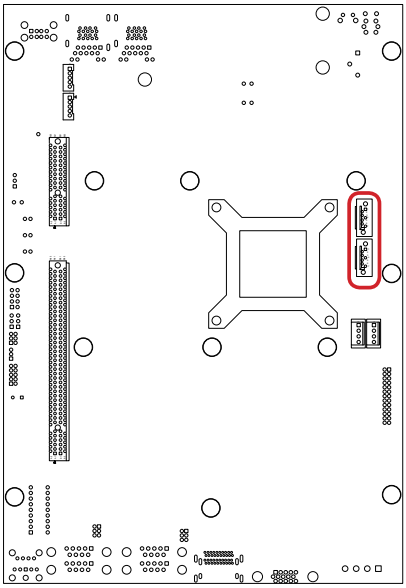
SATA1 & SATA2

Description: Serial ATA connectors for storage devices
Connector Type: 7-pin Serial ATA connector

Pin	Description
1	GND
2	TX+
3	TX-
4	GND
5	RX-
6	RX+
7	GND



Board Bottom



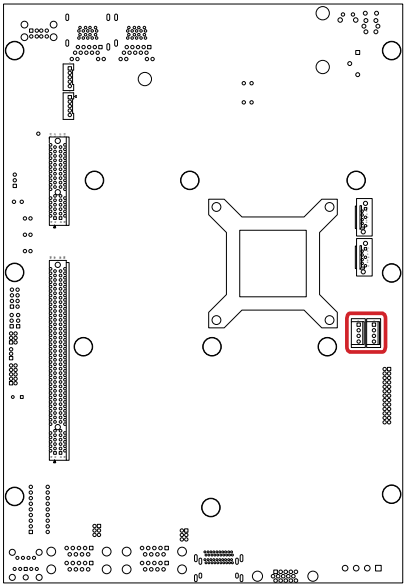
PWR1 and **PWR2**

Description: Power connectors for SATA storage devices

Connector Type: 2.54mm-pitch 1x4-pin DIP-type connector

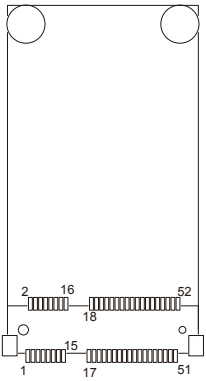
Pin	Desc.
1	+5V
2	GND
3	GND
4	+12V

Board Bottom



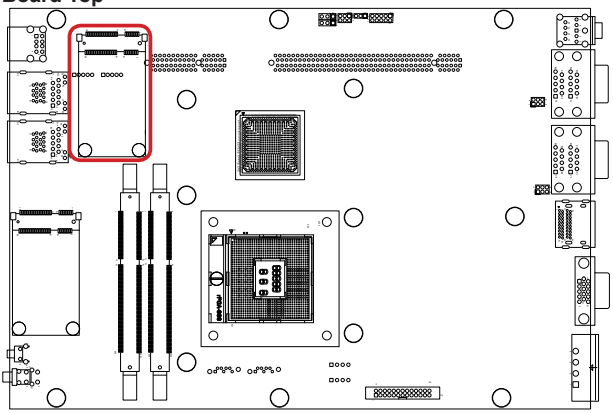
MC1

Description: PCI Express MiniCard socket
Connector Type: Onboard 0.8mm pitch 52-pin edge card connector



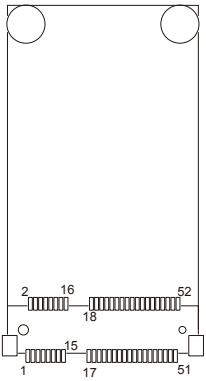
Pin	Desc.	Pin	Desc.	Pin	Desc.
1	Wake	20	W_Disable#	36	USB_D-
2	+3.3V	21	GND	37	GND
3	COEX1	22	PERST#	38	USB_D+
4	GND	23	PERn0	39	+3.3V
5	COEX2	24	+3.3V	40	GND
6	+1.5V	25	PERp0	41	+3.3V
7	CLKREQ#	26	GND	42	LED_WWAN#
8	UIM_PWR	27	GND	43	GND
9	GND	28	+1.5V	44	LED_WLAN#
10	UIM_DATA	29	GND	45	Reserved
11	REFCLK-	30	SMB_CLK	46	LED_WPAN#
12	UIM_CLK	31	PETn0	47	Reserved
13	REFCLK+	32	SMB_DATA	48	+1.5V
14	UIM_RESET	33	PETp0	49	Reserved
15	GND	34	GND	50	GND
16	UIM_VPP	35	GND	51	Reserved
17	UIM_C8/Reserved			52	+3.3V
18	GND				
19	UIM_C4/Reserved				

Board Top



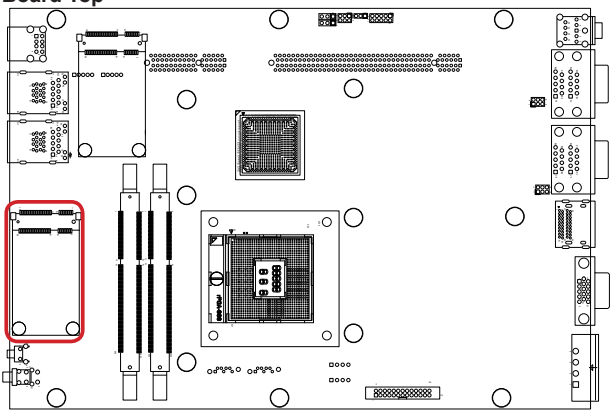
MC2

Description: PCIe MiniCard socket
Connector Type: Onboard 0.8mm pitch 52-pin edge card connector



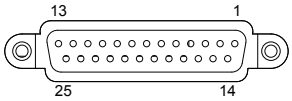
Pin	Desc.	Pin	Desc.	Pin	Desc.
1	Wake	20	W_Disable#	36	USB_D-
2	+3.3V	21	GND	37	GND
3	COEX1	22	PERST#	38	USB_D+
4	GND	23	PERn0	39	+3.3V
5	COEX2	24	+3.3V	40	GND
6	+1.5V	25	PERp0	41	+3.3V
7	CLKREQ#	26	GND	42	LED_WWAN#
8	UIM_PWR	27	GND	43	GND
9	GND	28	+1.5V	44	LED_WLAN#
10	UIM_DATA	29	GND	45	Reserved
11	REFCLK-	30	SMB_CLK	46	LED_WPAN#
12	UIM_CLK	31	PETn0	47	Reserved
13	REFCLK+	32	SMB_DATA	48	+1.5V
14	UIM_RESET	33	PETp0	49	Reserved
15	GND	34	GND	50	GND
16	UIM_VPP	35	GND	51	Reserved
17	UIM_C8/Reserved			52	+3.3V
18	GND				
19	UIM_C4/Reserved				

Board Top



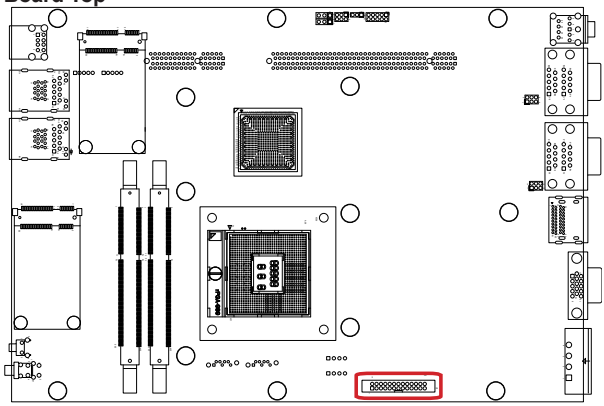
DIO1

Description: Digital I/O connector
Connector Type: 25-pin female DB connector

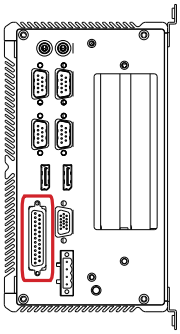


Pin	Desc.	Pin	Desc.
1	DIO0	14	DIO1
2	DIO2	15	DIO3
3	DIO4	16	DIO5
4	DIO6	17	DIO7
5	DIO8	18	DIO9
6	DIO10	19	DIO11
7	DIO12	20	DIO13
8	DIO14	21	DIO15
9	+5V	22	GND
10	+5V	23	GND
11	N.C	24	N.C
12	N.C	25	N.C
13	N.C		

Board Top



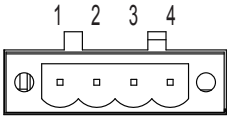
Rear Panel



PWRIN1

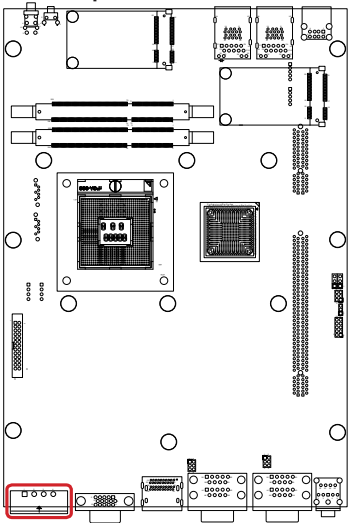
Description: DC-in power receptacle

Connector Type: 5.00mm-pitch 4-pole Euro-Type terminal block

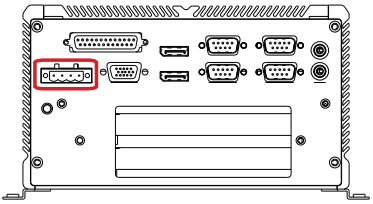


Pin	Desc.
1	PWRINV+
2	PWRINV-
3	C-GND
4	PWR_IN_SW#

Board Top



Rear Panel



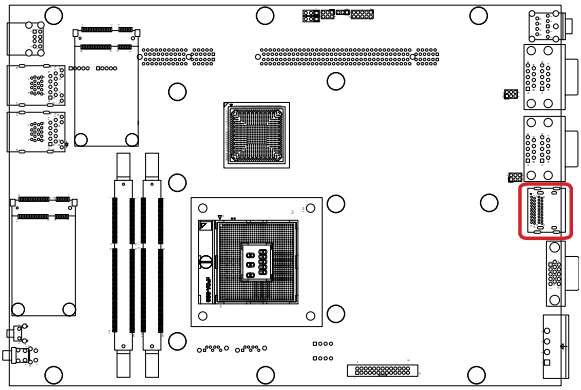
DP1A&DP1B

Description: DisplayPort double stack connectors

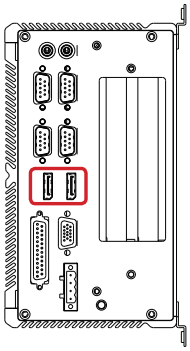
Connector Type: DisplayPort digital video connector

Pin	Desc.	Pin	Desc.
1	DDIC_TXC0_CON	11	GND
2	GND	12	DDIC_TXC3#_CON
3	DDIC_TXC0#_CON	13	DDPC_DP_AUX_EN#
4	DDIC_TXC1_CON	14	DDPC_DP_CONFIG2
5	GND	15	DDPC_AUXP_CON
6	DDIC_TXC1#_CON	16	GND
7	DDIC_TXC2_CON	17	DDPC_AUXN_CON
8	GND	18	DDPC_HPD_CON
9	DDIC_TXC2#_CON	19	GND
10	DDIC_TXC3_CON	20	PWR

Board Top



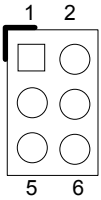
Rear Panel



JPIC1

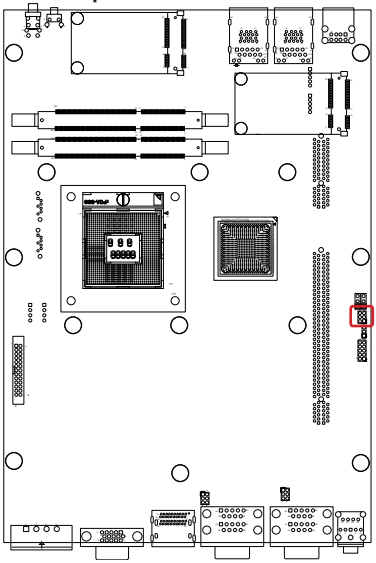
Description: PIC programming pin header

Connector Type: Onboard 2.0mm pitch 6-pin header



Pin	Desc.	Pin	Desc.
1	N/C	2	ICSP-CLK
3	ICSP-DAT	4	GND
5	VCC5_PIC	6	MCU_RST

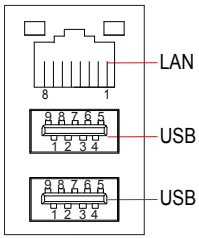
Board Top



LAN2&LAN3

Description: One Ethernet port over double-stacked USB 3.0 ports

Connector Type: One 8P8C RJ45 connector w/ two SuperSpeed type-A USB 3.0 connectors



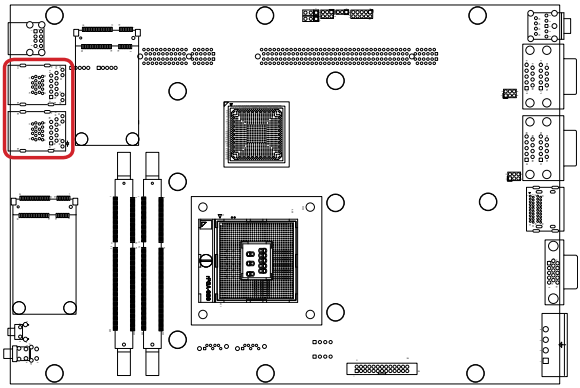
LAN (RJ-45)

Pin	Desc.	Pin	Desc.
1	MDI0+	5	MDI2+
2	MDI0-	6	MDI2-
3	MDI1+	7	MDI3+
4	MDI1-	8	MDI3-

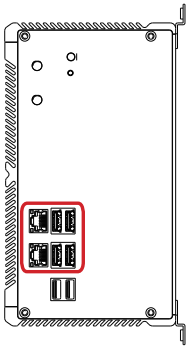
USB (Type-A)

Pin	Desc.
1	VBUS
2	Data-
3	Data+
4	GND
5	StdA_SSRX-
6	StdA_SSRX+
7	GND_DRAIN
8	StdA_SSTX-
9	StdA_SSTX+

Board Top



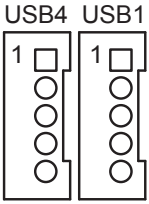
Rear Panel



USB1 and **USB4**

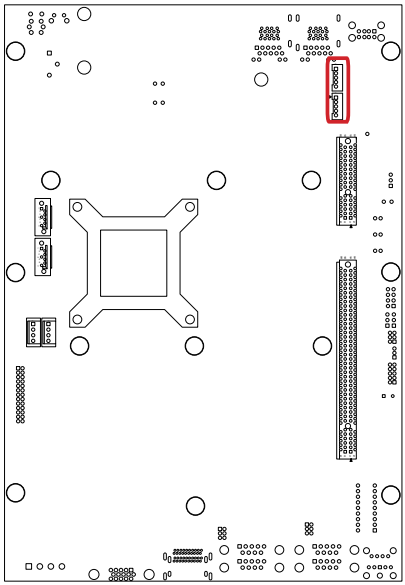
Description: Connectors for the internal USB ports (for FPC-7601/7602/7603 only, Configure-to-Order)

Connector Type: 1 x 5-pin wafer connector



USB1		USB4	
Pin	**Desc.**	**Pin**	**Desc.**
1	+5V	1	+5V
2	D-	2	D-
3	D+	3	D+
4	GND	4	GND
5	GND	5	GND

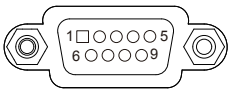
Board Bottom



COM1&COM2

Description: Serial port 1&2, RS232 ports

Connector Type: 9-pin male DB connector

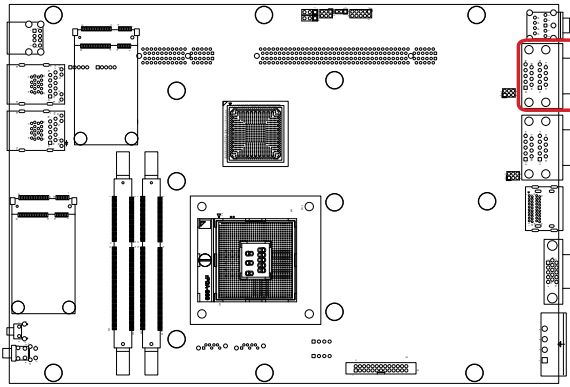


Pin Definition:

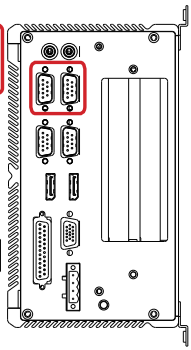
RS232

Pin	Desc.	Pin	Desc.
1	DCD	2	RXD
3	TXD	4	DTR
5	GND	6	DSR
7	RTS	8	CTS
9	RI	10	N.C

Board Top



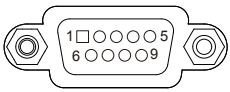
Rear Panel



COM3&COM4

Description: Serial port 3&4, configurable between RS232, RS422 and RS485.

Connector Type: 9-pin male DB connector



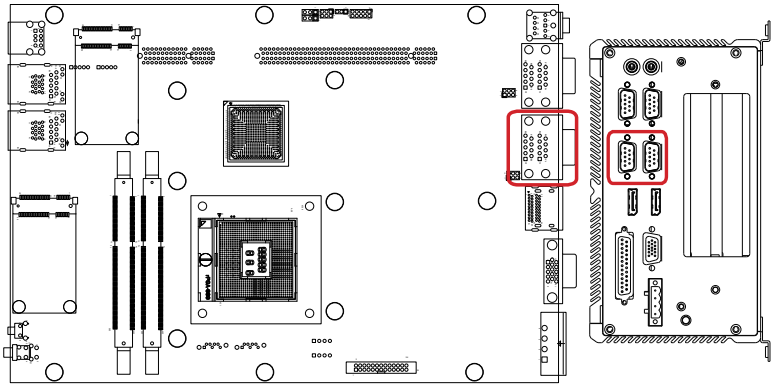
Pin Definition:

RS232				RS485		RS422	
Pin	Desc.	Pin	Desc.	Pin	Desc.	Pin	Desc.
1	DCD	6	DSR	1	RS485D-	1	RS422 TX-
2	RXD	7	RTS	2	RS485D+	2	RS422 TX+
3	TXD	8	CTS	5	GND	3	RS422 RX+
4	DTR	9	RI			4	RS422 RX-
5	GND					5	GND

To switch between RS232/422/485 mode, refer to BIOS setting: 5.2.7. F81866 Super IO Configuration

To switch the RS485/422 terminal mode, refer to P.21 JTERM1/2 setting.

Board Top **Rear Panel**



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Chapter 4

Installation and Maintenance

4.1. Install Hardware

The FPC-7600 Series is constructed based on modular design to make it easy for users to add hardware or to maintain the computer. The following sections will guide you to the simple hardware installations for the computer.

4.1.1. Open the Computer

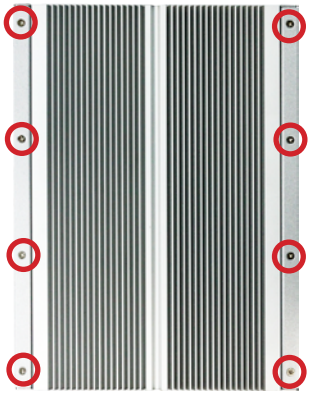
For the computer, removing the top and bottom covers is essential to open the computer and access the inside. Follow through the steps below to remove the top cover and bottom cover from the computer.

4.1.1.1. Remove Top Cover

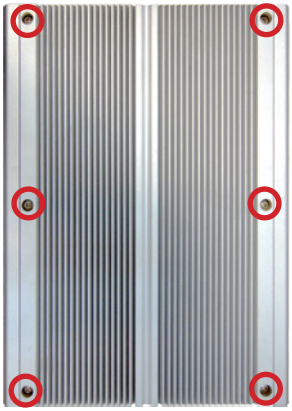
All jumpers, MiniCard socket, SDRAM SO-DIMM slots, DIO port and PIO port (printer port) are built on the top side of the main board. To access these components, the computer's top cover has to go. Follow through the steps below to remove the top cover.

1. Place the computer on a flat surface. Loosen and remove those screws as marked in the illustration below.

FPC-7600



FPC-7601~04



After the said screws are removed, proceed to dismount the top cover. Carefully lift the top cover and then completely part the top cover from the computer.

The inside of the computer comes to view.

FPC-7600

FPC-7601~04

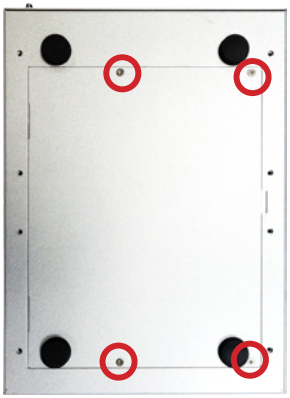
- To adjust jumpers or connect/disconnect cables to/from the main board, see 3.2. Jumpers and Connectors on page 22.
- To install memory modules, see 4.1.2. Install/uninstall Memory Modules on page 44.
- To install MiniCard-based wireless modules, see 4.1.6. Install Wireless Modules on page 58.

4.1.1.2. Remove the Bottom Cover

The Serial ATA connectors, the power connectors for SATA storage devices, and the internal USB ports (configure-to-order for FPC-7601/7602/7603 only), PCI and PCIe connectors are all built on the bottom side of the main board. To access these connectors, the computer's bottom cover has to go. Follow through the steps below to remove the bottom cover from the computer.

1. Place the computer upside down on a flat surface. Loosen and remove the 2 screws as marked in the illustration below.

FPC-7600



FPC-7601~04

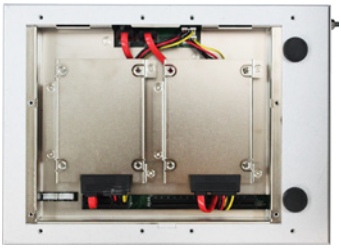
2. After the said screws are removed, proceed to dismount the bottom cover. Carefully lift and then completely part the bottom cover from the computer.

FPC-7600

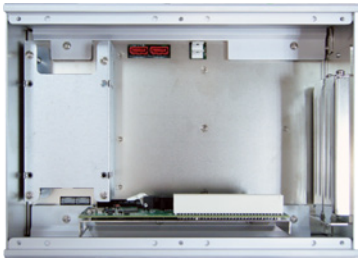
FPC-7601~04

The inside of the computer comes to view.

FPC-7600



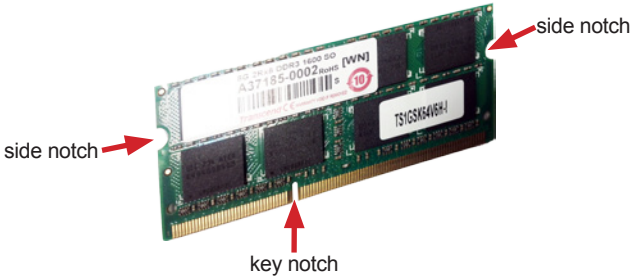
FPC-7601~04



- To install internal USB drives, see 4.1.3. Install CPU on page 52.
- To install SATA storage devices, see 4.1.4. Install SATA Storage Devices on page 53.
- To install PCI/PCIe cards, see 4.1.5. Install PCI and PCI Express Cards on page 56.

4.1.2. Install/uninstall Memory Modules

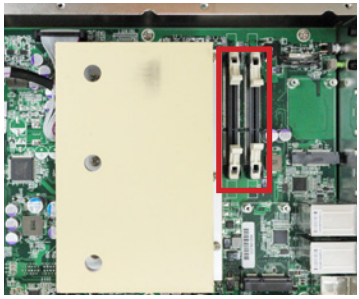
The main board has two dual inline memory module (DIMM) sockets. Increase memory capacity to make programs run faster on the system. The memory module for the FPC-7600 Series' SO-DIMM sockets should be a 204-pin DDR3 with a "key notch" off the centre among the pins, which enables the memory module for particular applications. There are another two notches at each left and right side of the memory module to help fix the module in the socket.



To install a DDR3 memory module:

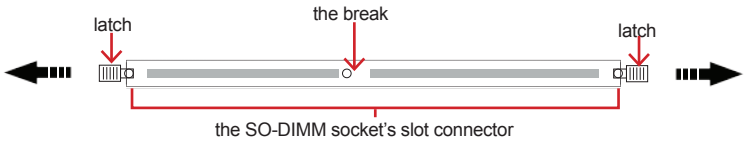
1. Remove the top cover from the computer as described in 4.1.1.1. Remove Top Cover on page 40.

2. Find the SO-DIMM sockets on the board as marked in the illustration below.



The SO-DIMM sockets are vertical type, and each socket has two latches for fixing the memory modules. The memory module can only be installed by one direction due to the notch.

3. Pull back both latches from the socket.



vertical-type SO-DIMM socket (overview)

4. Confront the memory module's edge connector side at the SO-DIMM socket. Position the memory module at the SO-DIMM socket, with the memory module's key notch aligned at the break of the SO-DIMM's slot connector.

5. Vertically plug the memory module to the DIMM socket. "Fully" plug the memory module until both latches auto-lock the memeory module in place.

6. Restore the top cover to the computer.

To uninstall a DDR3 memory module:

1. Pull back both latches from the SO-DIMM socket.

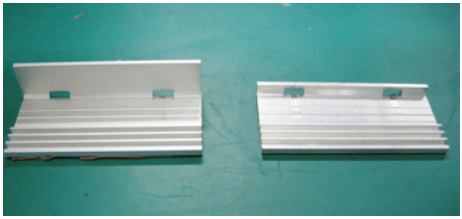
   The DDR3 memory module will be auto-released from the socket.

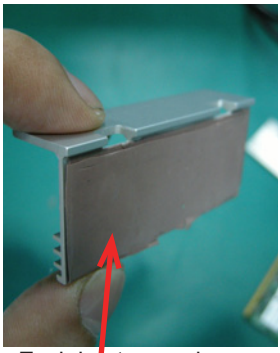
2. Remove the memory module.

3. Restore the top cover to the computer.

Install Memory Module with Heat Spreaders

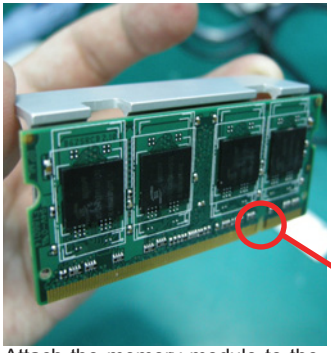
1. Have the heat spreaders. One has the bigger fin and the other has the smaller fin.





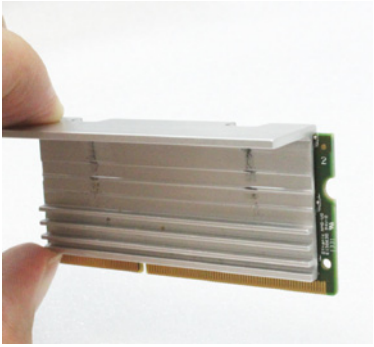
Each heat spreader comes with a thermal pad.

2. Attach the memory module to the thermal pad side of the heat spreader with bigger fin. See the picture below.



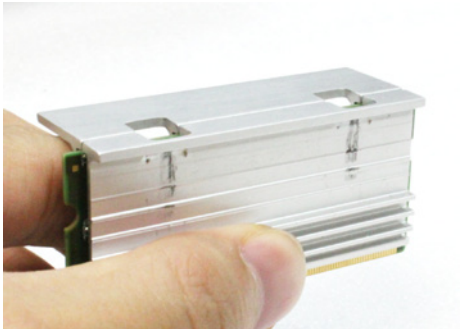
Attach the memory module to the thermal pad

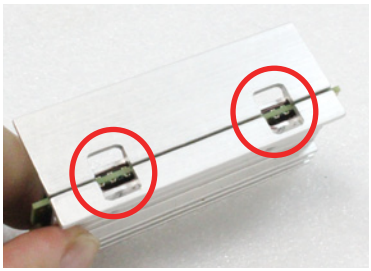
The connector break on the 204-pin memory module



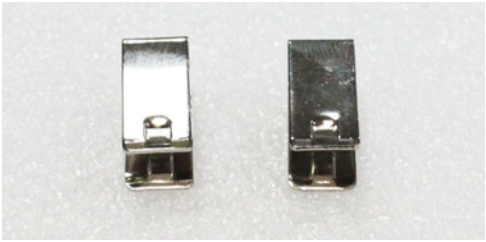
View from the other side..

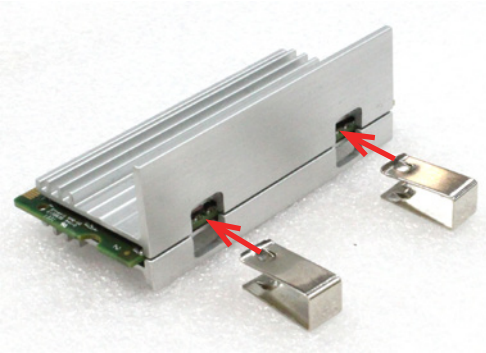
3. Attach the other heat spreader to the other side of the memory module so the two heat spreaders sandwich the memory module. Be sure to align the two heat spreaders properly so as to form the two clip holes.

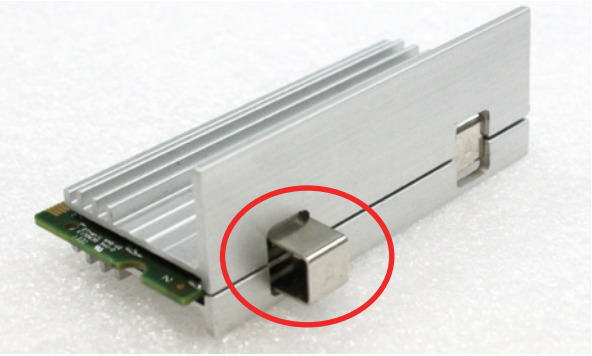




4. Have the two metal clips. Use them to hold the heat spreaders and the memory module together.

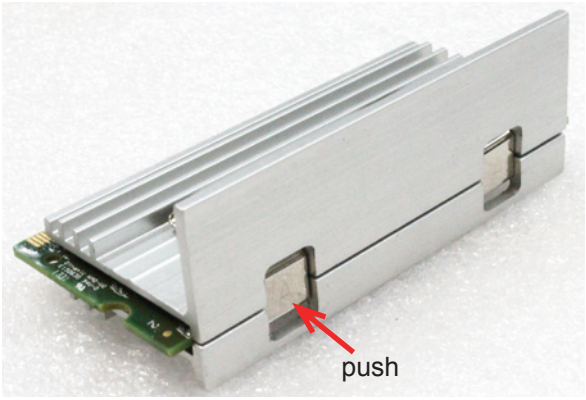


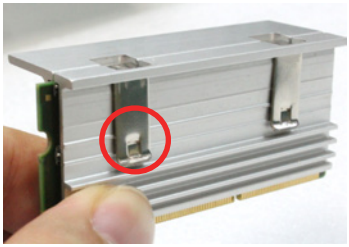


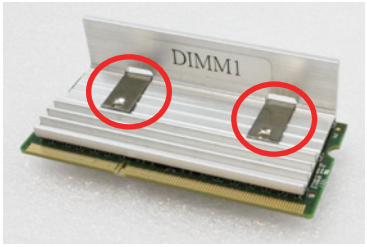


Make sure the heat spreaders are clipped exactly as shown in the pictures below.

5. Fully push the clips until they cannot be pushed any more. See the pictures below.







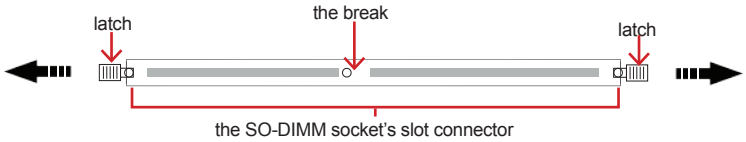
Note: The above mentioned demonstrated one clip only. When you install the memory module with heat spreaders, be sure to use both clips.

6. Remove the top cover from the computer as described in 4.1.1.1. Remove Top Cover on page 40.

7. Find the SO-DIMM sockets on the board as marked in the illustration below.

The SO-DIMM sockets are vertical type, and each socket has two latches to fix the memory modules. The memory module can only be installed by one direction due to the key notch.

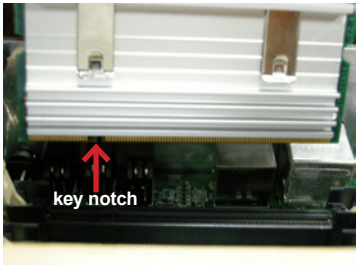
8. Pull back both latches from the socket.



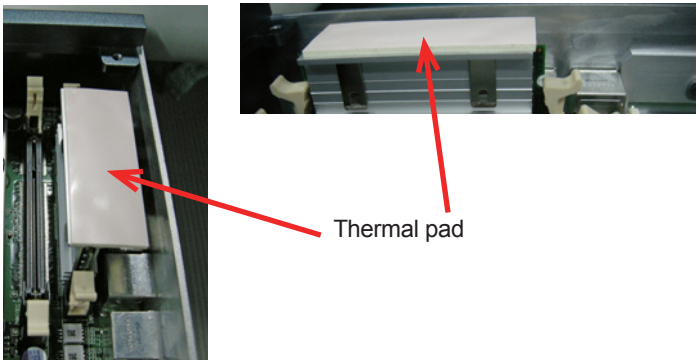
vertical-type SO-DIMM socket (overview)

9. Confront the memory module's edge connector side at the SO-DIMM socket. Position the memory module at the SO-DIMM socket, with the memory module's key notch aligned at the break of the SO-DIMM's slot connector.

10. Vertically plug the memory module to the DIMM socket. “Fully” plug the memory module until both latches auto-lock the memory module in place.



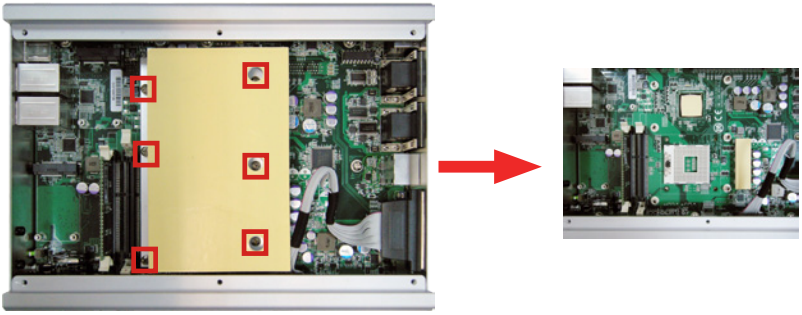
11. Attach another thermal pad onto the top of the heat spreaders.



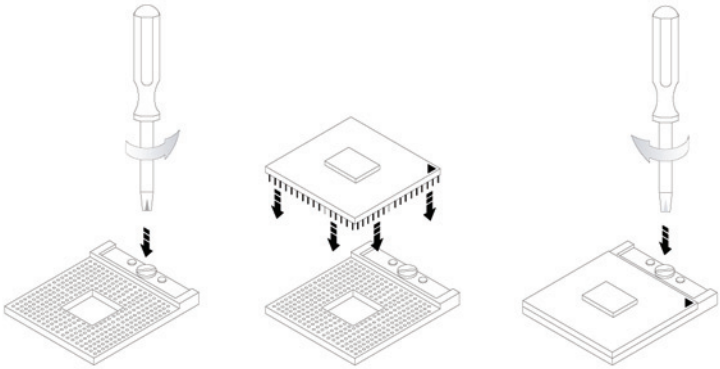
12. Restore the top cover to the computer.

4.1.3. Install CPU

1. Locate the six screws which secure the Thermal Lump.
2. Use a screwdriver to remove the six screws and keep them safely for later use.



3. The processor socket comes with a screw to secure the CPU. As shown in the picture below, loose the screw first before inserting the CPU.



4. Place the CPU into the socket by making sure the notch on the corner of the CPU corresponding with the notch on the inside of the socket. Once the CPU is slid into the socket, lock the screw.

5. The contact area and gap between the processor and the heatsink require a thermal pad or thermal paste. Make sure that heatsink of the CPU top surface is in complete contact to avoid the CPU overheating problem. If not, it would cause your system or CPU to be hanged, unstable, or damaged.

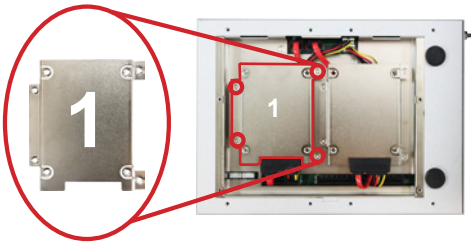
4.1.4. Install SATA Storage Devices

The computer supports two 2.5" SATA storage devices to work inside the computer for RAID. The following will gudie you to install two SATA HDD or SSD.

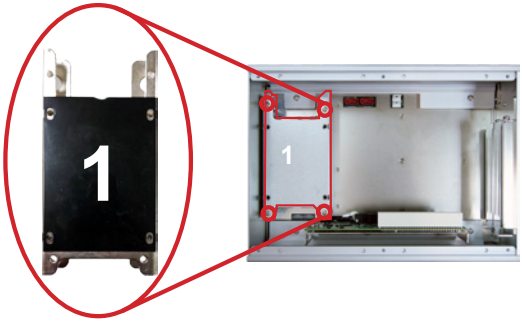
4.1.4.1. Install SATA Storage Devices for FPC-7600 Series

1. Remove the bottom cover from the computer as described in 4.1.1.2. Remove the Bottom Cover on page 42..

2. Find the HDD/SSD brackets inside the computer. Loosen and remove the screws as marked in the illustration below. Then dismount the brackets from the computer.



FPC-7600



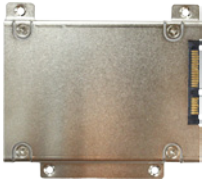
FPC-7601~04

3. For the 1st storage bracket: Slide an HDD/SSD storage device into the bracket.

FPC-7600

FPC-7601~04

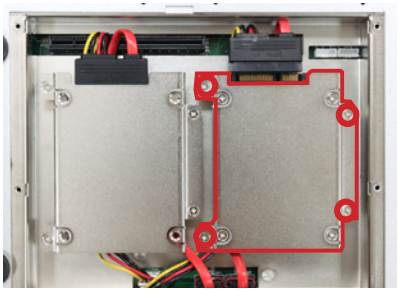
4. Fix the storage device in place by using screws at the four screw holes on both sides of the bracket.



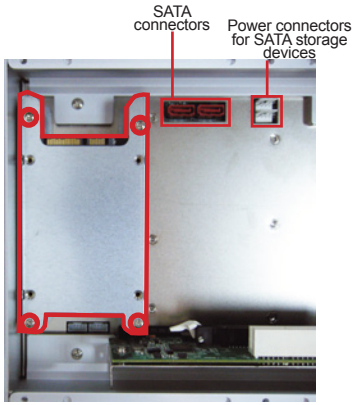
FPC-7600

FPC-7601~04

5. Install the bracket and the storage device back into the computer by refastening the four screws.

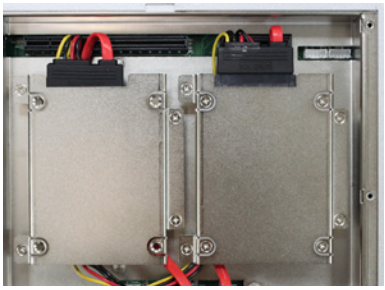


FPC-7600

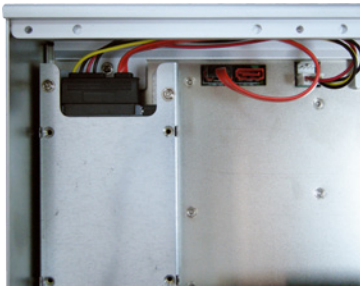


FPC-7601~04

6. Connect the SATA signal cable(s) and power cable(s).



FPC-7600



FPC-7601~04

7. Restore the bottom cover to the computer.

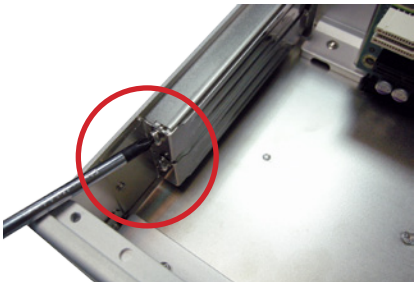
4.1.5. Install PCI and PCI Express Cards

The FPC-7600 series supports PCIe x16 slots, PCIe x8 slots, and PCI slots. Different SKUs have different options, please refer to Section 1.5. Ordering Information on page 5. Follow the guide below to install an PCI Express or PCI card to the computer.

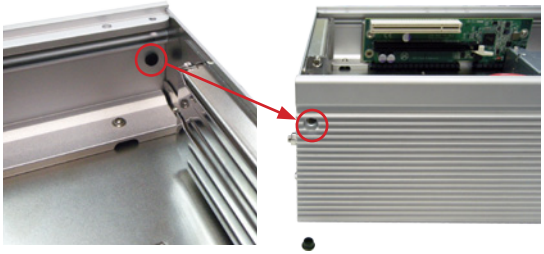
To install a PCI or PCI Express card:

1. Remove the bottom cover from the computer as described in 4.1.1.2. Remove the Bottom Cover on page 42.

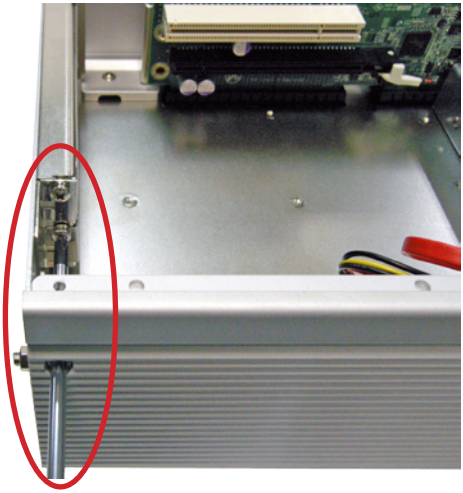
2. Use a cross head screwdriver to loose the screw that secure the expansion slot bracket. And then you can install a PCIe card to this expansion slot.



3. If you want to install the PCIe card to the lower slot, please push the rubber cover out of the unit.



4. Use the screwdriver to loose the screw securing the lower expansion slot bracket.



4.1.6. Install Wireless Modules

The computer comes with two **Mini-card** sockets to load the computer with the wireless modules of **PCI Express Mini-card** form factor. The configure-to-order wireless modules available with the computer is the Wi-Fi moldue **WIFI-AT2300**:

WIFI-AT2300
Atheros AR9462 Wi-Fi module w/ 20cm internal wiring

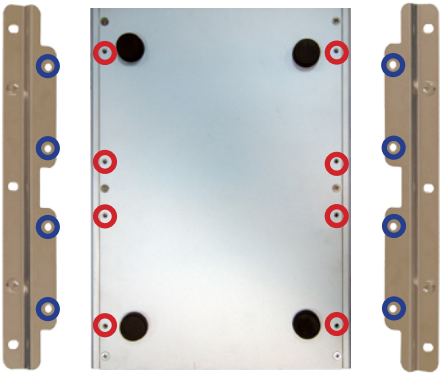
(See also 1.5.2. Configure-to-Order Service on page 6.)

- If you have ordered the Wi-Fi module **WIFI-AT2300**, see Appendix on C: Wi-Fi Module WIFI-AT2300 Hardware Installation page 96 to know how to install the hardware and software for the module.

4.2. Mount the Computer

Integrate the computer to where it works by mounting it to a wall in the surroundings. Such integration relies on a wall-mount kit, which is available on option. Follow through the guide below to assemble the kit to the computer:

1. Place the computer upside down on a flat surface. Find the eight screw holes at its bottom as marked in the red circles in the illustration below:



2. Have the two wall-mount brackets. Use the screws included in the wall-mount kit to assemble each of the brackets to the computer's bottom by the screw holes on them (as marked in the blue circles in the illustration above).
3. Use the other screw holes and cutouts on both wall-mount brackets to mount the computer to a wall. (See the green circles in the illustration below).

4.3. Ground the Computer

Follow the instructions below to ground the computer to land. Be sure to follow every grounding requirement in your place.

> **Warning** Whenever the unit is installed, the ground connection must always be made first of all and disconnected lastly.

1. See the illustration below. Remove the ground screw from the rear panel.
2. Attach a ground wire to the rear panel with the screw.

FPC-7600

FPC-7601~03

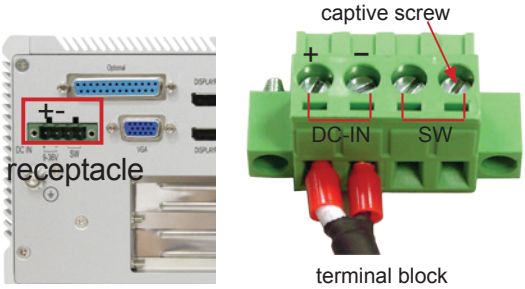
FPC-7604

4.4. Wire DC-in Power Source

> **Warning** Only trained and qualified personnel are allowed to install or replace this equipment.

Follow the instructions below for connecting the computer to a DC-input power source.

1. Before wiring, make sure the power source is disconnected.
2. Find the terminal block in the accessory box.
3. Use the wire-stripping tool to strip a short insulation segment from the output wires of the DC power source.
4. Identify the positive and negative feed positions for the terminal block connection. See the symbols printed on the rear panel indicating the polarities and DC-input power range in voltage.
5. Insert the exposed wires into the terminal block plugs. Only wires with insulation should extend from the terminal block plugs. Note that the polarities between the wires and the terminal block plugs must be positive to positive and negative to negative.
6. Use a slotted screwdriver to tighten the captive screws. Plug the terminal block firmly, which wired, into the receptacle on the rear panel.



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Chapter 5

BIOS

The BIOS Setup utility for the FPC-7600 Series is featured by American Megatrends Inc to configure the system settings stored in the system's BIOS ROM. The BIOS is activated once the computer powers on. When the computer is off, the battery on the main board supplies power to BIOS RAM.

To enter the BIOS Setup utility, keep hitting the "Delete" key upon powering on the computer.

The featured settings are:

Menu	Description
Main	See 5.1. Main on page 66.
Advanced	See 5.2. Advanced on page 67.
Chipset	See 5.3. Chipset on page 78.
Boot	See 5.4. Boot on page 85.
Security	See 5.5. Security on page 88.
Save & Exit	See 5.6. Save & Exit on page 89.

Key Commands

The BIOS Setup utility relies on a keyboard to receive user's instructions. Hit the following keys to navigate within the utility and use the utility.

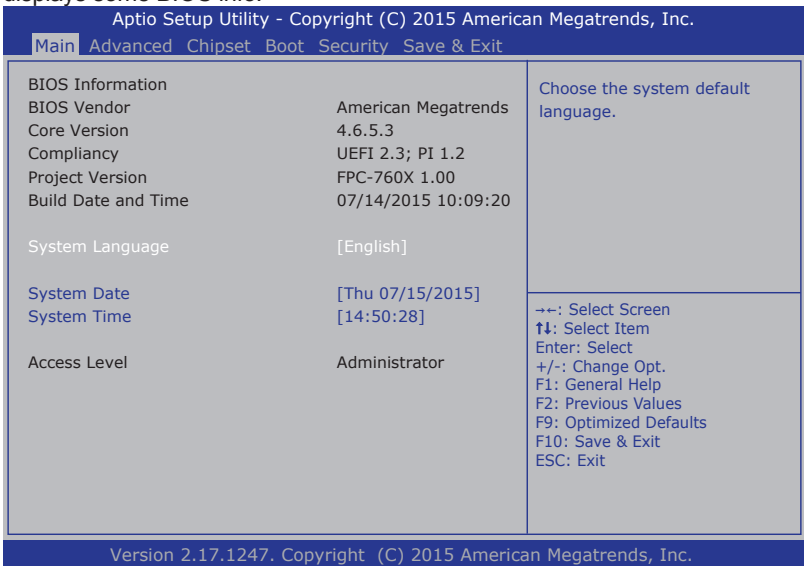
Keystroke	Function
← →	Moves left/right between the top menus.
↓ ↑	Moves up/down between highlight items.
Enter	Selects an highlighted item/field.
Esc	▸ On the top menus: Use **Esc** to quit the utility without saving changes to CMOS. (The screen will prompt a message asking you to select **OK** or **Cancel** to exit discarding changes. ▸ On the submenus: Use **Esc** to quit current screen and return to the top menu.
Page Up / +	Increases current value to the next higher value or switches between available options.
Page Down / -	Decreases current value to the next lower value or switches between available options.
F1	Opens the **Help** of the BIOS Setup utility.
F10	Exits the utility saving the changes that have been made. (The screen then prompts a message asking you to select **OK** or **Cancel** to exit saving changes.)

Note: Pay attention to the "WARNING" that shows at the left pane onscreen when making any change to the BIOS settings.

This BIOS Setup utility is updated from time to time to improve system performance and hence the screenshots hereinafter may not fully comply with what you actually have onscreen.

5.1. Main

The **Main** menu features the settings of **System Date** and **System Time** and displays some BIOS info.



The BIOS info displayed are:

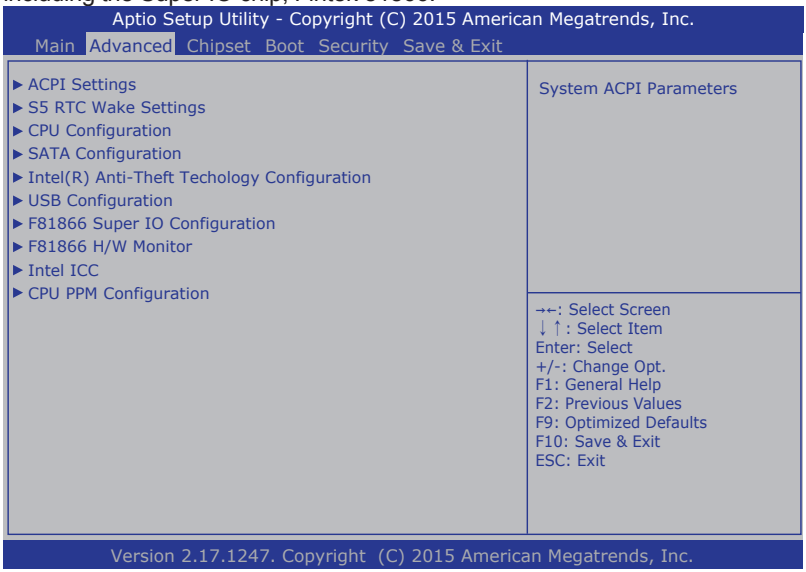
Info	Description
BIOS Vendor	Delivers the provider of the BIOS Setup utility.
Core Version	Delivers the version info of the core.
Compliency	Delivers the UEFI support.
Project Version	Delivers the computer's BIOS version.
Build Date and Time	Delivers the date and time when the BIOS Setup utility was made/updated.
Access Level	Delivers the level that the BIOS is being accessed at the moment.

The featured settings are:

Setting	Description
Language	The system language is set to **English** and cannot be changed.
System Time	Sets system time.
System Date	Sets system date.

5.2. Advanced

Access the **Advanced** menu to manage the computer's system configuration including the Super IO chip, Fintek 81866.

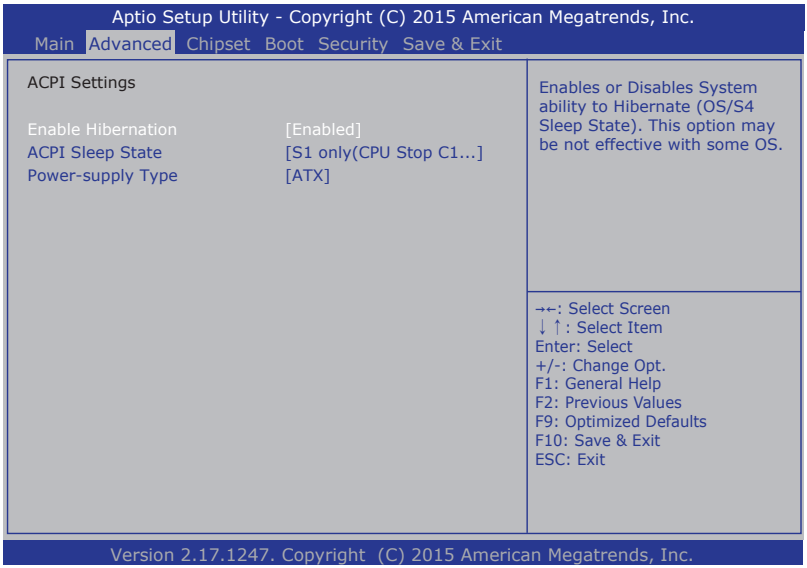


The featured settings and submenus are:

Setting	Description
ACPI Settings	See 5.2.1. ACPI Settings on page 68.
SS RTC Wake Settings	See 5.2.2. SS RTC Wake Settings on page 69.
CPU Configuration	See 5.2.3. CPU Configuration on page 70.
SATA Configuration	See 5.2.4. SATA Configuration on page 71.
Intel Anti-Theft Technology Configuration	See 5.2.5. Intel(R) Anti-Theft Technology Configuration on page 72.
USB Configuration	See 5.2.6. USB Configuration on page 73.
F81866 Super IO Configuration	See 5.2.7. F81866 Super IO Configuration on page 74.
F81866 H/W Monitor	See 5.2.8. F81866 H/W Monitor on page 76.
Intel ICC	See 5.2.9. Intel ICC on page 77.
CPU PPM Configuration	See 5.2.10. CPU PPM Configuration on page 78.

5.2.1. ACPI Settings

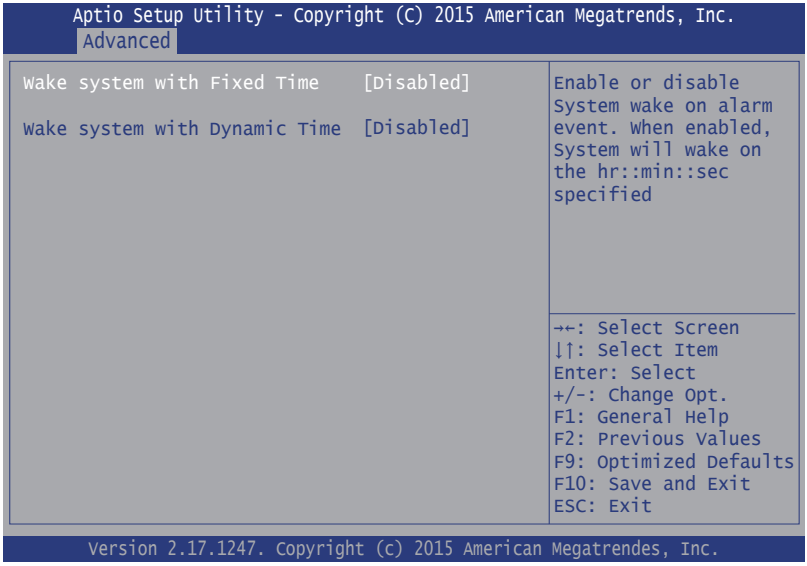
The submenu **ACPI Settings** enable users to change the system's ACPI (Advanced Configuration and Power Interface) configuration by the following settings:



Setting	Description
Enable Hibernation	Enables/disables the system to/from hibernation (OS/S4 Sleep State). ▸ This option may not be effective with some OS. ▸ Options available are **Enabled** (default) and **Disabled**.
ACPI Sleep State	Sets the ACPI sleep state for the system to enter when the suspend button is hit. ▸ Options available are **Suspend Disabled**, **S1 only (CPU Stop Clock), S3 only (Suspend to RAM)** and Both S1 and S3 available for OS to choose from. ▸ **S3 only (Suspend to RAM)** is the default.
Power-Supply Type	Configures system power-supply type. ▸ Options available are **AT**,and **ATX** (default).

5.2.2. SS RTC Wake Settings

Access this submenu to configure whether and when to awake the system.



The featured settings are:

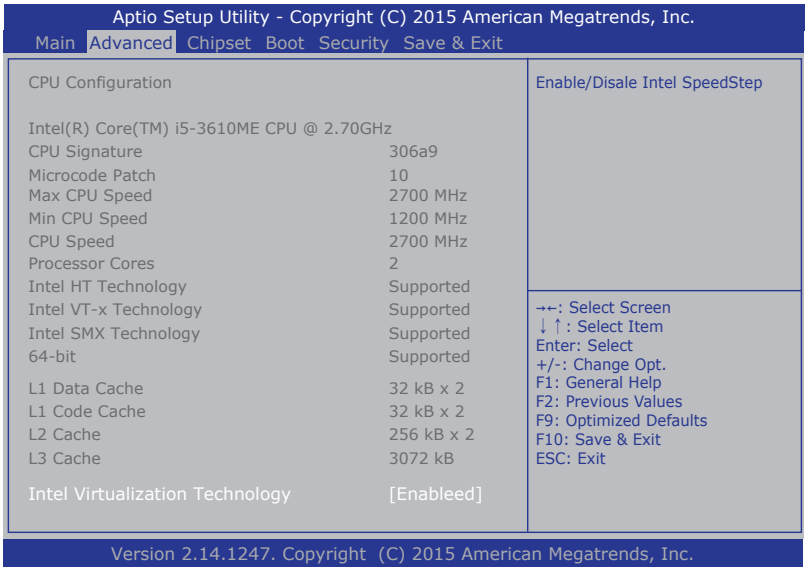
Setting	Description
Wake System with Fixed Time	Sets if to awake the system at a defined moment. ▸ Options available are **Enabled** and **Disabled** (default). ▸ Enable this feature to awake the system at a defined moment in time. When enabled, the following settings become available:

Setting	Description
Wake up hour	Defines the (hour) time to awake the system. ▸ 0 to 23 configurable.
Wake up minute	Defines the (minute) time to awake the system. ▸ 0 to 59 configurable.
Wake up second	Defines the (second) time to awake the system. ▸ 0 to 59 configurable.

<table>
<tr>
<td>Wake System with Dynamic TIme</td>
<td>Sets if to awake the system some time in the future.
▸ Options available are Enabled and Disabled (default).
▸ Enable this feature to awake the system some time from now. When enabled, the following setting becomes available:
<table>
<tr><th>Setting</th><th>Description</th></tr>
<tr><td>Wake up minute increase</td><td>Defines how long from now to awake the system.
▸ 1 to 5 minutes configurable.</td></tr>
</table>
</td>
</tr>
</table>

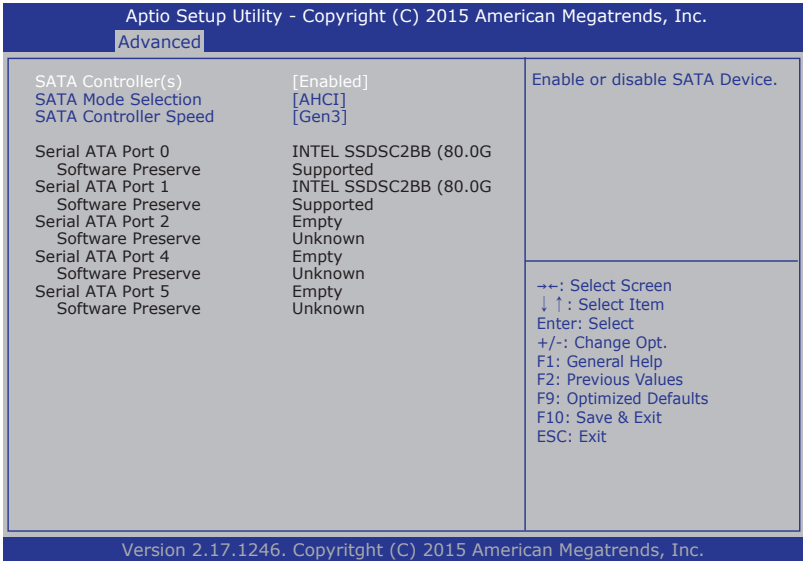
5.2.3. CPU Configuration

Select **CPU Configuration** to run a report of the CPU's details including: model name, processor speed, microcode revision, max./min. processor speeds, the amount of processor core(s), and CPU caches. See the depiction below:



5.2.4. SATA Configuration

SATA Configuration manages the system's SATA configuration and also delivers its status.

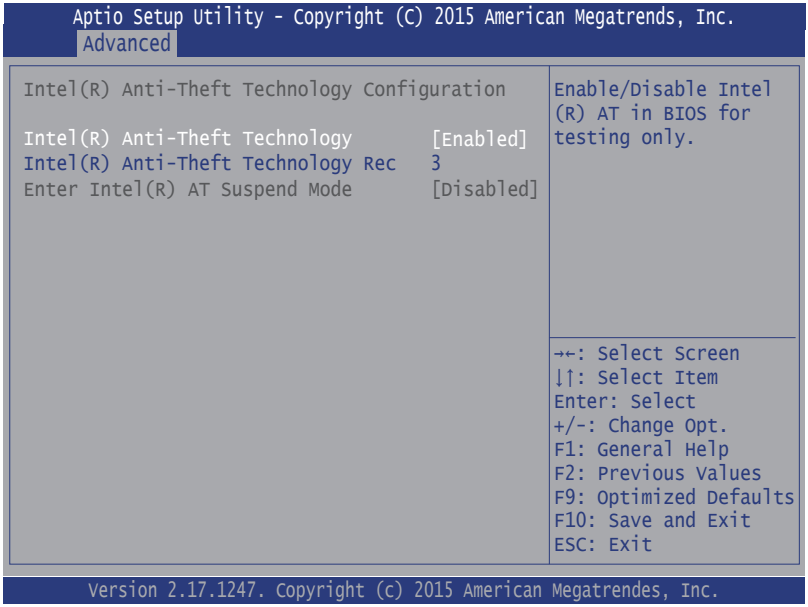


The featured settings are:

Setting	Description
SATA Controller(s)	Enables/disables SATA device(s). ▸ **Enabled** is the default.
SATA Mode Selection	Configures how SATA controller(s) operate. ▸ Options available are **IDE**, **AHCI** (default) and **RAID**.
SATA Controller Speed	Configures the maximum speed of SATA controller ▸ Options available are **Gen1**, **Gen2** and **Gen3**(default).
Serial ATA Port 0 ,1 ,2,4,5.	SATA device information

5.2.5. Intel(R) Anti-Theft Technology Configuration

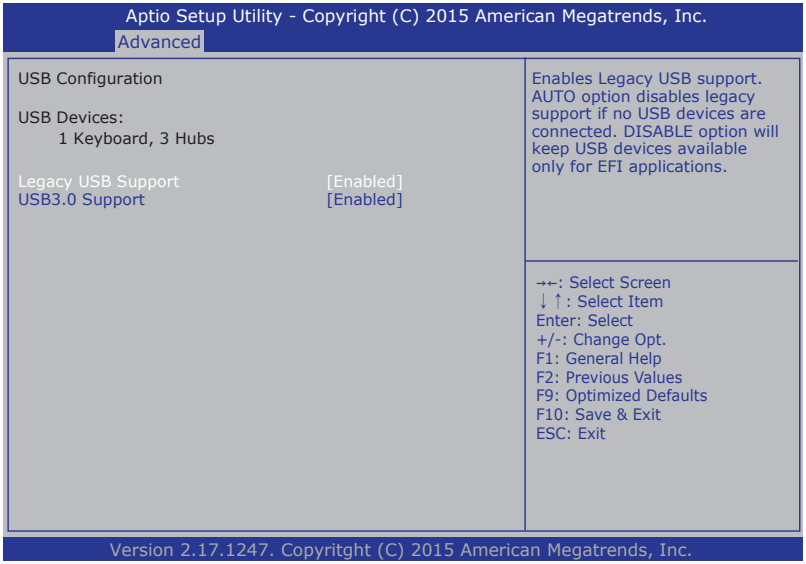
Disabling Intel(R) AT Allow User to login to platform. This is strictly for testing only. This does not disable Intel(R) AT Services in ME.



Setting	Description
Intel(R) Anti-Theft Technology	Enables (default)/disables Intel(R) AT in BIOS.
Intel(R) Anti-Theft Technology Rec	Set the number of times Recovery attempted will be allowed.

5.2.6. USB Configuration

Select this submenu to view the status of the USB devices and configure USB features.

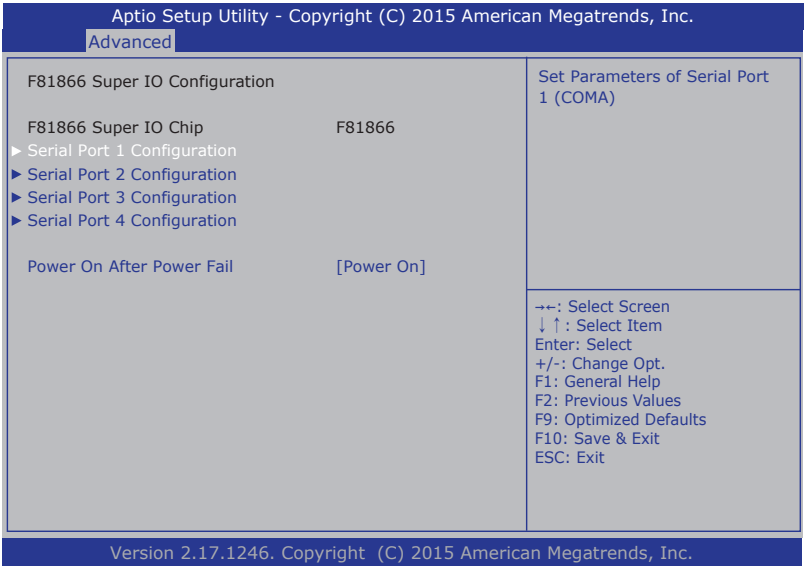


The featured settings are:

Setting	Description
Legacy USB Support	Enables/disables legacy USB support. ▸ Options available are **Enabled** (default), **Disabled** and **Auto**. ▸ Select **Auto** to disable legacy support if no USB device are connected. ▸ Select **Disabled** to keep USB devices available only for EFI applications.
USB3.0 Support	Enables/disables USB3.0 Support. The optional settings are: **Disabled** / **Enabled**.

5.2.7. F81866 Super IO Configuration

This submenu configures the Super IO chip (Fintek F81866) for the computer's serial ports 1~4 and the parallel port. The featured submenus are:

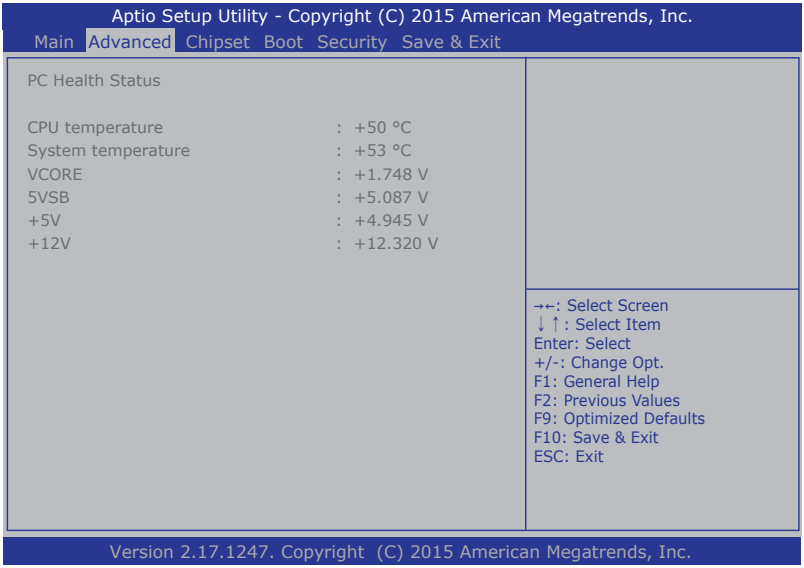


<table>
<tr><th>Submenu</th><th>Description</th></tr>
<tr><td>Serial Port 1 Configuration</td><td>Configures the computer's COM1. The featured settings are:
<table>
<tr><th>Setting</th><th>Description</th></tr>
<tr><td>Serial Port</td><td>Enables/disables the serial port.
▸ Enabled is the default.</td></tr>
<tr><td>Change Settings</td><td>Select an optimal setting for Super IO device.</td></tr>
</table></td></tr>
<tr><td>Serial Port 2 Configuration</td><td>Configures the computer's COM2. The featured settings are:
<table>
<tr><th>Setting</th><th>Description</th></tr>
<tr><td>Serial Port</td><td>Enables/disables the serial port.
▸ Enabled is the default.</td></tr>
<tr><td>Change Settings</td><td>Select an optimal setting for Super IO device.</td></tr>
</table></td></tr>
</table>

<table>
<tr><td>Serial Port 3 Configuration</td><td>Configures the computer's COM3 , which is fixed to RS232 and cannot be changed. The featured settings are:<table><tr><th>Setting</th><th>Description</th></tr><tr><td>Serial Port</td><td>Enables/disables the serial port.
▸ Enabled is the default.</td></tr><tr><td>Change Settings</td><td>Select an optimal setting for Super IO device.</td></tr><tr><td>Serial Port 1</td><td>Select RS232, RS422, and RS485 mode
▸ RS232 is the default.</td></tr></table></td></tr>
<tr><td>Serial Port 4 Configuration</td><td>Configures the computer's COM4, which is fixed to RS232 and cannot be changed. The featured settings are:<table><tr><th>Setting</th><th>Description</th></tr><tr><td>Serial Port</td><td>Enables/disables the serial port.
▸ Enabled is the default.</td></tr><tr><td>Change Settings</td><td>Select an optimal setting for Super IO device.</td></tr><tr><td>Serial Port 1</td><td>Select RS232, RS422, and RS485 mode
▸ RS232 is the default.</td></tr></table></td></tr>
<tr><td>Power On After Power Fail</td><td>Sets whether the system should power on or power off when the power supply resumes after an power failure.
▸ Options are Power off (default) and Power on.</td></tr>
</table>

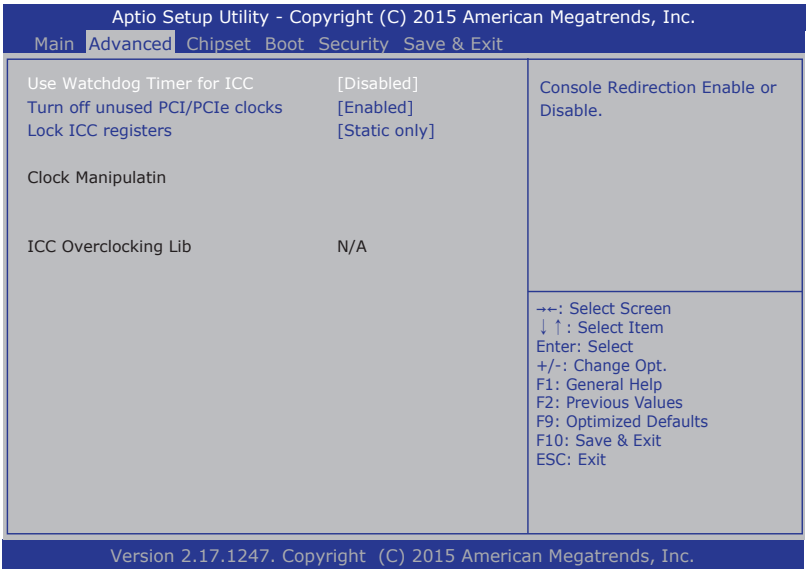
5.2.8. F81866 H/W Monitor

Select this submenu to view the main board's hardware status. Select it to run a report of various info as depicted below:



5.2.9. Intel ICC

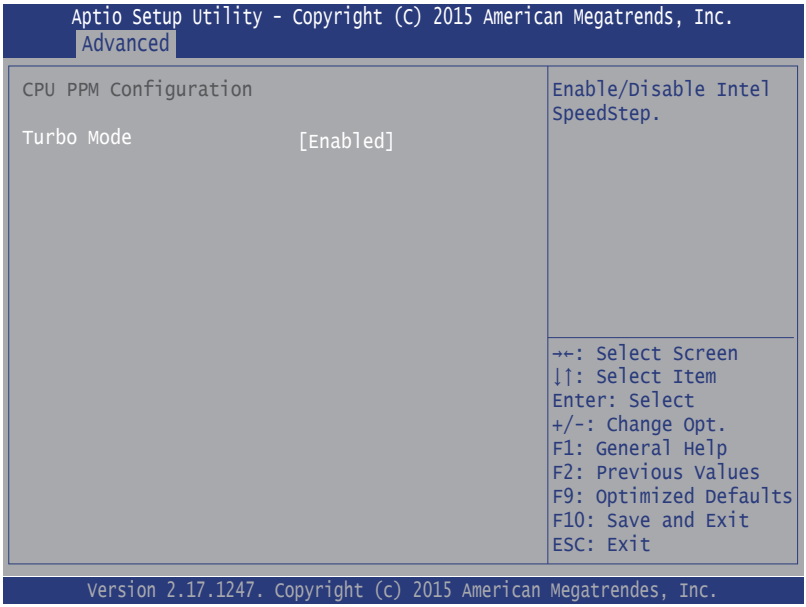
Select this submenu to configure the serial port console redirection configuration.



The featured setting is:

Setting	Description
Use Watchdog Timer for ICC	Enables/Disables Watchdog Timer operation for ICC. ▸ **Disabled** is the default.
Turn off unused PCI/PCIe clocks	Enables/Disables clocks for empty PCI/PCIe slots to save power. ▸ **Enabled** is the default.
Lock ICC registers	Configures ICC register Lock. ▸ Options available are **All registers**, and **Static only** (default).

5.2.10. CPU PPM Configuration

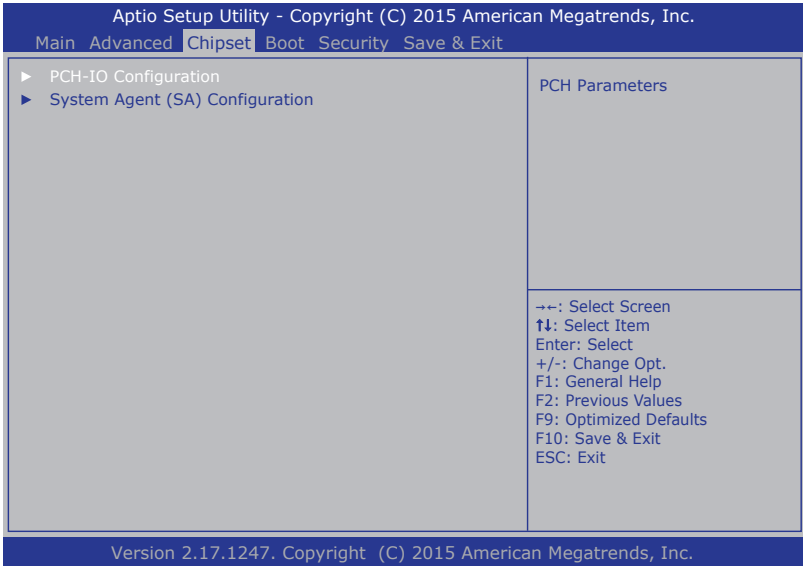


The featured settings are:

Setting	Description
Turbo Mode	Enables/Disables CPU Turbo Mode. ▸ **Enabled** is the default.

5.3. Chipset

The **Chipset** menu controls the system's chipset.



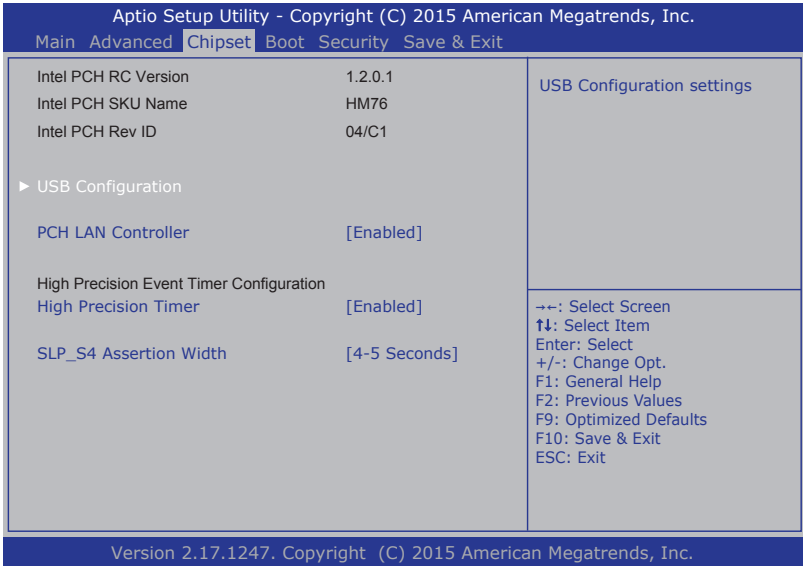
The featured submenus are **PCH-IO Configuration** and **System Agent (SA) Configuration**, which are explicated in the following of this section.

Submenu overview:

Submenu	Description
PCH-IO Configuration	Configures the PCH (Platform Controller Hub). See 5.3.1. PCH-IO Configuration on page 80 for the settings.
System Agent (SA) Configuration	Configures the System Agent (SA), i.e. the north bridge. See 5.3.1.1. USB Configuration on page 81 for the settings.

5.3.1. PCH-IO Configuration

Select this submenu to view the RC version, SKU name and revision ID of the Intel® PCH. Select this submenu also to configure the PCH:

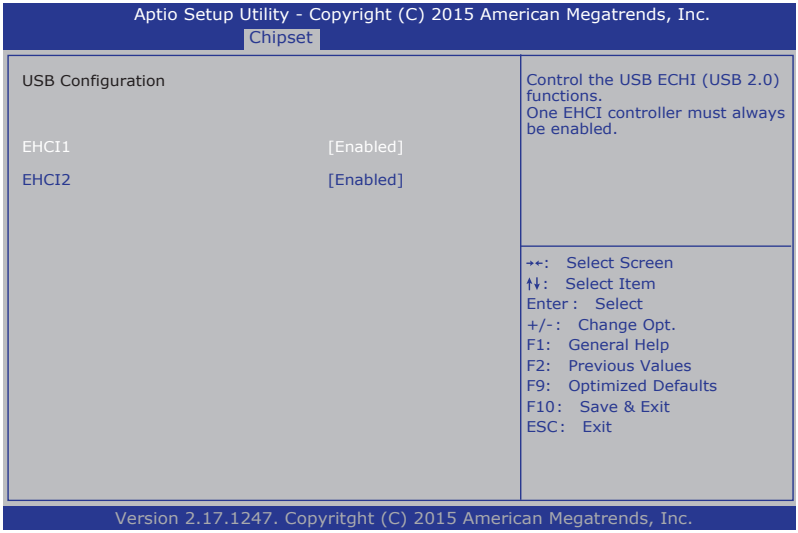


The featured settings/submenus are:

Setting /Submenu	Description
USB Configuration	See 5.3.1.1. USB Configuration on page 81.
PCH LAN Controller	Enables/disables the onboard NIC. ▸ **Enabled** is the default.
High Precision Timer	Enables/disables the High Precision Timer. ▸ **Enabled** is the default.
SLP_S4 Assertion Width	Configure the minimum assertion width of the SLP_S4# Signal. ▸ **4-5 Seconds** is the default.

5.3.1.1. USB Configuration

Access this submenu to configure the system's USB ports.

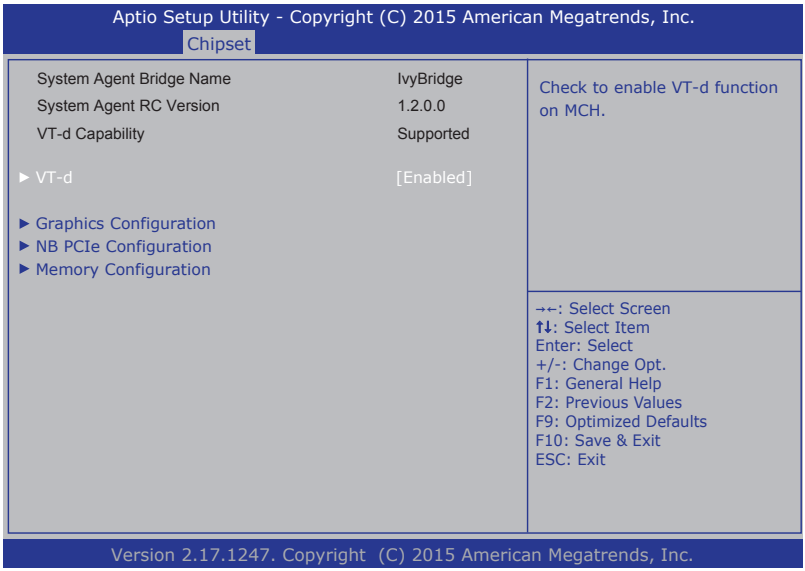


The featured settings are:

Setting	Description
EHCI1	Enables/disables the USB EHCI (USB2.0) functions. ▸ **Enabled** is the default. ▸ One EHCI controller must always be enabled.
EHCI2	Enables/disables the USB EHCI (USB2.0) functions. ▸ **Enabled** is the default. ▸ One EHCI controller must always be enabled.

5.3.2. System Agent (SA) Configuration

Select this submenu to view the name and RC version of the **System Agent (SA)**, i.e. the north bridge. Select this submenu also to configure the **System Agent (SA)** by the following setting and submenus:



Setting / Submenu	Description
VT-d	Enables/disables Intel® virtualization technology for directed I/O on the MCH (memory controller hub). ▸ **Enabled** is the default.
Graphics Configuration	See 5.3.2.1. Graphics Configuration on page 83.
NB PCIe Configuration	See 5.3.2.2. NB PCIe Configuration on page 83.
Memory Configuration	See 5.3.2.3. Memory Configuration on page 84.

5.3.2.1. Graphics Configuration

Select **Graphics Configuration** to view graphics info and accesses graphics settings.

The featured settings are:

Setting	Description
IGFX VBIOS Version	Display the IGFX(internal VGA) VBIOS version.
IGFX Frequency	Display the IGFX freqency
Graphics Turbo IMON Current	Sets the graphics turbo IMON current values. ▸ Options available are **14** to **31**. ▸ **31** is the default.
Primary Display	Select the Graphics device which will be activated as Primary Display. ▸ Options available are **Auto (Default)**, **IGFX**, and **PEG**.
Internal Graphics	Enables/disables the IGD. ▸ Options available are **Auto (Default)**, **Disabled,** and **Enabled.**

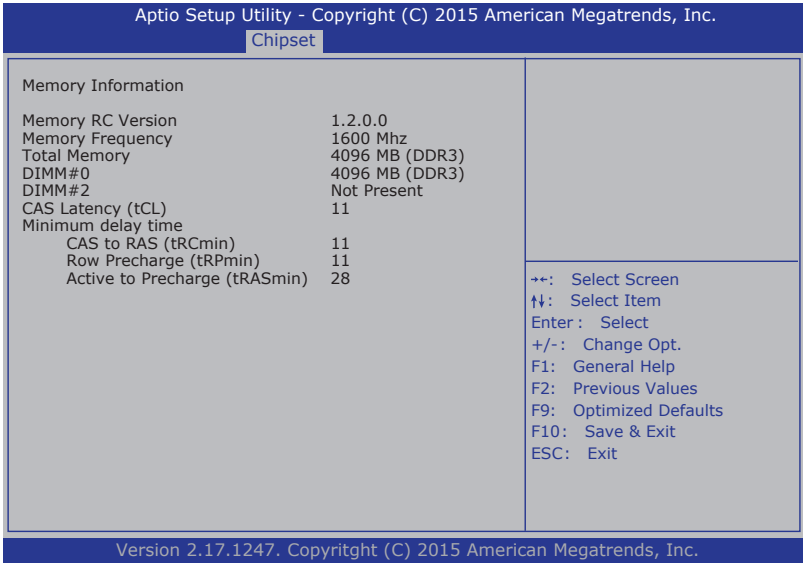
5.3.2.2. NB PCIe Configuration

Access this submenu to configure the system's PCIe.

Setting	Description
PEG0	Display the PEG0 status.
PEG0-Gen X	Configure the PEG0 ▸ Options available are Auto/Gen1/Gen2/Gen3. ▸ Gen3 is the default.
PEG0 ASPM	Configure the PEG0 ASPM ▸ Options available are Disabled/Auto/ASPM L0s/ASPM L1/ASPM L0sL1. ▸ Disabled is the default.

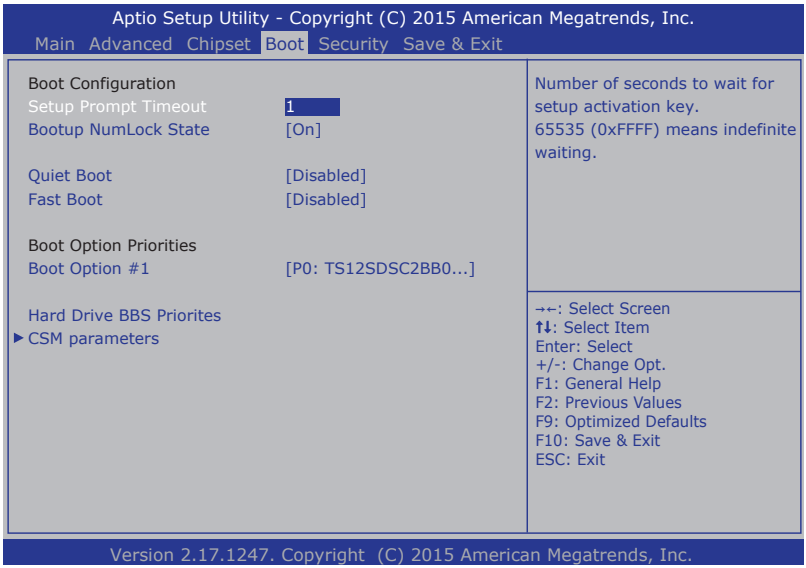
5.3.2.3. Memory Configuration

Display the memory information



5.4. Boot

The **Boot** menu configures how to boot up the system such as the configuration of boot device priority.



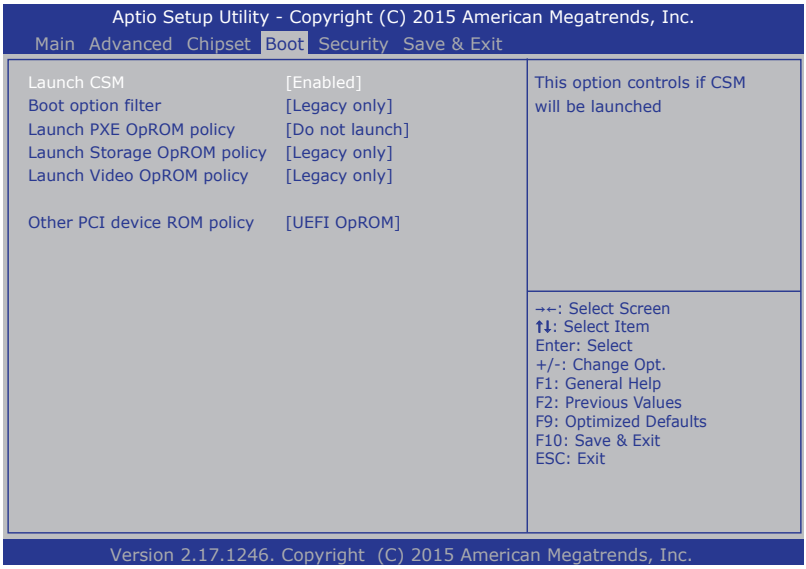
The featured settings and submenu are:

Setting	Description
Setup Prompt Timeout	Set how long to wait for the prompt to show for entering BIOS Setup. ▸ The default setting is **1** (sec). ▸ Set it to **65535** to wait indefinitely.
Bootup NumLock State	Sets whether to enable or disable the keyboard's NumLock state when the system starts up. ▸ Options available are **On** (default) and **Off**.
Quiet Boot	Sets whether to display the POST (Power-on Self Tests) messages or the system manufacturer's full screen logo during booting. ▸ Select **Disabled** to display the normal POST message, which is the default.

Fast Boot	Enables/disables boot with initialization of a minimal set of devices required to launch active boot option. Has no effect for BBS boot options. ▸ **Disabled** is the default.
Boot Option Priority	
Boot Option #1	Set the system boot priorities.
Hard Drive BBS Priorities	Set the hard drive BBS priorities.
CSM parameters	Configures whether to launch the UEFI/legacy OpROM, boot options, filters, etc. See the full settings at 5.4.1. CSM Paramenters on page 86.

5.4.1. CSM Paramenters

Access this submenu to configure the execution of OpROM, boot options filter and so on.

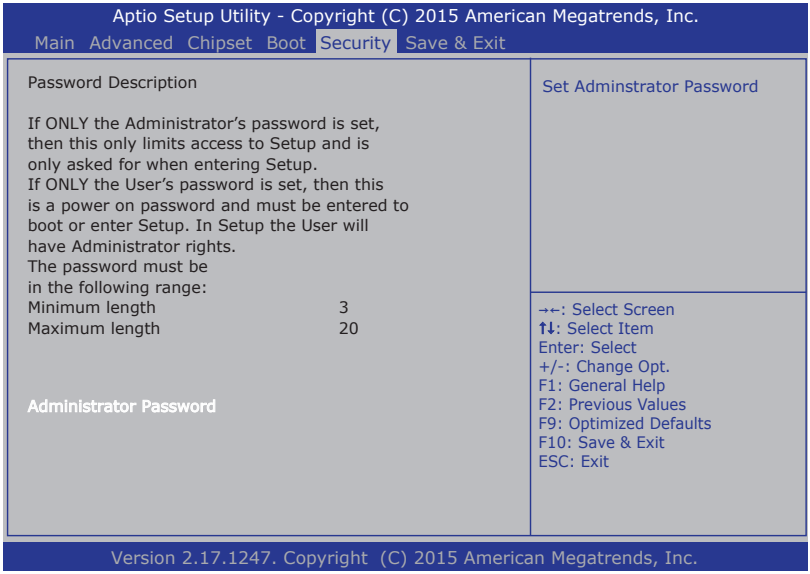


The featured settings are:

Setting	Description
Launch CSM	Enables/disables launching CSM (capability support module), which provides UEFI with the additional functionality to allow loading a traditional OS or using a traditional OpROM. ▸ Options available are: **Enabled** (default) and **Disabled**.
Boot Option Filter	Defines the devices to boot the system to. ▸ Options available are **UEFI and Legacy** (default), **Legacy only** and **UEFI only**. ▸ This setting is only available when **Launch CSM** is enabled (set to **Always**).
Launch PXE OpROM policy	Configures whether to launch the UEFI or legacy OpROM of PXE (Preboot eXecution Environment). ▸ Options available are **Do not launch** (default), **UEFI only** and **Legacy only**. ▸ This setting is only available when **Launch CSM** is enabled (set to **Always**).
Launch Storage OpROM policy	Configures whether to launch the UEFI or legacy OpROM of storage. ▸ Options available are **Do not launch**, **UEFI only** and **Legacy only** (default). ▸ This setting is only available when **Launch CSM** is enabled (set to **Always**).
Launch Video OpROM policy	Configures whether to launch the UEFI or legacy OpROM of video. ▸ Options available are **Do not launch**, **UEFI only** and **Legacy only** (default). ▸ This setting is only available when **Launch CSM** is enabled (set to **Always**).
Other PCI device ROM priority	Configures which OpROM to run for the PCI devices other than network, mass storage, or video. ▸ Options available are **UEFI OpROM** and **Legacy OpROM** (default).

5.5. Security

The **Security** menu sets up the password for the system's administrator account. Once the administrator password is set up, this BIOS Setup utility is limited to access and will ask for the password each time any access is attempted.

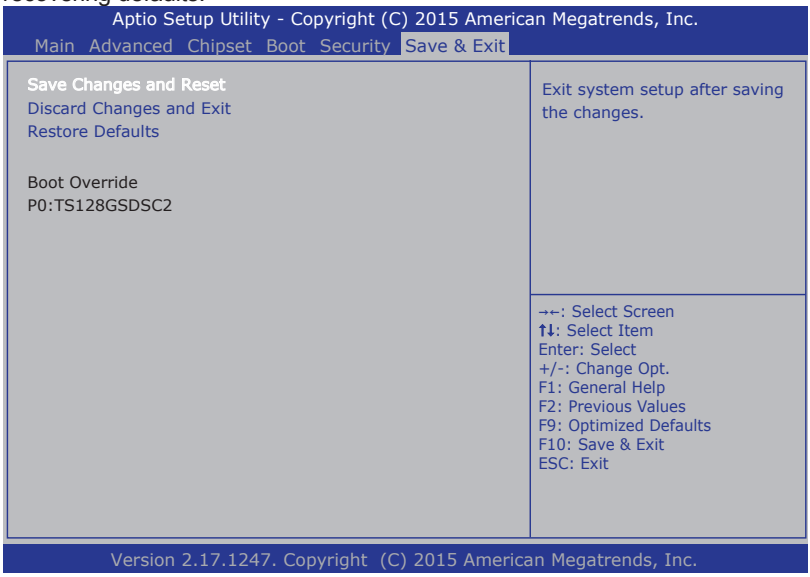


The featured setting is:

Setting	Description
Administrator Password	To set up an administrator password: 1. Select **Administrator Password**. An **Create New Password** dialog then pops up onscreen. 2. Enter your desired password that is no less than 3 characters and no more than 20 characters. 3. Hit [Enter] key to submit.

5.6. Save & Exit

The **Save & Exit** menu features a handful of commands to launch actions from the BIOS Setup utility regarding saving changes, quitting the utility and recovering defaults.



The features settings are:

Setting	Description
Save Changes and Reset	Saves the changes and quits the BIOS Setup utility.
Discard Changes and Exit	Quits the BIOS Setup utility without saving the change(s).
Restore Defaults	Restores all settings to defaults. ▸ This is a command to launch an action from the BIOS Setup utility.
Boot Override	**Boot Override** presents a list in context with the boot devices in the system. Select the device to boot up the system regardless of the currently configured boot priority. ▸ This is a command to launch an action from the BIOS Setup utility.

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Appendices

A: Digital I/O Setting

Digital I/O can read from or write to a line or an entire digital port, which is a collection of lines. This mechanism helps users achieve various applications such as industrial automation, customized circuit, and laboratory testing. Take the source code below that is written in C for the digital I/O application example.

Sample Codes:

```
/*-----  Include Header Area -----*/
#include "math.h"
#include "stdio.h"
#include "dos.h"

#define  sioIndex          0x4E                                        / *
or 0x2E */
#define   sioData  0x4F                                          /*  or  0x2F
*/

/*-----  routing, sub-routing -----*/
void main()
{
    int iData;

    SioGPIOMode(0x00FF);
    delay(2000);

         SioGPIOData(0x0055);
         delay(2000);

    iData = SioGPIOStatus();
    printf(" Input : %2x \n",iData);
    delay(2000);

         SioGPIOData(0x00AA);
         delay(2000);

    iData = SioGPIOStatus();
    printf(" Input : %2x \n",iData);
    delay(2000);
}

void SioGPIOMode(int iMode)
{
         int iTemp;

    outportb(sioIndex,0x87);                                    /*    Enable
Super I/O */
    outportb(sioIndex,0x87);
```

```
    outportb(sioIndex,0x07);                                    /*    Select
logic device - GPIO */
    outportb(sioData, 0x06);

    outportb(sioIndex,0x30);                                    /*    Enable
GPIO */
    outportb(sioData, 0x01);

         iTemp = iMode & 0x00FF;
    outportb(sioIndex,0xA0);                                    /*      GPIO
50~57 - Output Enable */
    outportb(sioData,iTemp);

         iTemp = (iMode & 0xFF00) >> 8;
    outportb(sioIndex,0x88);                                    /*      GPIO
80~87 - Output Enable */
    outportb(sioData,iTemp);

         outportb(sioIndex,0xAA);                               /*   Disable
Super I/O */
}

void SioGPIOData(int iData)
{
         int iTemp;

    outportb(sioIndex,0x87);                                    /*    Enable
Super I/O */
    outportb(sioIndex,0x87);

    outportb(sioIndex,0x07);                                    /*    Select
logic device - GPIO */
    outportb(sioData, 0x06);

         iTemp = iData & 0x00FF;
    outportb(sioIndex,0xA1);                                    /*      GPIO
50~57 - Output Data */
    outportb(sioData,iTemp);

         iTemp = (iData & 0xFF00) >> 8;
    outportb(sioIndex,0x89);                                    /*      GPIO
80~87 - Output Data */
    outportb(sioData,iTemp);

         outportb(sioIndex,0xAA);                               /*   Disable
Super I/O */
}

int SioGPIOStatus()
{
         int iStatus;
         int iTemp;
```

```
    outportb(sioIndex,0x87);                                    /*    Enable
Super I/O */
    outportb(sioIndex,0x87);

    outportb(sioIndex,0x07);                                    /*    Select
logic device - GPIO */
    outportb(sioData, 0x06);

        outportb(sioIndex,0xA2);                                /*      GPIO
50~57 - Status */
    iTemp = inportb(sioData);

        outportb(sioIndex,0x8A);                                /*      GPIO
80~07 - Status */
    iStatus = inportb(sioData);

        outportb(sioIndex,0xAA);                                /*   Disable
Super I/O */

        iStatus = (iStatus<<8) + iTemp;

        return iStatus;
}
```

B: Watchdog Timer (WDT) Setting

WDT is widely used for industry application to monitor the activity of CPU. Application software depends on its requirement to trigger WDT with adequate timer setting. Before WDT time out, the functional normal system will reload the WDT. The WDT never time out for a normal system. The WDT will not be reloaded by an abnormal system, then WDT will time out and auto-reset the system to avoid abnormal operation.

This computer supports 255 levels watchdog timer by software programming I/O ports.

Below is an assembly program example to disable and load WDT.

Sample Codes:

```
/*-----  Include Header Area -----*/
#include "math.h"
#include "stdio.h"
#include "dos.h"

#define SIO_INDEX       0x4E                        /* or index = 0x2E */
#define SIO_DATA        0x4F            /* or data  = 0x2F */

/*-----  routing, sub-routing -----*/
void main()
{
        outportb(sioIndex, 0x87);                   /* SIO - Enable */
        outportb(sioIndex, 0x87);

        outportb(sioIndex, 0x07);                   /* LDN - WDT */
        outportb(sioData,  0x07);

        outportb(sioIndex, 0x30);                   /* WDT - Enable */
        outportb(sioData,  0x01);

        outportb(sioIndex, 0xFA);                   /* WDTOut - Enable */
        outportb(sioData,  0x01);

        outportb(sioIndex, 0xF6);                   /*   WDT   -   Timeout
Value */
        outportb(sioData,  0x05);

        outportb(sioIndex, 0xF5);                   /* WDT - Configuration
*/
        outportb(sioData,  0x32);

        outportb(sioIndex, 0xAA);                   /* SIO - Disable */
}
```

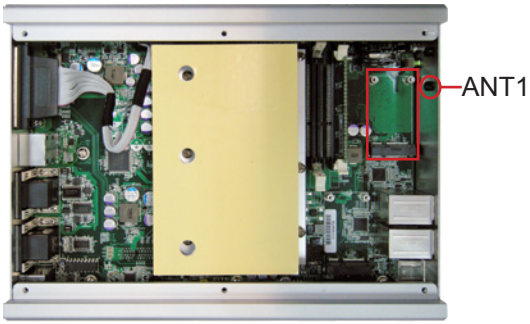
C: Wi-Fi Module WIFI-AT2300 Hardware Installation

To use Wi-Fi, hardware-wise the computer needs a Wi-Fi module installed, and software-wise the computer needs the device driver and an application program. This appendix will guide you to install the Wi-Fi module **WIFI-AT2300** . (To have a copy of the device driver, please contact ARBOR customer service by the contact info described in Technical Support on page viii.)

C.1. Install WIFI-AT2300

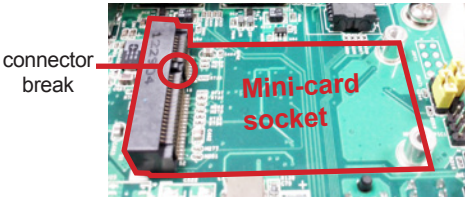
1. Remove the computer's top cover as described in 4.1.1.1. Remove Top Cover on page 40.

   The inside of the computer comes to view.

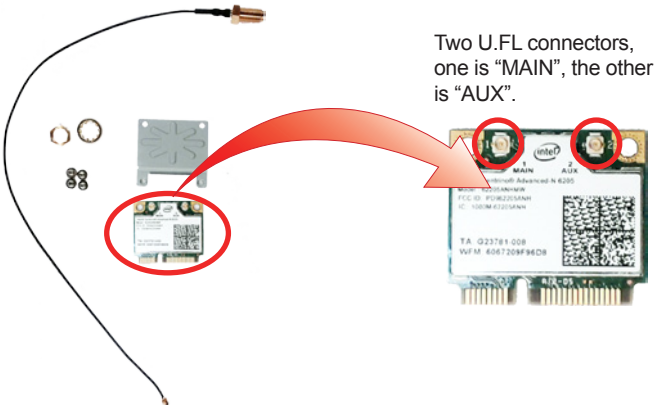


2. Find the **Mini-card** socket for wireless modules on the board as the illustration above shows.

   The socket has a break among the connector.



3. Prepare the **WIFI-AT2300** Wi-Fi module kit. The module is a half-size module of **PCI Express Mini-card** form factor, with two U.FL connectors, one is “MAIN“, and the other is “AUX“.



4. In order to make the half-size Wi-Fi module compatible with the **Mini-card** socket, extend the WiFi module with a “mini half bracket”. Join them together by using two screws.

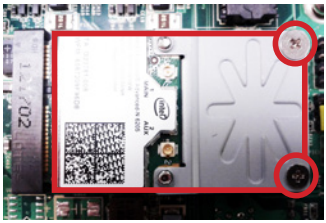
Position the WiFi module and the “mini half bracket” exactly as shown.

Join the WiFi module and the “mini half bracket” by using two screws.

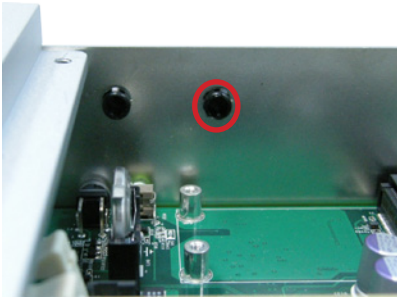
5. Plug the Wi-Fi module to the socket’s connector by a slanted angle. Fully plug the module, and note the notch on the wireless module should meet the break of the connector.

Fully plug the module.

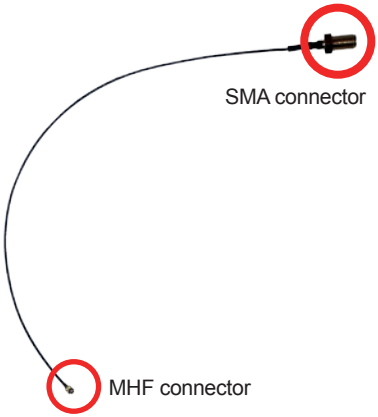
6. Press down the module and fix the module in place using two screws.



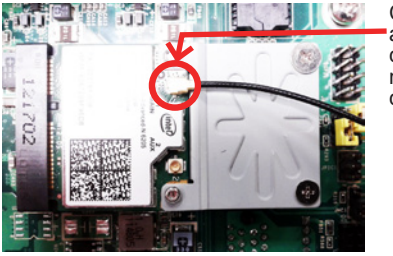
7. Remove the plastic plug from the computer's rear (or front) panel to make an antenna hole. Keep the plastic plug for any possible restoration in the future.



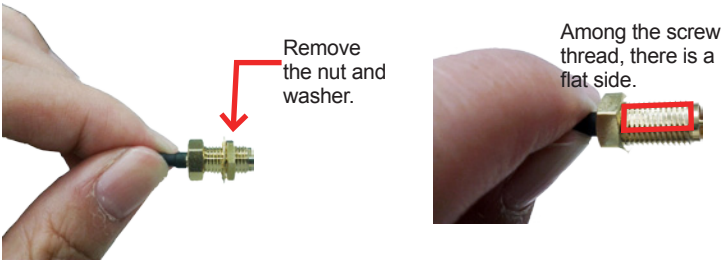
8. Have the RF antenna. The antenna has an SMA connector on one end and an MHF connector on the other.



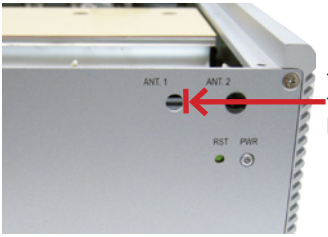
9. Connect the RF antenna's MHF connector to the Wi-Fi module's "MAIN" connector.

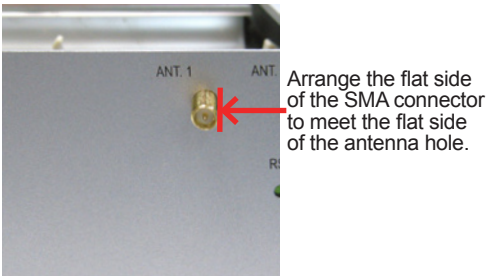


10. From the other end of the RF antenna, which is an SMA connector, remove the washer and the nut. Save the washer and nut for later use. Note the SMA connector has the form of a threaded bolt, with one flat side.

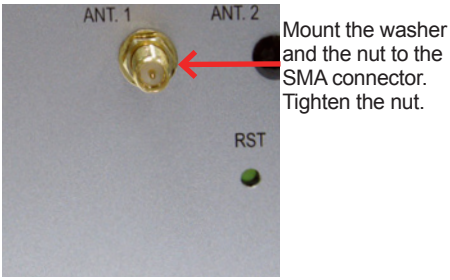


11. Pull the SMA connector through the above mentioned antenna hole. Note to meet the aforesaid flat side with the antenna hole's flat side.



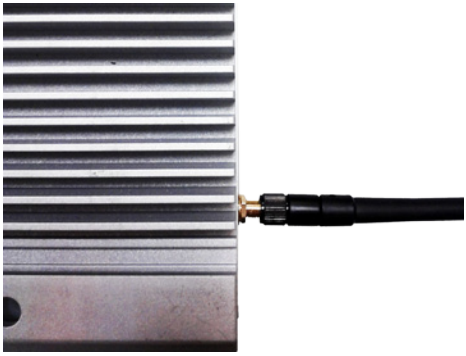


12. Mount the washer first and then the nut to the SMA connector. Make sure the nut is tightened.



13. Restore the computer's top cover.

14. Have an external antenna. Screw and tightly fasten the antenna to the SMA connector.



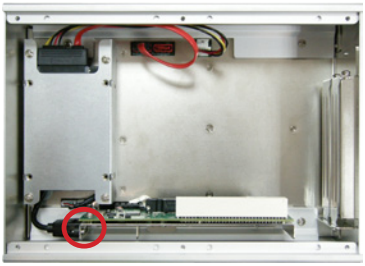
15. Swivel the antenna to an angle of best signals.

D: Install Internal USB Drives

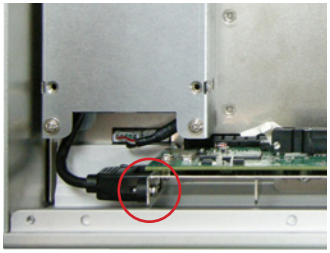
Since some critical application programs rely on a USB key to run, an USB drive is necessary to store related encrypted keys and digital certificates. The FPC-7601, FPC-7602 and FPC-7603 allow building one USB port inside the chassis to support one USB drive to work therein for reinforced protection against theft or tamper. (Configure-to-Order only)

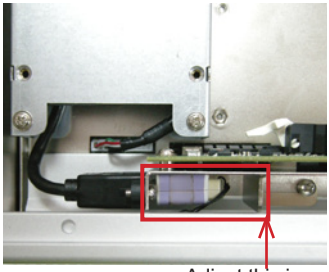
To install the internal USB drive(s):

1. Remove the bottom cover from the computer as described in 4.1.1.2. Remove the Bottom Cover on page 42.
2. Find the one USB port inside the computer as marked in the picture below.



3. Install an USB drive to one of the internal USB port.





Adjust this iron to make space for the USB drive installed.

4. Restore the bottom cover to the computer.