



# ViTAM-6XX Series

10.1", 12.1", 15", and 21" New Gen. IP66/IP69K Stainless Steel Panel PC

## User Manual

**Release Date**

**Revision**

Oct. 2017

V1.5

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# Revision History

Reversion	Date	Description
0.1	2016/12/08	For Preliminary Release
0.2	2016/12/22	Update Power consumption and net weight Spec.
1.0	2017/01/11	Official Version
1.1	2017/06/02	Add 21 inch model Modify optional function Add micro SD card storage
1.2	2017/07/28	Add I/O drawing and definition
1.3	2017/10/13	Modify expansion I/O function
1.4	2018/11/01	Modify Operating Temperature
1.5	2018/11/07	Modify Operating system, remove QT and update to Android 6.0.1 & Linux 4.1.15

# 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

**This information in this document is subject to change without notice. In no event shall Apex Technology Inc. be liable for damages of any kind, whether incidental or consequential, arising from either the use or misuse of information in this document or in any related materials.**

## 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!/Caution/Disclaimer.....	2
Packing List.....	3
Safety Precautions.....	4

## **Chapter 1** **Getting Started**

1.1 Features.....	6
1.2 Specifications.....	6
1.3 Dimensions.....	10
1.4 Brief Description of ViTAM-6XX Series.....	12
1.5 Yoke Mounting and VESA Mounting.....	13

## **Chapter 2** **Hardware**

2.1 Motherboard Jumpers Setting and Connectors.....	14
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## **Chapter 3** **Installations**

3.1 Update Linux QT for SBC-7112.....	20
3.2 Update Android Firmware.....	24

## **Figures**

Figure 1.1: Dimensions of ViTAM-610P/R/G(H).....	10
Figure 1.2: Dimensions of ViTAM-612P/R/G(H).....	10
Figure 1.3: Dimensions of ViTAM-615P/R/G(H).....	11
Figure 1.4: Dimensions of ViTAM-621P/R/G(H).....	11
Figure 1.5: Front View and Touch on/off Button of ViTAM-6XX Series..	12
Figure 1.6: Rear View of ViTAM-6XX Series.....	12
Figure 1.7: Yoke Mounting of ViTAM-6XX Series.....	13
Figure 1.8: VESA Mounting of ViTAM-6XX Series.....	13

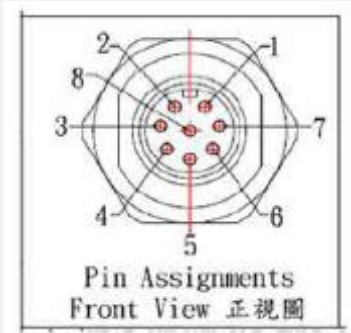
# Chapter 1



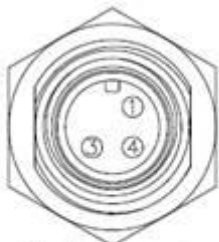
# Getting Started

## 1.1 Features

- 10.1", 12.1", 15", and 21" New generation stainless steel panel PC
- Freescale I.MX6 DualLite 1.0GHz onboard processor
- True flat front bezel design and grade 304 stainless steel enclosure (grade 316 for option)
- IP66/IP69K rated with M12 connectors
- Support resistive touch, projected capacitive touch, and glass
- Touch on/off button on the side edge for hygienic cleaning
- Support ergonomic versatile mounting: Yoke mounting / space-saving VESA mounting.

## 1.2 Specifications

	ViTAM-610 P/R/G/(H)	ViTAM-612 P/R/G/(H)	ViTAM-615 P/R/G/(H)	ViTAM-621 P/R/G/(H)																		
System																						
CPU	Freescale I.MX6 DualLite 1.0GHz																					
Chipset	SoC																					
Memory	Onboard 1GB DDR3 DRAM (2GB option)																					
RFID Module	RFID module design on the front side (option)																					
Outside IO Port – Standard M12 I/O Connector on the Rear Side																						
USB	1 x M12 for 2 x USB 2.0  USB1/2: <table><tr><td>CN1</td><td>Pin Define</td></tr><tr><td>1</td><td>USB1 5V</td></tr><tr><td>3</td><td>D1-</td></tr><tr><td>4</td><td>D1+</td></tr><tr><td>7</td><td>GND</td></tr><tr><td>2</td><td>USB2 5V</td></tr><tr><td>5</td><td>D2-</td></tr><tr><td>6</td><td>D2+</td></tr><tr><td>8</td><td>GND</td></tr></table>		CN1	Pin Define	1	USB1 5V	3	D1-	4	D1+	7	GND	2	USB2 5V	5	D2-	6	D2+	8	GND		
CN1	Pin Define																					
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7	GND																					
2	USB2 5V																					
5	D2-																					
6	D2+																					
8	GND																					

Serial/Parallel	<div>1 x M12 for RS-232/422/485, Default RS-232</div> <table><tr><td></td><td>Pin Define</td></tr><tr><td>1</td><td>DCD</td></tr><tr><td>2</td><td>RXD</td></tr><tr><td>3</td><td>TXD</td></tr><tr><td>4</td><td>DTR</td></tr><tr><td>5</td><td>GND</td></tr><tr><td>6</td><td>DSR</td></tr><tr><td>7</td><td>RTS</td></tr><tr><td>8</td><td>CTS</td></tr></table>		Pin Define	1	DCD	2	RXD	3	TXD	4	DTR	5	GND	6	DSR	7	RTS	8	CTS	<div></div>
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4	DTR																			
5	GND																			
6	DSR																			
7	RTS																			
8	CTS																			
LAN	<div>1 x M12 for LAN</div> <div>LAN:</div> <table><tr><td></td><td>Pin Define</td></tr><tr><td>2</td><td>LAN1_0+</td></tr><tr><td>1</td><td>LAN1_0-</td></tr><tr><td>4</td><td>LAN1_1+</td></tr><tr><td>3</td><td>LAN1_1-</td></tr><tr><td>6</td><td>LAN1_2+</td></tr><tr><td>5</td><td>LAN1_2-</td></tr><tr><td>8</td><td>LAN1_3+</td></tr><tr><td>7</td><td>LAN1_3-</td></tr></table>		Pin Define	2	LAN1_0+	1	LAN1_0-	4	LAN1_1+	3	LAN1_1-	6	LAN1_2+	5	LAN1_2-	8	LAN1_3+	7	LAN1_3-	<div></div>
	Pin Define																			
2	LAN1_0+																			
1	LAN1_0-																			
4	LAN1_1+																			
3	LAN1_1-																			
6	LAN1_2+																			
5	LAN1_2-																			
8	LAN1_3+																			
7	LAN1_3-																			
Power	<div>1 x DC power input (9~36V) by M12 connector</div> <table><tr><td></td><td>Pin Define</td></tr><tr><td>1</td><td>NC</td></tr><tr><td>3</td><td>VCC</td></tr><tr><td>4</td><td>GND</td></tr></table>		Pin Define	1	NC	3	VCC	4	GND	<div></div>										
	Pin Define																			
1	NC																			
3	VCC																			
4	GND																			
Others	1 x Touch on/off button on the side																			



### Outside IO Port – M12 I/O for option

Option	TB-508 Series :  1 x RS-232/422/485 1 x 8-bit GPIO 1 x CAN 1 x POE via AG5300
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### Storage Space

Storage	Onboard 4GB eMMC NAND flash 1 x Micro SD card slot on board
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### Expansion

Expansion Slot	1 x Mini PCIe slot for WIFI/BT (option)
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### Display

Display Type	10.1 TFT LCD	12.1" TFT LCD	15" TFT LCD	21.5" TFT LCD
Max. Resolution	1280 x 800	800 x 600 1024 x 768 (option)	1024 x 768	1920 x 1080
Max. Color	16.7M	262K / 16.2M (option)	16.7M	16.7M
Luminance (cd/m <sup>2</sup> )	350	450 / 500 (option)	420	300
Contrast Ratio	800: 1	800: 1 / 700: 1 (option)	800: 1	3000:1
Viewing Angle	170(H) / 170(V)	160(H) / 150(V) 160(H) / 140(V) (option)	160(H) / 160(V)	178(H) / 178(V)
Backlight Lifetime	15,000 hrs	50,000 hrs / 30,000 hrs (option)	50,000 hrs	50,000 hrs
Option	Optical bonding			

### Display – High Brightness LCD (option)

Display Type	10.1 TFT LCD	12.1" TFT LCD	15" TFT LCD	21.5" TFT LCD
Max. Resolution	1280 x 800	800 x 600 1024 x 768 (option)	1024 x 768	1920 x 1080
Max. Color	16.7M	262K / 16.2M (option)	262K	16.7M
Luminance (cd/m <sup>2</sup> )	1000	1000	1000	1000
Contrast Ratio	800: 1	700: 1	800: 1	3000:1
Viewing Angle	170(H) / 170(V)	178(H) / 178(V) 160(H) / 140(V)	160(H) / 150(V)	178(H) / 178(V)

		(option)		
Backlight Lifetime	30,000 hrs	50,000 hrs	30,000 hrs	50,000 hrs
Option	Optical bonding			
Touch Screen				
Type	Resistive touch window (for R model) Projected capacitive touch screen (for P model)			
Interface	USB			
Light Transmission	Resistive touch window: over 80% Projected capacitive touch screen: over 90%			
Glass Type				
Type	AR			
Light Transmission	Over 90%			
Power				
Power Input	DC 9~36V			
Power Consumption	MAX: 13.6W (610R) MAX: 10.3W (610P)	MAX: 11.1W (612R) MAX: 12.4W (612P)	MAX: 11.8W (615R) MAX: 12.1W (615P)	MAX: TBD (621R) MAX: 22.5 (621P)
Mechanical				
Color	304 Stainless steel enclosure (default) 316 Stainless steel enclosure (option)			
Construction	Stainless steel enclosure			
Mounting	VESA mount 75 x 75 Yoke mount			VESA mount 100 x 100 Yoke mount
IP Rating	IP66/IP69K			
Dimension (mm)	300 x 220 x 53	335 x 265 x 53	399 x 324 x 53	571 x 362 x 55
Net Weight	3.8 Kg	4.6 Kg	7.1 Kg	9.8 kg
Environmental				
Operating temperature	0~50°C 0~40°C(For 21.5” High Brightness model)			
Storage temperature	-30~70°C			
Storage humidity	10 to 90% @ 40°C, non- condensing			
Certification	CE / FCC Class A			
Operating System Support	Android 6.0.1 Linux 4.1.15			

### 1.3 Dimensions

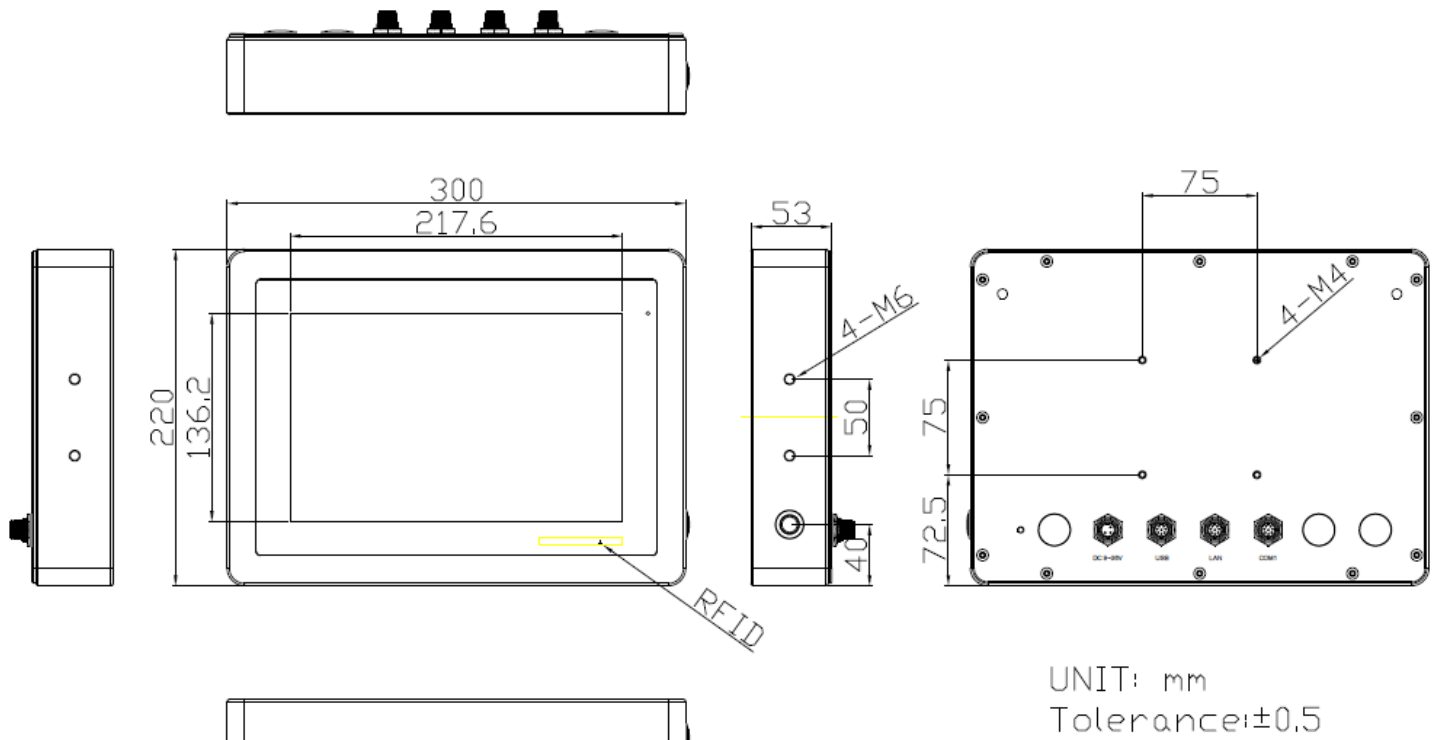
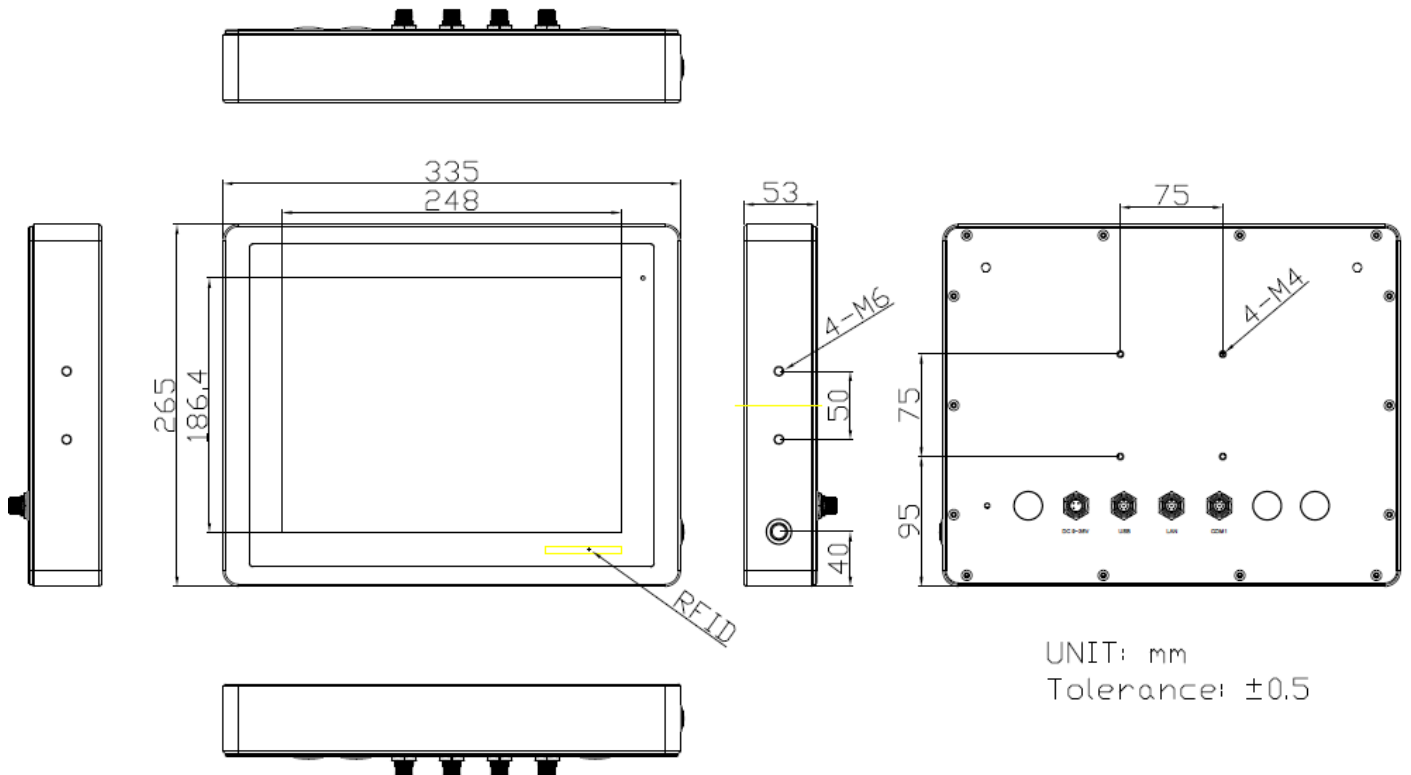
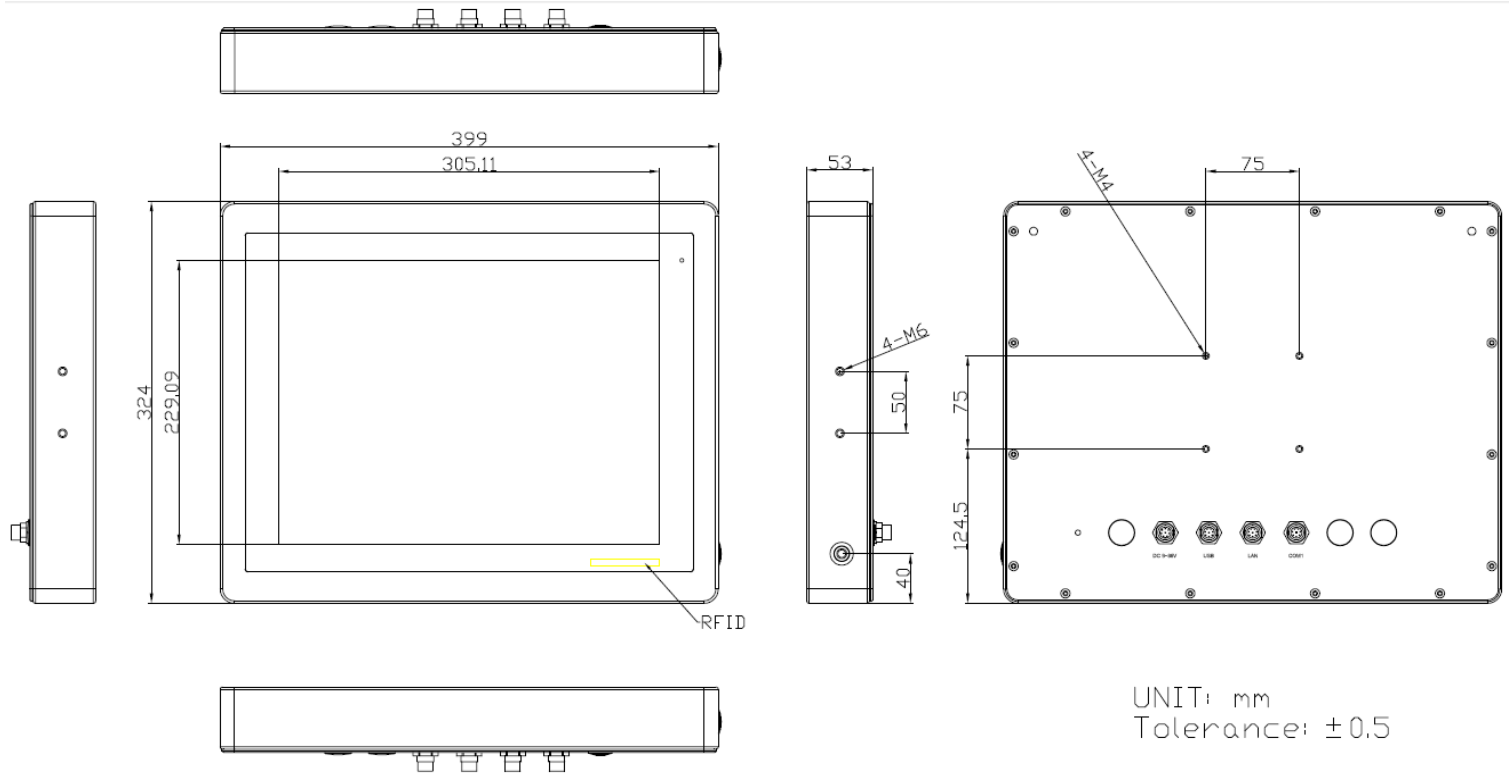


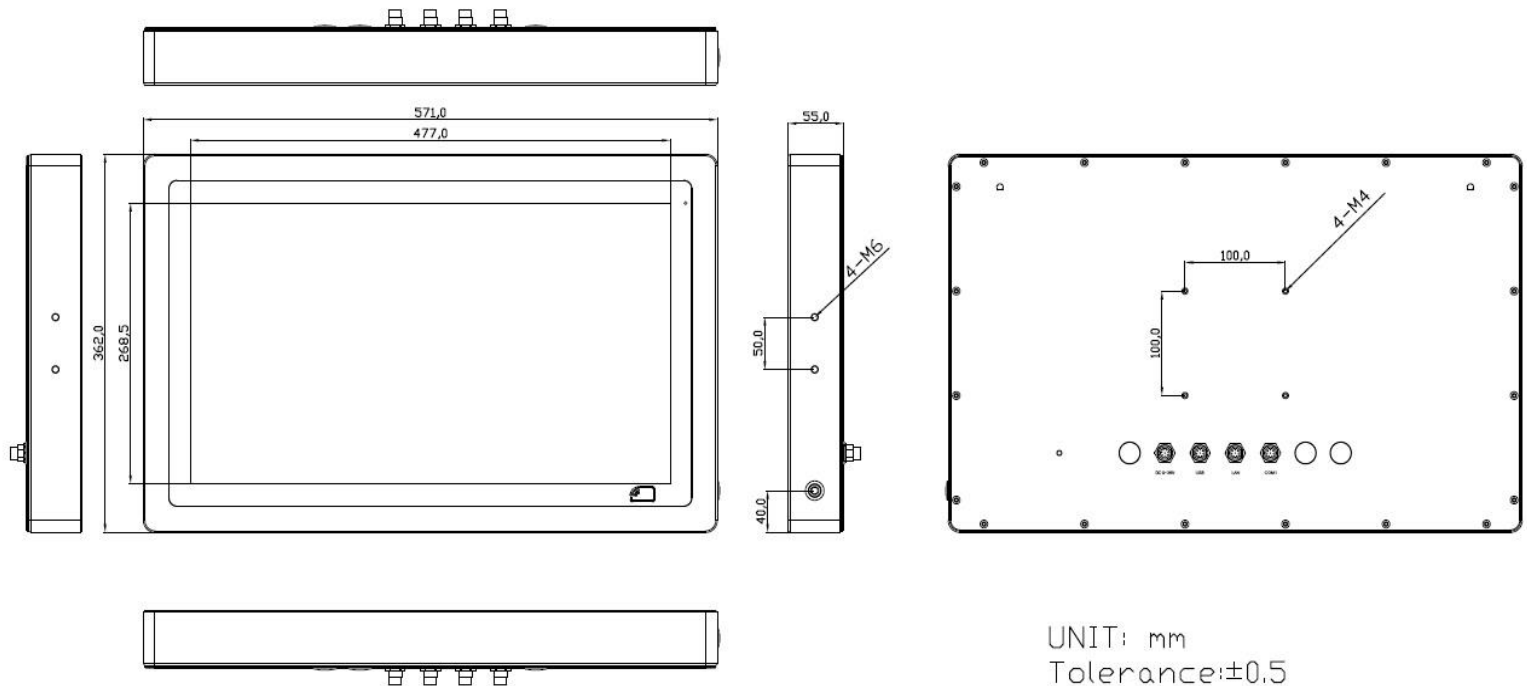
Figure 1.1: Dimensions of ViTAM-610P/R/G(H)



**Figure 1.2: Dimensions of ViTAM-612P/R/G(H)**



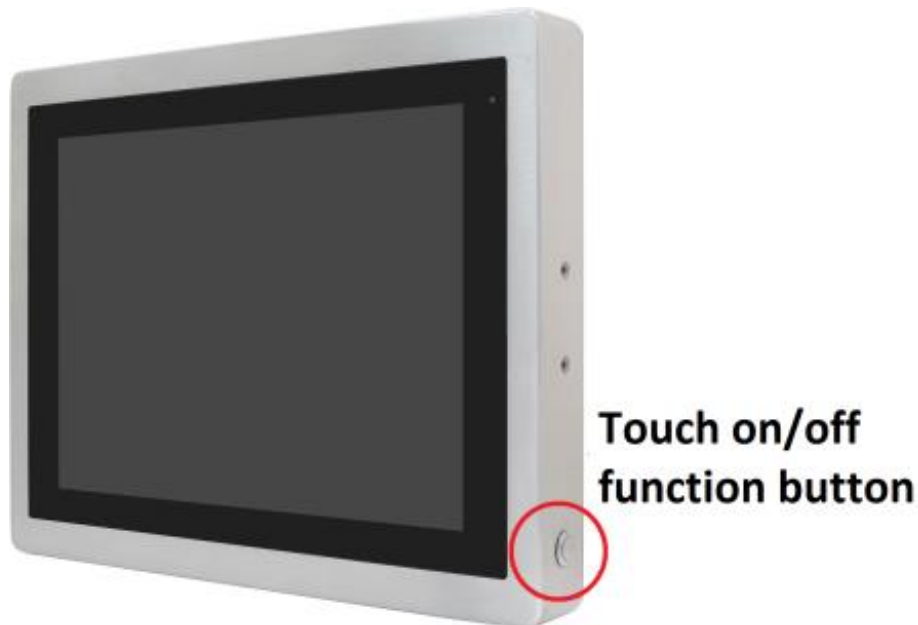
**Figure 1.3: Dimensions of ViTAM-615P/R/G(H)**



**Figure 1.4: Dimensions of ViTAM-621P/R/G(H)**

## 1.4 Brief Description of ViTAM-6XX Series

There are 10.1", 12.1", 15", and 21.5" new generation stainless steel panel PC in ViTAM-6XX series, which comes with true flat front bezel and fanless design. It powered by Freescale I.MX6 DualLite 1.0GHz processor onboard, 1GB DDR3 DRAM, and 4GB eMMC NAND flash for storage. ViTAM-6XX series is wide range DC 9~36V power input and IP66/IP69K rated with M12 connectors. Furthermore, the models support resistive touch, projected capacitive touch, and glass for option, and can be high brightness LCD and optical bonding designed for option. It supports touch on/off button on the side edge for hygienic cleaning and ergonomic versatile mounting: Yoke mounting and space-saving VESA 75 x 75 (VESA 100 x 100 for 21.5") mounting.



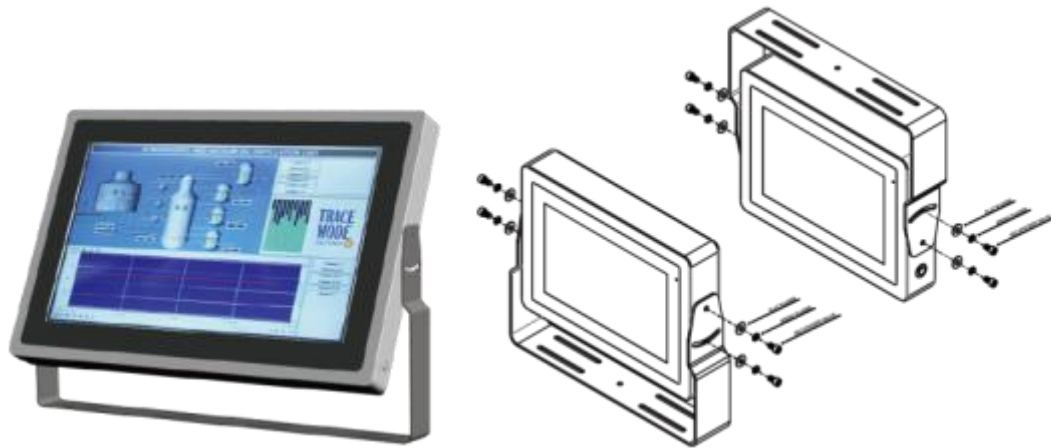
**Figure 1.5 Front View and Touch on/off Button of ViTAM-6XX Series**



**Figure 1.6 Rear View of ViTAM-6XX Series**

## 1.5 Yoke Mounting and VESA Mounting

The ViTAM-6XX Series model can be Yoke mounted and VESA mounted as shown in Picture below.



**Figure 1.7: Yoke mounting of ViTAM-6XX Series**



**Figure 1.8: VESA mounting of ViTAM-6XX Series**

## 2.1 Motherboard Jumpers Setting and Connectors

### 1. J5:

(Micro USB OTG 5P Connector), it is used to download and connect to Android App.

### 2. USB1:

(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.

### 3. LAN1:

(RJ45 Connector), Front LAN port. One standard 10/100M RJ45 Ethernet port is provided. Used Atheros AR8031 chipset, support LINK LED (green) and ACTIVE LED (yellow).

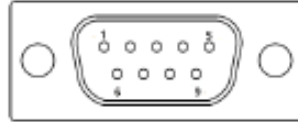
### 4. MIO1:

(1.25mm Pitch 2\*15 Connector), Including eight General-purpose input/output 、 a group of SMBUS and two groups of serial communication interfaces, it provides a group of self-programming interfaces to customers for flexible use.

Signal Name	Pin#	Pin#	Signal Name
PWRON	1	2	GND
POR_B	3	4	GND
5V_S0	5	6	GND
GPIO_IN0	7	8	GPIO_IN1
GPIO_IN2	9	10	GPIO_IN3
GPIO_OUT0	11	12	GPIO_OUT1
GPIO_OUT2	13	14	GPIO_OUT3
I2C3_SCL	15	16	5V_S0
I2C3_SDA	17	18	NC
GND	19	20	NC
UART1_TXD_B	21	22	GND
UART1_RXD_B	23	24	UART2_TXD
NC	25	26	NC
NC	27	28	UART2_RXD
GND	29	30	NC

## 5. 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.



Pin#	Signal Name
1	DCD3-_422TX-_485-
2	RXD3_422TX+_485+
3	TXD3_422RX+
4	DTR3_422RX-
5	GND
6	NC
7	NC
8	NC
9	COM3_9PIN(connect to JP1)

## 6. CON2:

(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_CON2_DM3	3	4	UART4_TXD
USBDN_CON2_DP3	5	6	UART4_RXD
GND	7	8	GND
GND	9	10	CAN1_TX
I2C2_SDA	11	12	CAN1_RX
I2C2_SCL	13	14	NC
3P3V_S0	15	16	NC

## 7.CON1 :

(TF Card Socket), Support TF Card devices.

## 8. TOUCH1:

(2.00mm Pitch 2\*5 Pin Header), Used the AR1021 as the touch screen controller which supports resistive touch screen.



Signal Name	Pin#	Pin#	Signal Name
Y-	1	2	SY-
SY+	3	4	Y+
X-	5	6	5WSX-
SX+	7	8	X+
M2(U17)	9	10	GND

#### 9. SIM1:

(SIM Card Socket), Support SIM Card devices.

#### 10. LVDS1:

(1.25mm Pitch 2\*10 Connector, DF13-20DP-1.25V), For 18-bit LVDS1 output connector.

Signal Name	Pin#	Pin#	Signal Name
VCC_LVDS0	1	2	VCC_LVDS0
GND	3	4	GND
LVDS0_TX0_N	5	6	LVDS0_TX0_P
LVDS0_TX1_N	7	8	LVDS0_TX1_P
LVDS0_TX2_N	9	10	LVDS0_TX2_P
NC	11	12	NC
LVDS0_CLK_N	13	14	LVDS0_CLK_P
GND	15	16	NC
BKLT_CTRL0	17	18	BKLT_EN_OUT0
VCC_BLO	19	20	VCC_BLO

#### 11. LVDS2:

(1.25mm Pitch 2\*10 Connector, DF13-20DP-1.25V), For 18/24-bit LVDS1 output connector.

Signal Name	Pin#	Pin#	Signal Name
VCC_LVDS1	1	2	VCC_LVDS1
GND	3	4	GND
LVDS1_TX0_N	5	6	LVDS1_TX0_P
LVDS1_TX1_N	7	8	LVDS1_TX1_P
LVDS1_TX2_N	9	10	LVDS1_TX2_P
LVDS1_TX3_N	11	12	LVDS1_TX3_P
LVDS1_CLK_N	13	14	LVDS1_CLK_P

GND	15	16	NC
BKLT_CTRL1	17	18	BKLT_EN_OUT1
VCC_BL1	19	20	VCC_BL1

## 12. INVT1:

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



Pin#	Signal Name
1	VCC_BL0
2	VCC_BL0
3	GND
4	GND
5	BKLT_EN_OUT0
6	BKLT_CTRL0

## 13. BT1:

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

Pin#	Signal Name
1	VRTC
2	GND

## 14. INVT2:

(2.0mm Pitch 1\*6 box Pin Header), Backlight control connector for LVDS2.



Pin#	Signal Name
1	VCC_BL1
2	VCC_BL1
3	GND
4	GND
5	BKLT_EN_OUT1
6	BKLT_CTRL1

**15. J20:**

(1.0mm Pitch 1\*2 box Pin Header), Reserved to connect switch reset button..

**16. 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.

**17. JP1:**

(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	COM1 Pin9 = NC (option)
Close 3-4	COM1 Pin9 = +5V (default)
Close 5-6	COM1 Pin9 = +12V (option)

**18. J1:**

(2.0mm Pitch 1\*3 Pin Header), LVDS1 jumper setting. It is used to provide 3.3V or 5V voltage to VCC\_LVDS0.

J1 Pin#	Function
Close 1-2	VCC_LVDS0 = 3.3V (option)
Close 2-3	VCC_LVDS0 = 5V (default)

**19. J2:**

(2.0mm Pitch 1\*3 Pin Header), LVDS1 jumper setting. It is used to provide 5V or 12V voltage to VCC\_BL0.

J2 Pin#	Function
Close 1-2	VCC_BL0 = 5V (option)
Close 2-3	VCC_BL0 = 12V (default)

**20. J3:**

(2.0mm Pitch 1\*3 Pin Header), LVDS2 jumper setting. It is used to provide 3.3V or 5V voltage to VCC\_LVDS1.

J3 Pin#	Function
Close 1-2	VCC_LVDS1 = 3.3V (option)
Close 2-3	VCC_LVDS1 = 5V (default)

**21. J4:**

(2.0mm Pitch 1\*3 Pin Header), LVDS2 jumper setting. It is used to provide 5V or 12V voltage to VCC\_BL1.

J4 Pin#	Function
Close 1-2	VCC_BL1 = 5V (option)
Close 2-3	VCC_BL1 = 12V (default)

**22. SW2:**

Dial Switch, it is used to select the voltage for BKLT\_CTRL0 and BKLT\_EN\_OUT0.

SW2 Pin#	Function	Function
1-4	Close	Open(default)
	BKLT_CTRL0 = 3.3V	BKLT_CTRL0 = 5V
2-3	Close	Open(default)
	BKLT_EN_OUT0 = 3.3V	BKLT_EN_OUT0 = 5V

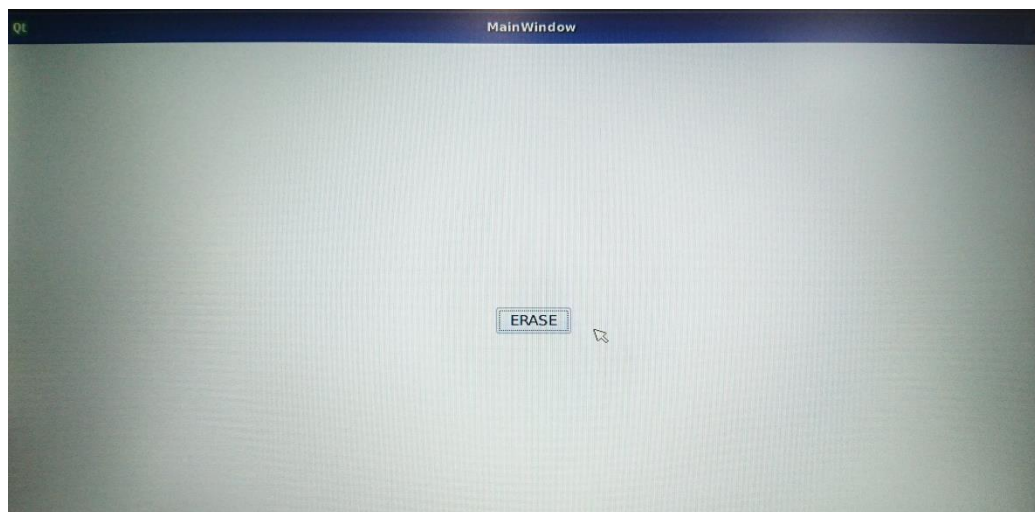
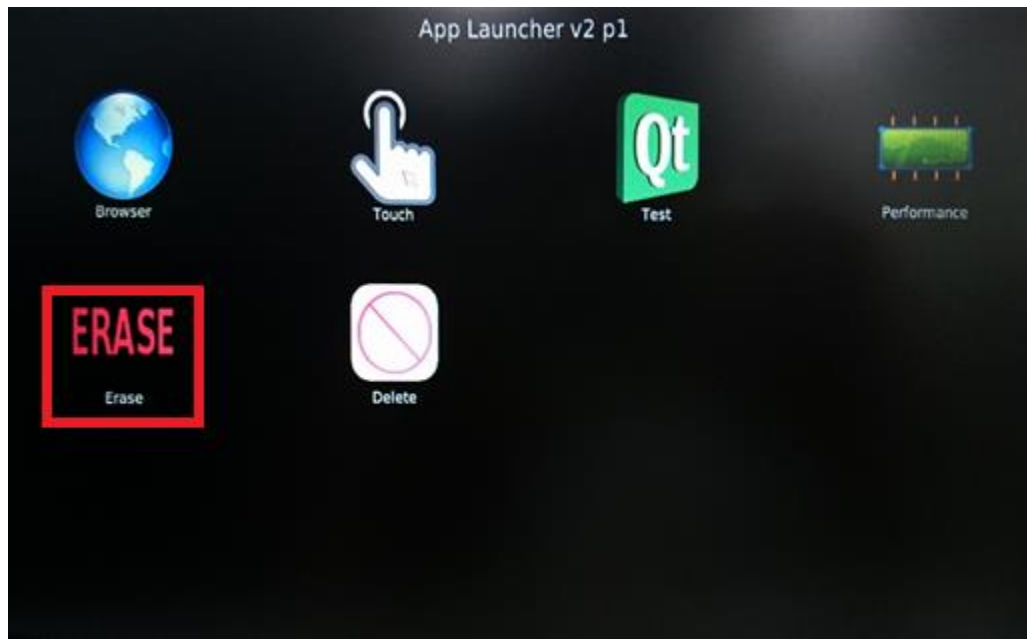
**23. SW3:**

Dial Switch, it is used to select the voltage for BKLT\_CTRL1 and BKLT\_EN\_OUT1.

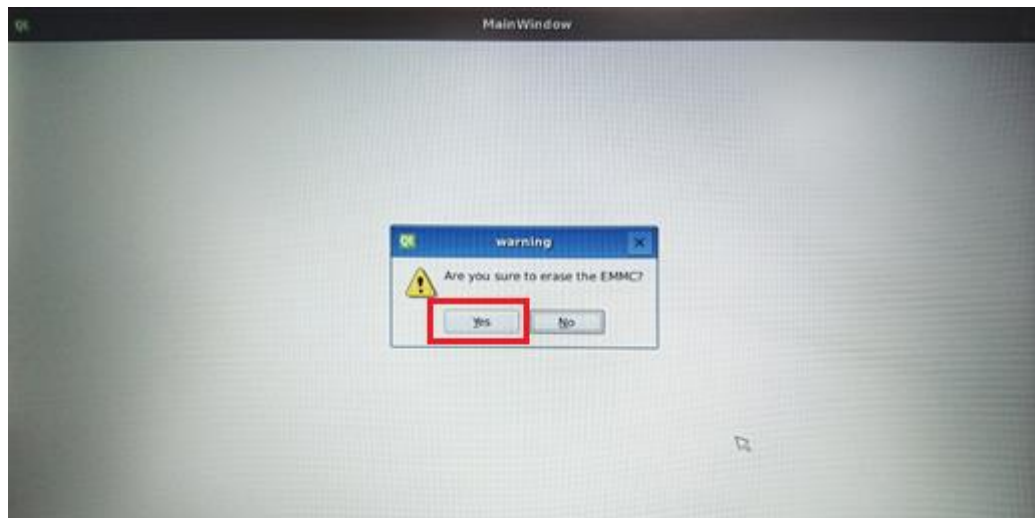
SW3 Pin#	Function	Function
1-4	Close	Open(default)
	BKLT_CTRL0 = 3.3V	BKLT_CTRL0 = 5V
2-3	Close	Open(default)
	BKLT_EN_OUT0 = 3.3V	BKLT_EN_OUT0 = 5V

### 3.1 Update Linux QT for SBC-7112

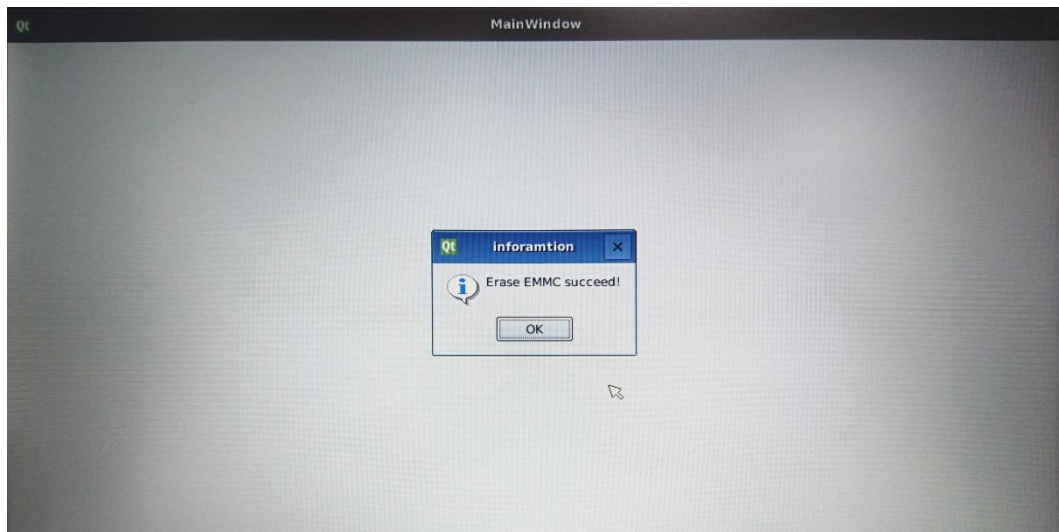
1. Select the “ERASE” APP on desktop to clear EMMC data(change to Download Mode)



2. Click “Yes” to erase the EMMC.

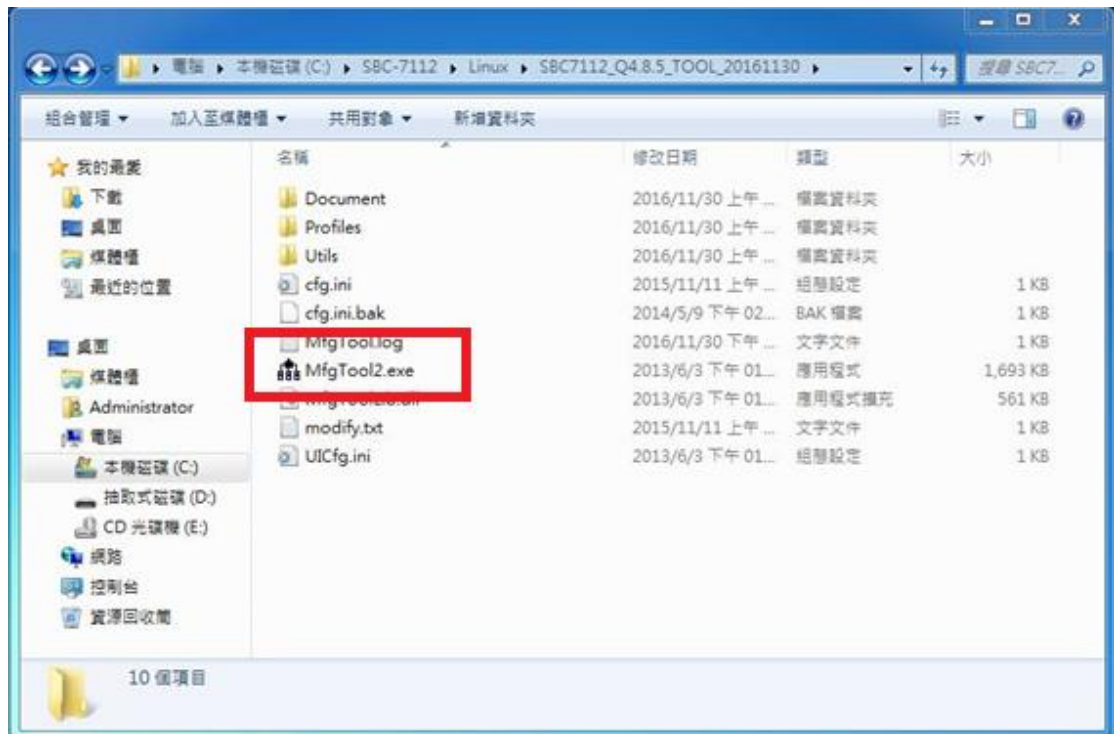


3. Reset machine when see the message “Erase EMMC success!!”

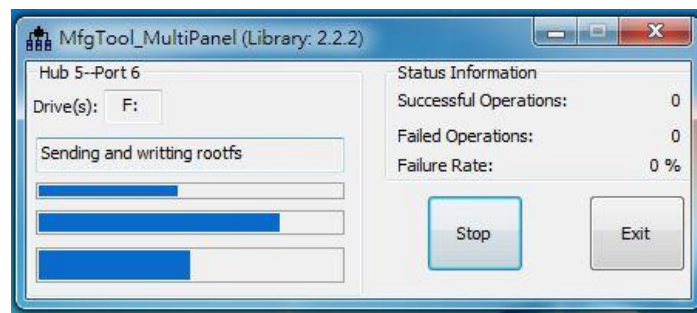


4. Connect Micro USB Cable from SBC-7112 to your desktop/laptop and run update tool “MftTool2.exe”.

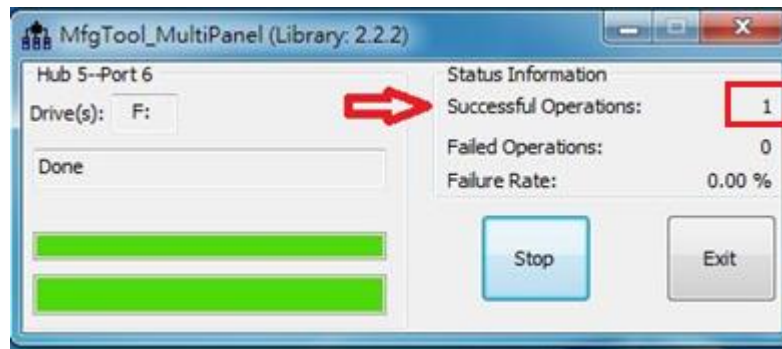




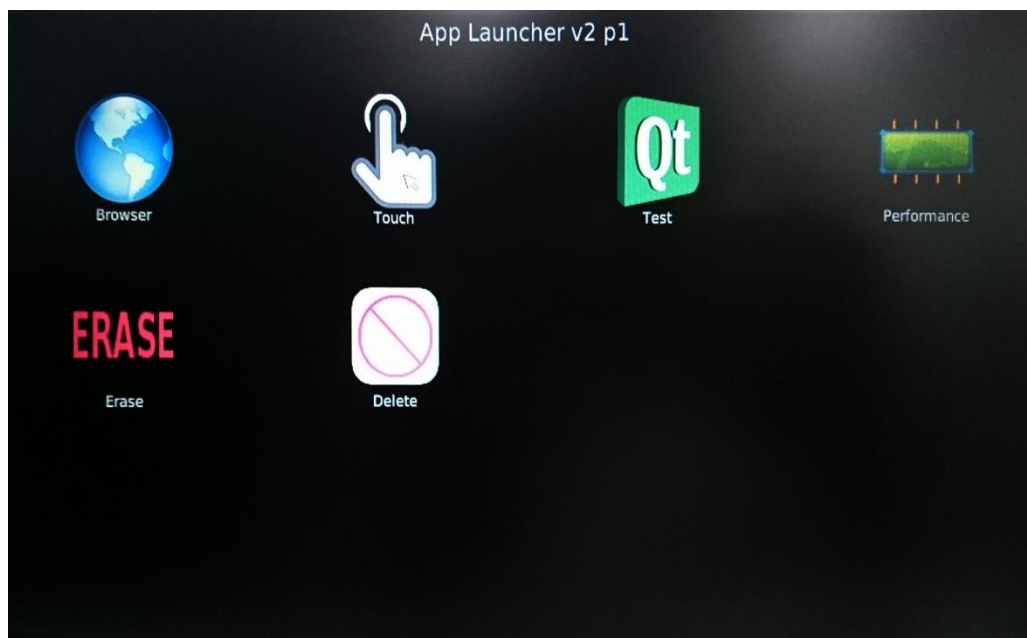
5. It will show up "Hub X--Port Y" on the upper left side if USB cable has been connected well, and then click "Start" to update Linux QT



6. When you finish updating, the screen will show the increasing counting numbers of “Successful Operations”. Click “Stop” and “Exit” then reset machine.



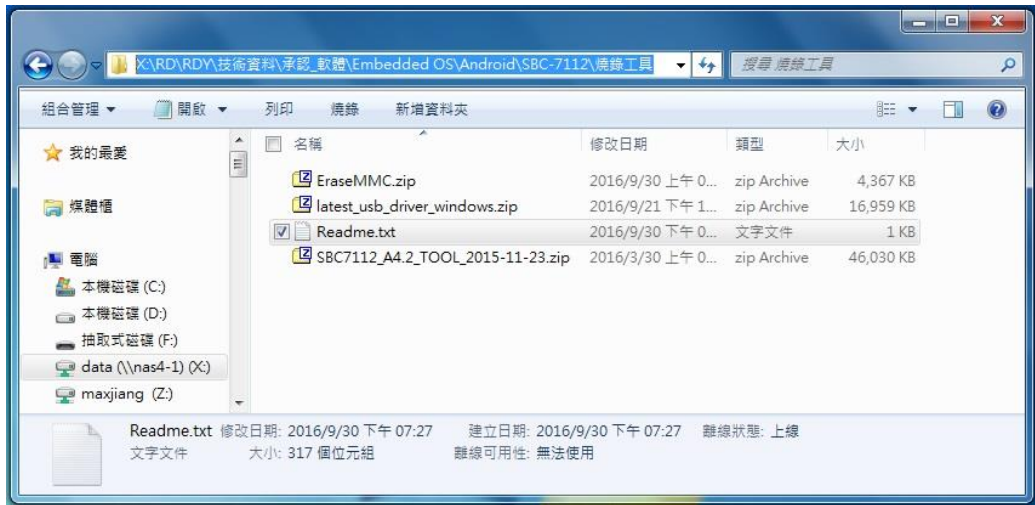
7. Linux QT has been updated successfully!!





## 3.2 Update Android Firmware

To update Android firmware, there must be three files as shown below.



**1. File1: latest\_usb\_driver\_windows.zip (ADB Interface Driver)**

The USB driver should be connected to ARMPAC device

**2. File2: EraseMMC.zip**

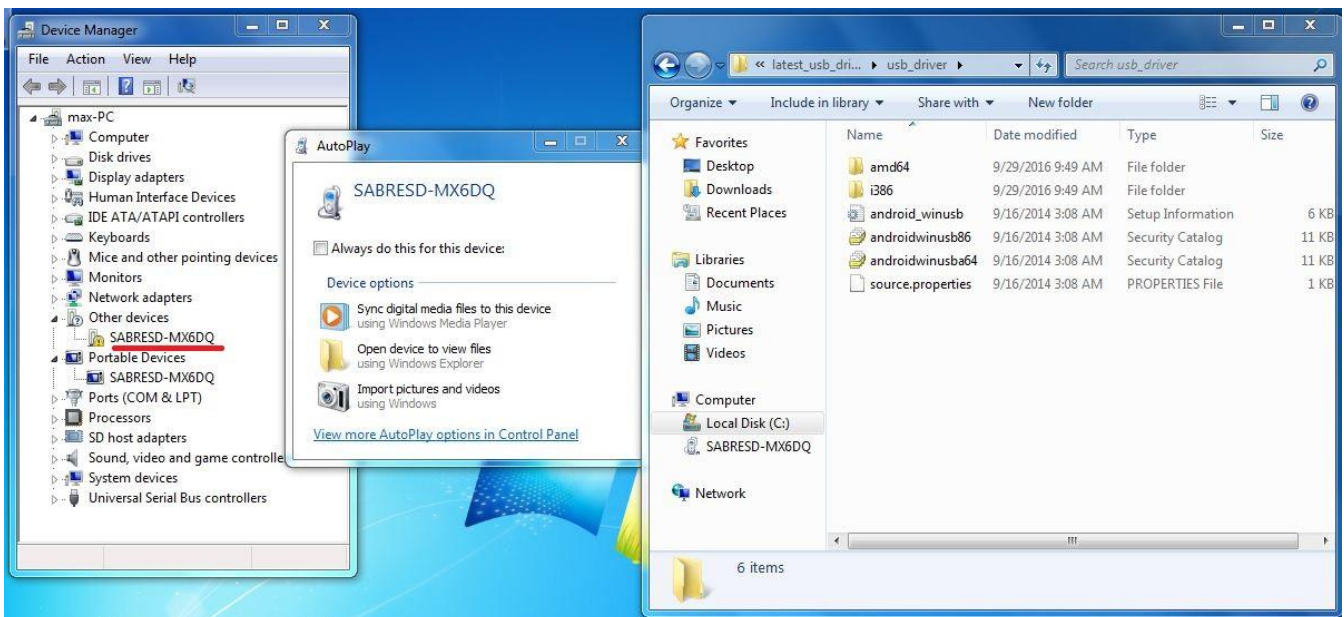
Erase all data on Flash and switch to download mode before updating Android firmware.

**3. File3: SBC7112\_A4.2\_TOOL\_2015-11-23.zip**

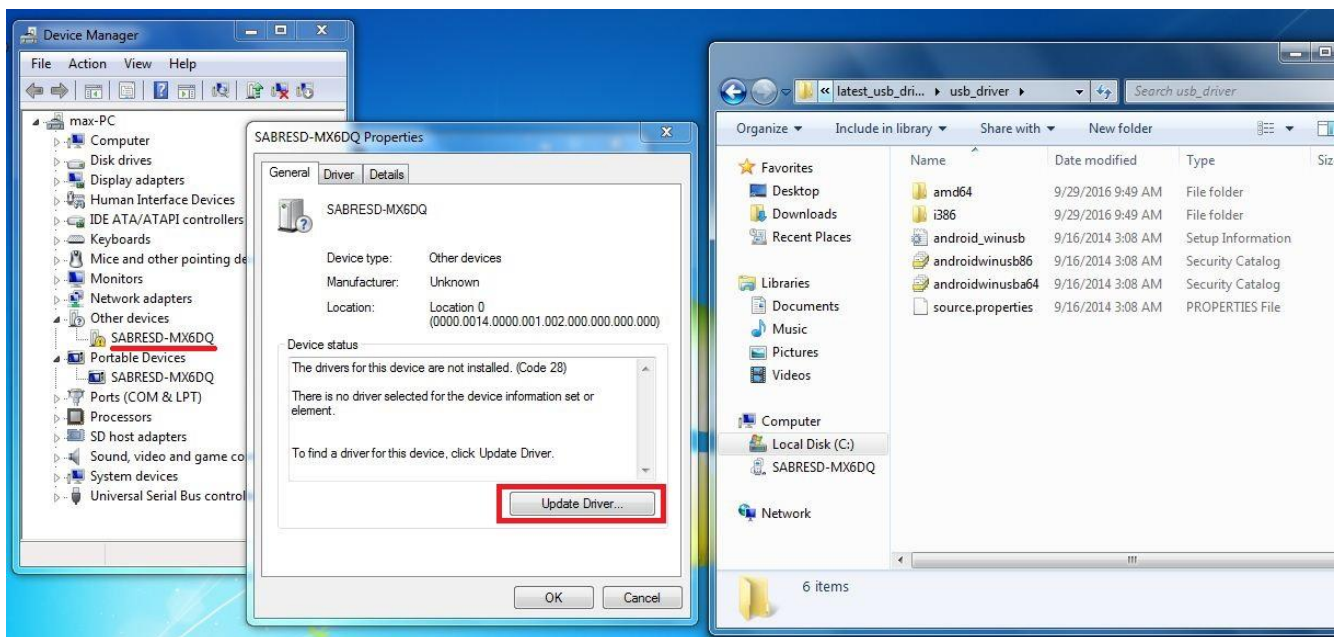
Update Android Firmware & update utility

**Step 1. → File1: latest\_usb\_driver\_windows.zip (ADB Interface Driver)**

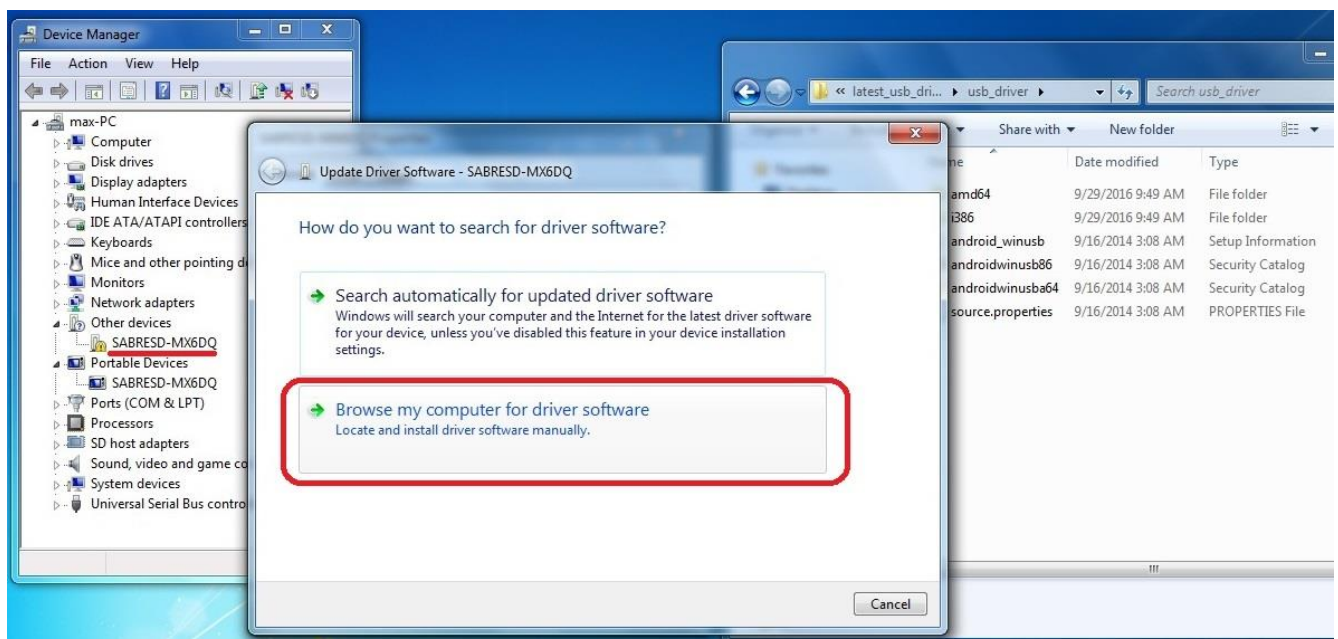
**1) Install ADB Interface Driver(laster\_usb\_driver\_windows.zip).**



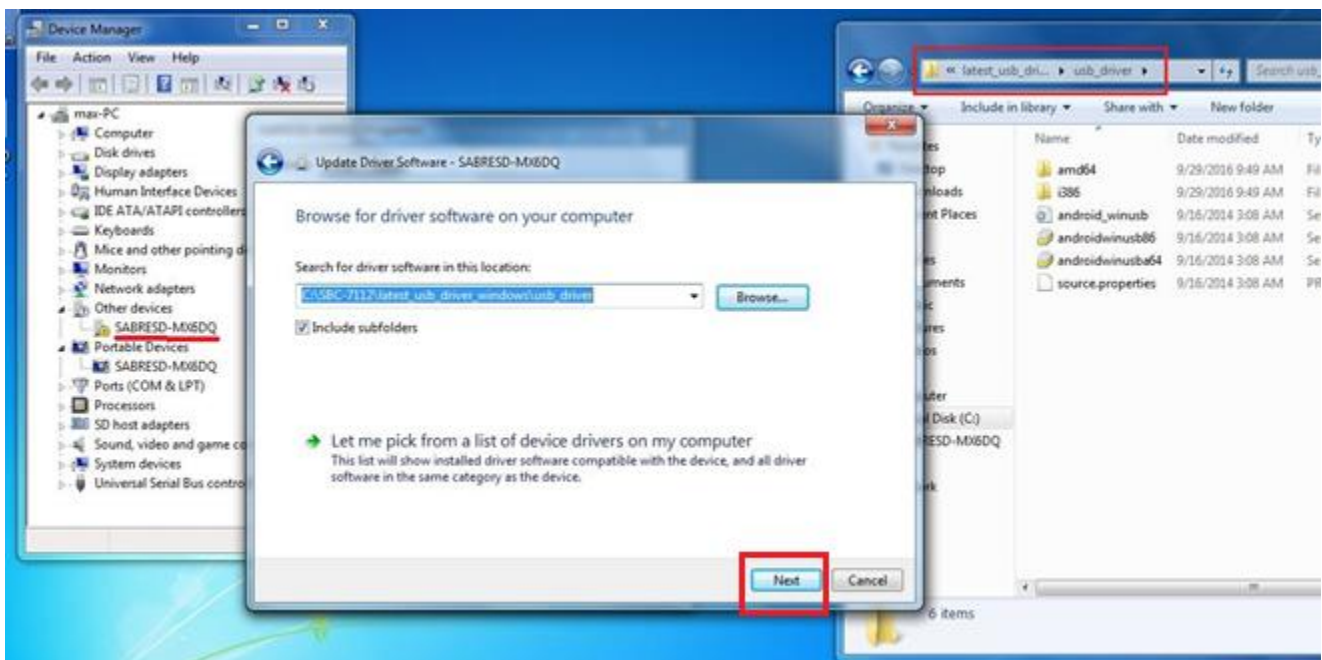
2) Click “Update Driver...” to continue.



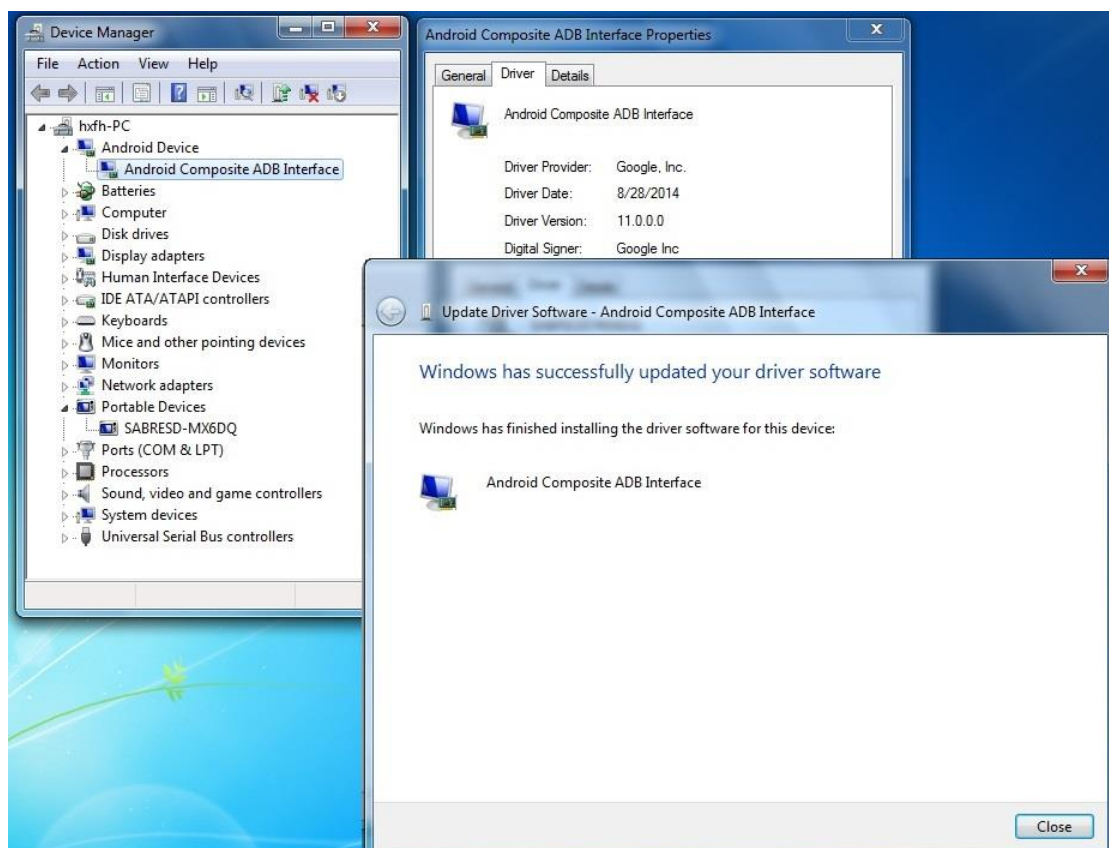
3) Select “Browse my computer for driver software” to locate and install driver software.



4) Click “Next” to continue.



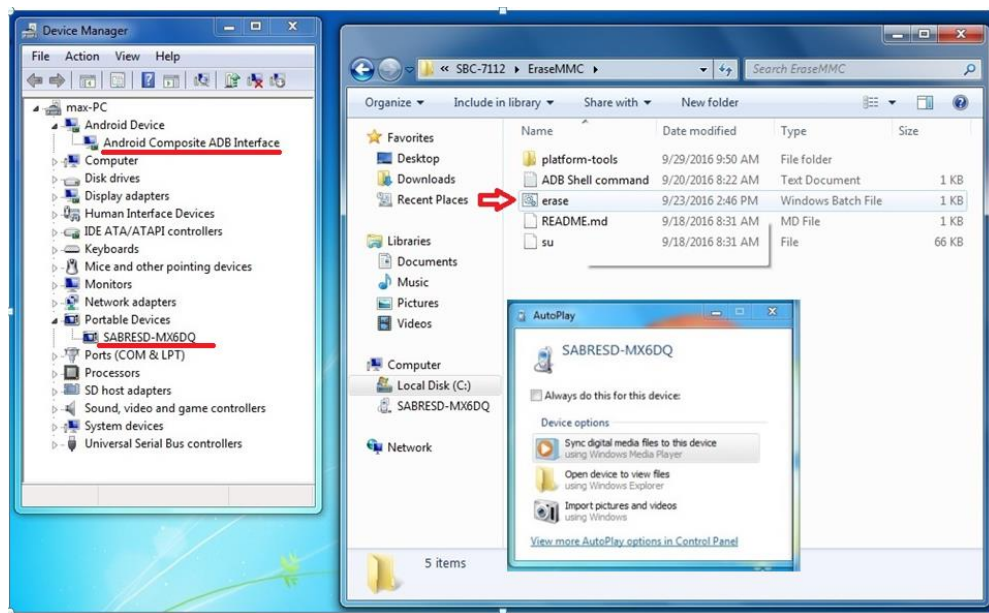
5) Click “Close” to complete the driver installation.



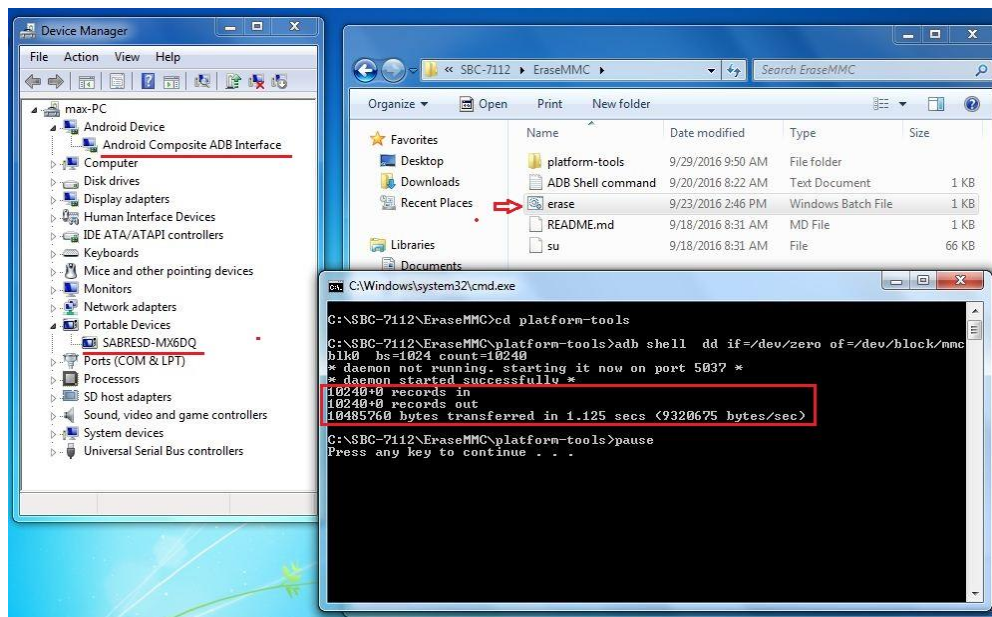


## Step 2. → File2: EraseMMC.zip

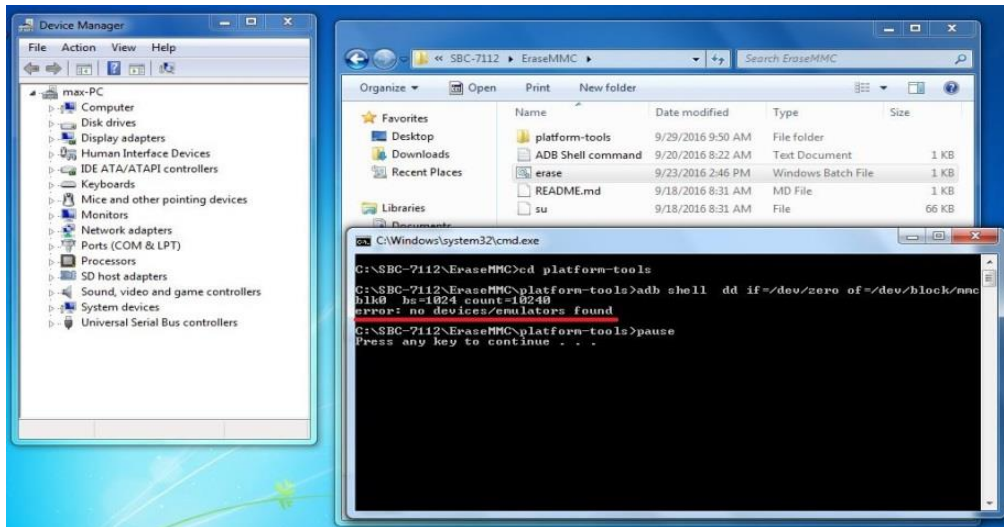
1) Switch to Download mode (Erase all data on Flash) via “ERASE.bat”.



2) It switches to Download Mode when the screen shows like the picture below, and then you can reset the ARMPAC.



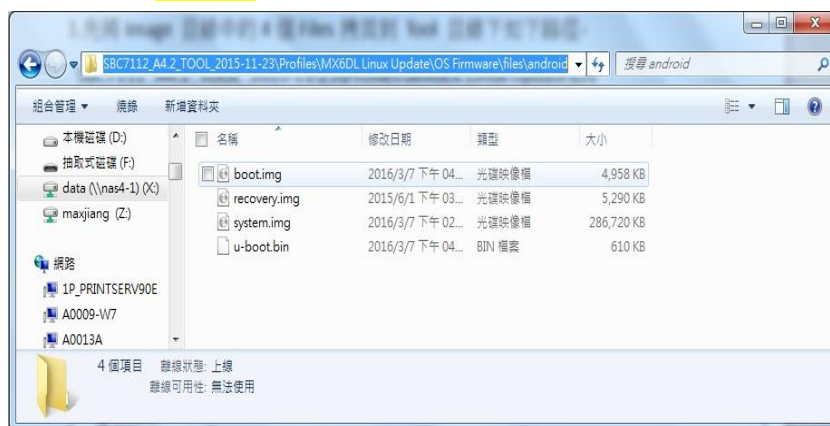
- There will be error message as shown like below picture if the USB hasn't been connected well.



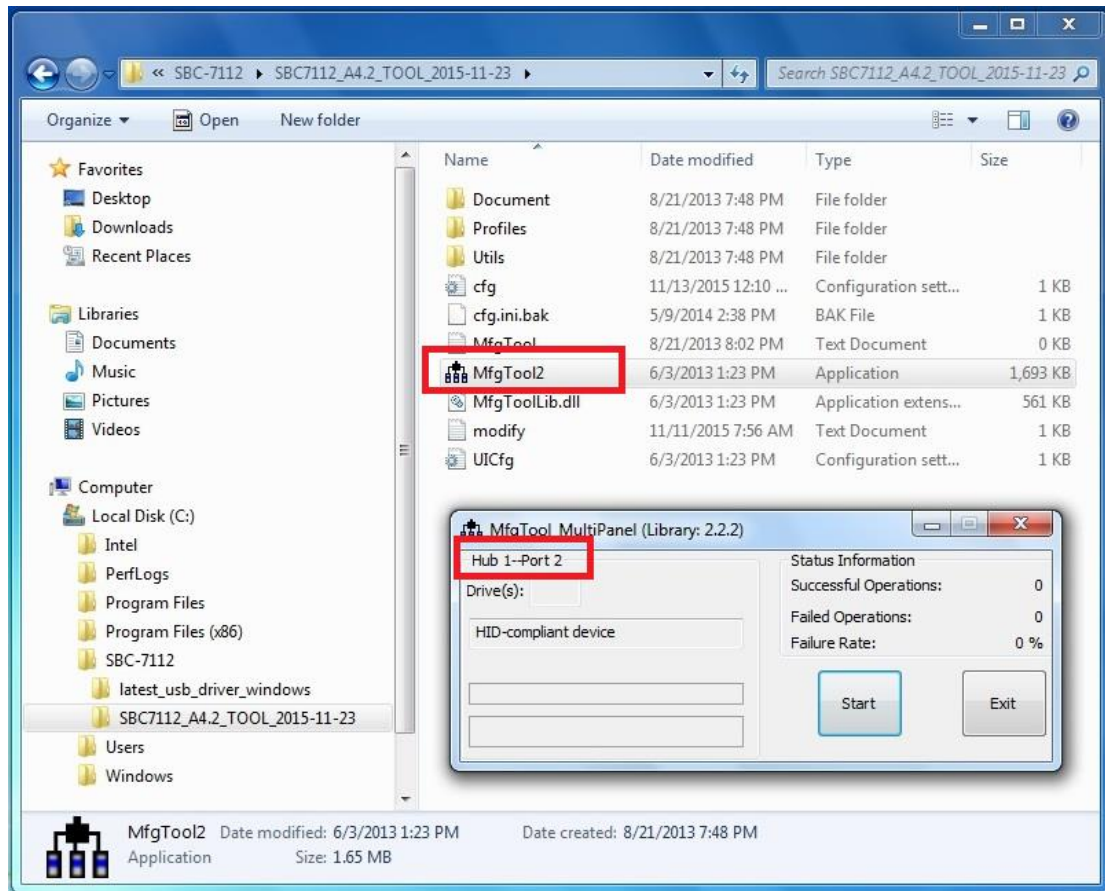
### Step 3. → File3: **SBC7112\_A4.2\_TOOL\_2015-11-23.zip**

- 1) Copy all images files include boot.img & recovery.img & system.img & u-boot.bin into "android" folder as below.

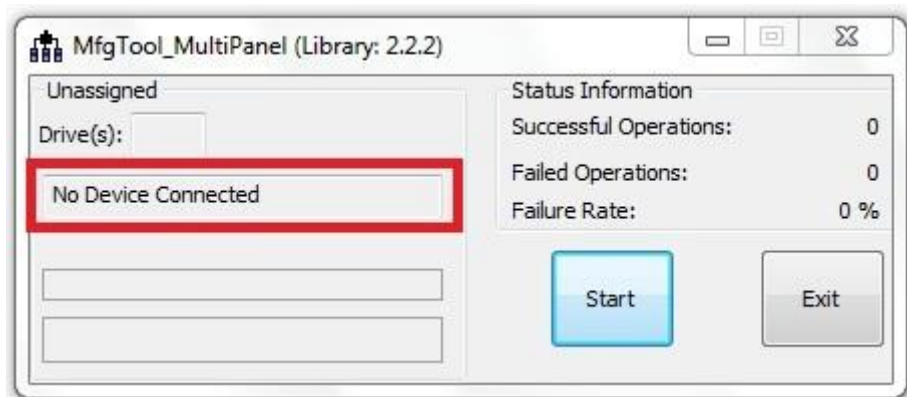
SBC7112\_A4.2\_TOOL\_2015-11-23\Profiles\MX6DL Linux Update\OS Firmware\files\android



- 2) Run “MftTool2.exe” to update firmware utility. The screen will show “HUB X-Port X” if the USB has been connected well. Then click “Start” to update firmware.



- The screen will show like this picture if the USB has not been connected well.



- 3) The screen will show the increasing counting numbers of “Successful Operations” when firmware has been updated successfully.

