



# ARMPAC-5XX Series

5.6", 7", 8", 10.1", and 12.1" Fanless TI-AM3354, ARM® Cortex™ A8 HMI Series

## User Manual

**Release Date**

**Revision**

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# Revision History

| Reversion | Date       | Description  |
|-----------|------------|--|
| 0.1       | 2015/09/16 | For Preliminary Release  |
| 0.2       | 2016/01/07 | Modify LAN, OS Support, Serial IO, Dimensions Specifications, Change product images and dimension images, Modify RISC Based to ARM Based, Optional power switch to default |
| 1.0       | 2016/08/16 | Official Version, Modify model color, add APP List   |
| 1.1       | 2017/01/13 | Add SOP of updating ARMPAC-5XX Linux / WEC7 Firmware, power consumption, and net weight Spec.  |
| 1.2       | 2017/04/12 | Modify power consumption data.   |
| 1.3       | 2017/10/24 | Modify RTW touch interface   |
| 1.4       | 2018/11/08 | Delete all QTs data<br>Update OS Support list  |
| 1.5       | 2019/03/18 | Update Storage Temperature   |
| 1.6       | 2020/09/16 | Modify 1.1 Spec features and 1.2 data  |
| 1.7       | 2025/06/12 | Add Trademark Warning in P2  |

# Warning!

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

Electric Shock Hazard – Do not operate the machine with its back cover removed. There are dangerous high voltages inside.

## Caution

**Risk of explosion if the battery is replaced with an incorrect type.**

**Batteries should be recycled where possible. Disposal of used batteries must be in accordance with local environmental regulations.**

## Disclaimer

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## Packing List

| Accessories (as ticked) included in this package are:  |
|--|
| <input type="checkbox"/> Adaptor                       |
| <input type="checkbox"/> Driver & manual CD disc       |
| <input type="checkbox"/> Other. _____ (please specify) |

## Safety Precautions

Follow the messages below to prevent your systems from damage:

- ◆ Avoid your system from static electricity on all occasions.
- ◆ Prevent electric shock. Don't touch any components of this card when the card is power-on. Always disconnect power when the system is not in use.
- ◆ Disconnect power when you change any hardware devices. For instance, when you connect a jumper or install any cards, a surge of power may damage the electronic components or the whole system.

# Table of Contents

|                         |   |
|-------------------------|---|
| Revision History.....   | 1 |
| Warning!.....           | 2 |
| Caution/Disclaimer..... | 3 |
| Packing List.....       | 4 |
| Safety Precautions..... | 5 |

## Chapter 1

## Getting Started

|  |    |
|--|----|
| 1.1 Features.....                        | 6  |
| 1.2 Specifications.....                  | 6  |
| 1.3 Dimensions.....                      | 9  |
| 1.4 Brief Description of ARMPAC-5XX..... | 12 |
| 1.5 VESA Mounting.....                   | 13 |
| 1.6 Panel Mounting.....                  | 13 |

## Chapter 2

## Hardware

|   |    |
|---|----|
| 2.1 Motherboard Jumpers Setting and Connectors..... | 14 |
|---|----|

## Chapter 3

## Installations

|   |    |
|---|----|
| 3.1 Update ARMPAC-5XX WEC7 Firmware.....  | 19 |
| 3.2 Update ARMPAC-5XX Linux Firmware..... | 20 |

## Figures

|  |    |
|--|----|
| Figure 1.1: Dimensions of ARMPAC-505.....        | 9  |
| Figure 1.2: Dimensions of ARMPAC-507(P).....     | 9  |
| Figure 1.3: Dimensions of ARMPAC-508(P).....     | 10 |
| Figure 1.4: Dimensions of ARMPAC-510(P).....     | 10 |
| Figure 1.5: Dimensions of ARMPAC-512(P).....     | 11 |
| Figure 1.6: Front View of ARMPAC-5XX Series..... | 12 |
| Figure 1.7: Rear View of ARMPAC-5XX Series.....  | 12 |
| Figure 1.8: ARMPAC Series VESA Mounting.....     | 13 |
| Figure 1.9: ARMPAC Series Panel Mounting.....    | 13 |

# Chapter 1

# Getting Started

## 1.1 Features

- ARM based HMI
- Fanless design
- Flat front panel touch screen
- Freescale i.MAX6 Dual Lite, ARM Cortex® A9 processor
- Onboard 512MB DDR3 SDRAM
- Onboard 512MB up to 1GB NAND flash
- Wide range DC 9~36V power input
- LED backlight LCD
- Resistive touch window/projected capacitive touch (**PCT not available for ARMPAC-505**)

## 1.2 Specifications

|                         | ARMPAC-505  | ARMPAC-507(P) | ARMPAC-508(P) | ARMPAC-510(P) | ARMPAC-512(P) |
|-------------------------|---|---------------|---------------|---------------|---------------|
| <b>System</b>           |   |               |               |               |               |
| CPU                     | Freescale i.MAX6 Dual Lite, ARM Cortex® A9(2 x Cores, 1.0GHz)                           |               |               |               |               |
| Memory                  | Onboard 512MB DDR3 SDRAM  |               |               |               |               |
| <b>External IO Port</b> |   |               |               |               |               |
| USB                     | 2 x USB 2.0 type A  |               |               |               |               |
| Serial/Parallel         | 1 x RS-232/422/485 DB-9, COM1, default RS-232   |               |               |               |               |
| Audio                   | 1 x Line out audio jack   |               |               |               |               |
| LAN                     | 1 x LAN port support (POE for option)   |               |               |               |               |
| Power                   | 1 x DC 9~36V power input via 3-pin terminal block<br>1 x 2-pin Power Switch             |               |               |               |               |
| Option                  | TB-508CAN1/TB-508C1   |               |               |               |               |
| <b>Storage Space</b>    |   |               |               |               |               |
| Storage                 | Onboard 512MB up to 1GB NAND flash<br>1 x Micro SD slot-movable                         |               |               |               |               |
| <b>Expansion</b>        |   |               |               |               |               |
| Expansion Slot          | 1 x SIM card slot ( <b>not for 5" model</b> )<br>1 x Mini-PCIe slot (full size)-onboard |               |               |               |               |
| <b>Display</b>          |   |               |               |               |               |
| Display Type            | 5.6" TFT LCD  | 7" TFT LCD    | 8" TFT LCD    | 10.1" TFT LCD | 12.1" TFT LCD |

|                    |               |               |               |               |                            |
|--------------------|---------------|---------------|---------------|---------------|----------------------------|
| Resolution         | 640 x 480     | 800 x 480     | 800 x 600     | 1024 x 600    | 800 x 600<br>1024 x 768    |
| Max. Color         | 262K          | 262K          | 16.2M         | 262K/16.7M    | 16.2M/262K<br>(SVGA)       |
| Luminance          | 350           | 350           | 350           | 250           | 450-SVGA<br>500-XGA        |
| Contrast Ratio     | 500: 1        | 400: 1        | 500: 1        | 500: 1        | 1500: 1-SVGA<br>1000:1-XGA |
| Viewing Angle      | 140(H)/120(V) | 140(H)/120(V) | 140(H)/120(V) | 140(H)/120(V) | 178(H)/178(V)              |
| Backlight Lifetime | 20,000 hrs    | 40,000 hrs    | 40,000 hrs    | 15,000 hrs    | 50,000 –SVGA<br>30,000-XGA |

#### Touch Screen

|                    |   |  |  |  |  |
|--------------------|---|--|--|--|--|
| Type               | Resistive touch window<br>Projected capacitive touch screen (for P model)<br>Glass (for G model)<br><b>Projected capacitive touch is not available for ARMAPC-505</b> |  |  |  |  |
| Interface          | Resistive touch window: ADC (Analog-to-digital converter)<br>Projected capacitive touch screen: USB   |  |  |  |  |
| Light Transmission | Resistive touch window: over 80%<br>Projected capacitive touch screen: over 90%   |  |  |  |  |

#### Power

|                   |                  |                    |                    |                    |                    |
|-------------------|------------------|--------------------|--------------------|--------------------|--------------------|
| Power Input       | DC 9~36V         |                    |                    |                    |                    |
| Power Consumption | MAX: 9W<br>(505) | MAX: 7.5W<br>(507) | MAX: 7.7W<br>(508) | MAX: 7.8W<br>(510) | MAX: 9.2W<br>(512) |

#### Mechanical

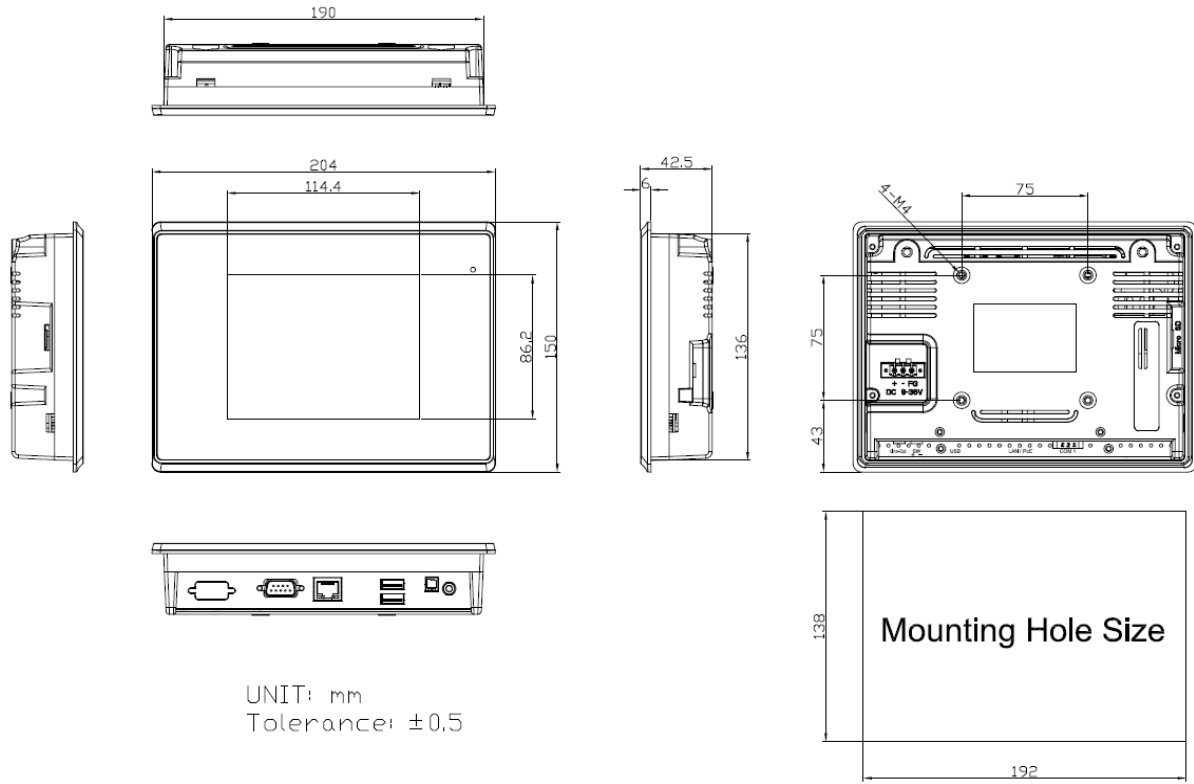
|                |                              |              |                |              |            |
|----------------|------------------------------|--------------|----------------|--------------|------------|
| Construction   | Aluminum die-casting chassis |              |                |              |            |
| Mounting       | Plastic / VESA Mount 75 x 75 |              |                |              |            |
| Chassis Color  | RAL9007                      |              |                |              |            |
| IP Rating      | IP66 Front Panel             |              |                |              |            |
| Dimensions(mm) | 204x150x42.5                 | 204x150x42.5 | 231.1x176.1x45 | 285x189x49.6 | 319x245x51 |
| Net Weight(Kg) | 0.8                          | 0.9          | 0.9            | 1.3          | 2          |

#### Environmental

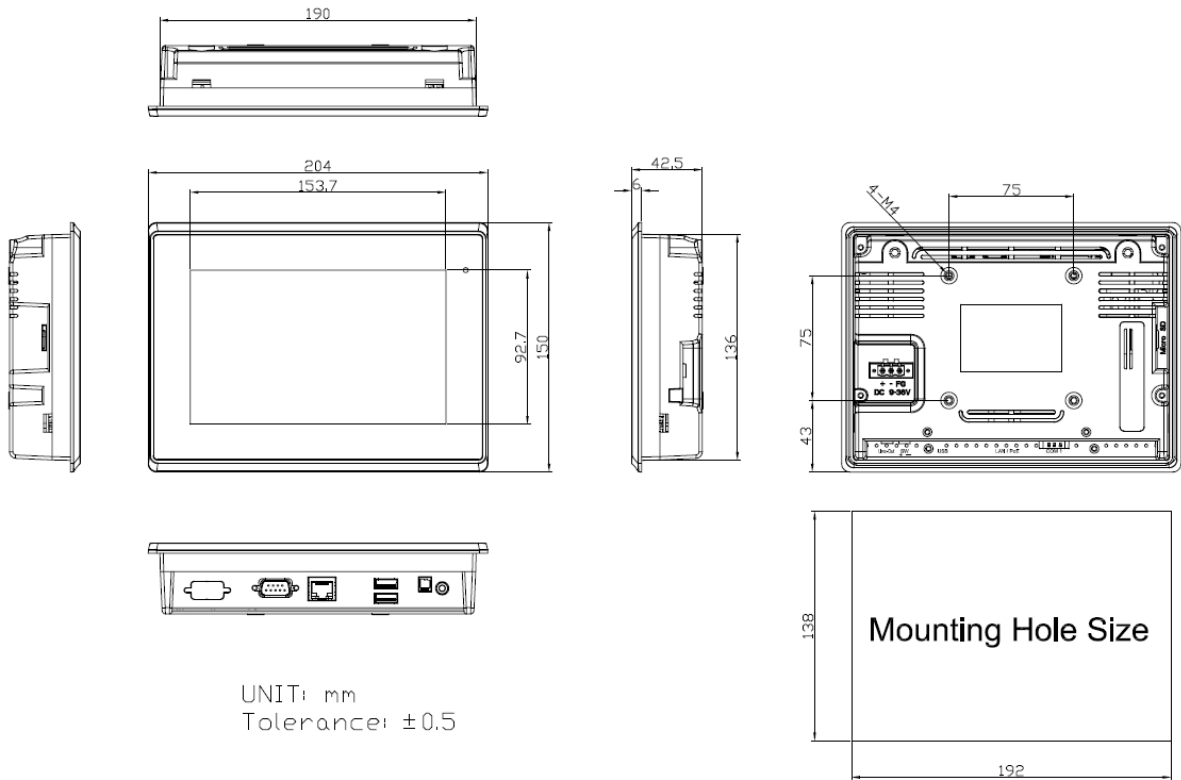
|                       |                                  |  |  |  |  |
|-----------------------|----------------------------------|--|--|--|--|
| Operating Temperature | 0~50°C (-20~60°C for option)     |  |  |  |  |
| Storage Temperature   | -30~70°C                         |  |  |  |  |
| Humidity              | 10 to 95% @ 40°C, non-condensing |  |  |  |  |

|                          |                                     |
|--------------------------|-------------------------------------|
| Certification            | CE / FCC Class A/UL                 |
| Operating System Support | Win Embedded Compact 7, Linux4.4.12 |

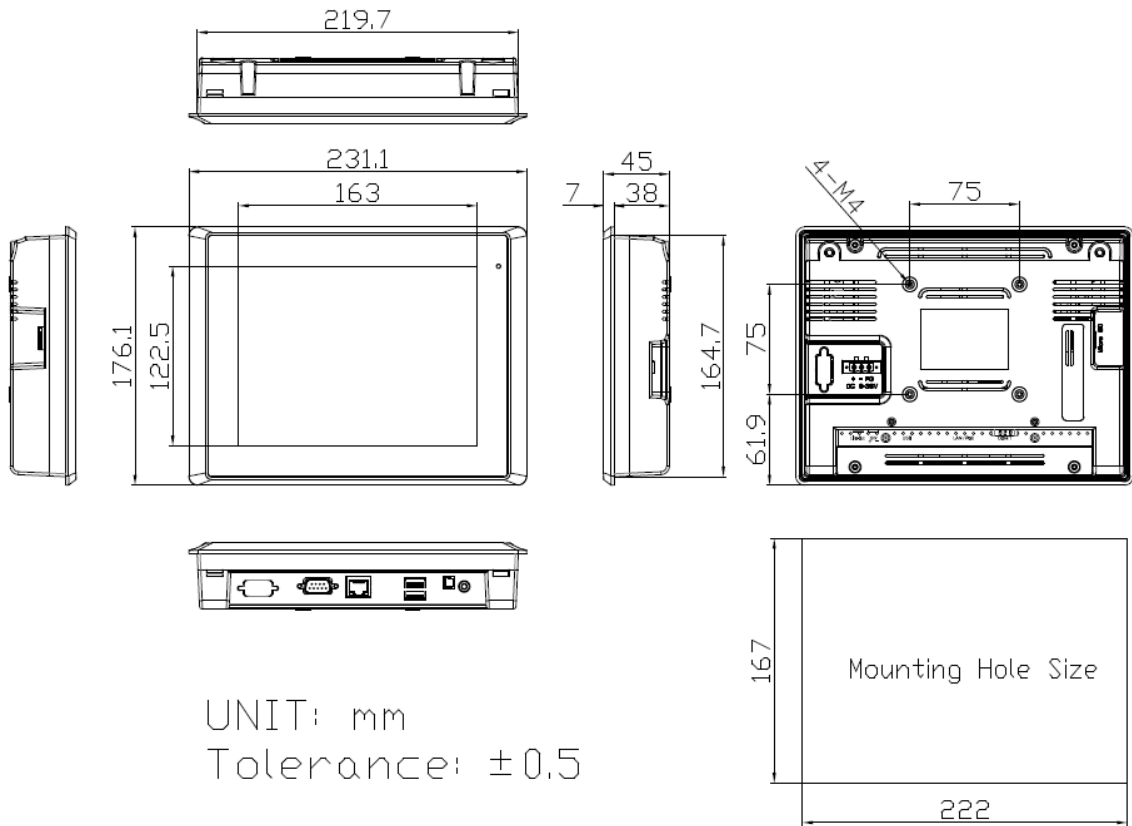
### 1.3 Dimensions



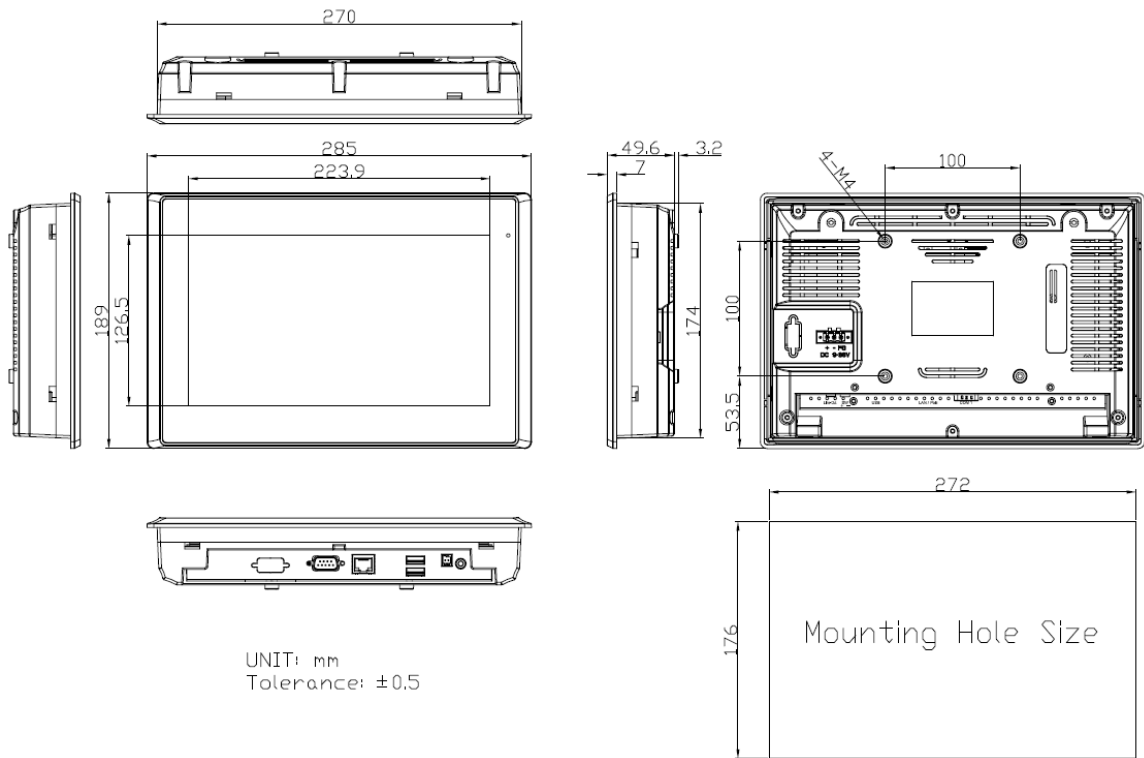
**Figure 1.1: Dimensions of ARMPAC-505**



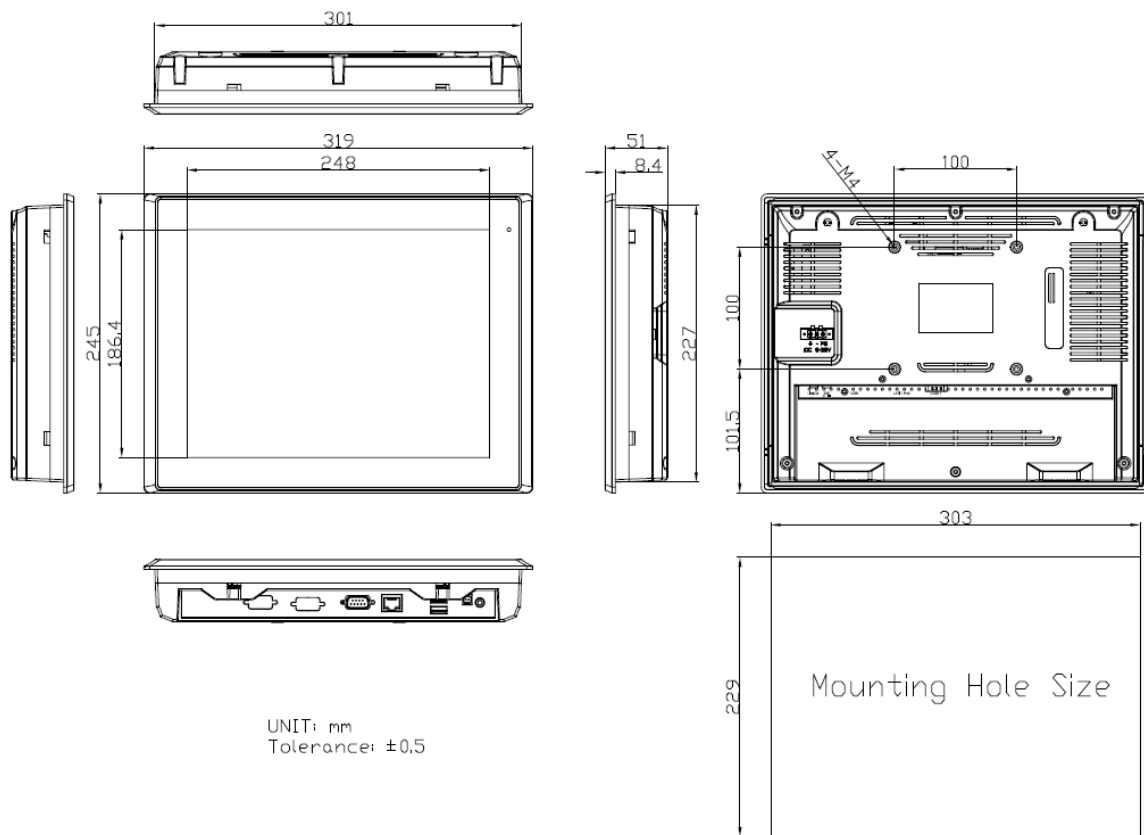
**Figure 1.2: Dimensions of ARMPAC-507(P)**



**Figure 1.3: Dimensions of ARMPAC-508(P)**



**Figure 1.4: Dimensions of ARMPAC-510(P)**



**Figure 1.5: Dimensions of ARMPAC-512(P)**

## 1.4 Brief Description of ARMPAC-5XX

There are 5.6", 7", 8", 10.1", and 12.1" in Fanless designed ARM based HMI, which comes with flat front panel LED backlight touch designed. It is powered by TI-AM3354 ARM Cortex A8 Processor, 512MB up to 1GB DDR3 memory onboard, and 512MB up to 1GB NAND Flash onboard. ARMPAC series is wide range DC 9~36V power input and IP65 compliant front panel. The 5.6", 7", and 8" model can be VESA 75 mounted, and 10.1" and 12.1" can be VESA 100 mounted. The chassis color is pantone cool gray 11C. Optional projected capacitive touch support 7H anti-scratch surface is ideal for use as PC-based controller for industrial Automation & Factory Automation.



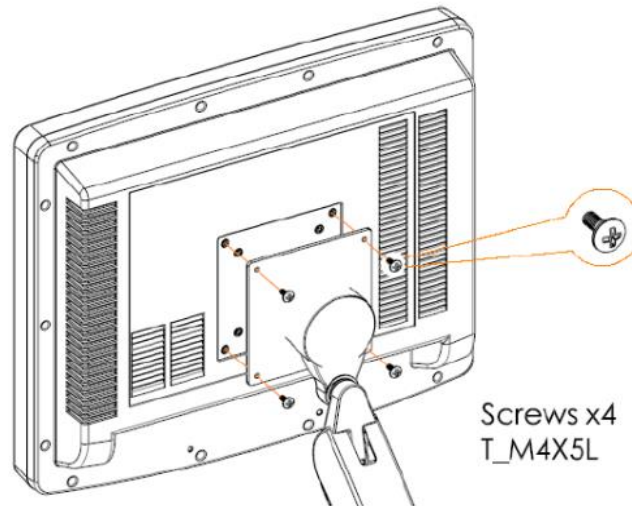
**Figure 1.6: Front View of ARMPAC-5XX Series**



**Figure 1.7: Rear View of ARMPAC-5XX Series**

## 1.5 VESA Mounting

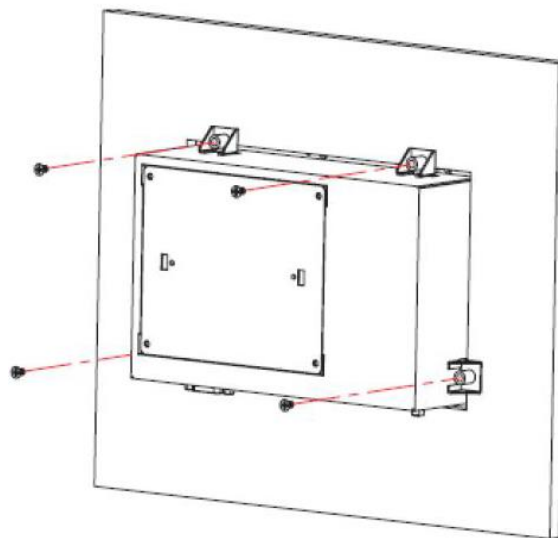
The ARMPAC series is designed to be VESA mounted as shown in Picture. Just carefully place the unit through the hole and tighten the given screws from the rear to secure the mounting.



**Figure 1.8: ARMPAC Series VESA Mounting**

## 1.6 Panel Mounting

There are four holes located along the four sides of the HMI. Insert the clamp from the four sides and tighten them with the nuts provided.



**Figure 1.9: ARMPAC Series Panel Mounting**

## 2.1 Motherboard Jumpers Setting and Connectors

### 1. DC\_IN1 :

(5.08mm Pitch 1\*3 Pin Connector), DC 9V~32V System power input connector.

| Pin# | Signal Name |
|------|-------------|
| Pin1 | DC 9~36V    |
| Pin2 | GND         |
| Pin3 | FG          |

### 2. AUDIO :

(2.0mm Pitch 2\*6 Pin Header), Front Audio, Line Out can be connected to a headphone or amplifier. Line In is used for the connection of external audio source via a line in cable. Mic is the port for microphone input audio.

| Signal Name | Pin# | Pin# | Signal Name |
|-------------|------|------|-------------|
| 5V_F_AUDIO  | 1    | 2    | GND_AUD     |
| LINE_OUT_L  | 3    | 4    | LINE_OUT_R  |
| TP9         | 5    | 6    | NC          |
| LINE_IN_L   | 7    | 8    | LINE_IN_R   |
| MIC_IN      | 9    | 10   | MIC_IN      |
| GND_AUD     | 11   | 12   | NC          |

### 3. LINE\_OUT :

(Diameter 3.5mm Double stack Jack), Line Out can be connected to a headphone or amplifier.

### 4. USB2 :

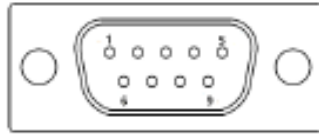
(Double stack USB type A), Front USB connector, it provides 2 USB2.0 ports, High-speed USB 2.0 allows data transfers up to 480 Mb/s, support USB full-speed and low-speed signaling.

### 5. LAN1&&LAN2 :

(RJ45 Connector), Front LAN port. Two standard 10/100M RJ45 Ethernet ports are provided. Used LAN8710A chipset, LINK LED (green) and ACTIVE LED (yellow) respectively located at the left-hand and right-hand side of the Ethernet port indicate the activity and transmission state of LAN.

## 6. COM1 :

(Type DB9), Front serial port, standard DB9 Male serial port is provided to make a direct connection to serial devices. Used the SP339E as the driver, which is an advanced multiprotocol transceiver supporting RS-232, RS-485 and RS-422. Integrated cable termination and four configuration modes allow all three protocols to be used interchangeably over a single cable or connector with no additional switching components. The high speed drivers operate up to 20Mbps ( operating system only supports 4Mbps ) in RS-485/422 modes, and up to 1Mbps in RS-232 mode.



| COM1 |                            |
|------|----------------------------|
| Pin# | Signal Name                |
| 1    | DCD0-_422TX-_485-          |
| 2    | RXD0_422TX+_485+           |
| 3    | TXD0_422RX+                |
| 4    | DTR0-_422RX-               |
| 5    | GND                        |
| 6    | NC                         |
| 7    | NC                         |
| 8    | NC                         |
| 9    | COM0_9PIN(connects to JP3) |

## 7. JP3:

(2.0mm Pitch 2\*3 Pin Header), COM1 jumper setting, pin1~6 are used to select signal out of pin 9 of COM1 port.

| JP1 Pin#  | Function                  |
|-----------|---------------------------|
| Close 1-2 | COM0 Pin9 = NC (option)   |
| Close 3-4 | COM0 Pin9 = +5V (default) |
| Close 5-6 | COM0 Pin9 = +12V (option) |

## 8. CON3

(2.0mm Pitch 2\*8 Pin Socket), it provides a group USB2.0·SMBUS·UART and CANBUS interfaces.

| Signal Name | Pin# | Pin# | Signal Name |
|-------------|------|------|-------------|
| 5V_S0       | 1    | 2    | NC          |
| USBDN_DM3   | 3    | 4    | NC          |
| USBDN_DP3   | 5    | 6    | NC          |

|                 |    |    |                  |
|-----------------|----|----|------------------|
| GND             | 7  | 8  | NC               |
| GND             | 9  | 10 | AM335X_CAN_TX    |
| AM335X_I2C2_SDA | 11 | 12 | AM335X_CAN_RX    |
| AM335X_I2C2_SCL | 13 | 14 | AM335X_UART1_TXD |
| 3P3V_S0         | 15 | 16 | AM335X_UART1_RXD |

**9. CON1:**

(TF Card Socket), Supports TF Card devices.

**10. SIM1:**

(SIM Card Socket), Supports SIM Card devices.

**11. MIO:**

(1.25mm Pitch 2\*10 Connector), Including eight General-purpose input/output and a group of USB communication interface.

| Signal Name      | Pin# | Pin# | Signal Name      |
|------------------|------|------|------------------|
| 5V_S0            | 1    | 2    | GND              |
| AM335X_GPIO_IN0  | 3    | 4    | AM335X_GPIO_IN1  |
| AM335X_GPIO_IN2  | 5    | 6    | AM335X_GPIO_IN3  |
| AM335X_GPIO_OUT0 | 7    | 8    | AM335X_GPIO_OUT1 |
| AM335X_GPIO_OUT2 | 9    | 10   | AM335X_GPIO_OUT3 |
| GND              | 11   | 12   | GND              |
| RESET_BOTTOM     | 13   | 14   | GND              |
| I2C3_SCL         | 15   | 16   | USBDN_DP4        |
| I2C3_SDA         | 17   | 18   | USBDN_DM4        |
| 3P3V_S0          | 19   | 20   | 5V_S0            |

**12. LVDS1:**

(1.25mm Pitch 2\*10 Connector, DF13-20DP-1.25V), For 18/24-bit LVDS1 output connector, Fully supported by Texas Instruments AM335X Processor, the interface features single channel 18/24-bit output. Low Voltage Differential Signaling, A high speed, low power data transmission standard used for display connections to LCD panels.

| Signal Name | Pin# | Pin# | Signal Name |
|-------------|------|------|-------------|
| VCC_LVDS    | 1    | 2    | VCC_LVDS    |
| GND         | 3    | 4    | GND         |
| LA_D0_N     | 5    | 6    | LA_D0_P     |
| LA_D1_N     | 7    | 8    | LA_D1_P     |
| LA_D2_N     | 9    | 10   | LA_D2_P     |

|           |    |    |             |
|-----------|----|----|-------------|
| NC        | 11 | 12 | NC          |
| LA_CLKN   | 13 | 14 | LA_CLKP     |
| GND       | 15 | 16 | GND         |
| BKLT_CTRL | 17 | 18 | BKLT_EN_OUT |
| VCC_BL1   | 19 | 20 | VCC_BL1     |

**13. J1:**

Reserved for LCD which is driven by current..

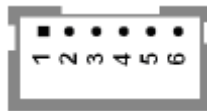
**14. JP1**

(2.0mm Pitch 1\*3 Pin Header), LCD jumper setting. It is used to provide 3.3V or 5V voltage to VCC\_LCD.

| JP1 Pin#  | Function       |
|-----------|----------------|
| Close 1-2 | VCC_LCD = 5V   |
| Close 2-3 | VCC_LCD = 3.3V |

**15. INVT1:**

(2.0mm Pitch 1\*6 box Pin Header), Backlight control connector for LVDS1.



| Pin# | Signal Name |
|------|-------------|
| 1    | BKLT_CTRL   |
| 2    | BKLT_EN_OUT |
| 3    | GND         |
| 4    | GND         |
| 5    | 12V_S0      |
| 6    | 12V_S0      |

**16.CON2 :**

(TFT LCD Socket), Supports TFT LCD devices.

**17. BT1:**

(1.0mm Pitch 1\*2 box Pin Header), 3.0V Li battery is embedded to provide power for RTC.

| Pin# | Signal Name |
|------|-------------|
| 1    | VBAT_VRTC   |
| 2    | GND         |

**18. J3:**

(2.0mm Pitch 1\*3 Pin Header), LVDS jumper setting. It is used to provide 3.3V or 5V voltage to VCC\_LVDS.

| J3 Pin#   | Function        |
|-----------|-----------------|
| Close 1-2 | VCC_LVDS = 3.3V |
| Close 2-3 | VCC_LVDS = 5V   |

**19. J4:**

(2.0mm Pitch 1\*3 Pin Header), LVDS jumper setting. It is used to provide 5V or 12V voltage to VCC\_BL1.

| J4 Pin#   | Function      |
|-----------|---------------|
| Close 1-2 | VCC_BL1 = 5V  |
| Close 2-3 | VCC_BL1 = 12V |

**20. J6 :**

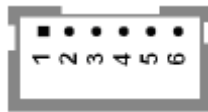
Reserved for WINCE.

**21. J7 :**

Reserved for emmc. It is closed when emmc is programmed and opened when emmc is operated.

**22. TOUCH1 :**

(2.0mm Pitch 1\*6 box Pin Header), Resistor touch interface.



| Pin# | Signal Name |
|------|-------------|
| 1    | AM335X_AIN4 |
| 2    | AM335X_AIN0 |
| 3    | AM335X_AIN1 |
| 4    | AM335X_AIN2 |
| 5    | AM335X_AIN3 |
| 6    | GND         |

**23.CN1 :**

Reserved

| Pin# | Signal Name |
|------|-------------|
| 1    | VBAT        |
| 2    | GND         |

**24. MPCIE1**

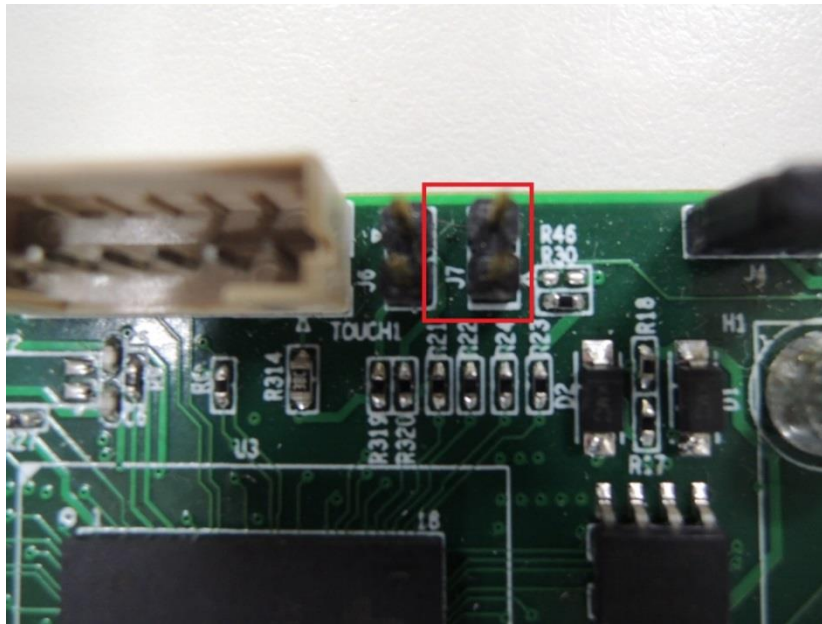
(Mini PCIe Socket 52Pin), mini PCIe socket, it is located at the top, it supports mini PCIe devices with USB2.0 and SIM and SMBUS and PCIe signal. MPCie card size is 30\*30mm or 30\*50.95mm.

# Chapter 3

# Installations

## 3.1 Update ARMPAC-5XX WEC7 Firmware

- 1) Format Micro SD Card 2G(or 4G) into FAT16 or FAT32, and then set “Active” to start the partition mode.
- 2) Copy the firmware into Micro SD Card.
- 3) Install the Micro SD Card in the SD Card Slot.
- 4) Open back cover and then remove the J7 Jumper. Now the ARMPAC is booted from SD.



- 5) After Powering on, it will install the image automatically.
- 6) When it finishes updating WEC7, you can hear a beep from the HMI. Then it will enter the WEC7 desktop.
- 7) Now the installation of system has been completed, and you can remove the Micro SD card.



- 8) Install the J7 Jumper, and now the ARMPAC is booted from NAND Flash.

## 3.2 Update ARMPAC-5XX Linux Firmware

- 1) Format Micro SD Card 2G(or 4G) into FAT16 or FAT32, and then set “Active” to start the partition mode.
- 2) Copy the firmware into Micro SD Card.
- 3) Install the Micro SD Card in the SD Card Slot.
- 4) Open back cover and then remove the J7 Jumper. Now the ARMPAC is booted from SD.
- 5) After Powering on, it will install the image automatically.



**Note: the installation of Linux is as same as the installation of WEC7.**

- 6) When it finishes updating Linux, the ARMPAC will show 100% complete scene like the picture below.
- 7) Now the installation of system has been completed, and you can remove the Micro SD card.



- 8) Install the J7 Jumper, and now the ARMPAC is booted from NAND Flash.