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
March. 2019	**V1.5**

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 Update OS Support list
1.5	2019/03/18	Update Storage Temperature

Warning!_____

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:
☐ Adaptor ☐ Driver & manual CD disc ☐ 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

Chapter 1   Getting Started

Chapter 2   Hardware

Chapter 3   Installations

Figures

Chapter 1   Getting Started

1.1 Features

- ARM based HMI

- Fanless design

- Flat front panel touch screen

- TI-AM3354, ARM® Cortex^{TM} A8 processor

- Onboard 512MB up to 1GB DDR3 DRAM

- Onboard 512MB up to 1GB NAND flash

- Wide range DC 9~36V power input

- LED backlight LCD

- Resistive touch window/projected capacitive touch **(not available for ARMPAC-505)**

1.2 Specifications

	ARMPAC-505	ARMPAC-507(P)	ARMPAC-508(P)	ARMPAC-510(P)	ARMPAC-512(P)
System					
CPU	TI-AM3354, ARM® Cortex® A8 up to 1GHz				
Memory	Onboard 512MB up to 1GB DDR3 DRAM				
External IO Port					
USB	2 x USB 2.0 type A				
Serial/Parallel	1 x RS-232/422/485 DB-9, COM1, default RS-232 1 x RS-232/422/485 DB-9, COM2, default RS-232 (option) 1 x DB-9 connector by cable (option for ARMPAC-510(P)/512(P))				
Audio	1 x line out audio jack				
LAN	1 x LAN port support POE(PD)(module for option)(24W)				
Power	1 x DC 9~36V power input via 1 x 3-pin terminal block 1 x 2-pin Power Switch				
Option	TB-549CAN1 WIFI via Mini-PCIe 3G Module via Mini-PCIe				
Internal IO Port					
Internal IO Port	1 x SIM card slot 1 x Micro SD slot				
Storage Space					

Storage	Onboard 512MB up to 1GB NAND flash				
Expansion					
Expansion Slot	1 x Mini-PCIe slot (full size)				
Display					
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
Max. Color	262K	262K	262K	262K	16.2M
Luminance	350	350	350	250	450
Contrast Ratio	500: 1	400: 1	500: 1	500: 1	800: 1
Viewing Angle	140(H)/120(V)	140(H)/110(V)	140(H)/135(V)	140(H)/120(V)	160(H)/140(V)
Backlight Lifetime	20,000 hrs	40,000 hrs	40,000 hrs	15,000 hrs	50,000 hrs
Touch Screen					
Type	Resistive touch window Projected capacitive touch screen (for P model) **Projected capacitive touch is not available for ARMAPC-505**				
Interface	Resistive touch window: ADC (Analog-to-digital converter) Projected capacitive touch screen: USB				
Light Transmission	Resistive touch window: over 80% Projected capacitive touch screen: over 90%				
Power					
Power Input	DC 9~36V				
Power Consumption	MAX: 9W (505)	MAX: 8W (507)	MAX: 9.5W (508)	MAX: 9W (510)	MAX: 11W (512)
Mechanical					
Front Bezel Metal	Plastic / Panel Mount				
Rear Panel Metal	Plastic / VESA Mount 75 x 75			Plastic / VESA Mount 100 x 100	
Chassis Color	Pantone Cool Gray 11C				
IP Rating	IP65 Front Panel				
Dimensions(mm)	204x150x42.5	204x150x42.5	231.1x176.1x45	285x189x49.6	319x245x51
Net Weight	0.8 Kg	0.9 Kg	0.9 Kg	1.3 Kg	2 Kg
Environmental					
Operating Temperature	0~50℃				
Storage Temperature	-30~70℃				
Storage Humidity	10 to 90% @ 40℃, non-condensing				
Certification	CE / FCC Class A				

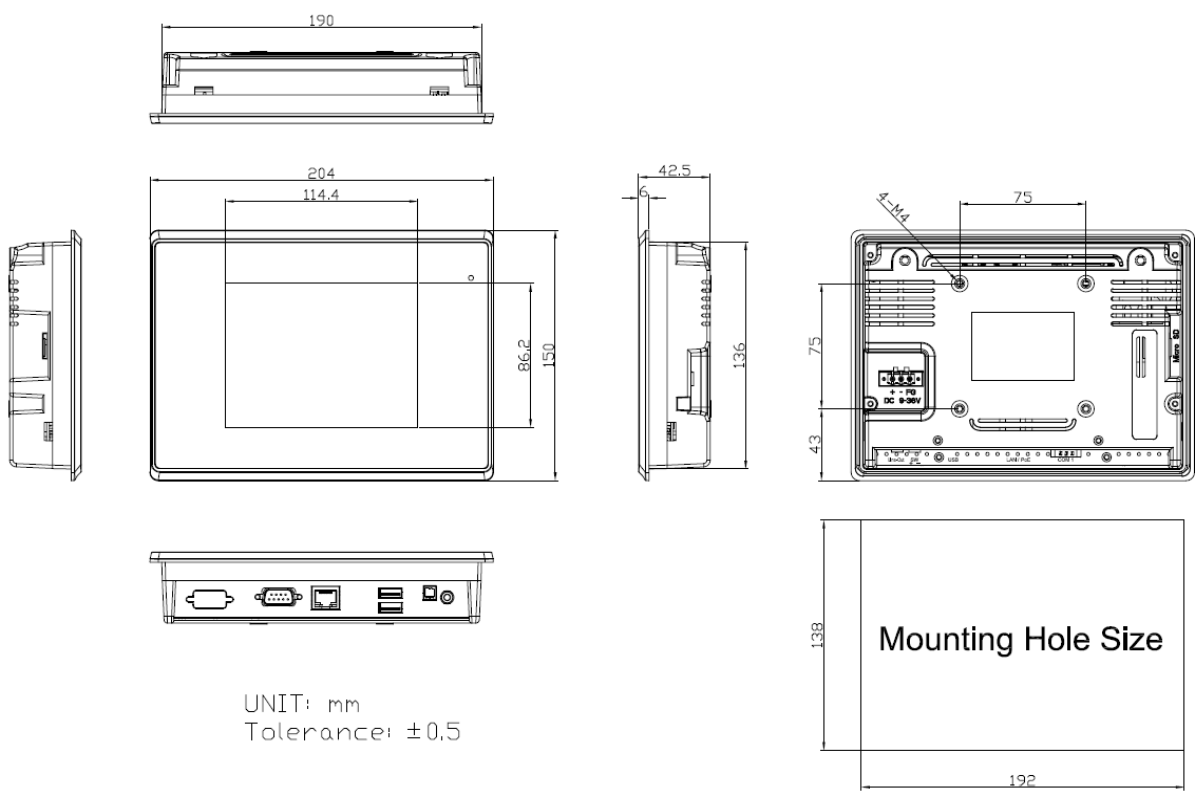| Operating System Support	Win Embedded Compact 7, Linux 3.2/4.4.12
	Provide Source Code:
	#ARM complier:linux-devkit.tar.bz2;
	#SD card partitioning tool:mksd.sh;
	#Uboot source code
	#Linux kernel source code

1.3 Dimensions

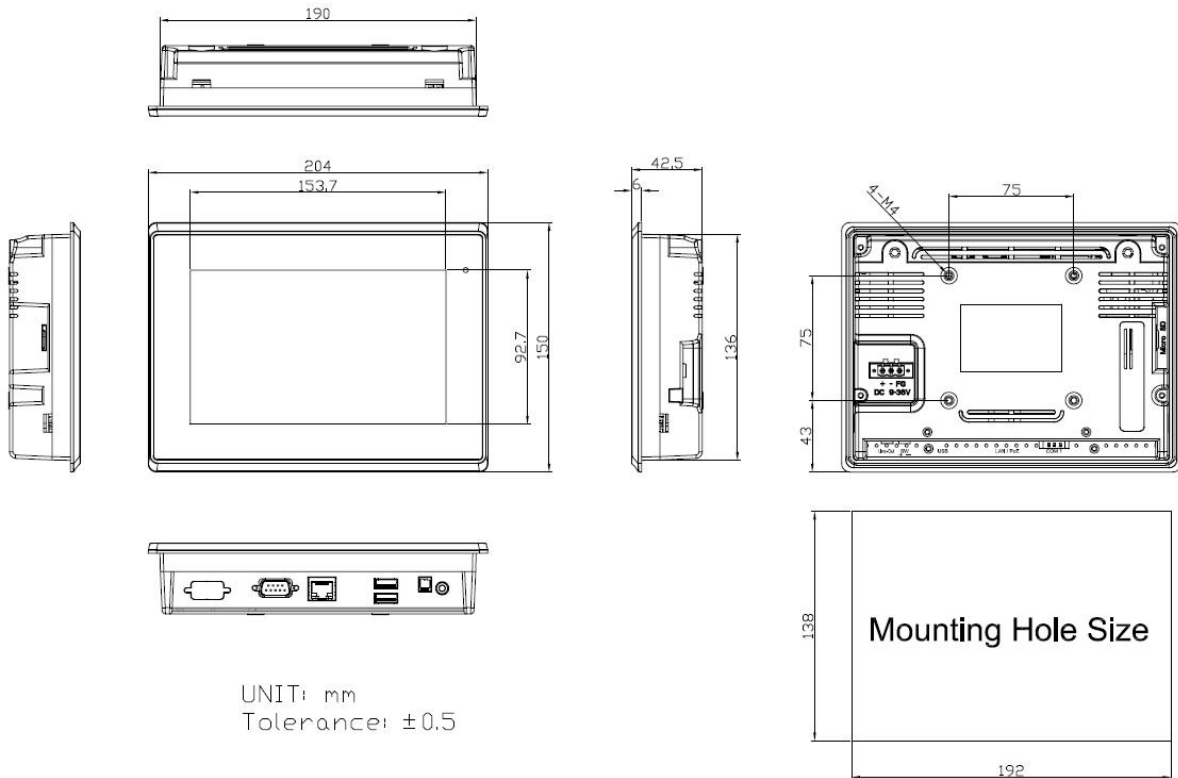**Figure 1.1: Dimensions of ARMPAC-505**
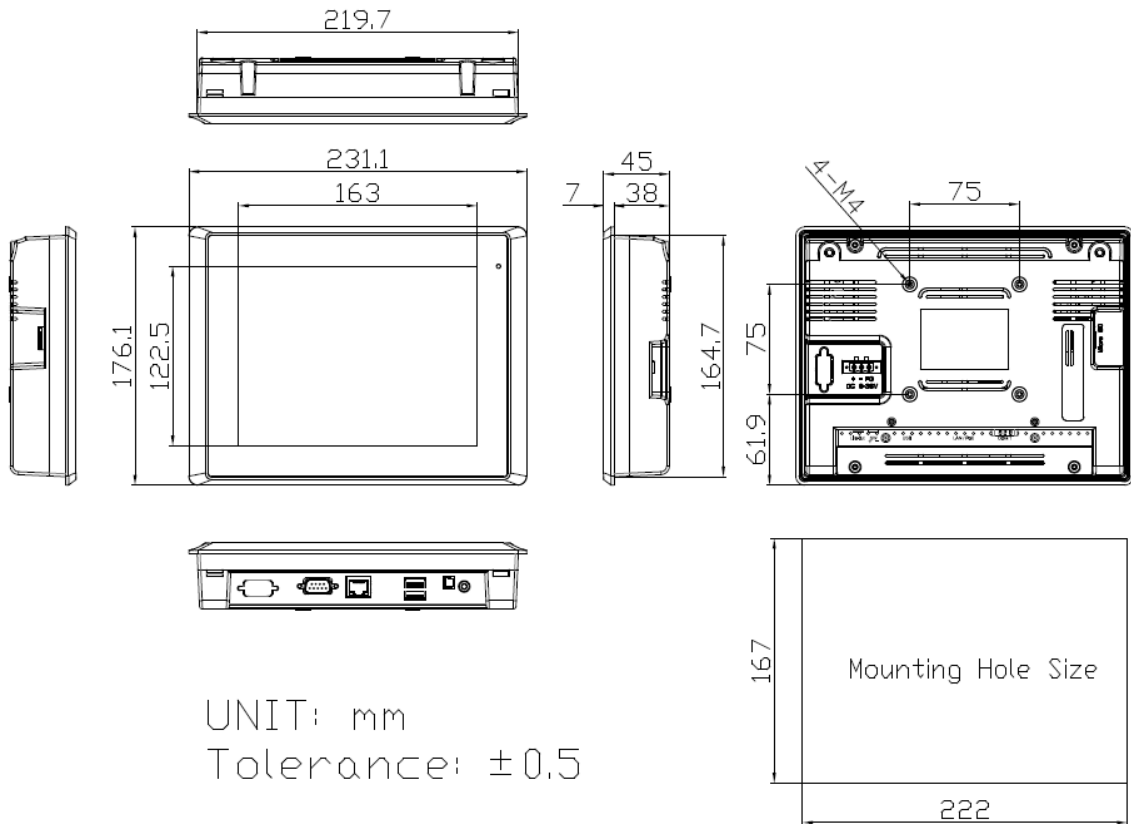
Figure 1.2: Dimensions of ARMPAC-507(P)

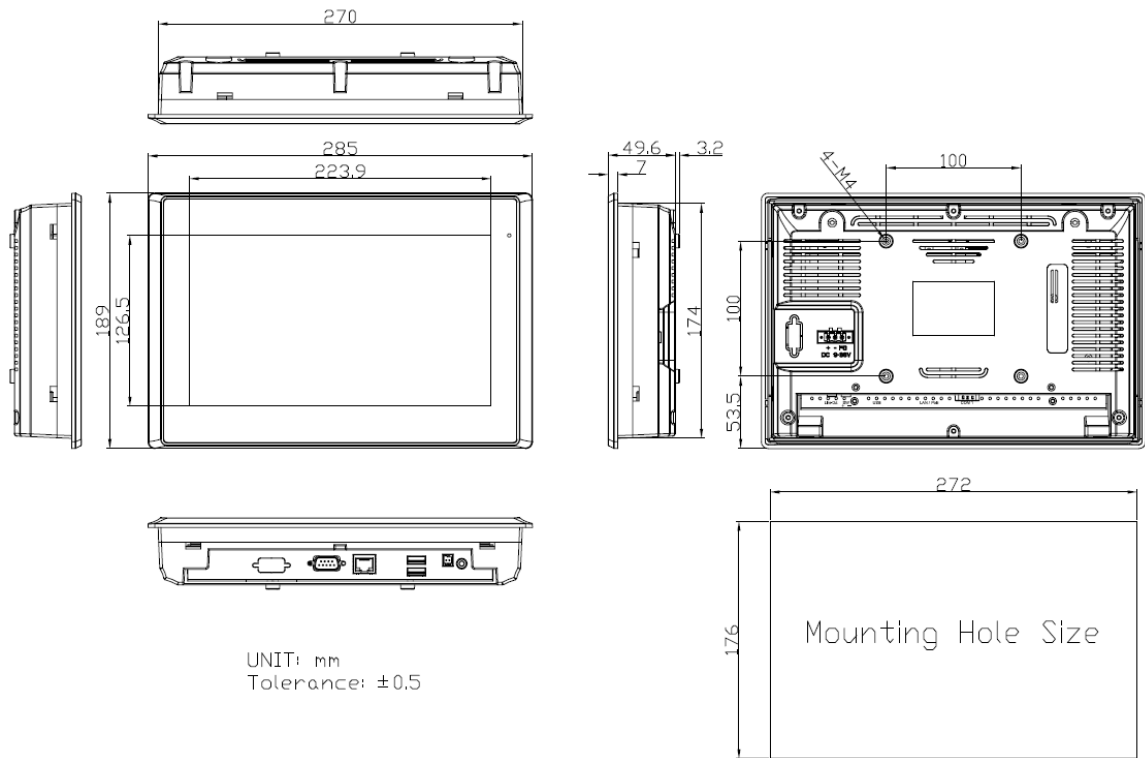**Figure 1.3: Dimensions of ARMPAC-508(P)**
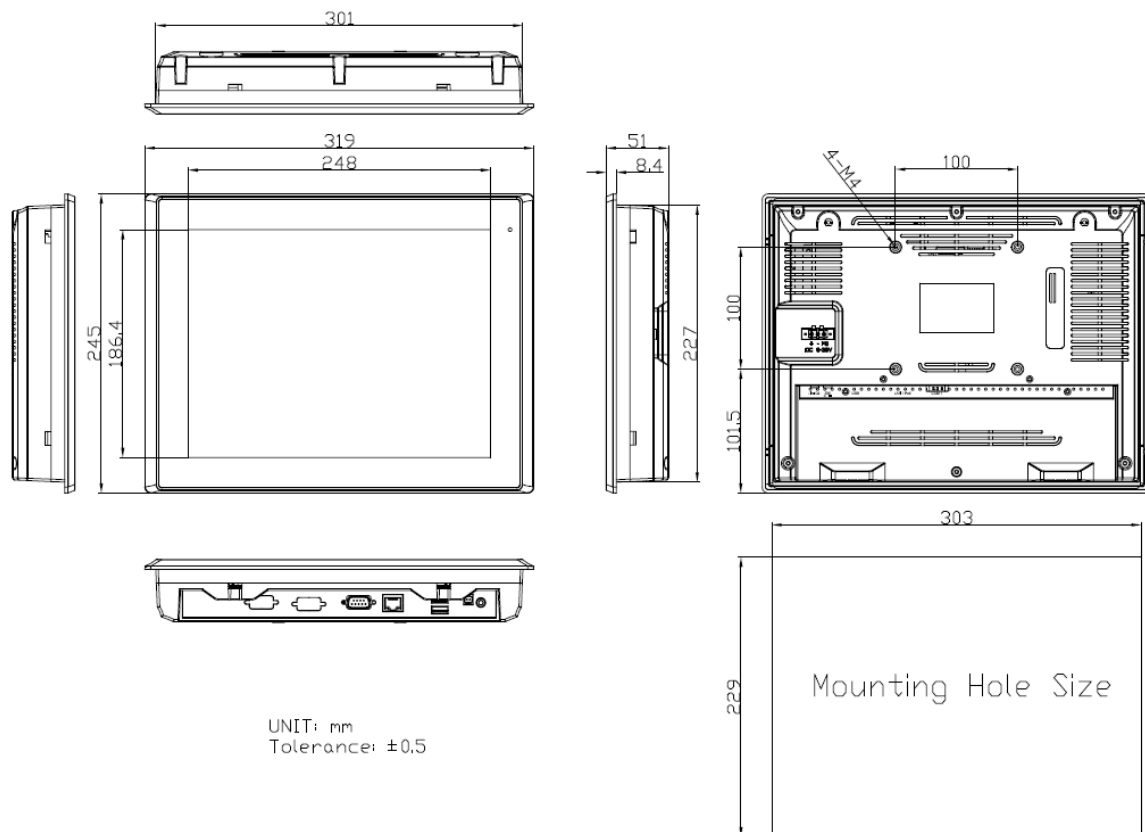
Figure 1.4: Dimensions of ARMPAC-510(P)

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.
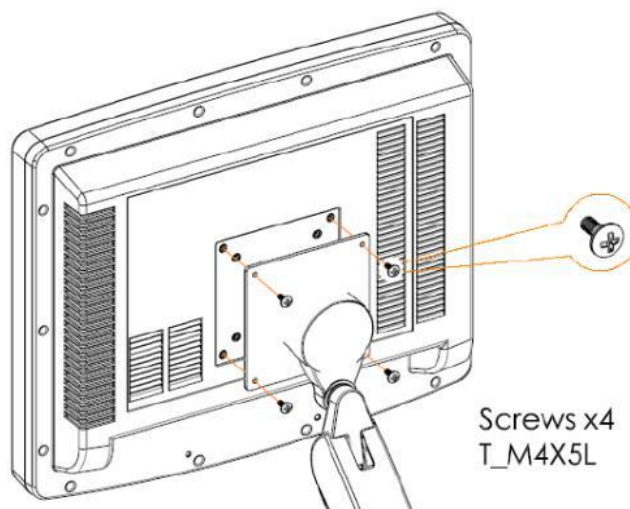

Screws x4
T_M4X5L

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.
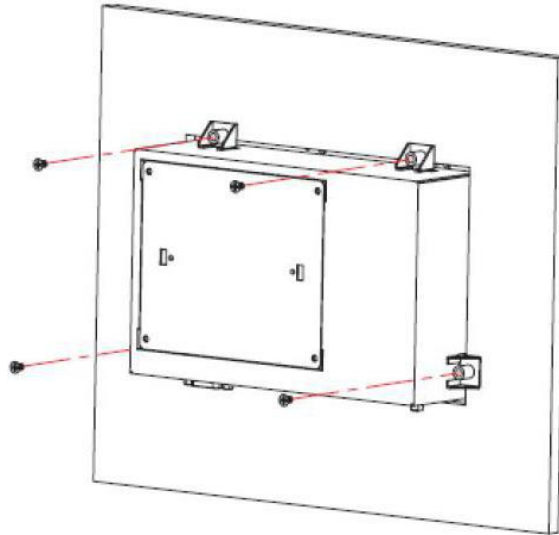
Figure 1.9: ARMPAC Series Panel Mounting

Chapter 2   Hardware

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.
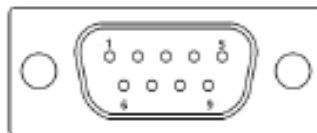
COM1	
Pin#	Signal Name
1	DCD0-_422TX-_485-
2	RXD0_422TX+_485+
3	TXD0_422RX+
4	DTR0-_422RX-

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..

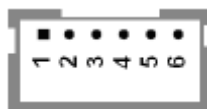## 14. JP1

(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.

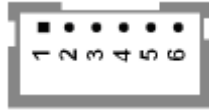| J4 Pin#	Function
Close 1-2	VCC_ BL1 = 5V
Close 2-3	VCC_ BL1 = 12V

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.
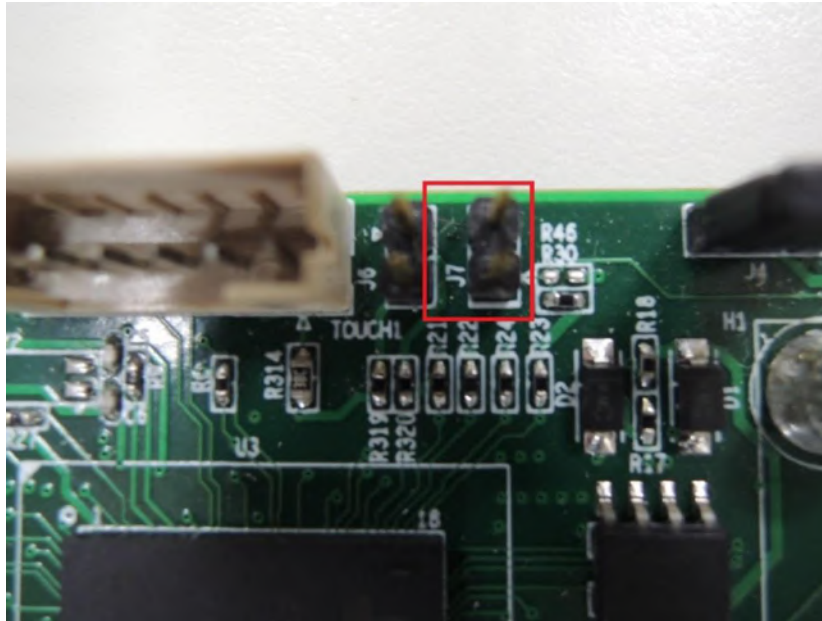
5) After Powering on, it will install the image automatically.

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.

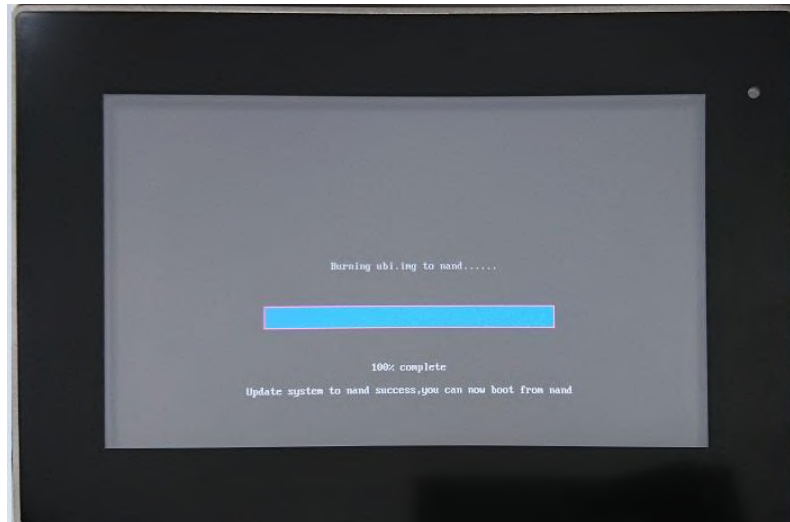8) Install the J7 Jumper, and now the ARMPAC is booted from NAND Flash.

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.