



**MODEL:**  
**PPC-FxxD-ULT5**

**Modular Panel PC with 8<sup>th</sup> Gen. Intel® Core™ i5-8365UE /  
Celeron® 4305UE CPU, DDR4, HDMI, USB 3.2 Gen 2,  
Triple GbE, RS-232/422/485, M.2 M-key/A-key,  
PoE, IP66 and RoHS Compliant**

# User Manual

# Revision

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Date	Version	Changes
December 1, 2020	1.00	Initial release



# Safety Instructions

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- en** Warning! Read the user manual before connecting the system to the power source.
- de** Vorsicht! Bitte lesen Sie die Bedienungsanleitung, bevor Sie das System an eine Stromquelle anschließen.
- fr** Attention! Avant de brancher le système à la source d'alimentation, consultez le mode d'emploi.
- it** Avvertenza! Consultare il manuale utente prima di collegare il sistema all'alimentatore.
- es** Atención! Lea atentamente este manual del usuario antes de operar la fuente de alimentación.
- zh** 警告！在將系統連接到電源之前，請仔細閱讀使用手冊。
- cn** 警告！在將系統連接到電源之前，請仔細閱讀使用手冊。
- 

- en** Warning! To prevent the system from overheating, do not operate it in an area that exceeds the maximum operating temperature described in the user manual.
- de** Vorsicht! Um eine Überhitzung des Systems zu vermeiden, betreiben Sie es ausschließlich im zulässigen Betriebstemperaturbereich. Dieser ist in der Bedienungsanleitung vermerkt.
- fr** Attention! Pour éviter la surchauffe du système, ne l'utilisez pas dans une zone dont la température dépasse les limites décrits dans le mode d'emploi.
- it** Avvertenza! Per evitare che il sistema si surriscaldi, non utilizzarlo in aree che superino la temperatura massima d'esercizio descritta nel manuale utente.
- es** Atención! Para evitar el excesivo calentamiento del sistema, no opere en las condiciones de temperatura superior a lo recomendado en este manual del usuario.
- zh** 警告！為防止系統過熱，不要在使用手冊上記載的產品工作溫度範圍之外操作此系統。
- cn** 警告！為防止系統過熱，不要在使用手冊上記載的產品工作溫度範圍之外操作此系統。
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- en** Warning! Ultimate disposal of this product should be handled according to all national laws and regulations.
  - de** Vorsicht! Die Entsorgung dieses Produkts sollte gemäß allen Bestimmungen und Gesetzen des Landes erfolgen.
  - fr** Attention! La mise au rebut ou le recyclage de ce produit sont généralement soumis aux lois et/ou directives de respect de l'environnement. Renseignez-vous auprès de l'organisme compétent.
  - it** Avvertenza! Lo smaltimento di questo prodotto deve essere eseguito secondo le leggi e i regolamenti locali.
  - es** Atención! La disposición final de residuos de este producto se debe cumplir con las normativas y leyes del país.
  - zh** 警告！本產品的廢棄處理應根據該國家的法律和規章進行。
  - cn** 警告！本产品的废弃处理应根据该国家的法律和规章进行。
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# Manual Conventions

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## **WARNING**

Warnings appear where overlooked details may cause damage to the equipment or result in personal injury. Warnings should be taken seriously.



## **CAUTION**

Cautionary messages should be heeded to help reduce the chance of losing data or damaging the product.



## **NOTE**

These messages inform the reader of essential but non-critical information. These messages should be read carefully as any directions or instructions contained therein can help avoid making mistakes.

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Chapter

1

# Introduction

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## 1.1 Overview



**Figure 1-1: PPC-FxxD-ULT5 Series Panel PC**

The PPC-FxxD-ULT5 series is a quad-core Intel® Core™ i5-8365UE / Celeron® 4305UE powered flat bezel touchscreen panel PC with a rich variety of functions and peripherals. It has a unique modular design to achieve high flexibility by assembling the FLEX series system with the LCD touchscreen module. The flat-bezel design is ideal for easy and simplified integration into various applications.

The Intel® Core™ i5-8365UE / Celeron® 4305UE is a System-on-Chip (SoC) that ensures optimal memory, graphics, and peripheral I/O support. The system comes with 4.0 GB of DDR4 SO-DIMM memory ensuring smooth data throughputs with reduced bottlenecks and fast system access.

One RS-232/422/485 serial port, one RS-232 serial port and four external USB 3.2 Gen 2 ports ensure simplified connectivity to a variety of external peripheral devices. Three RJ-45 Ethernet connectors provide the system with smooth connection to an external LAN. Moreover, two of the Ethernet connectors are capable to support PoE by installing the optional PoE module.

## PPC-FxxD-ULT5

### 1.2 Model Variations

The model variations of the PPC-FxxD-ULT5 panel PC series are listed below.

	Size	Resolutions	Processor + Memory
PPC-F15D-ULT5-i5/4G/PC	15"	1024x768	Intel® Core™ i5-8365UE CPU 4 GB DDR4 SO-DIMM
PPC-FW15D-ULT5-i5/4G/PC	15.6"	1366x768	
PPC-F17D-ULT5-i5/4G/PC	17"	1280x1024	
PPC-FW19D-ULT5-i5/4G/PC	18.5"	1366x768	
PPC-F15D-ULT5-C/4G/PC	15"	1024x768	Intel® Celeron® 4305UE CPU 4 GB DDR4 SO-DIMM
PPC-FW15D-ULT5-C/4G/PC	15.6"	1366x768	
PPC-F17D-ULT5-C/4G/PC	17"	1280x1024	
PPC-FW19D-ULT5-C/4G/PC	18.5"	1366x768	

**Table 1-1: Model Variations**

### 1.3 Features

The PPC-FxxD-ULT5 has the following features

- 8<sup>th</sup> generation Intel® Core™ i5-8365UE / Celeron® 4305UE processor
- Modularized design for flexible utilization
- Preinstalled with 4 GB of DDR4 memory (system max. 32 GB)
- Anti-glare/anti-UV projected capacitive type touchscreen
- Three PCIe GbE RJ-45 connectors (two with PoE support)
- Four USB 3.2 Gen 2 (10 Gb/s) ports
- One RS-232/422/485 serial port and one RS-232 serial port by D-sub 9 connectors; support Auto Flow Control (AFC) via RS-485
- Supports one 2.5" SATA 6Gb/s HDD/SSD
- 12 V DC power input
- IP 66 compliant front panel
- RoHS compliant design

## 1.4 Front Panel

The front side of the PPC-FxxD-ULT5 is a flat panel LCD with P-CAP touchscreen surrounded by a metal frame.



Figure 1-2: Front Panel

## 1.5 Bottom Panel

An overview of the bottom panel is shown below.

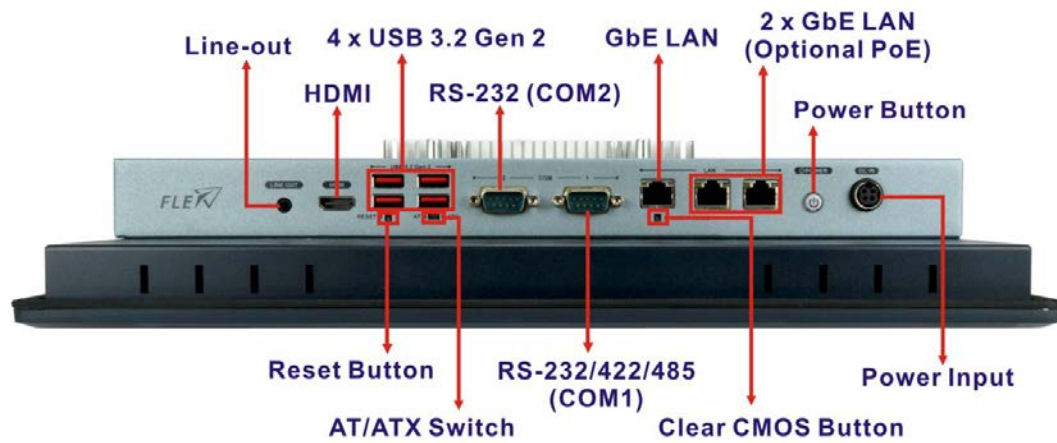


Figure 1-3: Bottom Panel



## PPC-FxxD-ULT5

### 1.6 Rear Panel

The rear panel has retention screw holes that support VESA mounting. The rear panel also provides access to the HDD bay and the PoE card slots.

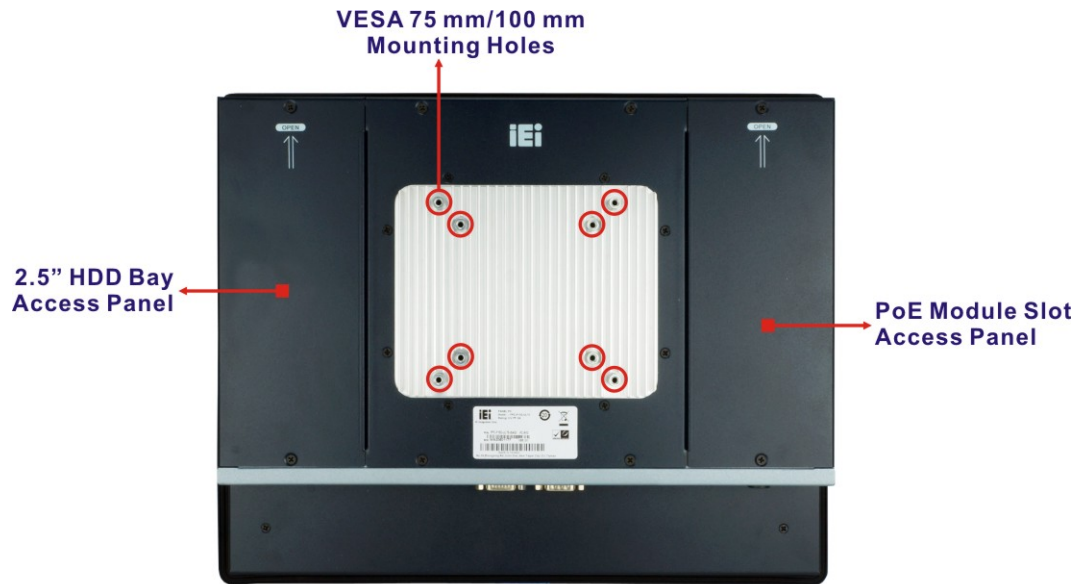


Figure 1-4: Rear Panel

## 1.7 Technical Specifications

### 1.7.1 15" & 15.6" Specifications

	PPC-F15D-ULT5	PPC-FW15D-ULT5
<b>LCD Size</b>	15"	15.6"
<b>Max. Resolution</b>	1024 x 768	1366 x 768
<b>Brightness (cd/m<sup>2</sup>)</b>	450	400
<b>Contrast Ratio</b>	800:1	500:1
<b>LCD Color</b>	16.2M	16.2M
<b>Pixel Pitch (mm)</b>	0.29 x 0.29	0.252 x 0.252
<b>Viewing Angle (H/V)</b>	160°/150°	170°/160°
<b>Backlight MTBF</b>	70,000 hrs	50,000 hrs
<b>Touchscreen Type</b>	Projected capacitive type with 10-point multi-touch and anti-glare coating	
<b>Touch Controller</b>	EETI EXC3000	
<b>CPU</b>	8th Generation Intel® Core™ i5-8365UE CPU (6M cache, up to 4.2 GHz) 8th Generation Intel® Celeron® 4305UE CPU (2M cache, 2.0 GHz)	
<b>BIOS</b>	AMI UEFI BIOS	
<b>Memory</b>	Two 260-pin 2400 MHz dual-channel unbuffered DDR4 SO-DIMM slots (system max. 32 GB) One slot is preinstalled with a 4 GB memory module	
<b>Graphics Engine</b>	Intel® HD Graphics Gen 9 Engines with 16 low-power execution units, supports 4K codec decode	
<b>Super I/O</b>	Fintek F81866	
<b>Storage</b>	1 x 2.5" SATA 6Gb/s HDD/SSD bay 1 x M.2 M-key (2280, PCIe 3.0 x4), supports NVMe SSD	
<b>Ethernet Controller</b>	Intel® I219 PHY (LAN1) Intel® I211 PCIe GbE controller (LAN2 & LAN3)	
<b>Ethernet Port</b>	2 x PoE GbE LAN* (RJ-45) 1 x GbE LAN (RJ-45)	
<b>PoE</b>	Optional IEEE802.3af/at/bt modules via PCIe Mini slots	
<b>COM</b>	1 x RS-232/422/485 (DB-9, COM1) 1 x RS-232 (DB-9, COM2)	

## PPC-FxxD-ULT5

<b>USB</b>	4 x USB 3.2 Gen 2 (10 Gb/s) Type-A	
<b>Audio</b>	Realtek ALC888 HD codec 1 x Line-out jack	
<b>Display Output</b>	1 x HDMI	
<b>Expansion</b>	1 x M.2 A-key (2230, PCIe x2 / USB 2.0 / I <sup>2</sup> C), supports Wi-Fi + BT module	
<b>Buttons and Indicators</b>	1 x Power button with LED indicator 1 x Reset button 1 x AT/ATX mode switch 1 x Clear CMOS button	
<b>Power Requirement</b>	12 V DC PoE IEEE802.3af/at/bt (optional, redundancy, power load-sharing)	
<b>Dimensions (WxHxD)</b>	378.5 x 303 x 75 (mm)	400 x 253 x 77 (mm)
<b>Cutout Dimensions</b>	361.1 x 285.6 (mm)	379.1 x 232.3 (mm)
<b>Net Weight</b>	6.1 kg	7.1 kg
<b>Chassis Construction</b>	Sheet metal	
<b>Color</b>	Pantone 296 C	
<b>Mounting</b>	Wall/Panel/Rack mount, VESA 75/100	
<b>Watchdog Timer</b>	Software programmable, support 1~255 sec. system reset	
<b>Vibration</b>	5~17Hz, 0.1 double amplitude displacement 17~640Hz 1.5G acceleration peak to peak	
<b>Shock</b>	10G acceleration part to part (11ms)	
<b>IP</b>	IP 66 compliant front panel	
<b>Operating Temp.</b>	-10°C ~ 50°C (with air flow)	
<b>Storage Temp.</b>	-20°C ~ 60°C	
<b>Humidity</b>	10% ~ 95% (non-condensing)	
*An IEI PoE module must be installed before start using the panel PC as a PoE powered device (PD). Refer to <b>Section 3.5</b> for the installation instruction of the optional PoE module.		

**Table 1-2: Technical Specifications (15" & 15.6")**

### 1.7.2 17" & 18.5" Specifications

	PPC-F17D-ULT5	PPC-FW19D-ULT5
<b>LCD Size</b>	17"	18.5"
<b>Max. Resolution</b>	1280 x 1024	1366 x 768
<b>Brightness (cd/m<sup>2</sup>)</b>	350	400
<b>Contrast Ratio</b>	1000:1	1000:1
<b>LCD Color</b>	16.7M	16.7M
<b>Pixel Pitch (mm)</b>	0.26 x 0.26	0.3 x 0.3
<b>Viewing Angle (H/V)</b>	170°/160°	170°/160°
<b>Backlight MTBF</b>	50,000 hrs	50,000 hrs
<b>Touchscreen Type</b>	Projected capacitive type with 10-point multi-touch and anti-glare coating	
<b>Touch Controller</b>	EETI EXC3000	
<b>CPU</b>	8th Generation Intel® Core™ i5-8365UE CPU (6M cache, up to 4.2 GHz) 8th Generation Intel® Celeron® 4305UE CPU (2M cache, 2.0 GHz)	
<b>BIOS</b>	AMI UEFI BIOS	
<b>Memory</b>	Two 260-pin 2400 MHz dual-channel unbuffered DDR4 SO-DIMM slots (system max. 32 GB) One slot is preinstalled with a 4 GB memory module	
<b>Graphics Engine</b>	Intel® HD Graphics Gen 9 Engines with 16 low-power execution units, supports 4K codec decode	
<b>Super I/O</b>	Fintek F81866	
<b>Storage</b>	1 x 2.5" SATA 6Gb/s HDD/SSD bay 1 x M.2 M-key (2280, PCIe 3.0 x4), support NVMe SSD	
<b>Ethernet Controller</b>	Intel® I219 PHY (LAN1) Intel® I211 PCIe GbE controller (LAN2 & LAN3)	
<b>Ethernet Port</b>	2 x PoE GbE LAN* (RJ-45) 1 x GbE LAN (RJ-45)	
<b>PoE</b>	Optional IEEE802.3af/at/bt modules via PCIe Mini slots	
<b>COM</b>	1 x RS-232/422/485 (DB-9, COM1) 1 x RS-232 (DB-9, COM2)	
<b>USB</b>	4 x USB 3.2 Gen 2 (10 Gb/s) Type-A	

## PPC-FxxD-ULT5

<b>Audio</b>	Realtek ALC888 HD codec 1 x Line-out jack	
<b>Display Output</b>	1 x HDMI	
<b>Expansions</b>	1 x M.2 A-key (2230, PCIe x2 / USB 2.0 / I <sup>2</sup> C), supports Wi-Fi + BT module	
<b>Buttons and Indicators</b>	1 x Power button with LED indicator 1 x Reset button 1 x AT/ATX mode switch 1 x Clear CMOS button	
<b>Power Requirement</b>	12 V DC PoE IEEE802.3af/at/bt (optional, redundancy, power load-sharing)	
<b>Dimensions (WxHxD)</b>	409 x 342 x 76 (mm)	470 x 290 x 77 (mm)
<b>Cutout Dimensions</b>	391 x 324 (mm)	447.8 x 267.2 (mm)
<b>Net Weight</b>	7.2 kg	7.3 kg
<b>Chassis Construction</b>	Sheet metal	
<b>Color</b>	Pantone 296 C	
<b>Mounting</b>	Wall/Panel/Rack mount, VESA 75/100	
<b>Watchdog Timer</b>	Software programmable, support 1~255 sec. system reset	
<b>Vibration</b>	5~17Hz, 0.1 double amplitude displacement 17~640Hz 1.5G acceleration peak to peak	
<b>Shock</b>	10G acceleration part to part (11ms)	
<b>IP</b>	IP 66 compliant front panel	
<b>Operating Temp.</b>	-10°C ~ 50°C (with air flow)	
<b>Storage Temp.</b>	-20°C ~ 60°C	
<b>Humidity</b>	10% ~ 95% (non-condensing)	
*An IEI PoE module must be installed before start using the panel PC as a PoE powered device (PD). Refer to <b>Section 3.5</b> for the installation instruction of the optional PoE module.		

**Table 1-3: Technical Specifications (17" & 18.5")**



## 1.8 Dimensions

### 1.8.1 PPC-F15D-ULT5 Dimensions

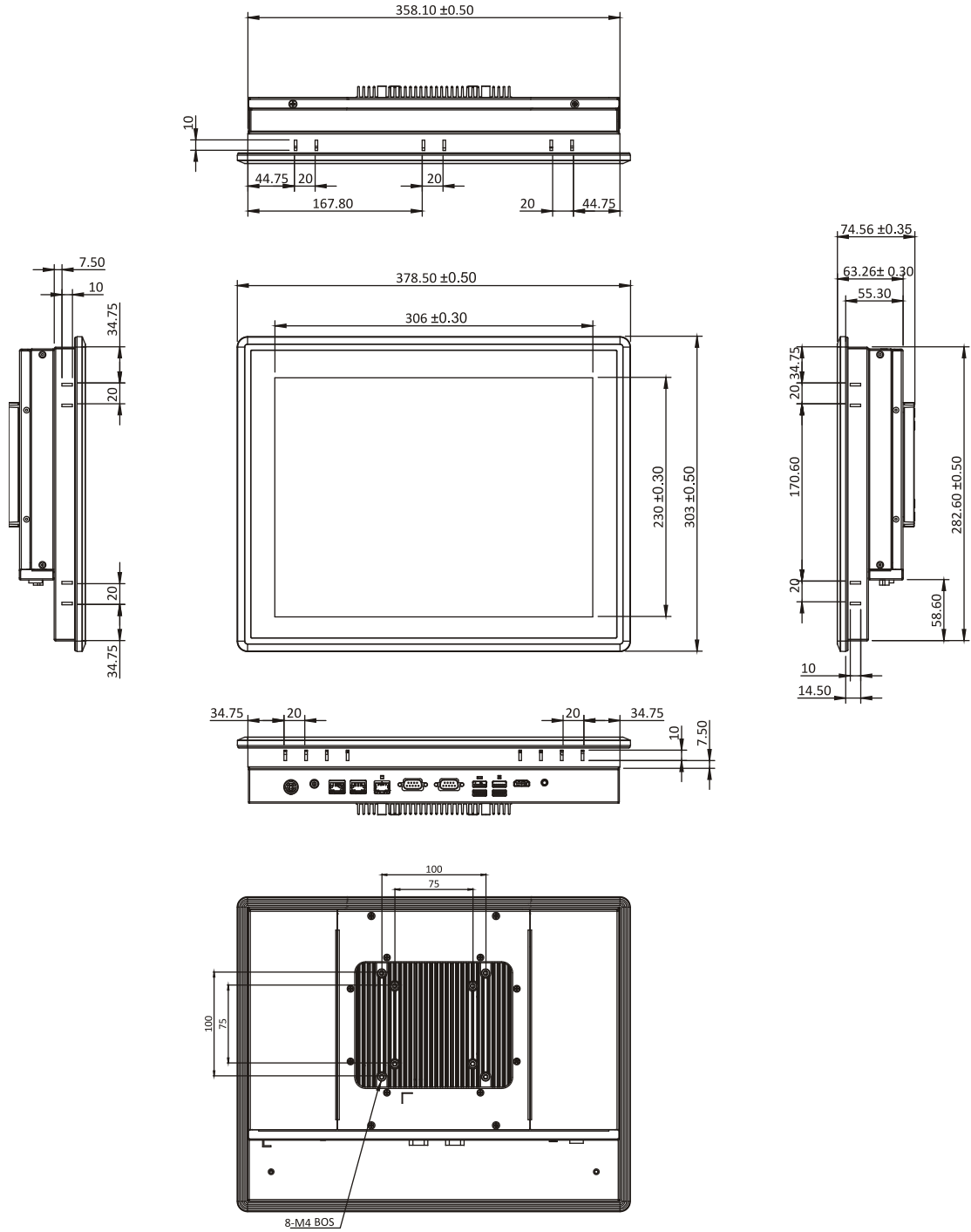


Figure 1-5: PPC-F15D-ULT5 Dimensions (Unit: mm)

PPC-FxxD-ULT5

1.8.2 PPC-FW15D-ULT5 Dimensions

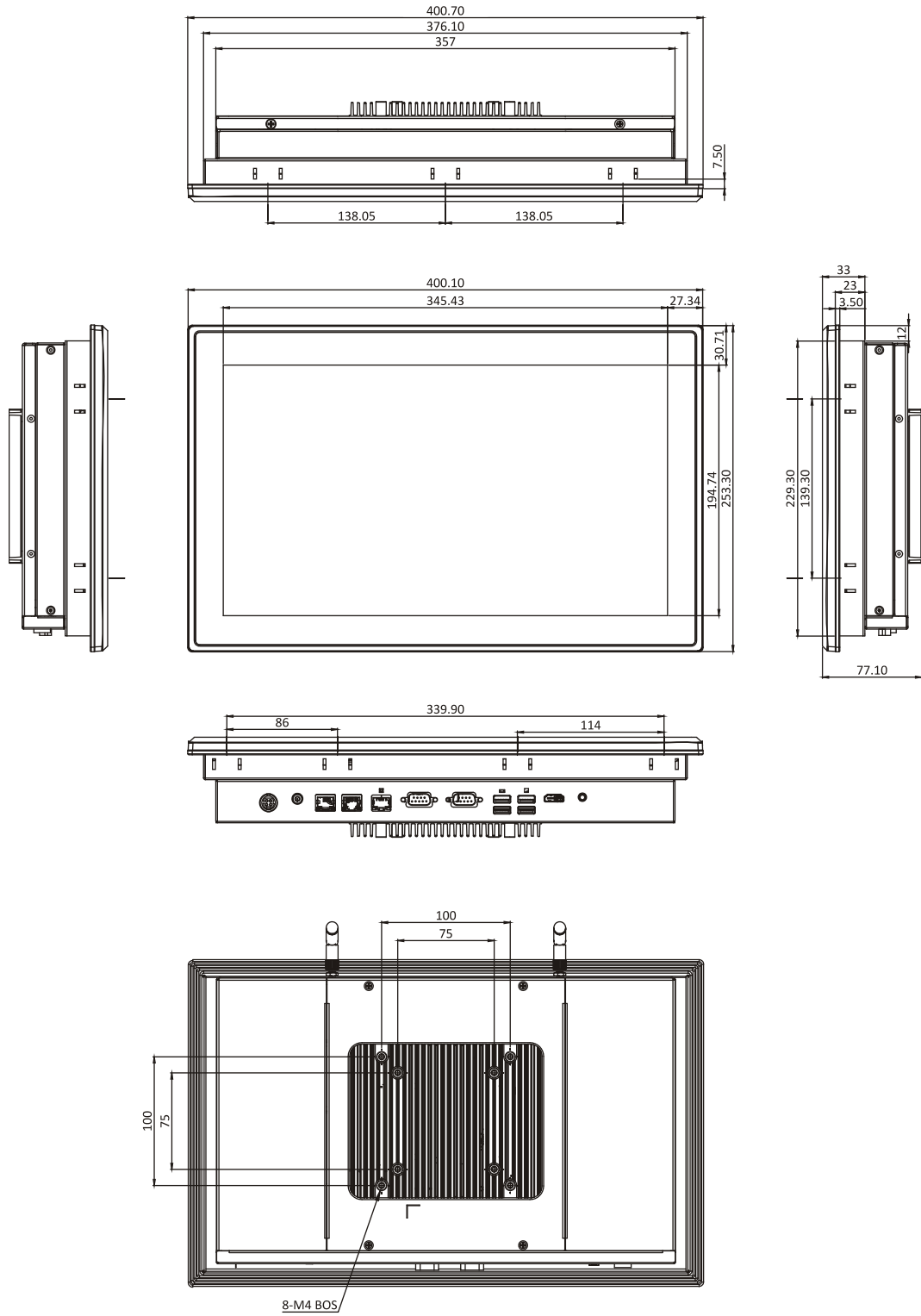
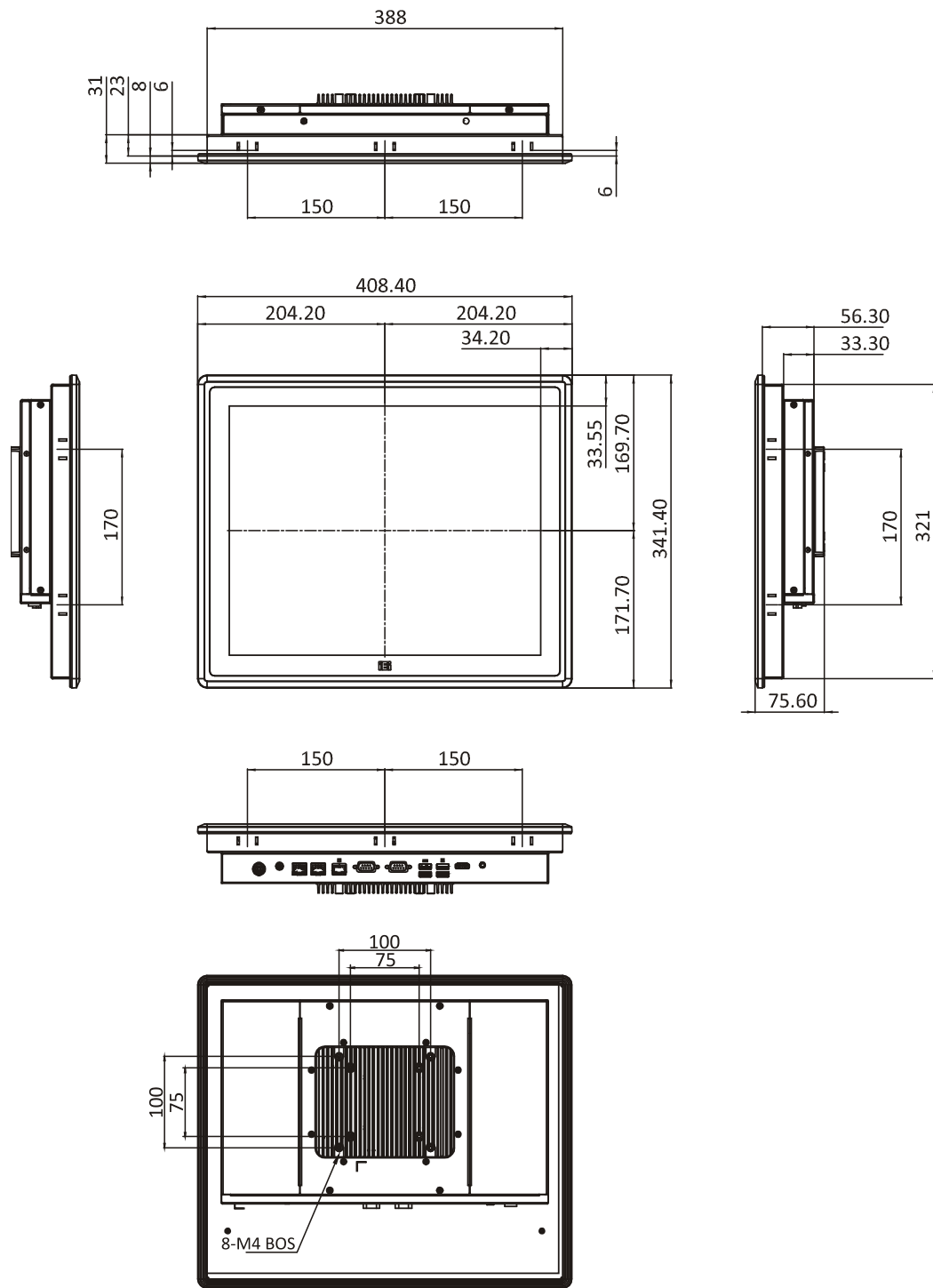


Figure 1-6: PPC-FW15D-ULT5 Dimensions (Unit: mm)

**1.8.3 PPC-F17D-ULT5 Dimensions**



**Figure 1-7: PPC-F17D-ULT5 Dimensions (Unit: mm)**

PPC-FxxD-ULT5

1.8.4 PPC-FW19D-ULT5 Dimensions

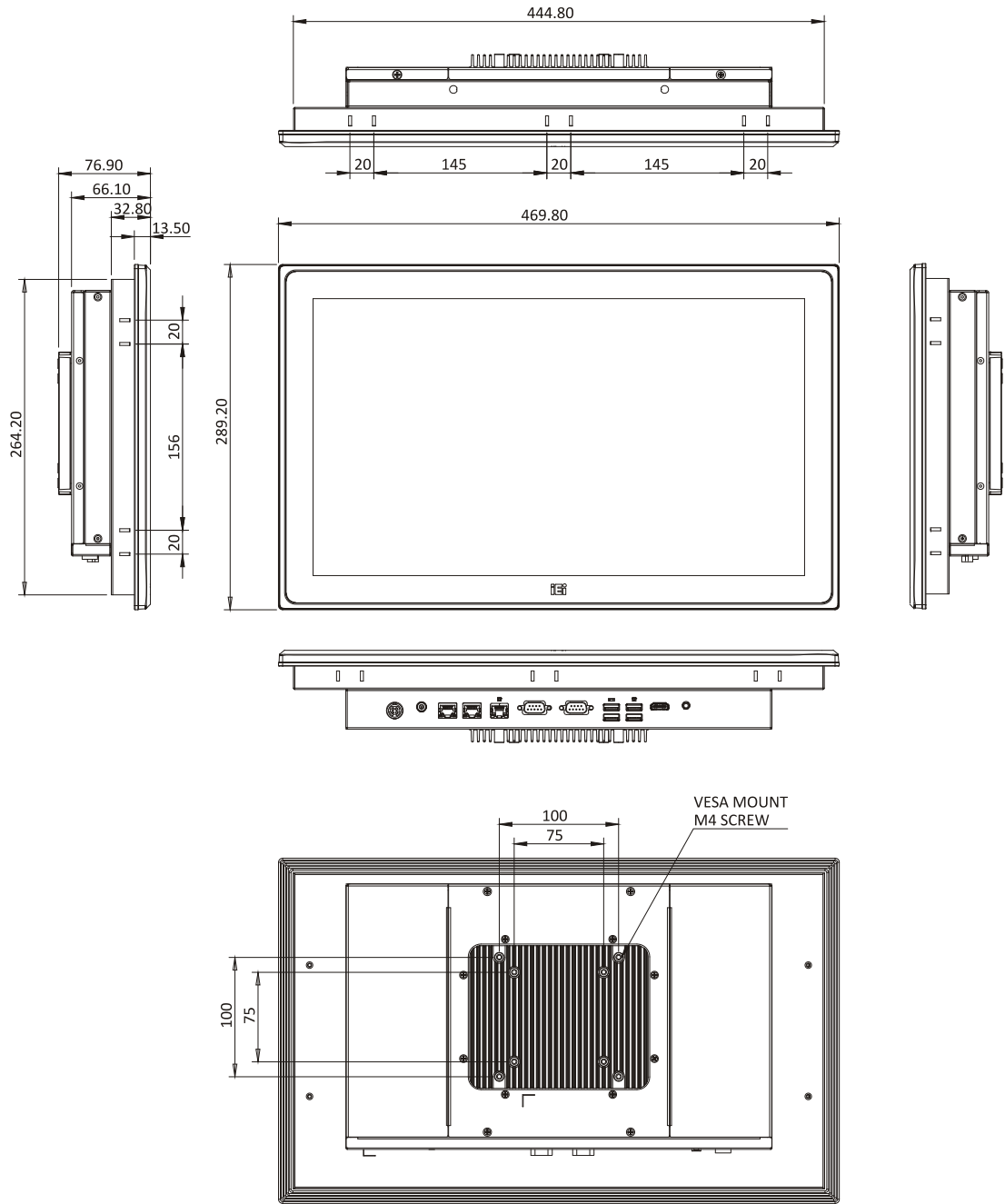


Figure 1-8: PPC-FW19D-ULT5 Dimensions (Unit: mm)

Chapter

**2**

# Unpacking

---



## PPC-FxxD-ULT5

### 2.1 Unpacking

To unpack the panel PC, follow the steps below:

- Step 1:** Use box cutters, a knife or a sharp pair of scissors that seals the top side of the external (second) box.
- Step 2:** Open the external (second) box.
- Step 3:** Use box cutters, a knife or a sharp pair of scissors that seals the top side of the internal (first) box.
- Step 4:** Lift the system out of the boxes.
- Step 5:** Remove both polystyrene ends, one from each side.
- Step 6:** Make sure all the components listed in the packing list are present.


### 2.2 Packing List



#### NOTE:

If any of the components listed in the checklist below are missing, do not proceed with the installation. Contact the IEI reseller or vendor the PPC-FxxD-ULT5 was purchased from or contact an IEI sales representative directly by sending an email to [sales@ieiworld.com](mailto:sales@ieiworld.com).

The PPC-FxxD-ULT5 panel PC is shipped with the following components:

Quantity	Item	Image
1	PPC-FxxD-ULT5 panel PC	





1	96 W power adapter	
1	Power cord	
4	Screws (M4*8) for VESA mounting	
4	Screws (M3*4) for HDD installation	
4	Backup screws (M4*4) for rear panel installation	

Table 2-1: Package List

## 2.3 Optional Items

The following items are optional accessories for the PPC-FxxD-ULT5 series:

Item	PPC-F15D	PPC-FW15D	PPC-F17D	PPC-FW19D
Arm	ARM-31-RS			
Stand	SAND-A21-R10			
	STAND-C19-R10			
Wall Mount Kit	WK-190MS-R10			
Panel Mount Kit	FPK-12-R10	FPK-14-R10	FPK-13-R10	FPK-13-R10
Rack Mount Kit	FRK15C-R10	FRKW15C-R10	FRK17C-R10	FRKW19C-R10
PoE PD Kit	GPOE-PD-BT01-R10 (PoE IEEE802.3af/at/bt, 71W)			
Wi-Fi Kit	EMB-WIFI-KIT02E-R10 (2T2R, 802.11ac/a/b/g/n and BT v4.1, NGFF 2230 Type A-E )			

Table 2-2: Optional Items

Chapter

**3**

# Installation

---

### 3.1 Anti-static Precautions

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**WARNING:**

Failure to take ESD precautions during the maintenance of the PPC-FxxD-ULT5 may result in permanent damage to the PPC-FxxD-ULT5 and severe injury to the user.

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Electrostatic discharge (ESD) can cause serious damage to electronic components, including the WAFER series motherboard and the power module. (Dry climates are especially susceptible to ESD.) It is therefore critical that whenever the PPC-FxxD-ULT5 is opened and any electrical component handled, the following anti-static precautions are strictly adhered to.

- **Wear an anti-static wristband:** Wearing a simple anti-static wristband can help to prevent ESD from damaging the board.
- **Self-grounding:** Before handling the board, touch any grounded conducting material. During the time the board is handled, frequently touch any conducting materials that are connected to the ground.
- **Use an anti-static pad:** When configuring the PPC-FxxD-ULT5, place it on an anti-static pad. This reduces the possibility of ESD damaging the PPC-FxxD-ULT5.

### 3.2 Installation Precautions

During installation, be aware of the precautions below:

- **Read the user manual:** The user manual provides a complete description of the PPC-FxxD-ULT5, installation instructions and configuration options.
- **DANGER! Disconnect Power:** Power to the PPC-FxxD-ULT5 must be disconnected during the installation process. Failing to disconnect the power may cause severe injury to the body and/or damage to the system.
- **Qualified Personnel:** The PPC-FxxD-ULT5 must be installed and operated only by trained and qualified personnel. Maintenance, upgrades, or repairs

## PPC-FxxD-ULT5

may only be carried out by qualified personnel who are familiar with the associated dangers. Never open the equipment. For safety reasons, the equipment should be opened only by qualified skilled person.

- **Air Circulation:** Make sure there is sufficient air circulation when installing the PPC-FxxD-ULT5. The PPC-FxxD-ULT5's cooling vents must not be obstructed by any objects. Blocking the vents can cause overheating of the PPC-FxxD-ULT5. Leave at least 5 cm of clearance around the PPC-FxxD-ULT5 to prevent overheating.
- **Grounding:** The PPC-FxxD-ULT5 should be properly grounded. The voltage feeds must not be overloaded. Adjust the cabling and provide external overcharge protection per the electrical values indicated on the label attached to the back of the PPC-FxxD-ULT5.

### 3.3 Installation Procedure

To properly install the PPC-FxxD-ULT5, the following steps must be followed. Detailed descriptions of these instructions are listed in the sections that follow.

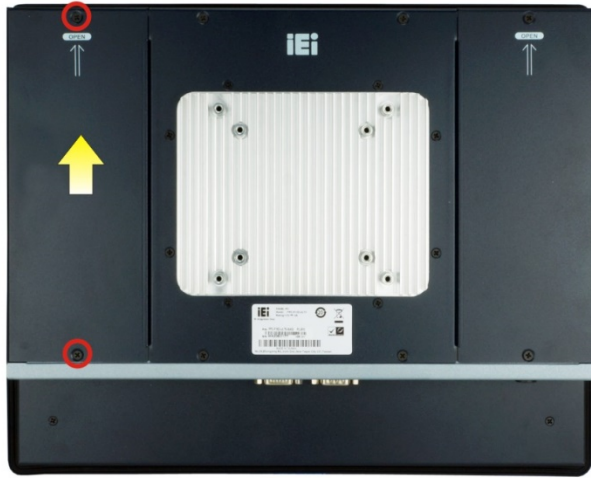
- Step 1:** Unpacking the PPC-FxxD-ULT5 panel PC
- Step 2:** Install SATA HDD
- Step 3:** Install PoE card (optional)
- Step 4:** Install M.2 SSD (optional)
- Step 5:** Install wireless LAN module and antenna (optional)
- Step 6:** Mount the PPC-FxxD-ULT5
- Step 7:** Connect the peripheral devices
- Step 8:** Power the system up



### 3.4 HDD Installation

To install the HDD into the system, please follow the steps below:

**Step 1:** Remove the HDD cover retention screws located on the left side of the rear panel. Slide the cover upwards to remove it.



**Figure 3-1: HDD Cover Retention Screws**

**Step 2:** Remove the four HDD bracket retention screws and lift the HDD bracket off the panel PC.



**Figure 3-2: HDD Bracket Retention Screws**

## PPC-FxxD-ULT5

**Step 3:** Attach the HDD brackets to the HDD. To do this, align the four retention screw holes in the both sides of the HDD bracket with the retention screw holes on the sides of the HDD. Insert four retention screws into the HDD bracket (Figure 3-3).



**Figure 3-3: HDD Retention Screws**

**Step 4:** Connect the SATA cable to the rear of HDD from the motherboard.

**Step 5:** Install the HDD into the PPC-FxxD-ULT5 by aligning the retention screw holes in the HDD brackets with the retention screw holes on the chassis. Insert the four retention screws.



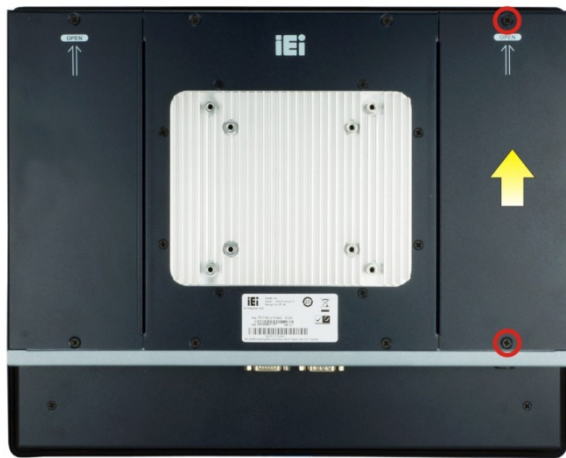
**Figure 3-4: HDD Installation**

**Step 6:** Reinstall the HDD cover.

### 3.5 PoE PD Module Installation (Optional)

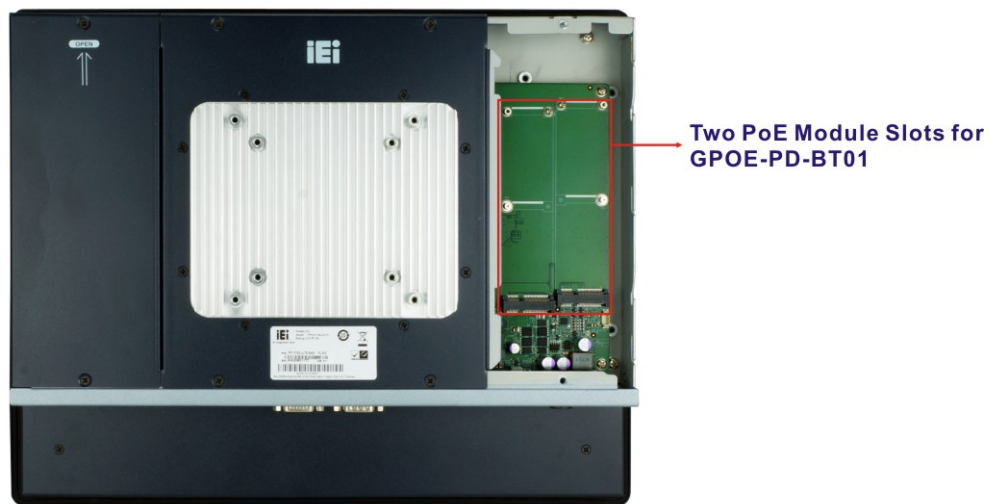
An IEI PoE module must be installed before start using the panel PC as a PoE powered device (PD). To install the optional PoE module, follow the steps below.

**Step 1:** Remove the PoE card cover retention screws located on the right side of the rear panel. Slide the cover upwards to remove it.



**Figure 3-5: PoE Card Cover Retention Screws**

**Step 2:** Refer to the following diagram to locate the PoE module slot for installing the GPOE-PD-BT01 PoE module.



**Figure 3-6: PoE Module Slot Locations**

## PPC-FxxD-ULT5

- Step 3:** Remove the on-board PoE card retention screw.
- Step 4:** Line up the notch on the PoE module with the notch on the connector. Slide the PoE module into the socket at an angle of about 20°.
- Step 5:** Push the other end of the PoE module down and secure the module with the retention screw previously removed.
- Step 6:** Re-install the PoE card cover.

### 3.6 M.2 SSD Installation (Optional)

The M.2 M-key slot allows installation of M.2 2280 cards. To install an M.2 card, please follow the steps below.

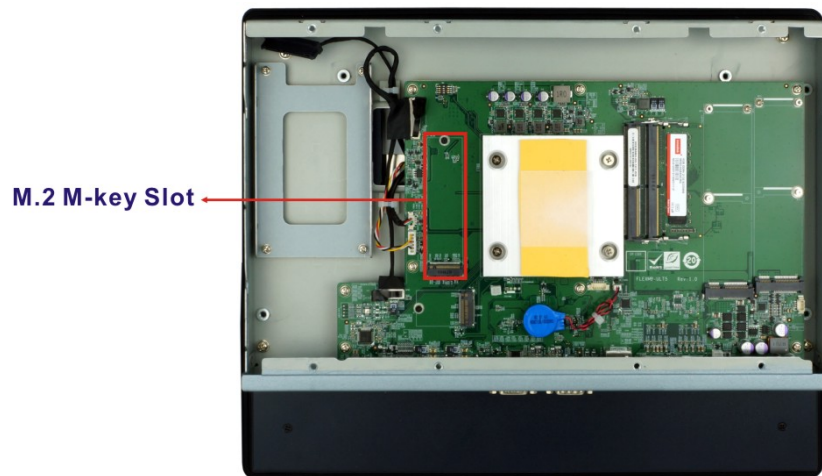
- Step 1:** Remove the eight retention screws from the rear panel. Slide the two side covers upwards to remove them. And then, lift the center piece off the system.



Figure 3-7: Rear Cover Retention Screws

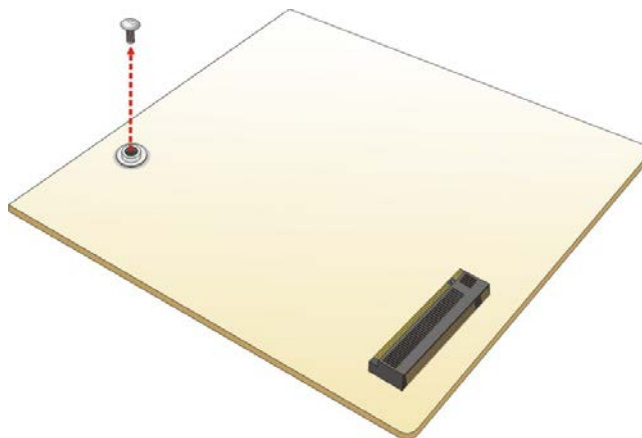
- Step 2:** Locate the M.2 slot as shown in Figure 3-8.





**Figure 3-8: M.2 Slot Location**

**Step 3:** Remove the on-board retention screw as shown in Figure 3-9.

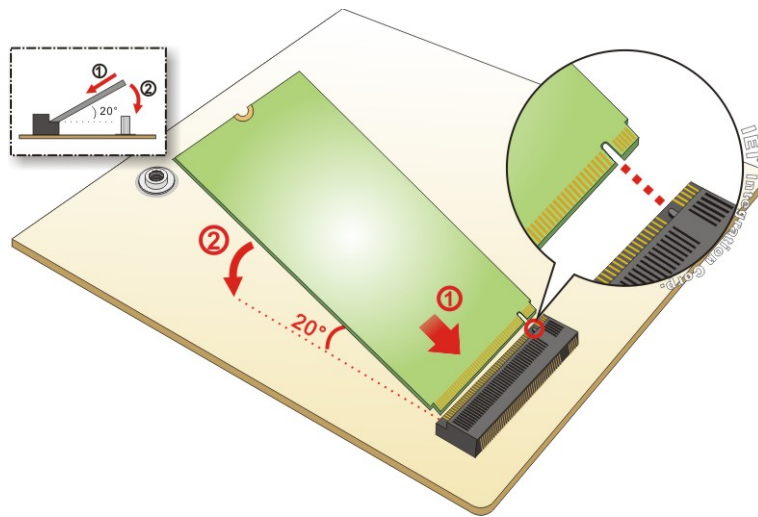


**Figure 3-9: Removing the M.2 Module Retention Screw**

**Step 4:** Line up the notch on the module with the notch on the slot. Slide the M.2 module into the socket at an angle of about 20° (**Figure 3-10**).

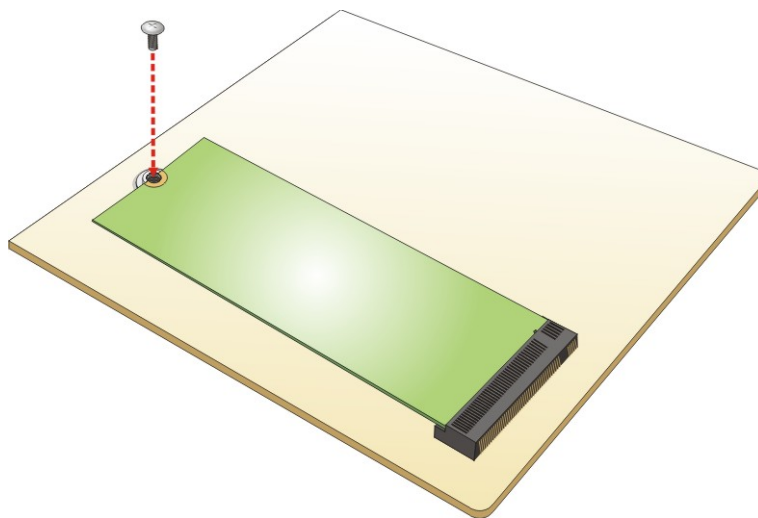


## PPC-FxxD-ULT5



**Figure 3-10: Inserting the M.2 Module into the Slot at an Angle**

**Step 5:** Push the M.2 module down and secure it with the previously removed retention screw (**Figure 3-11**).



**Figure 3-11: Securing the M.2 Module**

**Step 6:** Re-install the rear covers and secure them with the eight retention screws previously removed.

### 3.7 Wireless LAN Module Installation (Optional)

To install the optional wireless LAN (WLAN) module, please follow the steps below.

**Step 1:** Remove the eight retention screws from the rear panel. Slide the two side covers upwards to remove them. And then, lift the center piece off the system.

See **Figure 3-7**.

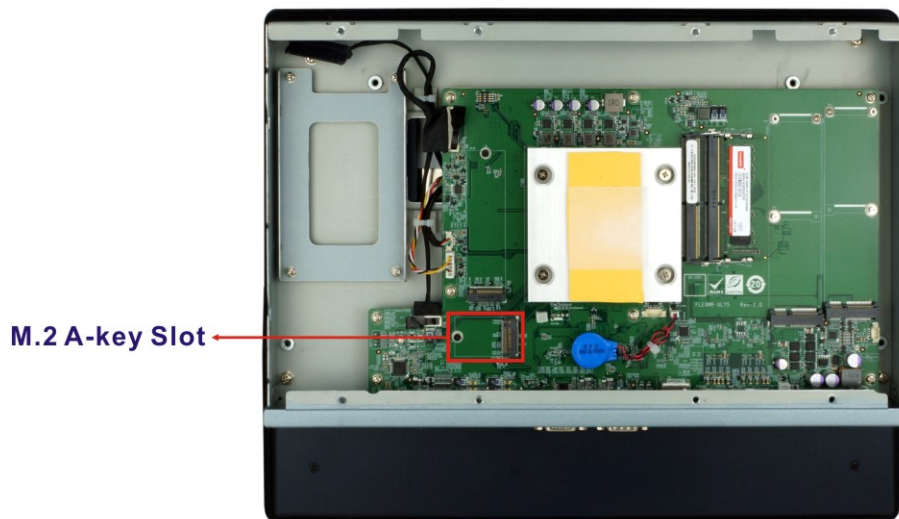
**Step 2:** Remove the two knockouts for antenna installation. The two knockouts are located on the top panel of the PPC-FxxD-ULT5 (**Figure 3-12**).



**Figure 3-12: Knockouts on Top Panel for Wireless Antennas**

**Step 3:** Locate the M.2 A-key slot (**Figure 3-13**).

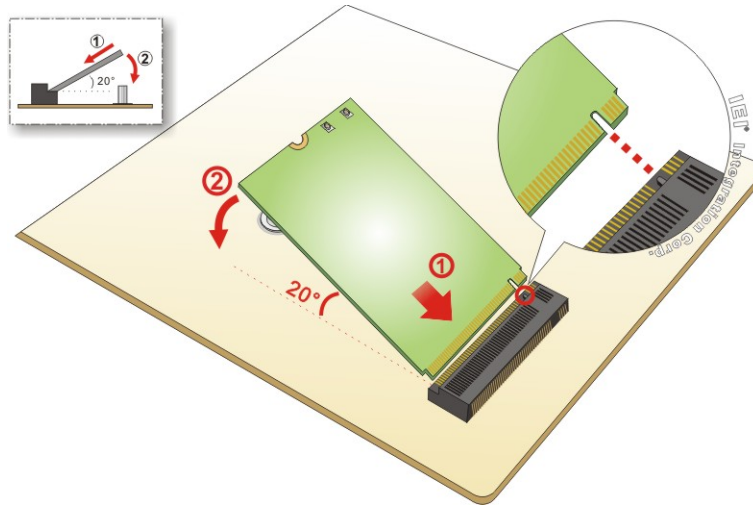
**Step 4:** Remove the on-board M.2 slot retention screw.



**Figure 3-13: M.2 A-key Slot Location**

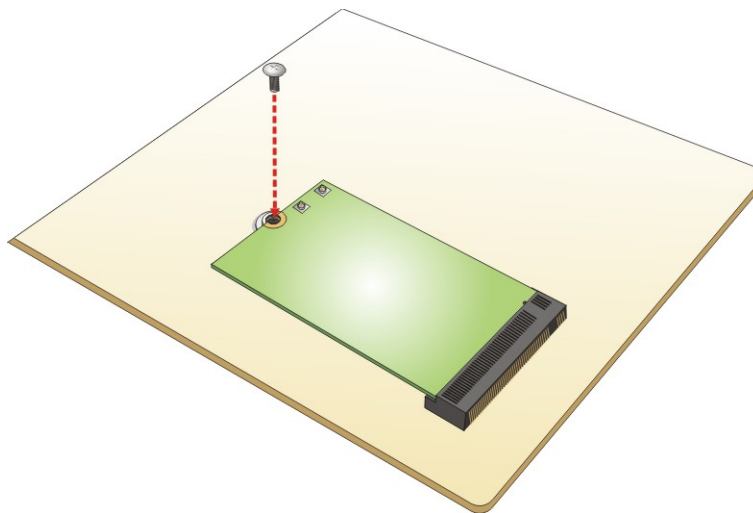
## PPC-FxxD-ULT5

**Step 5:** Line up the notch on the WLAN module with the notch on the slot. Slide the WLAN module into the slot at an angle of about 20° (**Figure 3-14**).



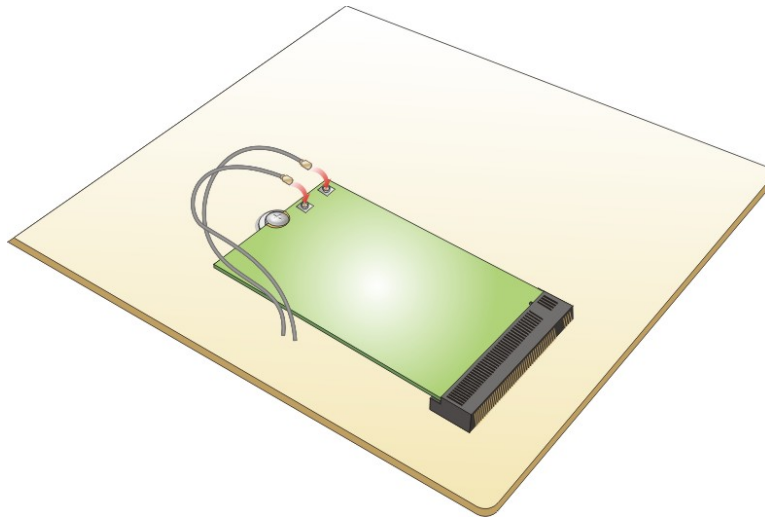
**Figure 3-14: Inserting the WLAN Module**

**Step 6:** Secure the WLAN module with the screw previously removed (**Figure 3-16**).



**Figure 3-15: Securing the WLAN Module**

**Step 7:** Connect the two RF cables to the antenna connectors on the WLAN module (**Figure 3-16**).



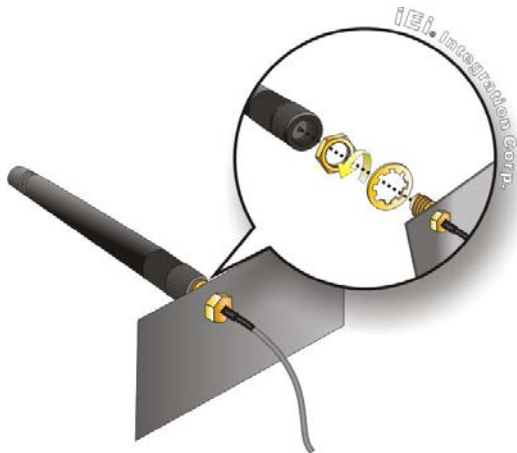
**Figure 3-16: Connecting RF Cables**

**Step 8:** Remove the nut and washer from the SMA connector at the other end of the RF cable.

**Step 9:** Insert the SMA connector to the antenna connector holes on the rear panel.

**Step 10:** Secure the SMA connector by inserting the washer and tightening it with nut.

**Step 11:** Install the external antenna.



**Figure 3-17: Securing SMA Connector and External Antenna Installation**



## PPC-FxxD-ULT5

### 3.8 Mounting the System

The following sections describe the mounting methods supported by the PPC-FxxD-ULT5.

#### 3.8.1 Arm Mounting

The PPC-FxxD-ULT5 is VESA (Video Electronics Standards Association) compliant and can be mounted on an arm with a 75 mm or 100 mm interface pad. To mount the PPC-FxxD-ULT5 on an arm, please follow the steps below.

**Step 1:** The arm is a separately purchased item. Please correctly mount the arm onto the surface it uses as a base. To do this, refer to the installation documentation that came with the mounting arm.



#### NOTE:

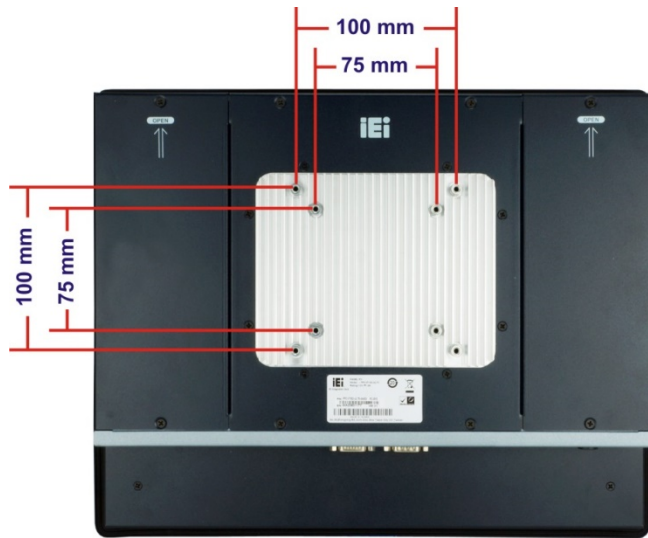
When purchasing the arm please ensure that it is VESA compliant and that the arm has a 75 mm / 100 mm interface pad. If the mounting arm is not VESA compliant it cannot be used to support the PPC-FxxD-ULT5.

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**Step 2:** Once the mounting arm has been firmly attached to its surface, lift the PPC-FxxD-ULT5 onto the interface pad of the mounting arm.

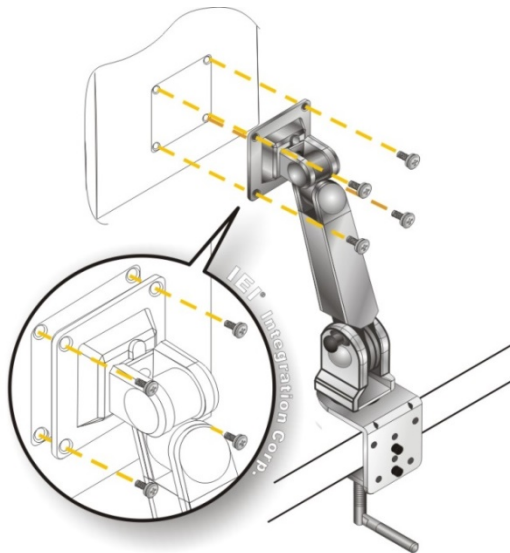
**Step 3:** Align the retention screw holes on the mounting arm interface with those in the PPC-FxxD-ULT5. The PPC-FxxD-ULT5 arm mount retention screw holes are shown in **Figure 3-18**.





**Figure 3-18: Arm Mount Retention Screw Holes**

**Step 4:** Secure the PPC-FxxD-ULT5 to the interface pad by inserting four retention screws through the mounting arm interface pad and into the PPC-FxxD-ULT5.



**Figure 3-19: Arm Mounting (ARM-11-RS)**

## PPC-FxxD-ULT5

### 3.8.2 Panel Mounting

To mount the PPC-FxxD-ULT5 panel PC into a panel, please follow the steps below.

**Step 1:** Select the position on the panel to mount the PPC-FxxD-ULT5.

**Step 2:** Cut out a section of the panel that corresponds to the rear panel dimensions of the PPC-FxxD-ULT5. The recommended cutout sizes are shown below.

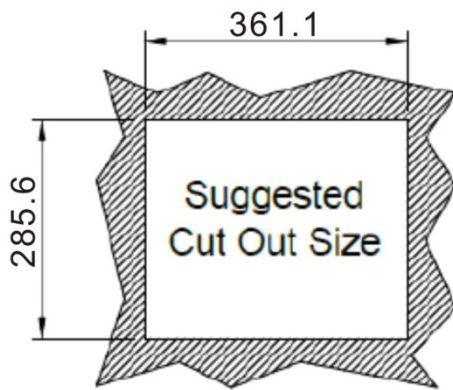


Figure 3-20: PPC-F15D-ULT5 Panel Cutout Dimensions

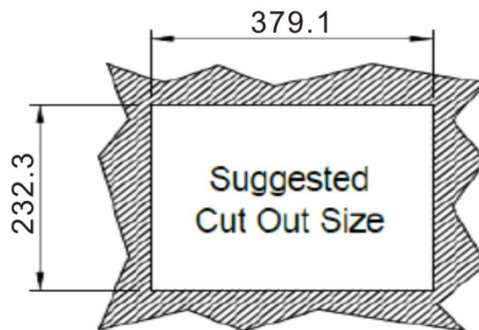
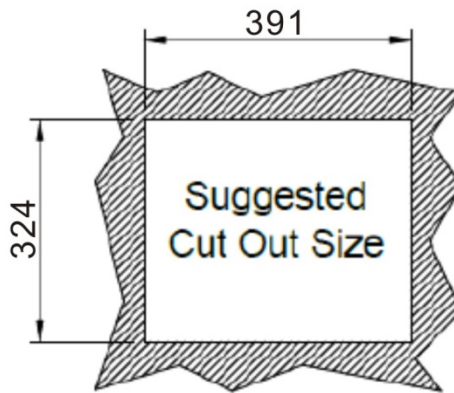
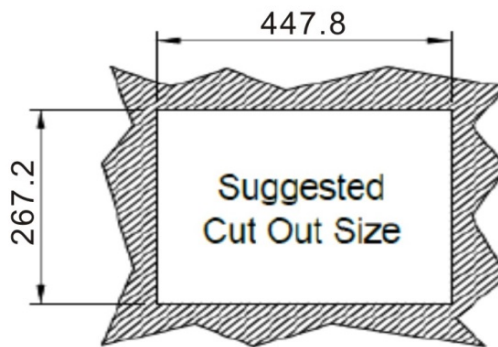


Figure 3-21: PPC-FW15D-ULT5 Panel Cutout Dimensions



**Figure 3-22: PPC-F17D-ULT5 Panel Cutout Dimensions**



**Figure 3-23: PPC-FW19D-ULT5 Panel Cutout Dimensions**

- Step 3:** Slide the PPC-FxxD-ULT5 through the hole until the aluminum frame is flush against the panel.
- Step 4:** Insert the mounting clamps into the mounting brackets and pre-formed holes along the edges of the front panel, behind the frame (**Figure 3-24**). The required number of mounting clamps may vary by models.
- Step 5:** Tighten the screws that pass through the mounting clamps until the plastic caps at the front of all the screws are firmly secured to the panel (**Figure 3-24**).

PPC-FxxD-ULT5

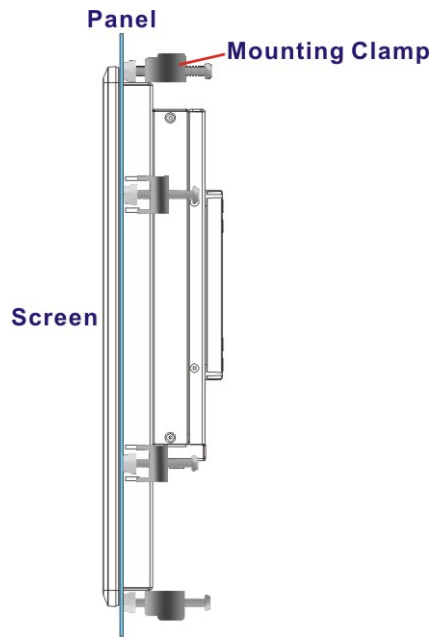


Figure 3-24: Tighten the Mounting Clamp Screws

### 3.8.3 Rack and Cabinet Installation

The PPC-FxxD-ULT5 panel PC can be installed into a cabinet or rack. The installation procedures are similar to the panel mounting installation. To do this, please follow the steps described in the following sections.

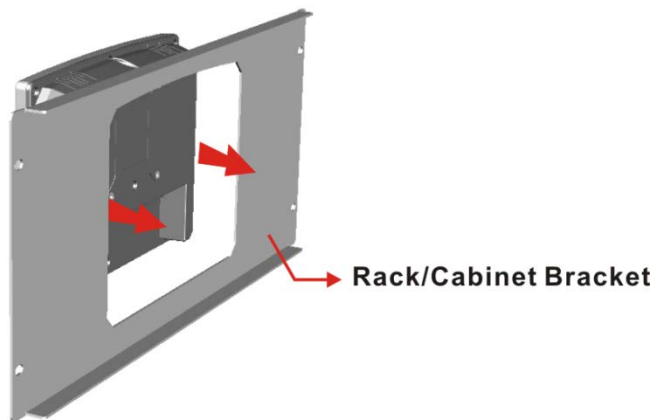


#### NOTE:

When purchasing the cabinet/rack installation bracket, make sure it is compatible with both the PPC-FxxD-ULT5 panel PC and the rack/cabinet into which the PPC-FxxD-ULT5 is installed.

---

**Step 1:** Slide the rear of the PPC-FxxD-ULT5 panel PC through the rack/cabinet bracket until the aluminum frame is flush against the front of the bracket (**Figure 3-25**).



**Figure 3-25: The Rack/Cabinet Bracket**

**Step 2:** Insert the mounting clamps into the mounting brackets and pre-formed holes along the edges of the front panel, behind the frame (**Figure 3-26**). The required number of mounting clamps may vary by models.

**Step 3:** Tighten the screws that pass through the mounting clamps until the plastic caps at the front of all the screws are firmly secured to the bracket (**Figure 3-26**).



PPC-FxxD-ULT5

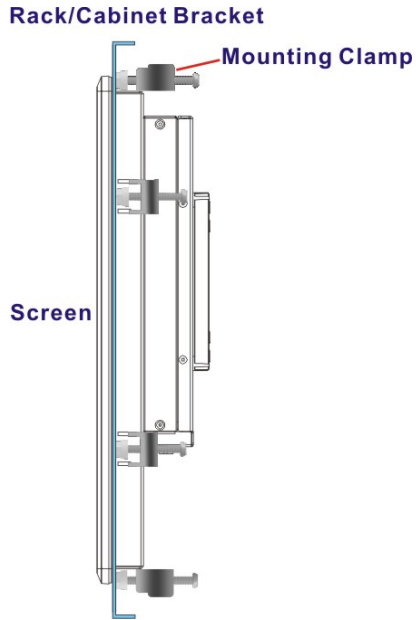


Figure 3-26: Secure the Rack/Cabinet Bracket

**Step 4:** Slide the PPC-FxxD-ULT5 with the attached rack/cabinet bracket into a rack or cabinet (**Figure 3-27**).

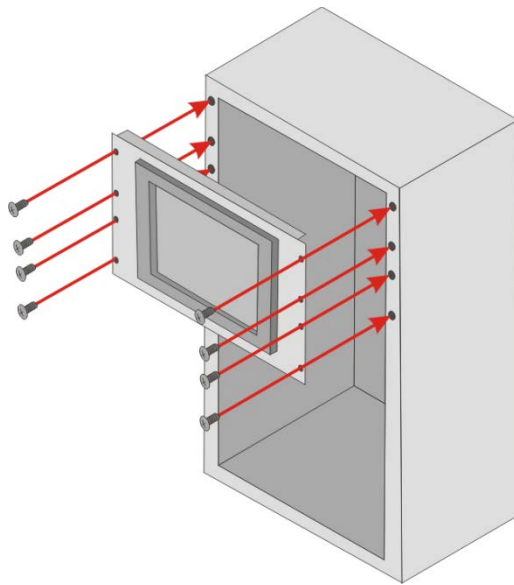


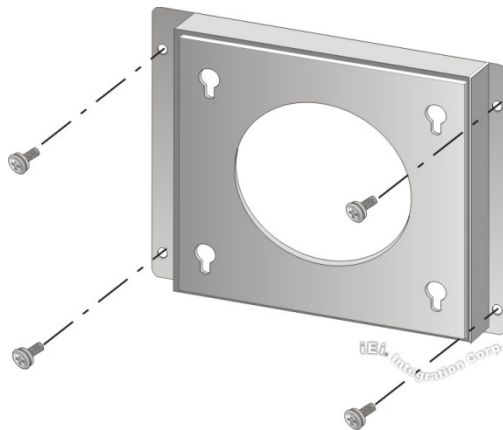
Figure 3-27: Install into a Rack/Cabinet

**Step 5:** Once the panel PC with the attached rack/cabinet bracket has been properly inserted into the rack or cabinet, secure the front of the rack/cabinet bracket to the front of the rack or cabinet (**Figure 3-27**).

### 3.8.4 Wall Mounting

To mount the PPC-FxxD-ULT5 flat panel PC onto a wall, please follow the steps below.

- Step 1:** Select the location on the wall for the wall-mounting bracket.
- Step 2:** Carefully mark the locations of the four bracket screw holes on the wall.
- Step 3:** Drill four pilot holes at the marked locations on the wall for the bracket retention screws.
- Step 4:** Align the wall-mounting bracket screw holes with the pilot holes.
- Step 5:** Secure the mounting-bracket to the wall by inserting the retention screws into the four pilot holes and tightening them (Figure 3-28).



**Figure 3-28: Wall-mounting Bracket**

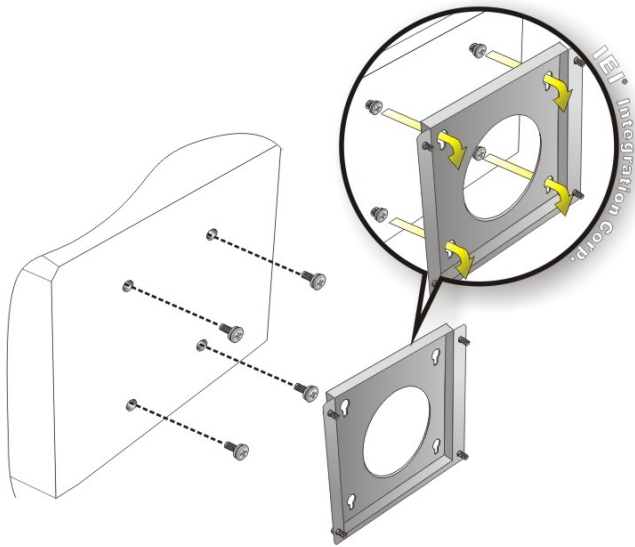
- Step 6:** Insert the four monitor mounting screws provided in the wall mounting kit into the four screw holes on the rear panel of the monitor and tighten until the screw shank is secured against the rear panel (Figure 3-29).
- Step 7:** Align the mounting screws on the monitor rear panel with the mounting holes on the bracket.
- Step 8:** Carefully insert the screws through the holes and gently pull the monitor downwards until the monitor rests securely in the slotted holes (Figure 3-29).

## PPC-FxxD-ULT5

Ensure that all four of the mounting screws fit snugly into their respective slotted holes.

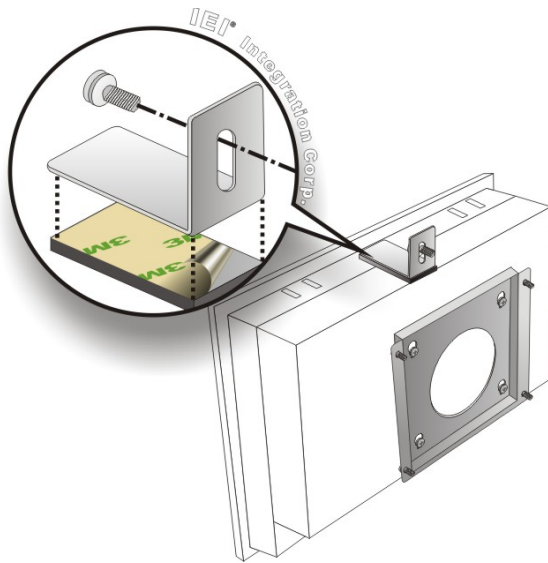
**NOTE:**

In the diagram below the bracket is already installed on the wall.



**Figure 3-29: Mount the Chassis**

- Step 9:** Secure the panel PC with the wall-mounting kit. To do this, stick the protective cushion to the wall-mounting kit first. Then, put the wall-mounting kit on the top panel of the panel PC. Carefully mark the location of the wall-mounting kit screw holes on the wall. Drill a pilot hole at the marked location on the wall. Secure the wall-mounting kit to the wall by inserting a retention screw into the pilot hole on the wall (Figure 3-30). This step is to avoid the panel PC being pushed apart from the wall-mounting bracket accidentally.



**Figure 3-30: Secure the Chassis**

### 3.9 RS-232/422/485 Serial Port (COM1) Selection

The bottom panel of the PPC-FxxD-ULT5 has one D-sub 9 male connectors for RS-232/422/485 connection. The serial communication mode selection can be made through the BIOS options (see **Section 4.3.7.1.1**).

#### 3.9.1 COM1 Pinouts

The pinouts of COM1 external serial port are detailed below.

PIN NO.	RS-232	RS-422	RS-485
1	DCD	TXD422-	TXD485-
2	RXD	TXD422+	TXD485+
3	TXD	RXD422+	--
4	DTR	RXD422-	--
5	GND	--	--
6	DSR	--	--
7	RTS	--	--
8	CTS	--	--
9	RI	--	--

**Table 3-1: RS-232/422/485 Serial Port (COM1) Pinouts**

PPC-FxxD-ULT5

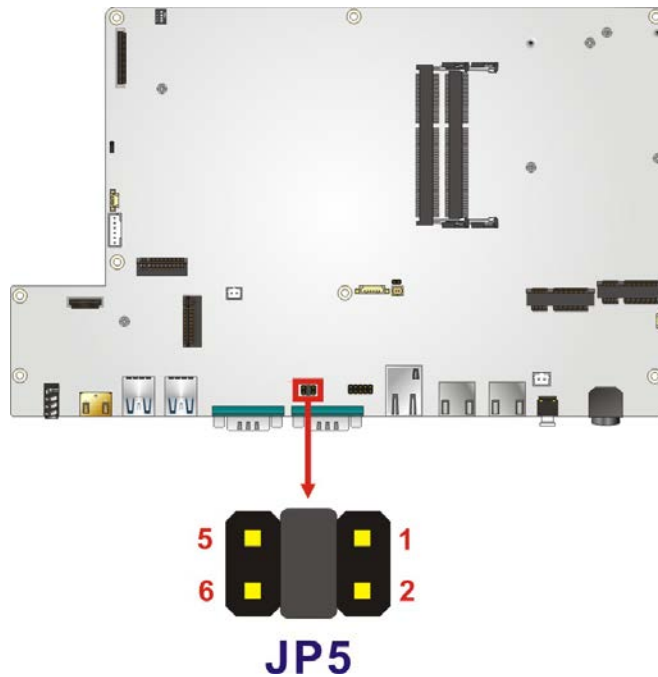
3.9.2 COM1 Pin 9 Selection

Pin 9 on the COM1 DB-9 connector can be set as the ring (RI) signal, +5 V or +12 V. The jumper selection options are shown in **Table 3-2**.

JP5	Description
Short 1-2	COM1 RI Pin use +12 V
Short 3-4	COM1 RI Pin use RI (Default)
Short 5-6	COM1 RI Pin use +5 V

**Table 3-2: COM1 Pin 9 Setting Jumper Settings (JP5)**

The COM1 Pin 9 Setting jumper location is shown in **Figure 3-31** below.

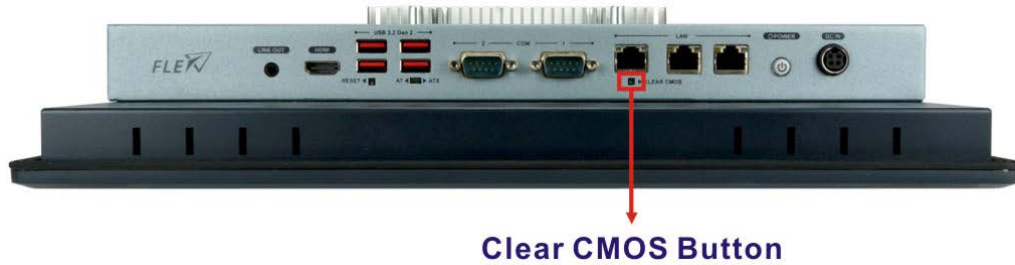


**Figure 3-31: COM1 Pin 9 Setting Jumper Location**



### 3.10 Clear CMOS

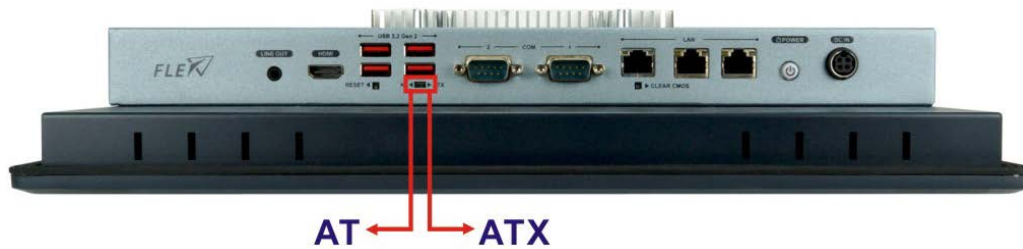
If the PPC-FxxD-ULT5 fails to boot due to improper BIOS settings, the clear CMOS jumper clears the CMOS data and resets the system BIOS information. To do this, push the clear CMOS button for three seconds, then restart the system. The clear CMOS button location is shown in **Figure 3-32**.



**Figure 3-32: Clear CMOS Button Location**

### 3.11 AT/ATX Mode Selection

AT or ATX power mode can be used on the PPC-FxxD-ULT5. The selection is made through an AT/ATX switch located on the bottom panel (**Figure 3-33**).



**Figure 3-33: AT/ATX Switch Location**

## PPC-FxxD-ULT5

## 3.12 Power-On Procedure

### 3.12.1 Installation Checklist

**WARNING:**

Make sure a power supply with the correct input voltage is being fed into the system. Incorrect voltages applied to the system may cause damage to the internal electronic components and may also cause injury to the user.

To power on the panel PC please make sure of the following:

- The rear covers are installed
- All peripheral devices are connected
- The system is securely mounted

### 3.12.2 Power-on Procedure

To power-on the PPC-FxxD-ULT5 please follow the steps below:

**Step 1:** Connect the power source to the power inlet on the bottom panel. **Ensure to connect the power cord to a socket-outlet with earthing connection.**

**Step 2:** Press the power button on the bottom panel until the LED lights on in blue to power up the system (**Figure 3-34**).



Figure 3-34: Power Input and Power Button

### 3.13 Reset the System

The reset button enables user to reboot the system when the system is on. The reset button location is shown in **Figure 3-35**. Press the reset button to reboot the system.



Figure 3-35: Reset Button Location

### 3.14 Software Installation

All the drivers for the PPC-FxxD-ULT5 are available on IEI Resource Download Center (<https://download.ieiworld.com>). Type PPC-FxxD-ULT5 and press Enter to find all the relevant software, utilities, and documentation.

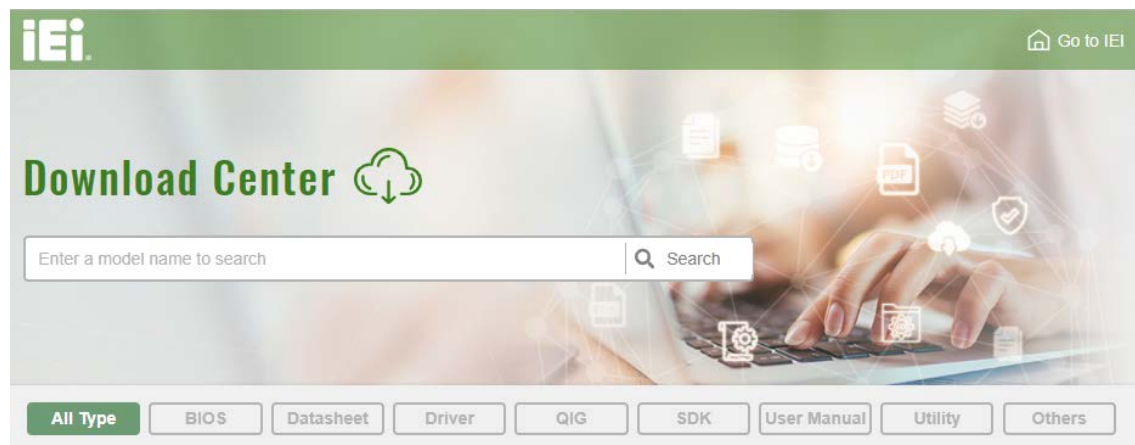


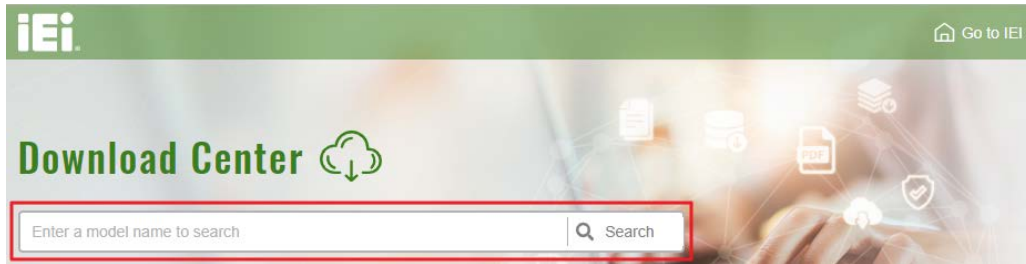
Figure 3-36: IEI Resource Download Center

## PPC-FxxD-ULT5

### 3.14.1 Driver Download

To download drivers from IEI Resource Download Center, follow the steps below.

**Step 1:** Go to <https://download.ieiworld.com>. Type PPC-FxxD-ULT5 and press Enter.

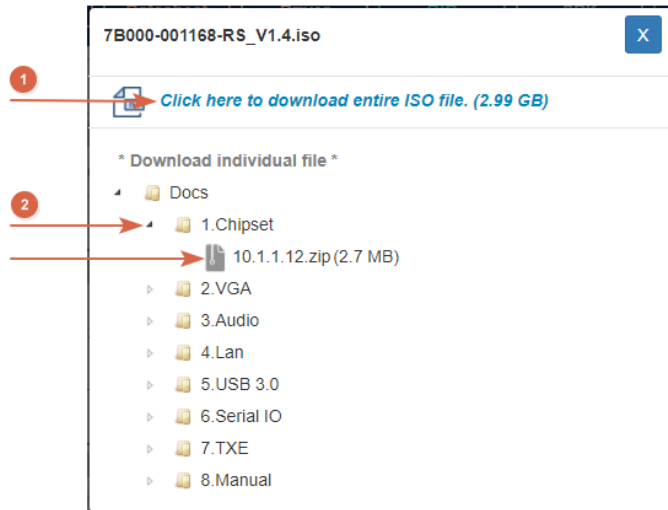


**Step 2:** All product-related software, utilities, and documentation will be listed. You can choose **Driver** to filter the result.

File Name	Published	Version	File Checksum
<a href="#">7B000-001033-RS V2.3.iso (2.23 GB)</a>	2017/10/03	2.30	3B2DB1F792779A93A8F50DDBC3943E30

**Step 3:** Click the driver file name on the page and you will be prompted with the following window. You can download the entire ISO file (❶), or click the small arrow to find an individual driver and click the file name to download (❷).





**NOTE:**

To install software from the downloaded ISO image file in Windows 8, 8.1 or 10, double-click the ISO file to mount it as a virtual drive to view its content.



Chapter

4

# BIOS

---

## 4.1 Introduction

The BIOS is programmed onto the BIOS chip. The BIOS setup program allows changes to certain system settings. This chapter outlines the options that can be changed.



### NOTE:

Some of the BIOS options may vary throughout the life cycle of the product and are subject to change without prior notice.

---

### 4.1.1 Starting Setup

The UEFI BIOS is activated when the computer is turned on. The setup program can be activated in one of two ways.

1. Press the **DELETE** key as soon as the system is turned on or
2. Press the **DELETE** key when the “**Press Delete to enter SETUP**” message appears on the screen.

If the message disappears before the **DELETE** key is pressed, restart the computer and try again.

### 4.1.2 Using Setup

Use the arrow keys to highlight items, press **ENTER** to select, use the PageUp and PageDown keys to change entries, press **F1** for help and press **ESC** to quit. Navigation keys are shown in.

Key	Function
Up arrow	Move to the item above
Down arrow	Move to the item below
Left arrow	Move to the item on the left hand side
Right arrow	Move to the item on the right hand side
+	Increase the numeric value or make changes

Key	Function
-	Decrease the numeric value or make changes
Page up	Move to the next page
Page down	Move to the previous page
Esc	Main Menu – Quit and do not save changes into CMOS Status Page Setup Menu and Option Page Setup Menu -- Exit current page and return to Main Menu
F1 key	General help, only for Status Page Setup Menu and Option Page Setup Menu
F2 key	Load previous values
F3 key	Load optimized defaults
F4 key	Save changes and Exit BIOS

**Table 4-1: BIOS Navigation Keys**

### 4.1.3 Getting Help

When **F1** is pressed a small help window describing the appropriate keys to use and the possible selections for the highlighted item appears. To exit the Help Window press **Esc** or the **F1** key again.

### 4.1.4 BIOS Menu Bar

The **menu bar** on top of the BIOS screen has the following main items:

- Main – Changes the basic system configuration.
- Advanced – Changes the advanced system settings.
- Chipset – Changes the chipset settings.
- Security – Sets User and Supervisor Passwords.
- Boot – Changes the system boot configuration.
- Save & Exit – Selects exit options and loads default settings

The following sections completely describe the configuration options found in the menu items at the top of the BIOS screen and listed above.

## 4.2 Main

The **Main** BIOS menu (**BIOS Menu 1**) appears when the **BIOS Setup** program is entered.

```

Aptio Setup Utility - Copyright (C) 2020 American Megatrends, Inc.
Main  Advanced  Chipset  Security  Boot  Save & Exit
BIOS Information
BIOS Vendor                American Megatrends
Core Version               5.13
Compliancy                 UEFI 2.7; PI 1.6
Project Version            Z659AR11.ROM
Build Date and Time        06/09/2020 11:19:50

iWDD Vendor                iEi
iWDD Version               Z659ER10.bin

Processor Information
Name                       WhiskeyLake ULT
Type                       Intel(R) Core(TM)
                           i5-8365UE CPU @ 1.60GHz
Speed                      1800 MHz
ID                          0x806EC
Stepping                   V0
Number of Processors       4Core(s) / 8Thread(s)
Microcode Revision         CA
GT Info                     GT2 (0x3EA0)

IGFX VBIOS Version         1017
Memory RC Version          0.7.1.95
Total Memory                4096 MB
Memory Frequency           2133 MHz

PCH Information
Name                       CNL PCH-LP
PCH SKU                     (U) Premium SKU
Stepping                    D0

ME FW Version               12.0.47.1524
ME Firmware SKU             Consumer SKU

Access Level                 Administrator

System Date                 [Fri 01/01/2010]
System Time                 [00:18:35]

Version 2.20.1271. Copyright (C) 2020 American Megatrends, Inc.
    
```

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

### BIOS Menu 1: Main

The System Overview field also has two user configurable fields:

## PPC-FxxD-ULT5

### → System Date [xx/xx/xx]

Use the **System Date** option to set the system date. Manually enter the day, month and year.

### → System Time [xx:xx:xx]

Use the **System Time** option to set the system time. Manually enter the hours, minutes and seconds.

## 4.3 Advanced

Use the **Advanced** menu (**BIOS Menu 2**) to configure the CPU and peripheral devices through the following sub-menus:



### WARNING!

Setting the wrong values in the sections below may cause the system to malfunction. Make sure that the settings made are compatible with the hardware.

```

Aptio Setup Utility - Copyright (C) 2020 American Megatrends, Inc.
Main  Advanced  Chipset  Security  Boot  Save & Exit
-----
> CPU Configuration          CPU Configuration
> PCH-FW Configuration      Parameters.
> Trusted Computing
> ACPI Settings
> RTC Wake Settings
> iWDD H/W Monitor
> F81866 Super IO Configuration
> Serial Port Console Redirection
> USB Configuration
> CSM Configuration
> NVMe Configuration
> iEi Feature

-----
<=>: Select Screen
↑ ↓: Select Item
Enter>Select
F1  General Help
F2  Previous Values
F3  Optimized Defaults
F4  Save
ESC Exit

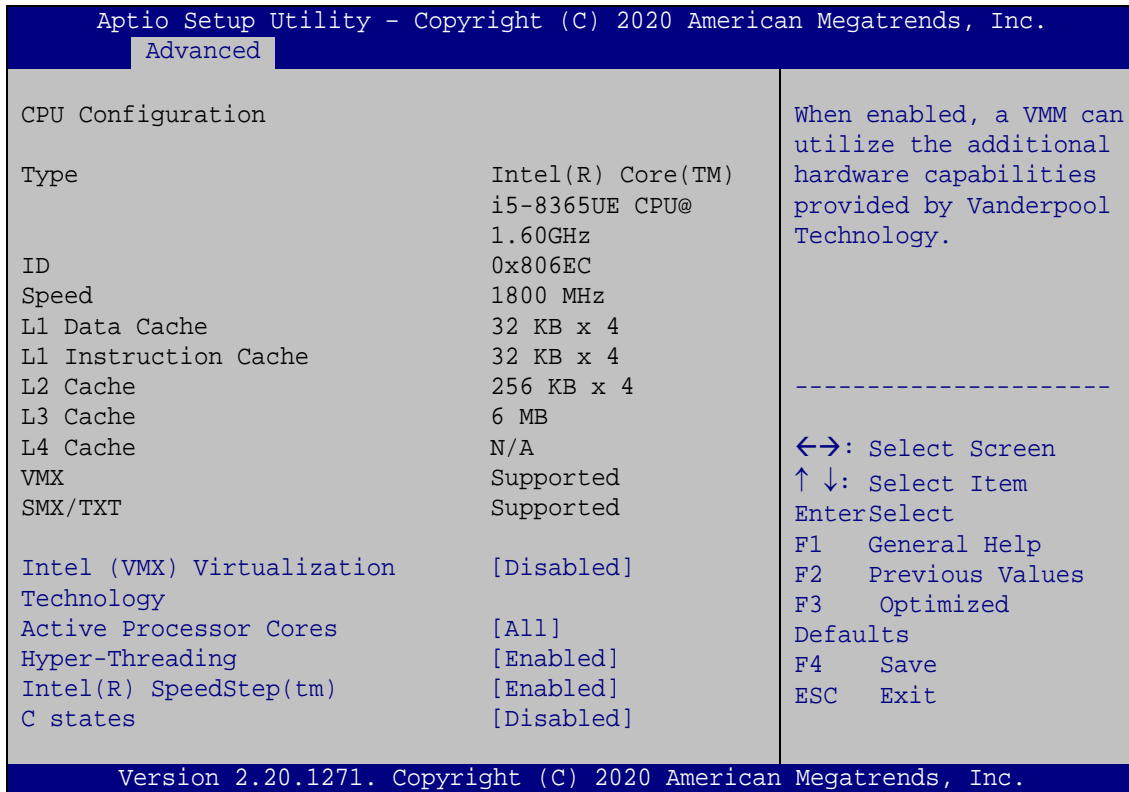
Version 2.20.1271. Copyright (C) 2020 American Megatrends, Inc.
    
```

### BIOS Menu 2: Advanced



### 4.3.1 CPU Configuration

Use the **CPU Configuration** menu (**BIOS Menu 3**) to view detailed CPU specifications and configure the CPU.



#### BIOS Menu 3: CPU Configuration

##### → Intel® (VMX) Virtualization Technology [Disabled]

Use the **Intel® (VMX) Virtualization Technology** option to enable or disable virtualization on the system. When combined with third party software, Intel® Virtualization technology allows several OSs to run on the same system at the same time.

- **Disabled**      **DEFAULT**      Disables Intel® Virtualization Technology.
- **Enabled**                      Enables Intel® Virtualization Technology.

## PPC-FxxD-ULT5

### → Active Processor Cores [All]

Use the **Active Processor Cores** BIOS option to enable numbers of cores in the processor package.

- **All**      **DEFAULT**      Enable all cores in the processor package.
- **1**                      Enable one core in the processor package.
- **2**                      Enable two cores in the processor package.
- **3**                      Enable three cores in the processor package.

### → Hyper-threading [Enabled]

Use the **Hyper-threading** BIOS option to enable or disable the Intel Hyper-Threading Technology.

- **Disabled**                      Disables the Intel Hyper-Threading Technology.
- **Enabled**      **DEFAULT**      Enables the Intel Hyper-Threading Technology.

### → Intel® SpeedStep™ [Enabled]

Use the **Intel® SpeedStep™** option to enable or disable the Intel® SpeedStep Technology.

- **Disabled**                      Disables the Intel® SpeedStep Technology.
- **Enabled**      **DEFAULT**      Enables the Intel® SpeedStep Technology.

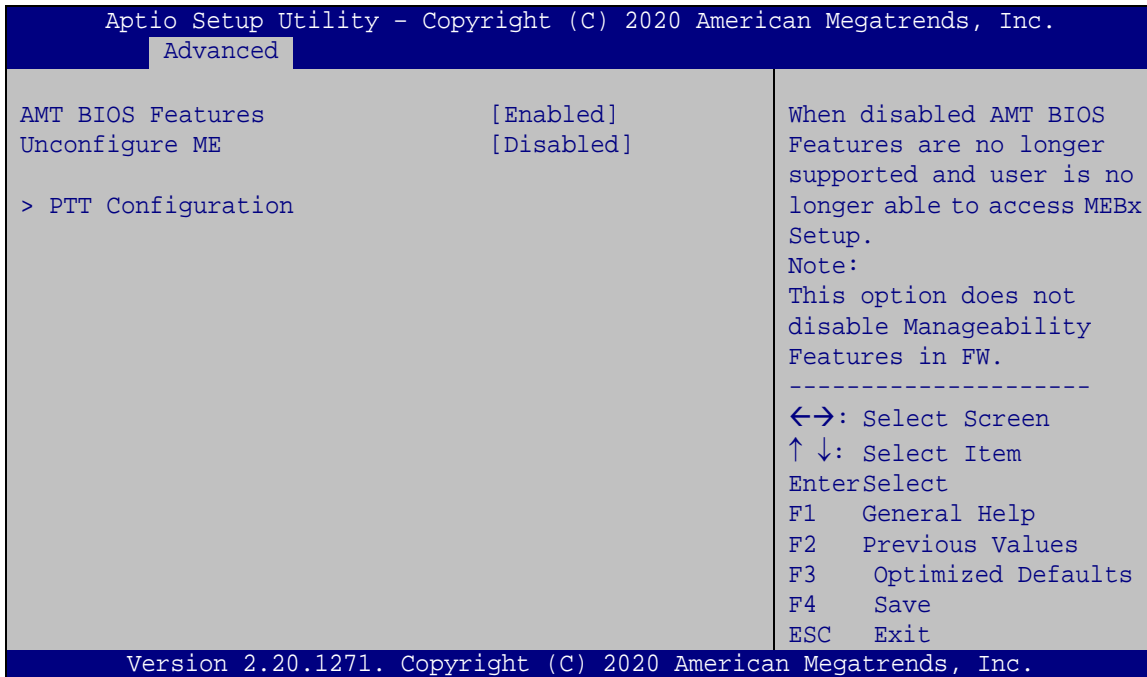
### → C State [Disabled]

Use the **C State** option to enable or disable CPU C state.

- **Disabled**      **DEFAULT**      Disables CPU C state.
- **Enabled**                      Enables CPU C state.

### 4.3.2 PCH-FW Configuration

The **PCH-FW Configuration** menu (**BIOS Menu 4**) allows Intel® Active Management Technology (AMT) options to be configured.



#### BIOS Menu 4: PCH-FW Configuration

##### ➔ AMT BIOS Features [Enabled]

Use **AMT BIOS Features** option to enable or disable the Intel® AMT function.

- ➔ **Disabled** Intel® AMT is disabled
- ➔ **Enabled** **DEFAULT** Intel® AMT is enabled

##### ➔ Unconfigure ME [Disabled]

Use the **Unconfigure ME** option to perform ME unconfigure without password operation.

- ➔ **Disabled** **DEFAULT** Not perform ME unconfigure
- ➔ **Enabled** To perform ME unconfigure

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### 4.3.2.1 PTT Configuration

Use the **PTT Configuration** menu (**BIOS Menu 6**) to configure settings related to the Trusted Platform Module (TPM).

```

Aptio Setup Utility - Copyright (C) 2020 American Megatrends, Inc.
  Advanced
PTT Capability / State          1 / 0
TPM Device Selection           [dTPM (If supported)]
Select TPM device: PTT or
dTPM. PTT- Enables PTT in
SkuMgr dTPM 1.2 -
Disables PTT in SkuMgr
Warning! PTT/dTPM will
be disabled and all data
saved on it will be lost.

-----
<->: Select Screen
↑ ↓: Select Item
EnterSelect
F1   General Help
F2   Previous Values
F3   Optimized
Defaults
F4   Save
ESC  Exit

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```

#### BIOS Menu 5: PTT Configuration

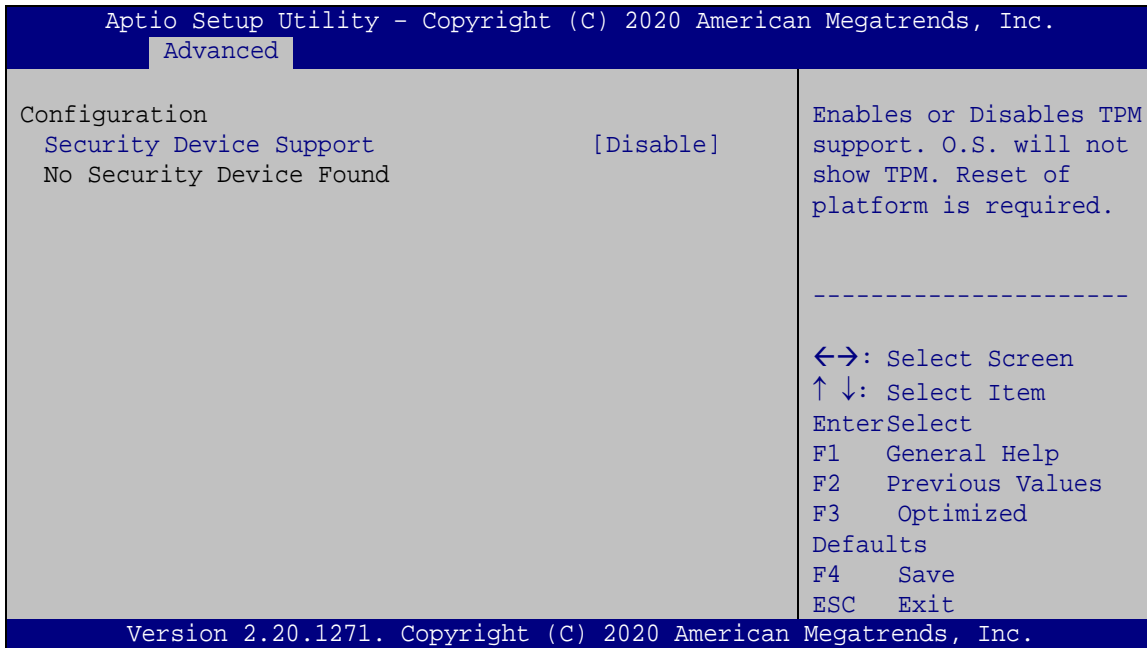
##### → TPM Device Selection [dTPM (If supported)]

Use the **TPM Device Selection** option to configure support for the TPM.

- **dTPM** (If **DEFAULT** Disable PTT in SkuMgr.  
supported)
- **PTT** Enable PTT in SkuMgr

### 4.3.3 Trusted Computing

Use the **Trusted Computing** menu (**BIOS Menu 6**) to configure settings related to the Trusted Computing Group (TCG) Trusted Platform Module (TPM).



#### BIOS Menu 6: Trusted Computing

##### → Security Device Support [Disable]

Use the **Security Device Support** option to configure support for the TPM.

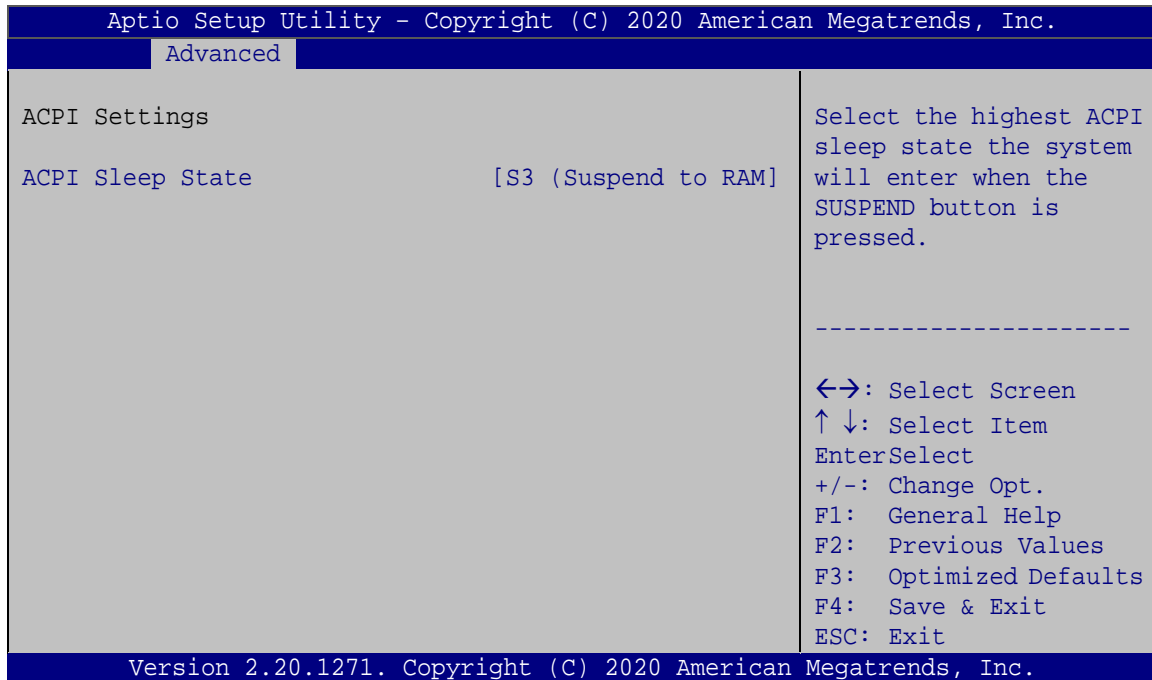
- **Disable**    **DEFAULT**    TPM support is disabled.
- **Enable**                    TPM support is enabled.



## PPC-FxxD-ULT5

### 4.3.4 ACPI Settings

The **ACPI Settings** menu (**BIOS Menu 7**) configures the Advanced Configuration and Power Interface (ACPI) options.



#### BIOS Menu 7: ACPI Settings

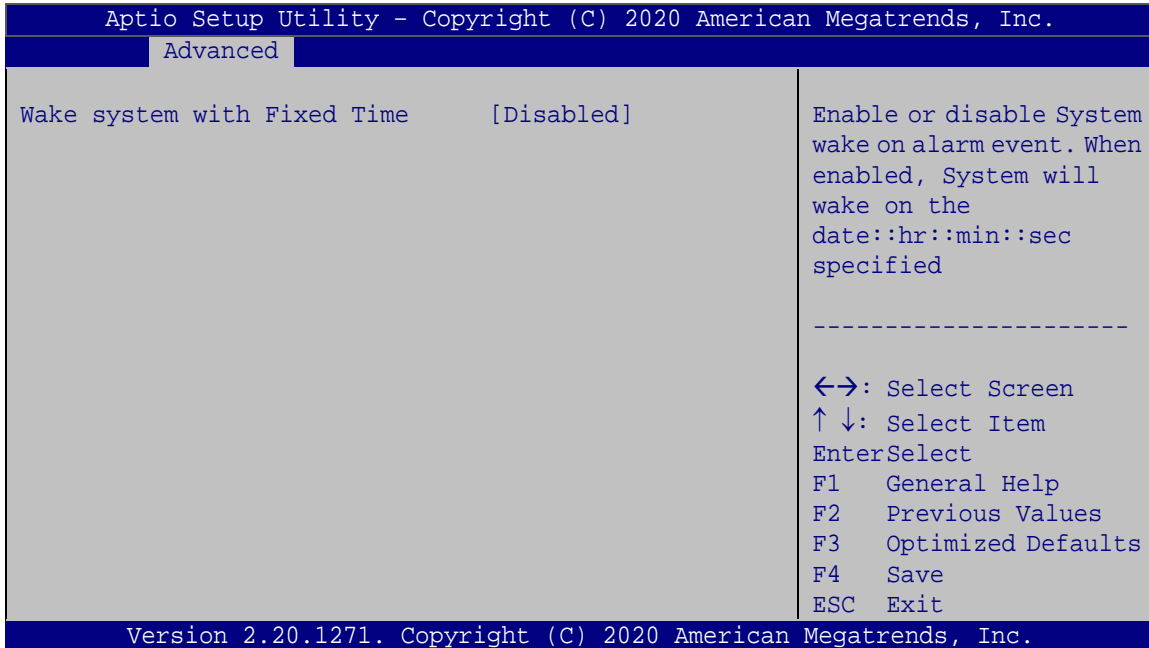
##### → **ACPI Sleep State [S3 (Suspend to RAM)]**

Use the **ACPI Sleep State** option to specify the sleep state the system enters when it is not being used.

- **S3 (Suspend to DEFAULT RAM)** The caches are flushed and the CPU is powered off. Power to the RAM is maintained. The computer returns slower to a working state, but more power is saved.

### 4.3.5 RTC Wake Settings

The **RTC Wake Settings** menu (**BIOS Menu 8**) configures RTC wake event.



#### BIOS Menu 8: RTC Wake Settings

##### → Wake system with Fixed Time [Disabled]

Use the **Wake system with Fixed Time** option to enable or disable the system wake on alarm event.

- **Disabled**      **DEFAULT**      The real time clock (RTC) cannot generate a wake event
  
- **Enabled**                      If selected, the **Wake up every day** option appears allowing you to enable to disable the system to wake every day at the specified time. Besides, the following options appear with values that can be selected:
  - Wake up date
  - Wake up hour
  - Wake up minute

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Wake up second

After setting the alarm, the computer turns itself on from a suspend state when the alarm goes off.

### 4.3.6 iWDD H/W Monitor

The **iWDD H/W Monitor** menu (**BIOS Menu 9**) contains the fan configuration submenus and displays operating temperature, fan speeds and system voltages.

```

Aptio Setup Utility - Copyright (C) 2020 American Megatrends, Inc.
-----
Advanced
-----
PC Health Status
CPU temperature           :+36 °C
System temperature       :+32 °C

+VCCCORE                 :+0.774 V
+VDDQ                    :+1.219 V
+V3.3S                   :+3.387 V
+V3.3A                   :+3.393 V
+V1.05A                  :+1.043 V
+VCCSA                   :+0.780 V

-----
<->: Select Screen
↑ ↓: Select Item
Enter>Select
+ - Change Opt.
F1  General Help
F2  Previous Values
F3  Optimized Defaults
F4  Save & Exit
ESC Exit
-----
Version 2.20.1271. Copyright (C) 2020 American Megatrends, Inc.
    
```

#### BIOS Menu 9: iWDD H/W Monitor

##### → PC Health Status

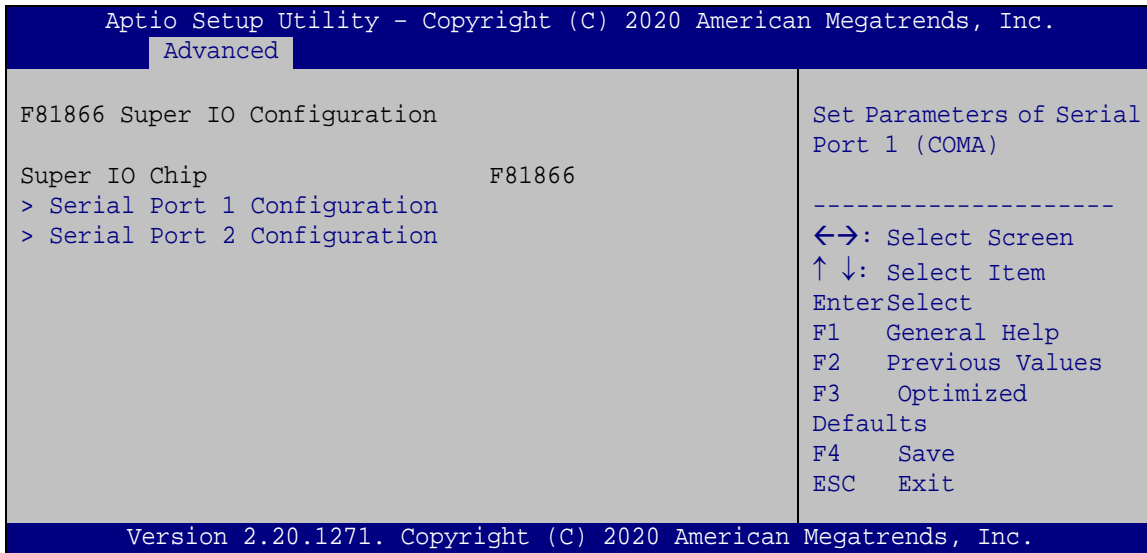
The following system parameters and values are shown. The system parameters that are monitored are:

- System Temperatures:
  - CPU Temperature
  - System temperature
- Voltages
  - +VCCCORE
  - +VDDQ
  - +V3.3S

- +V3.3A
- +V1.05A
- +VCCSA

### 4.3.7 F81866 Super IO Configuration

Use the **F81866 Super IO Configuration** menu (**BIOS Menu 10**) to set or change the configurations for the serial ports.

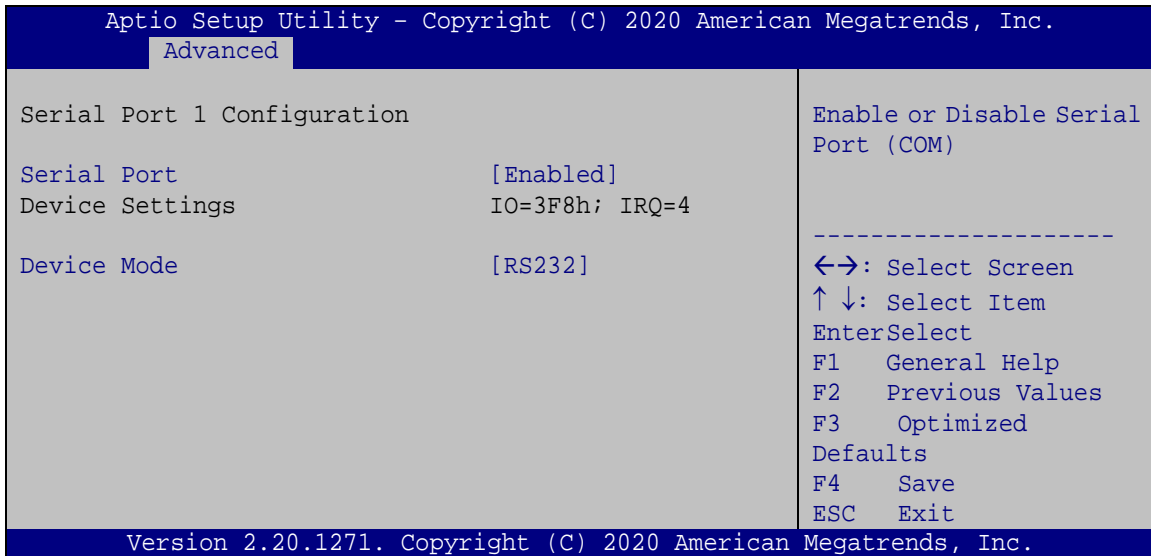


**BIOS Menu 10: F81866 Super IO Configuration**

## PPC-FxxD-ULT5

### 4.3.7.1 Serial Port n Configuration

Use the **Serial Port n Configuration** menu (**BIOS Menu 11**) to configure the serial port n.



#### BIOS Menu 11: Serial Port n Configuration

#### 4.3.7.1.1 Serial Port 1 Configuration

##### → Serial Port [Enabled]

Use the **Serial Port** option to enable or disable the serial port.

- **Disabled** Disable the serial port
- **Enabled** **DEFAULT** Enable the serial port

##### → Device Mode [RS232]

Use the **Device Mode** option to select the Serial Port 1 signaling mode.

- **RS422** Serial Port 1 signaling mode is RS-422
- **RS232** **DEFAULT** Serial Port 1 signaling mode is RS-232
- **RS485** Serial Port 1 signaling mode is RS-485





## PPC-FxxD-ULT5

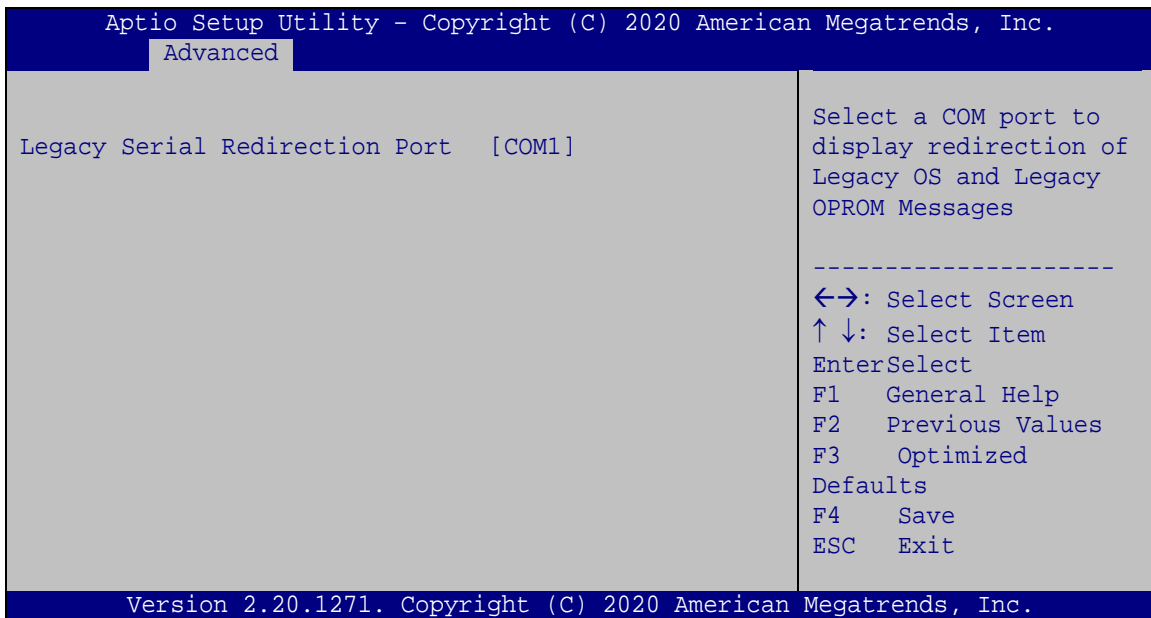
### → Console Redirection [Disabled]

Use **Console Redirection** option to enable or disable the console redirection function.

- **Disabled**      **DEFAULT**      Disabled the console redirection function
- **Enabled**                      Enabled the console redirection function

### 4.3.8.1 Legacy Console Redirection Settings

The **Legacy Console Redirection Settings** menu (**BIOS Menu 13**) allows the legacy console redirection options to be configured.



#### BIOS Menu 13: Legacy Console Redirection Settings

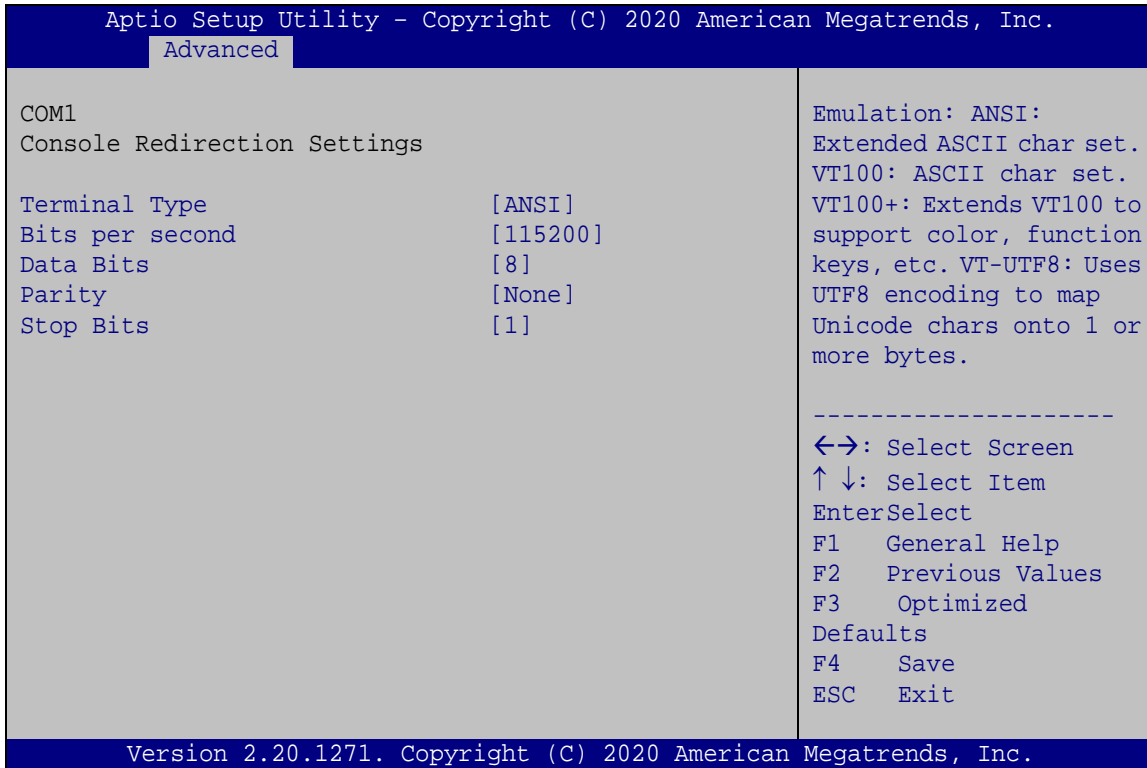
### → Legacy Serial Redirection Port [COM1]

Use the **Legacy Serial Redirection Port** option to specify a COM port to display redirection of legacy OS and legacy OPRM messages. The options include:

- COM1              **DEFAULT**
- COM2
- COM3 (Pci Bus0, Dev22, Func3)

### 4.3.8.2 Console Redirection Settings

The **Console Redirection Settings** menu (**BIOS Menu 14**) allows the console redirection options to be configured. The option is active when **Console Redirection** option is enabled.



#### BIOS Menu 14: Console Redirection Settings

##### ➔ Terminal Type [ANSI]

Use the **Terminal Type** option to specify the remote terminal type.

- ➔ **VT100**                      The target terminal type is VT100
- ➔ **VT100+**                    The target terminal type is VT100+
- ➔ **VT-UTF8**                    The target terminal type is VT-UTF8
- ➔ **ANSI**                      **DEFAULT**                    The target terminal type is ANSI

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### → Bits per second [115200]

Use the **Bits per second** option to specify the serial port transmission speed. The speed must match the other side. Long or noisy lines may require lower speeds.

- |   |               |                |  |
|---|---------------|----------------|--|
| → | <b>9600</b>   |                | Sets the serial port transmission speed at 9600.   |
| → | <b>19200</b>  |                | Sets the serial port transmission speed at 19200.  |
| → | <b>57600</b>  |                | Sets the serial port transmission speed at 57600.  |
| → | <b>115200</b> | <b>DEFAULT</b> | Sets the serial port transmission speed at 115200. |

### → Data Bits [8]

Use the **Data Bits** option to specify the number of data bits.

- |   |          |                |                          |
|---|----------|----------------|--------------------------|
| → | <b>7</b> |                | Sets the data bits at 7. |
| → | <b>8</b> | <b>DEFAULT</b> | Sets the data bits at 8. |

### → Parity [None]

Use the **Parity** option to specify the parity bit that can be sent with the data bits for detecting the transmission errors.

- |   |              |                |   |
|---|--------------|----------------|---|
| → | <b>None</b>  | <b>DEFAULT</b> | No parity bit is sent with the data bits.                                 |
| → | <b>Even</b>  |                | The parity bit is 0 if the number of ones in the data bits is even.       |
| → | <b>Odd</b>   |                | The parity bit is 0 if the number of ones in the data bits is odd.        |
| → | <b>Mark</b>  |                | The parity bit is always 1. This option does not provide error detection. |
| → | <b>Space</b> |                | The parity bit is always 0. This option does not provide error detection. |





## PPC-FxxD-ULT5

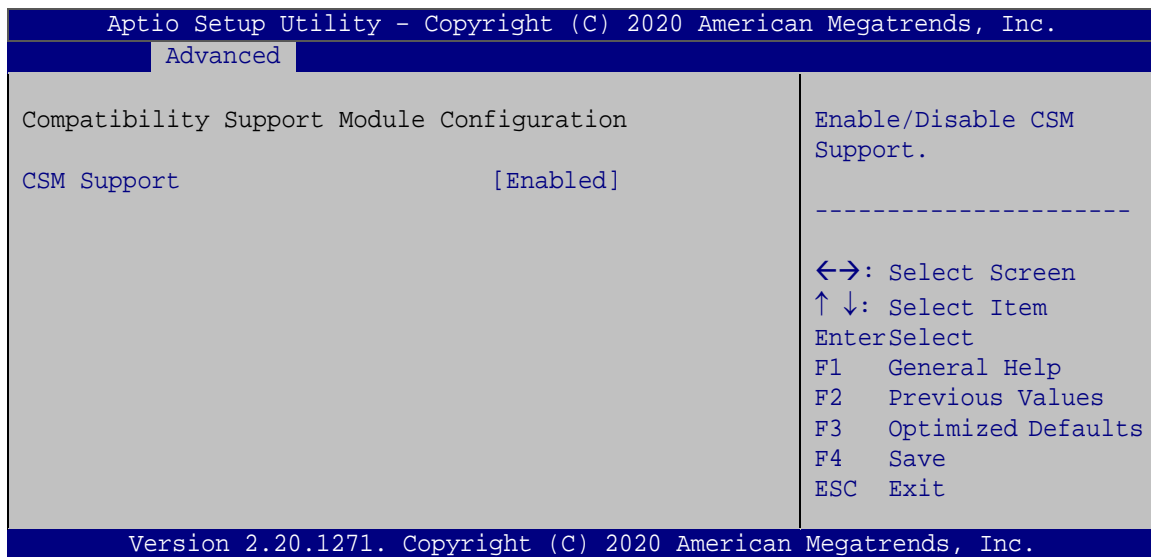
### → Legacy USB Support [Enabled]

Use the **Legacy USB Support** BIOS option to enable USB mouse and USB keyboard support. Normally if this option is not enabled, any attached USB mouse or USB keyboard does not become available until a USB compatible operating system is fully booted with all USB drivers loaded. When this option is enabled, any attached USB mouse or USB keyboard can control the system even when there is no USB driver loaded onto the system.

- **Enabled**      **DEFAULT**      Legacy USB support enabled
- **Disabled**                      Legacy USB support disabled
- **Auto**                              Legacy USB support disabled if no USB devices are connected

### 4.3.10 CSM Configuration

Use the **CSM Configuration** menu (**BIOS Menu 16**) to configure Compatibility Support Module (CSM).



**BIOS Menu 16: CSM Configuration**

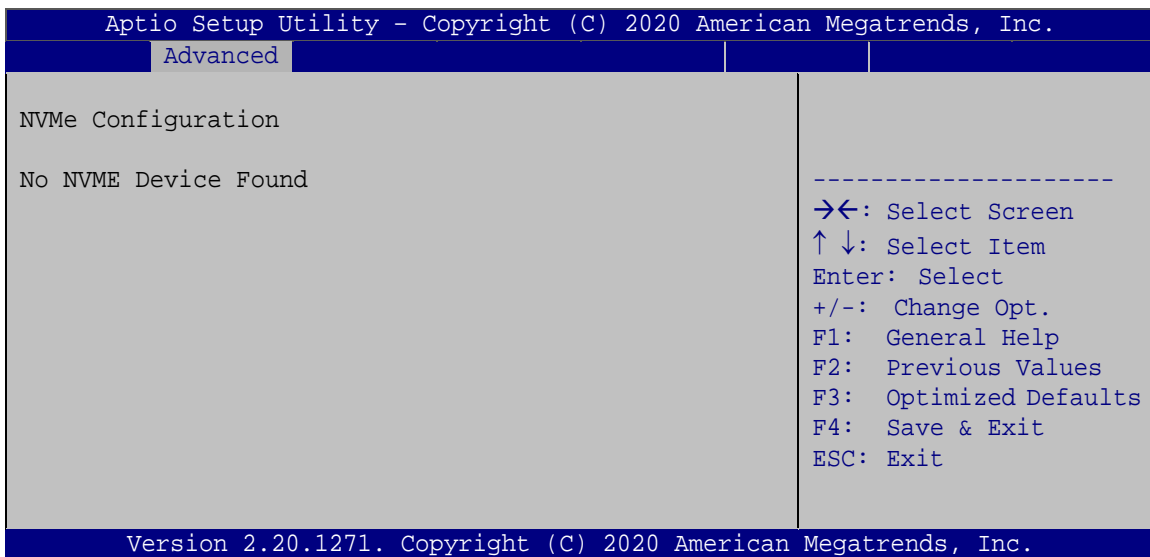
➔ **CSM Support [Enabled]**

Use the **CSM Support** BIOS option to enable or disable CSM support.

- ➔ **Disabled**                      CSM support disabled
- ➔ **Enabled**      **DEFAULT**      CSM support enabled

**4.3.11 NVMe Configuration**

Use the **NVMe Configuration (BIOS Menu 17)** menu to display the NVMe controller and device information.



**BIOS Menu 17: NVMe Configuration**

## PPC-FxxD-ULT5

### 4.3.12 IEI Feature

Use the **IEI Feature** menu (**BIOS Menu 18**) to configure One Key Recovery function.

```

Aptio Setup Utility - Copyright (C) 2020 American Megatrends, Inc.
-----
Advanced
-----
iEi Feature
Auto Recovery Function          [Disabled]
                                Auto Recovery Function
                                Reboot and recover
                                system automatically
                                within 10 min, when OS
                                crashes. Please install
                                Auto Recovery API
                                service before enabling
                                this function
                                -----
                                ←→: Select Screen
                                ↑↓: Select Item
                                Enter>Select
                                F1   General Help
                                F2   Previous Values
                                F3   Optimized Defaults
                                F4   Save
                                ESC  Exit
-----
Version 2.20.1271. Copyright (C) 2020 American Megatrends, Inc.

```

#### BIOS Menu 18: IEI Feature

#### ➔ Auto Recovery Function [Disabled]

Use the **Auto Recovery Function** BIOS option to enable or disable the auto recovery function of the IEI One Key Recovery.

- ➔ **Disabled**      **DEFAULT**      Auto recovery function disabled
- ➔ **Enabled**        Auto recovery function enabled

## 4.4 Chipset

Use the **Chipset** menu (**BIOS Menu 19**) to configure the system chipset.

```

Aptio Setup Utility - Copyright (C) 2020 American Megatrends, Inc.
Main   Advanced  Chipset  Security  Boot   Save & Exit

> System Agent (SA) Configuration
> PCH-IO Configuration

System Agent (SA)
Parameters

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

Version 2.20.1271. Copyright (C) 2020 American Megatrends, Inc.
    
```

**BIOS Menu 19: Chipset**

### 4.4.1 System Agent (SA) Configuration

Use the **System Agent (SA) Configuration** menu (**BIOS Menu 20**) to configure the System Agent (SA) parameters.

```

Aptio Setup Utility - Copyright (C) 2020 American Megatrends, Inc.
Chipset

System Agent (SA) Configuration
VT-d                               Supported

> Memory Configuration
> Graphics Configuration

VT-d                               [Disabled]

Memory Configuration
Parameters

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

Version 2.20.1271. Copyright (C) 2020 American Megatrends, Inc.
    
```

**BIOS Menu 20: System Agent (SA) Configuration**

## PPC-FxxD-ULT5

### → VT-d [Disabled]

Use the **VT-d** option to enable or disable VT-d support.

- **Disabled**    **DEFAULT**    Disable VT-d support.
- **Enabled**                    Enable VT-d support.

### 4.4.1.1 Memory Configuration

Use the **Memory Configuration** submenu (**BIOS Menu 21**) to display the memory information.

```

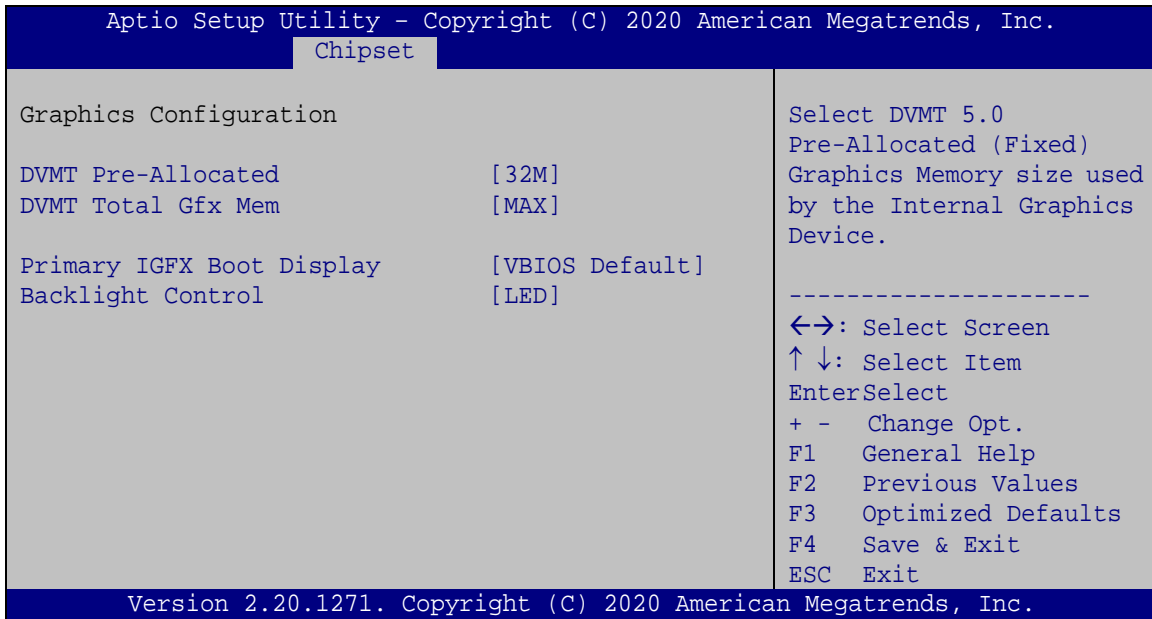
Aptio Setup Utility - Copyright (C) 2020 American Megatrends, Inc.
  Chipset
-----
Memory Configuration
Memory Frequency          2133 MHz
DIMM1                    Not Populated / Disabled
DIMM2                    Populated & Enabled
  Size                    4096 MB (DDR4)
-----
←→: Select Screen
↑ ↓: Select Item
EnterSelect
+ - Change Opt.
F1  General Help
F2  Previous Values
F3  Optimized Defaults
F4  Save & Exit
ESC Exit
Version 2.20.1271. Copyright (C) 2020 American Megatrends, Inc.
  
```

### BIOS Menu 21: Memory Configuration



### 4.4.1.2 Graphics Configuration

Use the **Graphics Configuration** menu (**BIOS Menu 22**) to configure the graphics settings.



#### BIOS Menu 22: Graphics Configuration

##### → DVMT Pre-Allocated [32M]

Use the **DVMT Pre-Allocated** option to set the amount of system memory allocated to the integrated graphics processor when the system boots. The system memory allocated can then only be used as graphics memory, and is no longer available to applications or the operating system. Configuration options are listed below:

- 32M                      **DEFAULT**
- 64M

##### → DVMT Total Gfx Mem [MAX]

Use the **DVMT Total Gfx Mem** option to select DVMT 5.0 total graphic memory size used by the internal graphics device. The following options are available:

- 128M
- 256M

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- MAX                      DEFAULT

### → Primary IGFX Boot Display [VBIOS Default]

Use the **Primary IGFX Boot Display** option to select the display device used by the system when it boots.

- VBIOS Default    **DEFAULT**
- HDMI
- LVDS

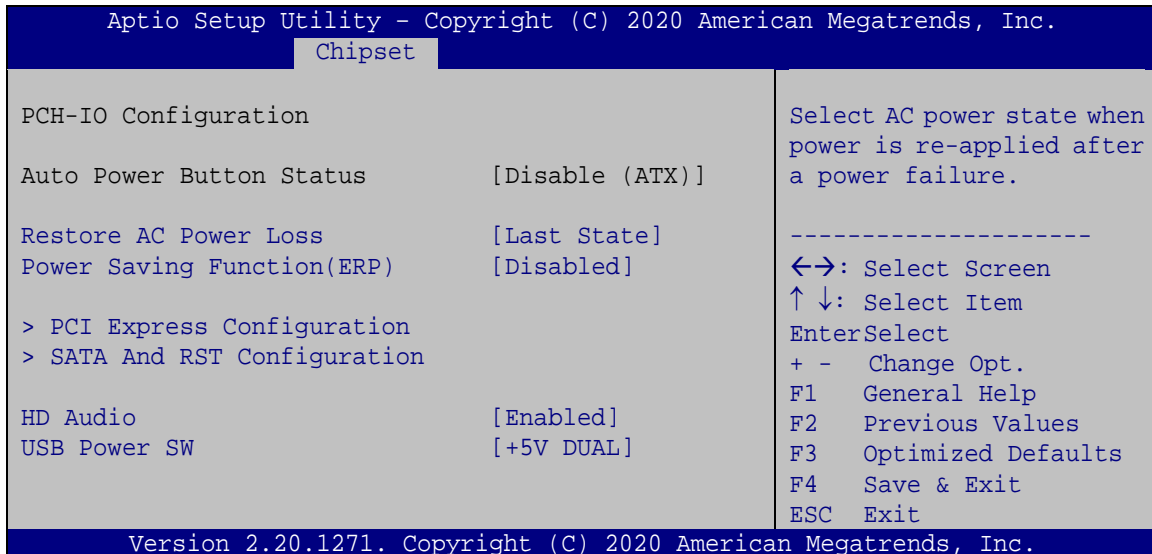
### → Backlight Control [LED]

Use the **Backlight Control** option to specify the backlight control mode. Configuration options are listed below.

- LED                      **DEFAULT**

## 4.4.2 PCH-IO Configuration

Use the **PCH-IO Configuration** menu (**BIOS Menu 23**) to configure the PCH-IO chipset.



**BIOS Menu 23: PCH-IO Configuration**

**→ Restore AC Power Loss [Last State]**

Use the **Restore AC Power** BIOS option to specify what state the system returns to if there is a sudden loss of power to the system.

- **Power Off**                      The system remains turned off
- **Power On**                      The system turns on
- **Last State**    **DEFAULT**    The system returns to its previous state. If it was on, it turns itself on. If it was off, it remains off.

**→ Power Saving Function(ERP) [Disabled]**

Use the **Power Saving Function(ERP)** BIOS option to enable or disable the power saving function.

- **Disabled**    **DEFAULT**    Power saving function is disabled.
- **Enabled**                      Power saving function is enabled. It will reduce power consumption when the system is off.

**→ HD Audio [Enabled]**

Use the **HD Audio** BIOS option to enable or disable the High Definition Audio controller.

- **Disabled**                      The High Definition Audio controller is disabled.
- **Enabled**    **DEFAULT**    The High Definition Audio controller is enabled.

**→ USB Power SW [+5V DUAL]**

Use the **USB Power SW** BIOS option to configure whether to provide power to the external USB connectors when the system is in S3/S4 sleep state. This option is valid only when the above **Power Saving Function (ERP)** BIOS option is disabled.

- **+5V**            **DEFAULT**    Power is provided to the USB connectors when the system is in S3/S4 sleep state
- **+5V**                      Power is not provided to the USB connectors when the system is in S3/S4 sleep state



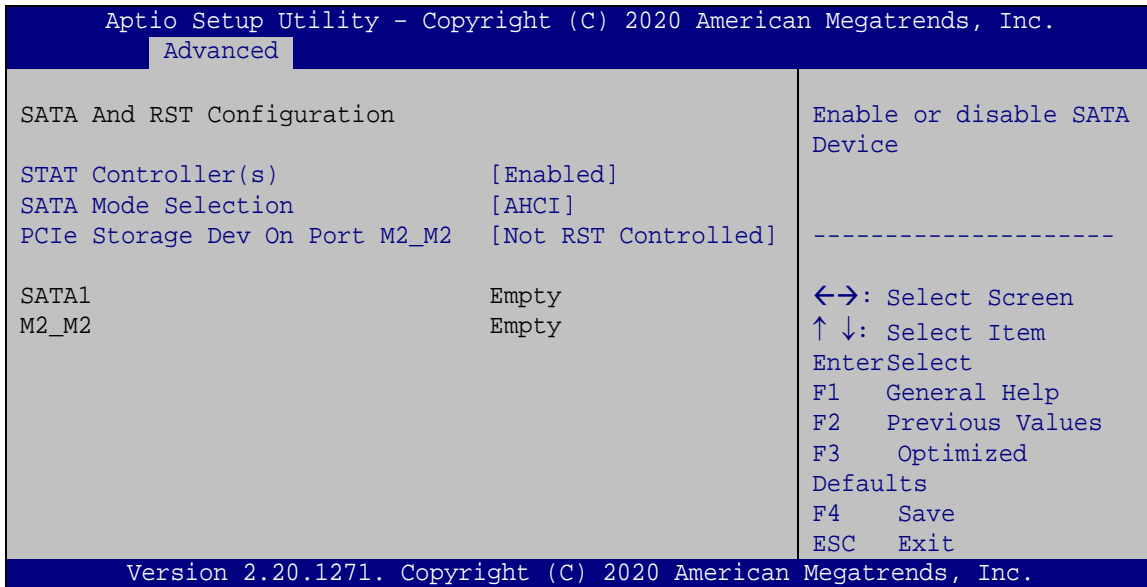
➔ **Detect Non-Compliance Device [Disabled]**

Use the **Detect Non-Compliance Device** option to enable or disable detecting if a non-compliance PCI Express device is connected to the PCI Express slot.

- ➔ **Disabled**                      **DEFAULT**      Disables to detect if a non-compliance PCI Express device is connected to the PCI Express slot.
- ➔ **Enabled**    Enables to detect if a non-compliance PCI Express device is connected to the PCI Express slot.

**4.4.2.2 SATA And RST Configuration**

Use the **SATA And RST Configuration** menu (**BIOS Menu 25**) to change and/or set the configuration of the SATA devices installed in the system.



**BIOS Menu 25: SATA and RST Configuration**

➔ **STAT Controller(s) [Enabled]**

Use the **STAT Controller(s)** option to enable or disable the SATA device.

- ➔ **Enabled**                      **DEFAULT**      Enables the SATA device.
- ➔ **Disabled**    Disables the SATA device.



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→ **SATA Mode Selection [AHCI]**

Use the **SATA Mode Selection** option to configure how the SATA controller(s) operate.

- **AHCI**                      **DEFAULT**      Configures SATA devices as AHCI device.
- **Intel RST**                                      Configures SATA devices as RAID device.  
**Premium**  
**with Intel**  
**Optane**  
**System**  
**Acceleration**

**NOTE:**

Before accessing the RAID configuration utility, ensure to set the **Option ROM Messages** BIOS option in the **Boot** menu to **Force BIOS**. This is to allow the “Press <CTRL+I> to enter Configuration Utility.....” message to appear during POST. Press Ctrl+I when prompted to enter the RAID configuration utility.

---

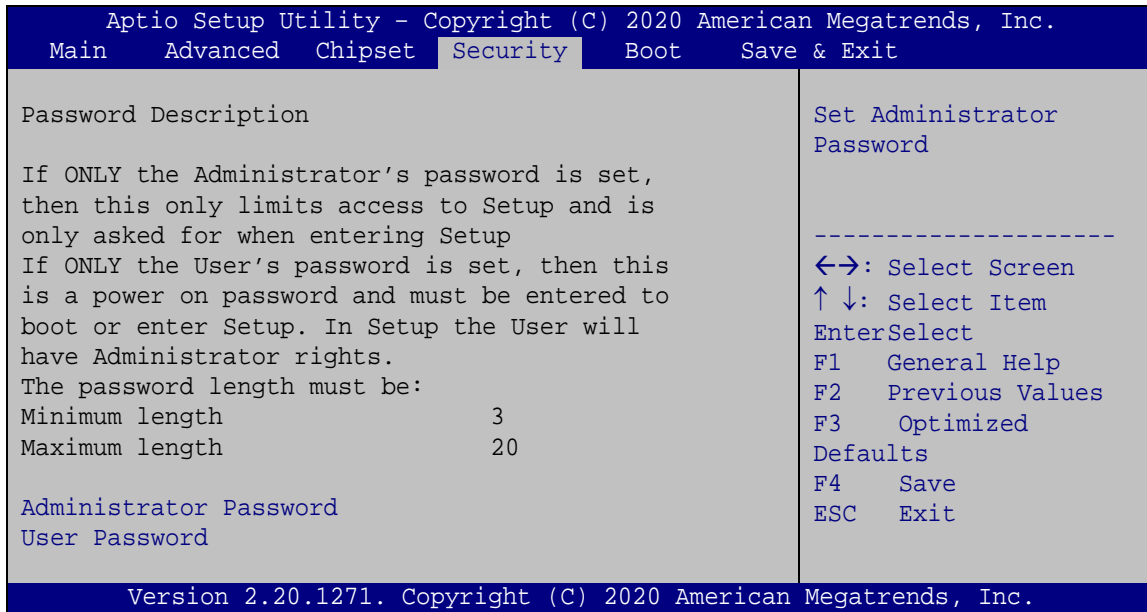
→ **PCIe Storage Dev On Port M2\_M2 [Not RST Controlled]**

Use the **PCIe Storage Dev On Port M2\_M2** option to enable or disable RST PCIe storage remapping for the M.2 M-key slot (M2\_M2).

- **RST**                                      Enable RST PCIe storage remapping.  
**Controlled**
- **Not RST**                      **DEFAULT**      Disable RST PCIe storage remapping.  
**Controlled**

## 4.5 Security

Use the **Security** menu (**BIOS Menu 26**) to set system and user passwords.



### BIOS Menu 26: Security

#### ➔ Administrator Password

Use the **Administrator Password** to set or change a administrator password.

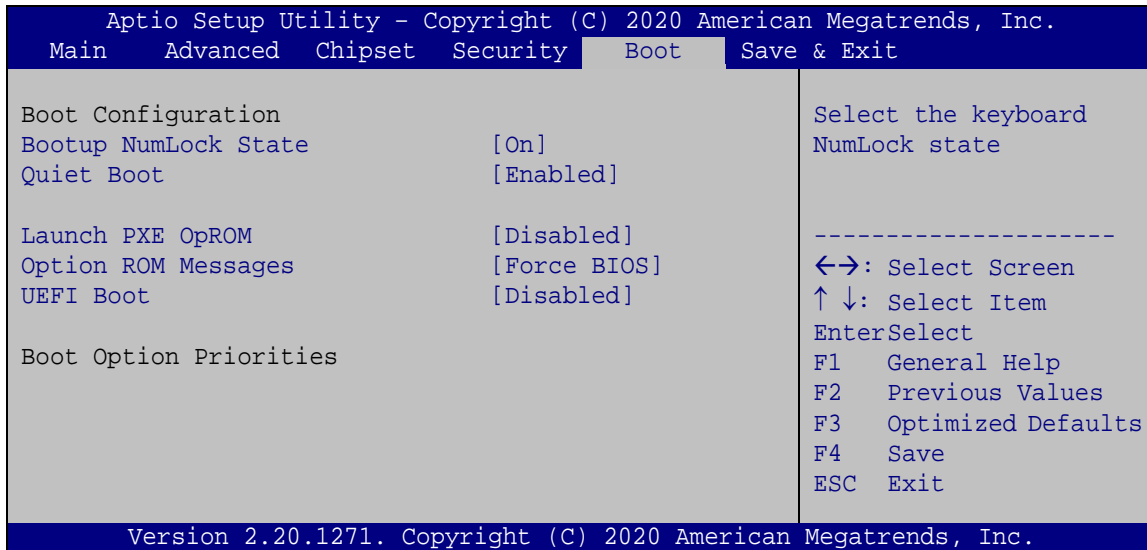
#### ➔ User Password

Use the **User Password** to set or change a user password.

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### 4.6 Boot

Use the **Boot** menu (**BIOS Menu 27**) to configure system boot options.



#### BIOS Menu 27: Boot

##### → Bootup NumLock State [On]

Use the **Bootup NumLock State** BIOS option to specify if the number lock setting must be modified during boot up.

- **On**                      **DEFAULT**                      Allows the Number Lock on the keyboard to be enabled automatically when the computer system boots up. This allows the immediate use of the 10-key numeric keypad located on the right side of the keyboard. To confirm this, the Number Lock LED light on the keyboard is lit.
- **Off**                                      Does not enable the keyboard Number Lock automatically. To use the 10-keys on the keyboard, press the Number Lock key located on the upper left-hand corner of the 10-key pad. The Number Lock LED on the keyboard lights up when the Number Lock is engaged.

**→ Quiet Boot [Enabled]**

Use the **Quiet Boot** BIOS option to select the screen display when the system boots.

- **Disabled** Normal POST messages displayed
- **Enabled** **DEFAULT** OEM Logo displayed instead of POST messages

**→ Launch PXE OpROM [Disabled]**

Use the **Launch PXE OpROM** option to enable or disable boot option for legacy network devices.

- **Disabled** **DEFAULT** Ignore all PXE Option ROMs
- **Enabled** Load PXE Option ROMs.

**→ Option ROM Messages [Force BIOS]**

Use the **Option ROM Messages** option to set the Option ROM display mode.

- **Force BIOS** **DEFAULT** Sets display mode to force BIOS.
- **Keep Current** Sets display mode to current.

**→ UEFI Boot [Disabled]**

Use the **UEFI Boot** option to enable or disable to boot from the UEFI devices.

- **Enabled** Boot from UEFI devices is enabled.
- **Disabled** **DEFAULT** Boot from UEFI devices is disabled.

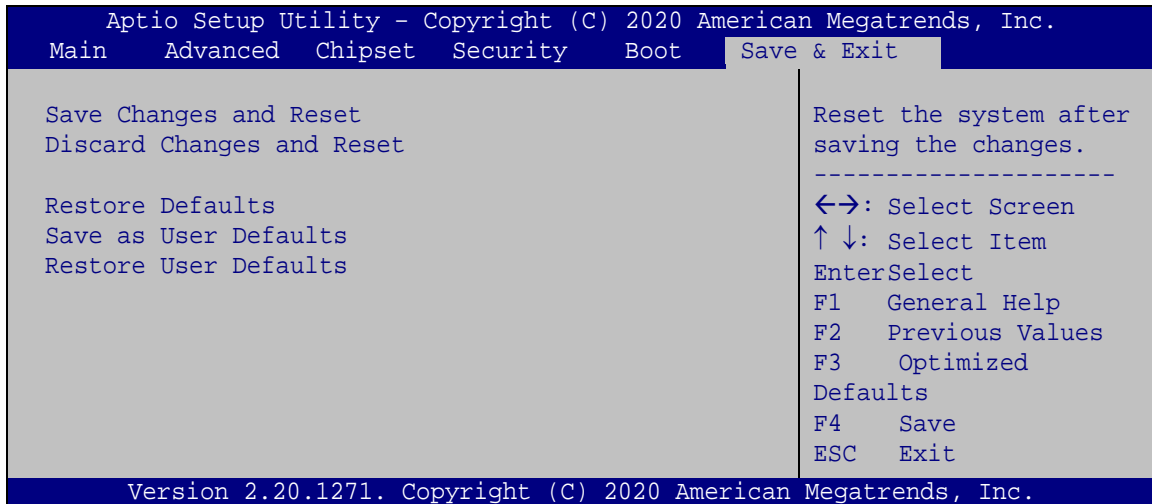
**→ Boot Option Priority**

Use the **Boot Option Priority** function to set the system boot sequence from the available devices. The drive sequence also depends on the boot sequence in the individual device section.

## PPC-FxxD-ULT5

## 4.7 Save &amp; Exit

Use the **Save & Exit** menu (**BIOS Menu 28**) to load default BIOS values, optimal failsafe values and to save configuration changes.

**BIOS Menu 28: Save & Exit**→ **Save Changes and Reset**

Use the **Save Changes and Reset** option to save the changes made to the BIOS options and to exit the BIOS configuration setup program.

→ **Discard Changes and Reset**

Use the **Discard Changes and Reset** option to exit the system without saving the changes made to the BIOS configuration setup program.

→ **Restore Defaults**

Use the **Restore Defaults** option to load the optimal default values for each of the parameters on the Setup menus. **F3 key can be used for this operation.**

→ **Save as User Defaults**

Use the **Save as User Defaults** option to save the changes done so far as user defaults.

→ **Restore User Defaults**

Use the **Restore User Defaults** option to restore the user defaults to all the setup options.



Chapter

**5**

# Interface Connectors

---

## PPC-FxxD-ULT5

### 5.1 Peripheral Interface Connectors

The PPC-FxxD-ULT5 panel PC motherboard comes with a number of peripheral interface connectors and configuration jumpers. The connector locations are shown in **Figure 5-1**. The Pin 1 locations of the on-board connectors are also indicated in the diagram below. The connector pinouts for these connectors are listed in the following sections.

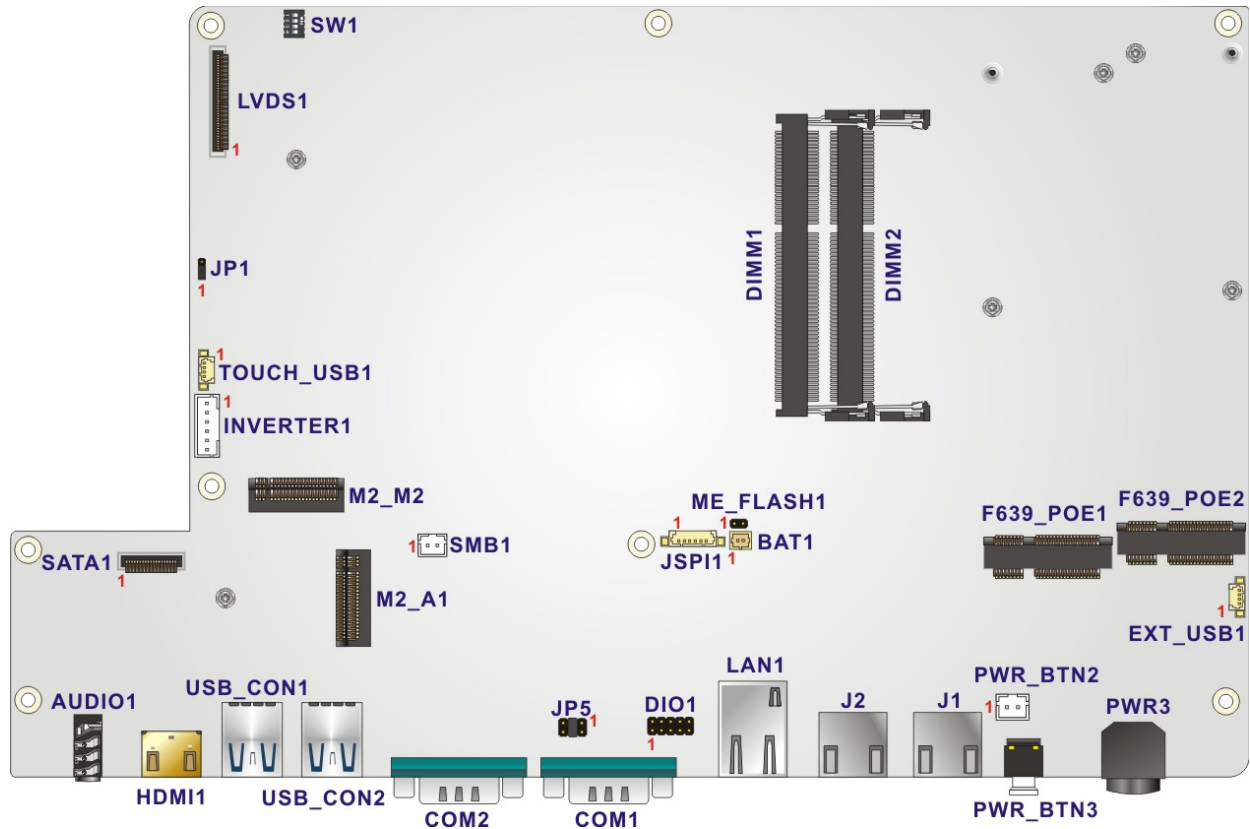


Figure 5-1: Main Board Layout Diagram

## 5.2 Internal Peripheral Connectors

Internal peripheral connectors are found on the motherboard and are only accessible when the motherboard is outside of the chassis. The table below shows a list of the peripheral interface connectors on the motherboard. Pinouts of these connectors can be found in the following sections.

Connector	Type	Label
Battery connector	2-pin wafer	BAT1
Digital I/O connector	10-pin header	DIO1
IEI PoE module slots	Full-size/Half-size PCIe Mini slot	F639_POE1, F639_POE2
Inverter connector	6-pin wafer	INVERTER1
LVDS connector	40-pin connector	LVDS1
M.2 slot (support WLAN module)	A-key slot	M2_A1
M.2 slot (support SSD)	M-key slot	M2_M2
Power button connector	2-pin wafer	PWR_BTN2
SATA connector	20-pin connector	SATA1
SMBus connector	2-pin wafer	SMB1
SPI Flash connector	6-pin wafer	JSPI1
USB connectors	4-pin wafer	TOUCH_USB1 EXT_USB1

**Table 5-1: Peripheral Interface Connectors**

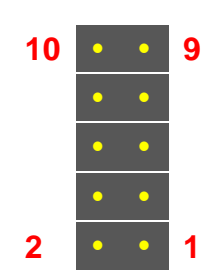
### 5.2.1 Battery Connector (BAT1)

PIN NO.	DESCRIPTION
1	VBATT
2	GND

**Table 5-2: Battery Connector (BAT1) Pinouts**

### 5.2.2 Digital I/O Connector (DIO1)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	+5V
3	DOUT3	4	DOUT2
5	DOUT1	6	DOUT0
7	DIN3	8	DIN2
9	DIN1	10	DINO



**Table 5-3: Digital I/O Connector (DIO1) Pinouts**

### 5.2.3 Inverter Connector (INVERTER1)

PIN NO.	DESCRIPTION
1	+12V
2	+12V
3	ENABKL
4	BRIGHTNESS
5	GND
6	GND

**Table 5-4: Inverter Connector (INVERTER1) Pinouts**

### 5.2.4 LVDS Connector (LVDS1)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	+VCC_LCD	2	+VCC_LCD
3	+VCC_LCD	4	+VCC_LCD
5	+VCC_LCD	6	NC
7	LVDS_RESETB	8	GND
9	GND	10	GND
11	GND	12	
13	CLK2M_L	14	GND

15	A7P_L	16	A7M_L
17	GND	18	A6P_L
19	A6M_L	20	GND
21	A5P_L	22	A5M_L
23	GND	24	A4P_L
25	A4M_L	26	GND
27	A3P_L	28	A3M_L
29	GND	30	CLK1P_L
31	CLK1M_L	32	GND
33	A2P_L	34	A2M_L
35	GND	36	A1M_L
37	A1P_L	38	GND
39	A0M_L	40	A0P_L

**Table 5-5: LVDS Connector (LVDS1) Pinouts**

### 5.2.5 M.2 A-Key Slot (M2\_A1)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	+V3.3A
3	USB+	4	+V3.3A
5	USB-	6	NC
7	GND	8	Module Key
9	Module Key	10	Module Key
11	Module Key	12	Module Key
13	Module Key	14	Module Key
15	Module Key	16	NC
17	NC	18	GND
19	NC	20	NC
21	NC	22	NC
23	GND	24	GND
25	NC	26	NC
27	NC	28	NC



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29	GND	30	GND
31	NC	32	NC
33	GND	34	NC
35	PCIE_TX+	36	GND
37	PCIE_TX-	38	NC
39	GND	40	NC
41	PCIE_RX+	42	NC
43	PCIE_RX-	44	NC
45	GND	46	NC
47	CLK_PCIE+	48	NC
49	CLK_PCIE-	50	NC
51	GND	52	BUF_PLT_RST#
53	NC	54	BT_DISABLE
55	PCIE_WAKE#	56	WIFI_DISABLE
57	GND	58	SMB_DATA
59	NC	60	SMB_CLK
61	NC	62	NC
63	GND	64	NC
65	NC	66	NC
67	NC	68	NC
69	GND	70	NC
71	NC	72	+V3.3A
73	NC	74	+V3.3A
75	GND		

**Table 5-6: M.2 A-Key Slot (M2\_A1) Pinouts**

### 5.2.6 M.2 M-key Slot (M2\_M2)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	+3.3VA
3	GND	4	+3.3VA
5	PCIE_RX-	6	N/C

7	PCIE_RX+	8	N/C
9	GND	10	+3.3VA
11	PCIE_TX-	12	+3.3VA
13	PCIE_TX+	14	+3.3VA
15	GND	16	+3.3VA
17	PCIE_RX-	18	+3.3VA
19	PCIE_RX+	20	N/C
21	GND	22	N/C
23	PCIE_TX-	24	N/C
25	PCIE_TX+	26	N/C
27	GND	28	N/C
29	PCIE_RX-	30	N/C
31	PCIE_RX+	32	N/C
33	GND	34	N/C
35	PCIE_TX-	36	N/C
37	PCIE_TX+	38	SATA_SLP
39	GND	40	N/C
41	PCIE_RX+	42	N/C
43	PCIE_RX-	44	N/C
45	GND	46	N/C
47	PCIE_TX-	48	N/C
49	PCIE_TX+	50	PCIE_RST#
51	GND	52	PCIEx4_CLKREQ
53	CLK_PCIE_M2_M-	54	LAN_WAKE#
55	CLK_PCIE_M2_M+	56	N/C
57	GND	58	N/C
59	N/C	60	N/C
61	N/C	62	N/C
63	N/C	64	N/C
65	N/C	66	N/C
67	N/C	68	N/C
69	M2_IFDET	70	+3.3VA
71	GND	72	+3.3VA

## PPC-FxxD-ULT5

73	GND	74	+3.3VA
75	GND		

**Table 5-7: M.2 M-key Slot (M2\_M2) Pinouts**

### 5.2.7 Power Button Connector (PWR\_BTN2)

PIN NO.	DESCRIPTION
1	PW_BN
2	GND

**Table 5-8: Power Button Connector (PWR\_BTN2) Pinouts**

### 5.2.8 SATA Connector (SATA1)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	11	+V5S
2	GND	12	NC
3	GND	13	NC
4	GND	14	GND
5	GND	15	SATA_RX+
6	NC	16	SATA_RX-
7	+V5S	17	GND
8	+V5S	18	SATA_TX-
9	+V5S	19	SATA_TX+
10	+V5S	20	GND

**Table 5-9: SATA Connector (SATA1) Pinouts**

### 5.2.9 SMBus Connector (SMB1)

PIN NO.	DESCRIPTION
1	SMBCLK
2	SMBDATA

**Table 5-10: SMBus Connector (SMB1) Pinouts**

### 5.2.10 SPI Flash Connector (JSPI1)

PIN NO.	DESCRIPTION
1	+V3.3M_SPI_CON
2	SPI_CS#0_CN
3	SPI_SO_SW
4	SPI_CLK_SW
5	SPI_SI_SW
6	GND

**Table 5-11: SPI Flash Connector (JSPI1) Pinouts**

### 5.2.11 USB Connector (TOUCH\_USB1)

PIN NO.	DESCRIPTION
1	+V5A
2	USB_DATA7-
3	USB_DATA7+
4	GND

**Table 5-12: USB Connector (TOUCH\_USB1) Pinouts**

## PPC-FxxD-ULT5

## 5.2.12 USB Connector (EXT\_USB1)

PIN NO.	DESCRIPTION
1	+V5A
2	USB_DATA4-
3	USB_DATA4+
4	GND

Table 5-13: USB Connector (EXT\_USB1) Pinouts

## 5.3 External Interface Panel Connectors

The table below lists the rear panel connectors on the motherboard. Pinouts of these connectors can be found in the following sections.

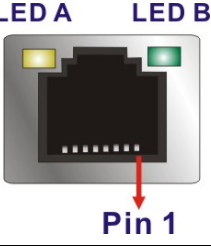
Connector	Type	Label
Audio line-out connector	Audio jack	AUDIO1
Ethernet connector	RJ-45	LAN1
Ethernet connector with PoE	RJ-45	J1, J2
HDMI connector	HDMI connector	HDMI1
Power connector	Power jack	PWR3
RS-232 serial port	D-sub 9	COM2
RS-232/422/485 serial port	D-sub 9	COM1
USB 3.2 Gen 2 connectors	USB 3.2 Gen 2 port	USB_CON1 USB_CON2

Table 5-14: Rear Panel Connectors



### 5.3.1 Ethernet Connectors (LAN1, J1, J2)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	MDIA0+	5	MDIA2-
2	MDIA0-	6	MDIA1-
3	MDIA1+	7	MDIA3+
4	MDIA2+	8	MDIA3-



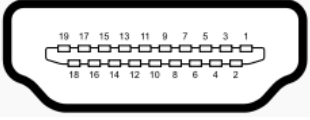
**Table 5-15: Ethernet Connectors (LAN1, J1, J2) Pinouts**

LED	Description	LED	Description
A	on: linked blinking: data is being sent/received	B	off: 10 Mb/s green: 100 Mb/s orange: 1000 Mb/s

**Table 5-16: Ethernet Connector LEDs**

### 5.3.2 HDMI Connector (HDMI1)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	HDMI_DATA2+	11	GND
2	GND	12	HDMI_CLK#
3	HDMI_DATA2#-	13	N/C
4	HDMI_DATA1+	14	N/C
5	GND	15	HDMI_SCL
6	HDMI_DATA1#-	16	HDMI_SDA
7	HDMI_DATA0+	17	GND
8	GND	18	+5VCC
9	HDMI_DATA0#-	19	HDMI_HPD
10	HDMI_CLK+		



**Table 5-17: HDMI Connector (HDMI1) Pinouts**

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5.3.3 Power Connector (PWR3)

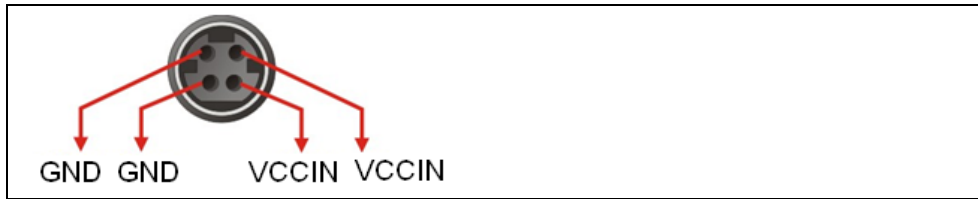


Table 5-18: Power Connector (PWR3) Pinouts

5.3.4 RS-232/422/485 DB-9 Serial Port (COM1)

Pin	RS-232	RS-422	RS-485
1	DCD1	TXD422-	TXD485-
2	SIN1	TXD422+	TXD485+
3	SOUT1	RXD422+	
4	DTR1	RXD422-	
5	GND		
6	DSR1		
7	RTS1		
8	CTS1		
9	RI1		

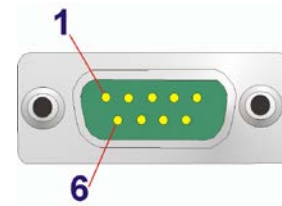


Table 5-19: RS-232/422/485 DB-9 Serial Port (COM1) Pinouts

5.3.5 RS-232 RJ-45 Serial Port (COM2)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	DCD2	6	DSR2
2	SIN2	7	RTS2
3	SOUT2	8	CTS2
4	RTS2	9	RI2
5	GND		

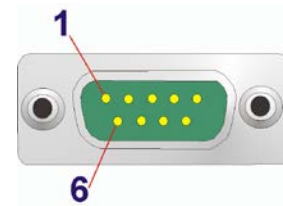
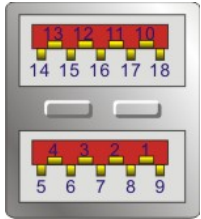


Table 5-20: RS-232 RJ-45 Serial Port (COM2) Pinouts

### 5.3.6 USB 3.2 Gen 2 Connectors (USB\_CON1, USB\_CON2)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	USB_VCC	2	USB2_D0-
3	USB2_D0-	4	GND
5	USB3_RXD0-	6	USB3_RXD0+
7	GND	8	USB3_TXD0-
9	USB3_TXD0+	10	USB_VCC
11	USB2_D1-	12	USB2_D1+
13	GND	14	USB3_RXD1-
15	USB3_RXD1+	16	GND
17	USB3_TXD1-	18	USB3_TXD1+



**Table 5-21: USB 3.2 Gen 2 Connectors (USB\_CON1, USB\_CON2) Pinouts**

## 5.4 Jumpers

The following table shows a list of jumpers on the PPC-FxxD-ULT5 motherboard.

Jumper Name	Type	Label
Flash Descriptor Security Override	2-pin header	ME_FLASH1
LVDS panel resolution selection	DIP switch	SW1
Panel voltage selection	3-pin header	JP1

**Table 5-22: Jumpers**

### 5.4.1 Flash Descriptor Security Override Jumper

The Flash Descriptor Security Override jumper (ME\_FLASH1) allows to enable or disable the ME firmware update. Refer to Table 5-23 for the jumper settings.

## PPC-FxxD-ULT5

Setting	Description
Open	Disabled (default)
Short	Enabled

**Table 5-23: Flash Descriptor Security Override Jumper Settings**

To update the ME firmware, please follow the steps below.

- Step 1:** Before turning on the system power, short the Flash Descriptor Security Override jumper.
- Step 2:** Update the BIOS and ME firmware, and then turn off the system power.
- Step 3:** Remove the metal clip on the Flash Descriptor Security Override jumper.
- Step 4:** Restart the system. The system will reboot 2 ~ 3 times to complete the ME firmware update.

Appendix

**A**

# Regulatory Compliance

---



**DECLARATION OF CONFORMITY**

This equipment is in conformity with the following EU directives:

- EMC Directive (2014/30/EU)
- Low-Voltage Directive (2014/35/EU)
- RoHS II Directive (2011/65/EU, 2015/863/EU)

If the user modifies and/or install other devices in the equipment, the CE conformity declaration may no longer apply.

If this equipment has telecommunications functionality, it also complies with the requirements of the Radio Equipment Directive 2014/53/EU.

---

English

IEI Integration Corp declares that this equipment is in compliance with the essential requirements and other relevant provisions of Directive 2014/53/EU.

---

Български [Bulgarian]

IEI Integration Corp. декларира, че този оборудване е в съответствие със съществените изисквания и другите приложими правила на Директива 2014/53/EU.

---

Česky [Czech]

IEI Integration Corp tímto prohlašuje, že tento zařizení je ve shodě se základními požadavky a dalšími příslušnými ustanoveními směrnice 2014/53/EU.

---

Dansk [Danish]

IEI Integration Corp erklærer herved, at følgende udstyr overholder de væsentlige krav og øvrige relevante krav i direktiv 2014/53/EU.

---

Deutsch [German]

IEI Integration Corp, erklärt dieses Gerät entspricht den grundlegenden Anforderungen und den weiteren entsprechenden Vorgaben der Richtlinie 2014/53/EU.

---

Eesti [Estonian]

IEI Integration Corp deklareerib seadme seadme vastavust direktiivi 2014/53/EÜ põhinõuetele ja nimetatud direktiivist tulenevatele teistele asjakohastele sätetele.

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**Español [Spanish]**

IEI Integration Corp declara que el equipo cumple con los requisitos esenciales y cualesquiera otras disposiciones aplicables o exigibles de la Directiva 2014/53/EU.

---

**Ελληνική [Greek]**

IEI Integration Corp ΔΗΛΩΝΕΙ ΟΤΙ ΕΞΟΠΛΙΣΜΟΣ ΣΥΜΜΟΡΦΩΝΕΤΑΙ ΠΡΟΣ ΤΙΣ ΟΥΣΙΩΔΕΙΣ ΑΠΑΙΤΗΣΕΙΣ ΚΑΙ ΤΙΣ ΛΟΙΠΕΣ ΣΧΕΤΙΚΕΣ ΔΙΑΤΑΞΕΙΣ ΤΗΣ ΟΔΗΓΙΑΣ 2014/53/EU.

---

**Français [French]**

IEI Integration Corp déclare que l'appareil est conforme aux exigences essentielles et aux autres dispositions pertinentes de la directive 2014/53/EU.

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**Italiano [Italian]**

IEI Integration Corp dichiara che questo apparecchio è conforme ai requisiti essenziali ed alle altre disposizioni pertinenti stabilite dalla direttiva 2014/53/EU.

---

**Latviski [Latvian]**

IEI Integration Corp deklarē, ka iekārta atbilst būtiskajām prasībām un citiem ar to saistītajiem noteikumiem Direktīvas 2014/53/EU.

---

**Lietuvių [Lithuanian]**

IEI Integration Corp deklaruoja, kad šis įranga atitinka esminius reikalavimus ir kitas 2014/53/EU Direktyvos nuostatas.

---

**Nederlands [Dutch]**

IEI Integration Corp dat het toestel toestel in overeenstemming is met de essentiële eisen en de andere relevante bepalingen van richtlijn 2014/53/EU.

---

**Malti [Maltese]**

IEI Integration Corp jiddikjara li dan prodott jikkonforma mal-ħtiġijiet essenzjali u ma provvedimenti oħrajn relevanti li hemm fid-Dirrettiva 2014/53/EU.

---

**Magyar [Hungarian]**

IEI Integration Corp nyilatkozom, hogy a berendezés megfelel a vonatkozó alapvető követelményeknek és az 2014/53/EU irányelv egyéb előírásainak.

---

**Polski [Polish]**

IEI Integration Corp oświadcza, że wyrobu jest zgodny z zasadniczymi wymogami oraz pozostałymi stosownymi postanowieniami Dyrektywy 2014/53/EU.

---

**Português [Portuguese]**

IEI Integration Corp declara que este equipamento está conforme com os requisitos essenciais e outras disposições da Directiva 2014/53/EU.

---

## PPC-FxxD-ULT5

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Româna [Romanian]

IEI Integration Corp declară că acest echipament este în conformitate cu cerințele esențiale și cu celelalte prevederi relevante ale Directivei 2014/53/EU.

---

Slovensko [Slovenian]

IEI Integration Corp izjavlja, da je ta opreme v skladu z bistvenimi zahtevami in ostalimi relevantnimi določili direktive 2014/53/EU.

---

Slovensky [Slovak]

IEI Integration Corp týmto vyhlasuje, že zariadenia spĺňa základné požiadavky a všetky príslušné ustanovenia Smernice 2014/53/EU.

---

Suomi [Finnish]

IEI Integration Corp vakuuttaa täten että laitteet on direktiivin 2014/53/EU oleellisten vaatimusten ja sitä koskevien direktiivin muiden ehtojen mukainen.

---

Svenska [Swedish]

IEI Integration Corp förklarar att denna utrustningstyp står i överensstämmelse med de väsentliga egenskapskrav och övriga relevanta bestämmelser som framgår av direktiv 2014/53/EU.

---

**FCC WARNING**

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.

This equipment should be installed and operated with a minimum distance of 20cm between the radiator & your body.

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

- This device may not cause harmful interference, and
- This device must accept any interference received, including interference that may cause undesired operation.

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.

**CHINA ROHS**

The label on the product indicates the estimated "Environmentally Friendly Use Period" (EFUP). This is an estimate of the number of years that these substances would "not leak out or undergo abrupt change." This product may contain replaceable sub-assemblies/components which have a shorter EFUP such as batteries and lamps. These components will be separately marked.

Appendix

**B**

# Safety Precautions

---



**WARNING:**

The precautions outlined in this chapter should be strictly followed. Failure to follow these precautions may result in permanent damage to the PPC-FxxD-ULT5.

## B.1 Safety Precautions

Please follow the safety precautions outlined in the sections that follow:

### B.1.1 General Safety Precautions

Please ensure the following safety precautions are adhered to at all times.

- **Follow the electrostatic precautions** outlined below whenever the device is opened.
- **Make sure the power is turned off and the power cord is disconnected** whenever the PPC-FxxD-ULT5 is being installed, moved or modified.
- **To prevent the risk of electric shock, make sure power cord is unplugged from wall socket.** To fully disengage the power to the unit, please disconnect the power cord from the power outlet. Refer servicing to qualified service personnel. The power outlet shall be readily available and accessible.
- **Do not apply voltage levels that exceed the specified voltage range.** Doing so may cause fire and/or an electrical shock. Use a power cord that matches the voltage of the power outlet, which has been approved and complies with the safety standard of your particular country.
- **Electric shocks can occur** if the PPC-FxxD-ULT5 chassis is opened when it is running. To avoid risk of electric shock, this device must only be connected to a supply mains with protective earth.
- **Do not drop or insert any objects** into the ventilation openings of the PPC-FxxD-ULT5.

## PPC-FxxD-ULT5

- ***If considerable amounts of dust, water, or fluids enter the device***, turn off the power supply immediately, unplug the power cord, and contact the PPC-FxxD-ULT5 vendor.
- ***This equipment is not suitable for use in locations where children are likely to be present.***
- **DO NOT:**
  - Drop the device against a hard surface.
  - In a site where the ambient temperature exceeds the rated temperature

### B.1.2 Anti-static Precautions

---



#### **WARNING:**

Failure to take ESD precautions during the installation of the PPC-FxxD-ULT5 may result in permanent damage to the PPC-FxxD-ULT5 and severe injury to the user.

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Electrostatic discharge (ESD) can cause serious damage to electronic components, including the PPC-FxxD-ULT5. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the PPC-FxxD-ULT5 is opened and any of the electrical components are handled, the following anti-static precautions are strictly adhered to.

- ***Wear an anti-static wristband:*** Wearing a simple anti-static wristband can help to prevent ESD from damaging any electrical component.
- ***Self-grounding:*** Before handling any electrical component, touch any grounded conducting material. During the time the electrical component is handled, frequently touch any conducting materials that are connected to the ground.
- ***Use an anti-static pad:*** When configuring or working with an electrical component, place it on an anti-static pad. This reduces the possibility of ESD damage.
- ***Only handle the edges of the electrical component:*** When handling the electrical component, hold the electrical component by its edges.

### B.1.3 Product Disposal

---

**CAUTION:**

Risk of explosion if the battery is replaced by an incorrect type;

Replacement of a battery with an incorrect type that can defeat a safeguard (for example, in the case of some lithium battery types);

Disposal of a battery into fire or a hot oven, or mechanically crushing or cutting of a battery, that can result in an explosion;

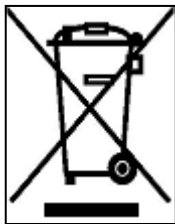
Leaving a battery in an extremely high temperature surrounding environment that can result in an explosion or the leakage of flammable liquid or gas;

A battery subjected to extremely low air pressure that may result in an explosion or the leakage of flammable liquid or gas.

Dispose of used batteries according to instructions and local regulations.

---

- Outside the European Union—If you wish to dispose of used electrical and electronic products outside the European Union, please contact your local authority so as to comply with the correct disposal method.
- Within the European Union—The device that produces less waste and is easier to recycle is classified as electronic device in terms of the European Directive 2012/19/EU (WEEE), and must not be disposed of as domestic garbage.



EU-wide legislation, as implemented in each Member State, requires that waste electrical and electronic products carrying the mark (left) must be disposed of separately from normal household waste. This includes monitors and electrical accessories, such as signal cables or power cords. When you need to dispose of your display products, please follow

the guidance of your local authority, or ask the shop where you purchased the product. The mark on electrical and electronic products only applies to the current European Union Member States.

Please follow the national guidelines for electrical and electronic product disposal.

## PPC-FxxD-ULT5

### B.2 Maintenance and Cleaning Precautions

When maintaining or cleaning the PPC-FxxD-ULT5, please follow the guidelines below.



#### **WARNING:**

- For safety reasons, turn-off the power and unplug the panel PC before cleaning.
  - If you dropped any material or liquid such as water onto the panel PC when cleaning, unplug the power cable immediately and contact your dealer or the nearest service center. Always make sure your hands are dry when unplugging the power cable.
- 

#### B.2.1 Maintenance and Cleaning

Prior to cleaning any part or component of the PPC-FxxD-ULT5, please read the details below.

- Never spray or squirt liquids directly onto any other components. To clean the panel PC, gently wipe it with a piece of soft dry cloth or a slightly moistened cloth.
- The interior of the device does not require cleaning. Keep fluids away from the device interior.
- Be cautious of all small removable components when vacuuming the device.
- Never drop any objects or liquids through the openings of the device.
- Be cautious of any possible allergic reactions to solvents or chemicals used when cleaning the device.
- Avoid eating, drinking and smoking within vicinity of the device.

#### B.2.2 Cleaning Tools

Some components in the PPC-FxxD-ULT5 may only be cleaned using a product specifically designed for the purpose. In such case, the product will be explicitly mentioned in the cleaning tips. Below is a list of items to use when cleaning the PPC-FxxD-ULT5.

- **Cloth**— Although paper towels or tissues can be used, a soft, clean piece of cloth is recommended when cleaning the device.

- **Water or rubbing alcohol**—A cloth moistened with water or rubbing alcohol can be used to clean the device.
- **Using solvents**—The use of solvents is not recommended when cleaning the device as they may damage the plastic parts.
- **Vacuum cleaner**—Using a vacuum specifically designed for computers is one of the best methods of cleaning the device. Dust and dirt can restrict the airflow in the device and cause its circuitry to corrode.
- **Cotton swabs**—Cotton swabs moistened with rubbing alcohol or water are excellent tools for wiping hard to reach areas.
- **Foam swabs**—Whenever possible, it is best to use lint free swabs such as foam swabs for cleaning.



Appendix

C

# BIOS Menu Options

---

## C.1 BIOS Configuration Options

Below is a list of BIOS configuration options described in **Chapter 4**.

<input type="checkbox"/>	<b>System Date [xx/xx/xx]</b> .....	<b>49</b>
<input type="checkbox"/>	<b>System Time [xx:xx:xx]</b> .....	<b>49</b>
<input type="checkbox"/>	<b>Intel® (VMX) Virtualization Technology [Disabled]</b> .....	<b>50</b>
<input type="checkbox"/>	<b>Active Processor Cores [All]</b> .....	<b>51</b>
<input type="checkbox"/>	<b>Hyper-threading [Enabled]</b> .....	<b>51</b>
<input type="checkbox"/>	<b>Intel® SpeedStep™ [Enabled]</b> .....	<b>51</b>
<input type="checkbox"/>	<b>C State [Disabled]</b> .....	<b>51</b>
<input type="checkbox"/>	<b>AMT BIOS Features [Enabled]</b> .....	<b>52</b>
<input type="checkbox"/>	<b>Unconfigure ME [Disabled]</b> .....	<b>52</b>
<input type="checkbox"/>	<b>TPM Device Selection [dTPM (If supported)]</b> .....	<b>53</b>
<input type="checkbox"/>	<b>Security Device Support [Disable]</b> .....	<b>54</b>
<input type="checkbox"/>	<b>ACPI Sleep State [S3 (Suspend to RAM)]</b> .....	<b>55</b>
<input type="checkbox"/>	<b>Wake system with Fixed Time [Disabled]</b> .....	<b>56</b>
<input type="checkbox"/>	<b>PC Health Status</b> .....	<b>57</b>
<input type="checkbox"/>	<b>Serial Port [Enabled]</b> .....	<b>59</b>
<input type="checkbox"/>	<b>Device Mode [RS232]</b> .....	<b>59</b>
<input type="checkbox"/>	<b>Serial Port [Enabled]</b> .....	<b>60</b>
<input type="checkbox"/>	<b>Console Redirection [Disabled]</b> .....	<b>61</b>
<input type="checkbox"/>	<b>Legacy Serial Redirection Port [COM1]</b> .....	<b>61</b>
<input type="checkbox"/>	<b>Terminal Type [ANSI]</b> .....	<b>62</b>
<input type="checkbox"/>	<b>Bits per second [115200]</b> .....	<b>63</b>
<input type="checkbox"/>	<b>Data Bits [8]</b> .....	<b>63</b>
<input type="checkbox"/>	<b>Parity [None]</b> .....	<b>63</b>
<input type="checkbox"/>	<b>Stop Bits [1]</b> .....	<b>64</b>
<input type="checkbox"/>	<b>USB Devices</b> .....	<b>64</b>
<input type="checkbox"/>	<b>Legacy USB Support [Enabled]</b> .....	<b>65</b>
<input type="checkbox"/>	<b>CSM Support [Enabled]</b> .....	<b>66</b>
<input type="checkbox"/>	<b>Auto Recovery Function [Disabled]</b> .....	<b>67</b>
<input type="checkbox"/>	<b>VT-d [Disabled]</b> .....	<b>69</b>
<input type="checkbox"/>	<b>DVMT Pre-Allocated [32M]</b> .....	<b>70</b>
<input type="checkbox"/>	<b>DVMT Total Gfx Mem [MAX]</b> .....	<b>70</b>

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<input type="checkbox"/>	Primary IGFX Boot Display [VBIOS Default] .....	71
<input type="checkbox"/>	Backlight Control [LED] .....	71
<input type="checkbox"/>	Restore AC Power Loss [Last State] .....	72
<input type="checkbox"/>	Power Saving Function(ERP) [Disabled].....	72
<input type="checkbox"/>	HD Audio [Enabled] .....	72
<input type="checkbox"/>	USB Power SW [+5V DUAL].....	72
<input type="checkbox"/>	M2_A1 / M2_M2 [Enabled].....	73
<input type="checkbox"/>	PCIe Speed [Auto].....	73
<input type="checkbox"/>	Detect Non-Compliance Device [Disabled] .....	74
<input type="checkbox"/>	STAT Controller(s) [Enabled].....	74
<input type="checkbox"/>	SATA Mode Selection [AHCI].....	75
<input type="checkbox"/>	PCIe Storage Dev On Port M2_M2 [Not RST Controlled].....	75
<input type="checkbox"/>	Administrator Password .....	76
<input type="checkbox"/>	User Password .....	76
<input type="checkbox"/>	Bootup NumLock State [On].....	77
<input type="checkbox"/>	Quiet Boot [Enabled] .....	78
<input type="checkbox"/>	Launch PXE OpROM [Disabled].....	78
<input type="checkbox"/>	Option ROM Messages [Force BIOS].....	78
<input type="checkbox"/>	UEFI Boot [Disabled] .....	78
<input type="checkbox"/>	Boot Option Priority.....	78
<input type="checkbox"/>	Save Changes and Reset .....	79
<input type="checkbox"/>	Discard Changes and Reset .....	79
<input type="checkbox"/>	Restore Defaults .....	79
<input type="checkbox"/>	Save as User Defaults .....	79
<input type="checkbox"/>	Restore User Defaults .....	79

Appendix

**D**

# Watchdog Timer

---

**NOTE:**

The following discussion applies to DOS environment. IEI support is contacted or the IEI website visited for specific drivers for more sophisticated operating systems, e.g., Windows and Linux.

The Watchdog Timer is provided to ensure that standalone systems can always recover from catastrophic conditions that cause the CPU to crash. This condition may have occurred by external EMI or a software bug. When the CPU stops working correctly, Watchdog Timer either performs a hardware reset (cold boot) or a Non-Maskable Interrupt (NMI) to bring the system back to a known state.

A BIOS function call (INT 15H) is used to control the Watchdog Timer:

**INT 15H:**

<b>AH – 6FH Sub-function:</b>	
AL – 2:	Sets the Watchdog Timer's period.
BL:	Time-out value (Its unit-second is dependent on the item "Watchdog Timer unit select" in CMOS setup).

**Table D-1: AH-6FH Sub-function**

Call sub-function 2 to set the time-out period of Watchdog Timer first. If the time-out value is not zero, the Watchdog Timer starts counting down. While the timer value reaches zero, the system resets. To ensure that this reset condition does not occur, calling sub-function 2 must periodically refresh the Watchdog Timer. However, the Watchdog timer is disabled if the time-out value is set to zero.

A tolerance of at least 10% must be maintained to avoid unknown routines within the operating system (DOS), such as disk I/O that can be very time-consuming.



**NOTE:**

When exiting a program it is necessary to disable the Watchdog Timer, otherwise the system resets.

**Example program:**

```
; INITIAL TIMER PERIOD COUNTER
;
W_LOOP:

    MOV    AX, 6F02H    ;setting the time-out value
    MOV    BL, 30      ;time-out value is 48 seconds
    INT    15H

;
; ADD THE APPLICATION PROGRAM HERE
;

    CMP    EXIT_AP, 1    ;is the application over?
    JNE    W_LOOP      ;No, restart the application

    MOV    AX, 6F02H    ;disable Watchdog Timer
    MOV    BL, 0        ;
    INT    15H

;
; EXIT ;
```

Appendix

E

# Error Beep Code

---

## E.1 PEI Beep Codes

Number of Beeps	Description
1	Memory not Installed
1	Memory was installed twice (InstallPeiMemory routine in PEI Core called twice)
2	Recovery started
3	DXE IPL was not found
3	DXE Core Firmware Volume was not found
4	Recovery failed
4	S3 Resume failed
7	Reset PPI is not available

## E.2 DXE Beep Codes

Number of Beeps	Description
1	Invalid password
4	Some of the Architectural Protocols are not available
5	No Console Output Devices are found
5	No Console Input Devices are found
6	Flash update is failed
7	Reset protocol is not available
8	Platform PCI resource requirements cannot be met



**NOTE:**

If you have any question, please contact IEI for further assistance.

Appendix

F

# Hazardous Materials Disclosure

---

### F.1 RoHS II Directive (2015/863/EU)

The details provided in this appendix are to ensure that the product is compliant with the RoHS II Directive (2015/863/EU). The table below acknowledges the presences of small quantities of certain substances in the product, and is applicable to RoHS II Directive (2015/863/EU).

Please refer to the following table.

Part Name	Toxic or Hazardous Substances and Elements									
	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent Chromium (CR(VI))	Polybrominated Biphenyls (PBB)	Polybrominated Diphenyl Ethers (PBDE)	Bis(2-ethylhexyl) phthalate (DEHP)	Butyl benzyl phthalate (BBP)	Dibutyl phthalate (DBP)	Diisobutyl phthalate (DIBP)
Housing	O	O	O	O	O	O	O	O	O	O
Printed Circuit Board	O	O	O	O	O	O	O	O	O	O
Metal Fasteners	O	O	O	O	O	O	O	O	O	O
Cable Assembly	O	O	O	O	O	O	O	O	O	O
Fan Assembly	O	O	O	O	O	O	O	O	O	O
Power Supply Assemblies	O	O	O	O	O	O	O	O	O	O
Battery	O	O	O	O	O	O	O	O	O	O
<p>O: This toxic or hazardous substance is contained in all of the homogeneous materials for the part is below the limit requirement in Directive (EU) 2015/863.</p> <p>X: This toxic or hazardous substance is contained in at least one of the homogeneous materials for this part is above the limit requirement in Directive (EU) 2015/863.</p>										



## PPC-FxxD-ULT5

### F.2 China RoHS

此附件旨在确保本产品符合中国 RoHS 标准。以下表格标示此产品中某有毒物质的含量符合中国 RoHS 标准规定的限量要求。

本产品上会附有“环境友好使用期限”的标签，此期限是估算这些物质“不会有泄漏或突变”的年限。本产品可能包含有较短的环境友好使用期限的可替换元件，像是电池或灯管，这些元件将会单独标示出来。

部件名称	有毒有害物质或元素					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (CR(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
壳体	○	○	○	○	○	○
印刷电路板	○	○	○	○	○	○
金属螺帽	○	○	○	○	○	○
电缆组装	○	○	○	○	○	○
风扇组装	○	○	○	○	○	○
电力供应组装	○	○	○	○	○	○
电池	○	○	○	○	○	○

○: 表示该有毒有害物质在该部件所有物质材料中的含量均在 SJ/T11364-2014 與 GB/T26572-2011 标准规定的限量要求以下。

X: 表示该有毒有害物质至少在该部件的某一均质材料中的含量超出 SJ/T11364-2014 與 GB/T26572-2011 标准规定的限量要求。