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ARMPAC-6XX Series

7”, 8”, 10.1”, and 12.1” Fanless i.MX6 DualLite ARM Cortex A9 HMI Series

User Manual

Release Date	Revision
Oct. 2019	V1.7

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Revision History

Reversion	Date	Description
1.0	2016/11/08	Official Version
1.1	2017/01/13	Add SOP of updating Firmware and Linux QT, and update power consumption and net weight. Update SBC-7112 motherboard manual to R1.2 version
1.2	2017/04/12	Modify power consumption data.
1.3	2017/07/19	Remove 5” Add 15”, 15.6”
1.4	2017/10/20	Add motherboard version Modify software/IP rating Delete 15”, 15.6”
1.5	2018/11/08	Delete all QTs data Update OS Support list
1.6	2019/03/18	Update Storage Temperature
1.7	2019/10/18	Modify Linux and ANDROID information and photos

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.

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Chapter 1 Getting Started

1.1 Features

- ARM based HMI
- Fanless design
- Flat front panel touch screen
- Freescale i.MX6 DualLite/Quad (option) ARM Cortex A9 Processor
- Onboard 1GB DDR3 DRAM
- Onboard 4GB eMMC Flash
- Wide range DC 9~36V power input
- LED backlight LCD
- Resistive touch windows/Projected capacitive touch

1.2 Specifications

	ARMPAC-607(P)	ARMPAC-608(P)	ARMPAC-610(P)	ARMPAC-612(P)
System				
CPU	Freescale i.MX6 DualLite/Quad(option) ARM Cortex A9 processor 1.0GHz			
Memory	Onboard 1GB DDR3 DRAM			
External IO Port				
USB	2 x USB 2.0 type A 1 x USB 2.0 (Micro B type)			
Serial/Parallel	1 x RS-232/422/485 DB-9, COM1			
LAN	1 x LAN Port			
Power	1 x 9~36V DC power input via 1 x 3-pin terminal block			
Option	1 x RS-232/422/485 (TB-508C1) WIFI/4G module via Mini-PCIe			
Internal IO Port				
Internal IO Port	1 x SIM card slot 1 x Micro SD slot			
Storage Space				
Storage	Onboard 4GB eMMC NAND flash			
Expansion				
Expansion Slot	1 x Mini-PCIe Slot full size			
Display				
Display Type	7” color TFT LCD	8” color TFT LCD	10.1” color TFT LCD	12.1” color TFT LCD

Resolution	800x480	800x600	1024x600	800x600
Max. Color	262K	262K	262K	262K
Luminance	350	350	250	450
Contrast Ratio	400: 1	500: 1	500: 1	800: 1
Viewing Angle	140(H)/110(V)	140(H)/135(V)	140(H)/120(V)	160(H)/140(V)
Backlight Lifetime	40,000 hrs	40,000 hrs	25,000 hrs	50,000 hrs
Touch Screen – Resistive Touch Window Type				
Interface	SPI			
Light Transmission	Over 80%			
Touch Screen – Projected Capacitive Type				
Interface	USB			
Light Transmission	Over 90%			
Power				
Power Input	DC9~36V			
Power Consumption	MAX: 5.3W (607)	MAX: 7W (608)	MAX: 7W (610)	MAX: 10.8W (612)
Mechanical				
Front Bezel Metal	Plastic/Panel Mount			
Rear Panel Metal	Plastic/VESA 75		Plastic/VESA 100	
Chassis Color	Pantone Cool Gray 11C			
IP Rating	IP66 Front Panel			
Dimensions	204 x 150 x 42.5 mm	231.1 x 176.1 x 45 mm	285 x 189 x 49.6 mm	319 x 245 x 51 mm
Net Weight	0.9 Kg	0.9 kg	1.4 Kg	1.5 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	Linux 4.9.88+ChromiumV67 ; ANDROID 6.0.1			

1.3 Dimensions

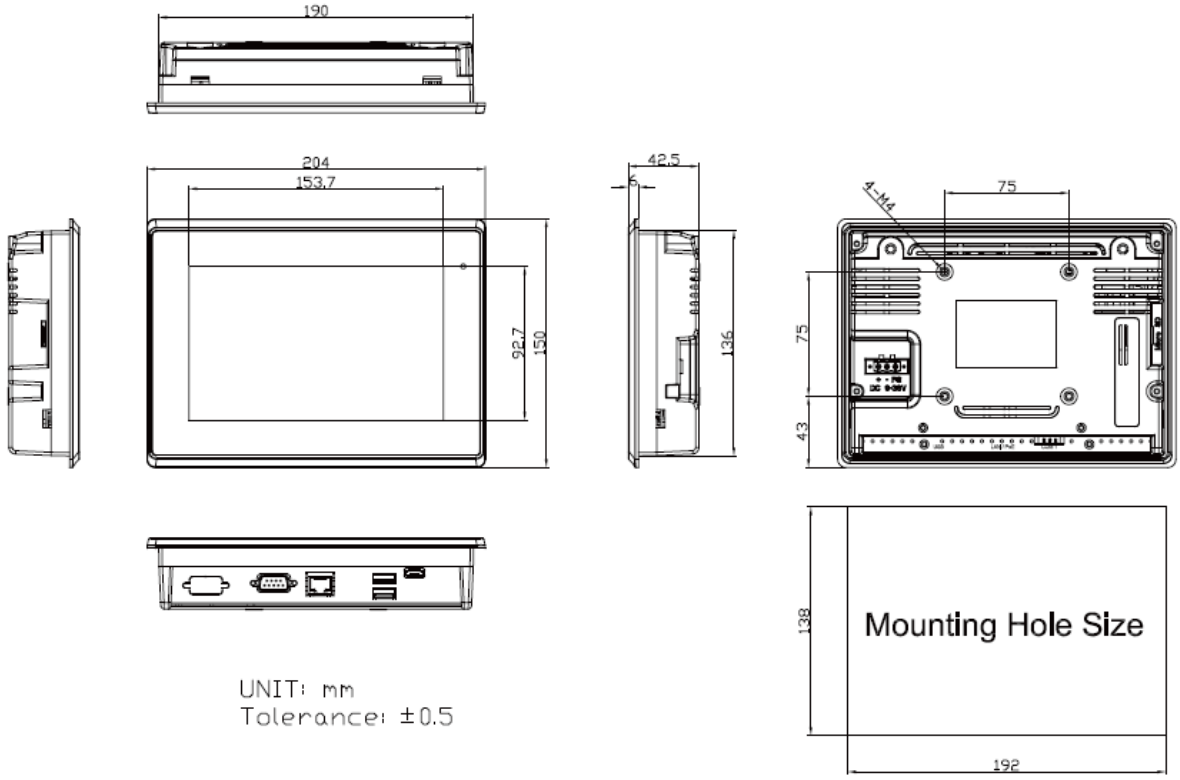


Figure 1.1: Dimensions of ARMPAC-607(P)

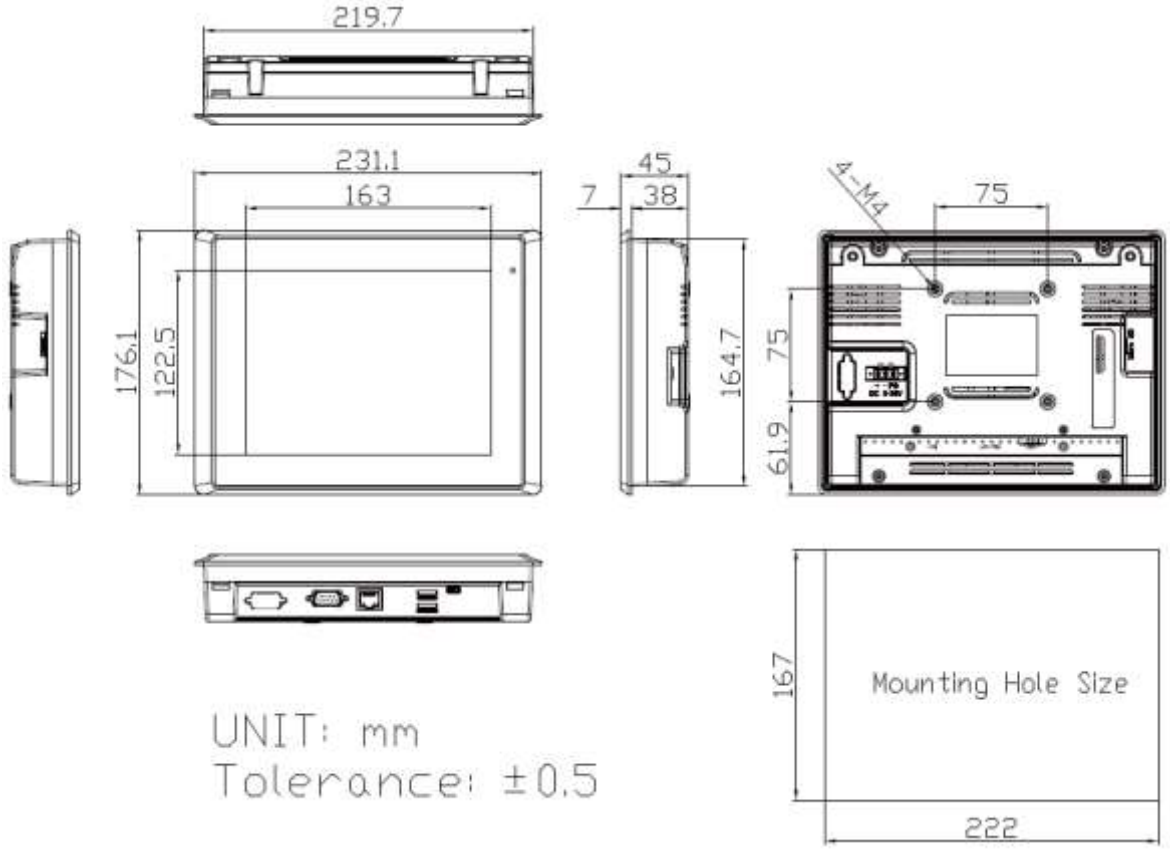


Figure 1.2: Dimensions of ARMPAC-608(P)

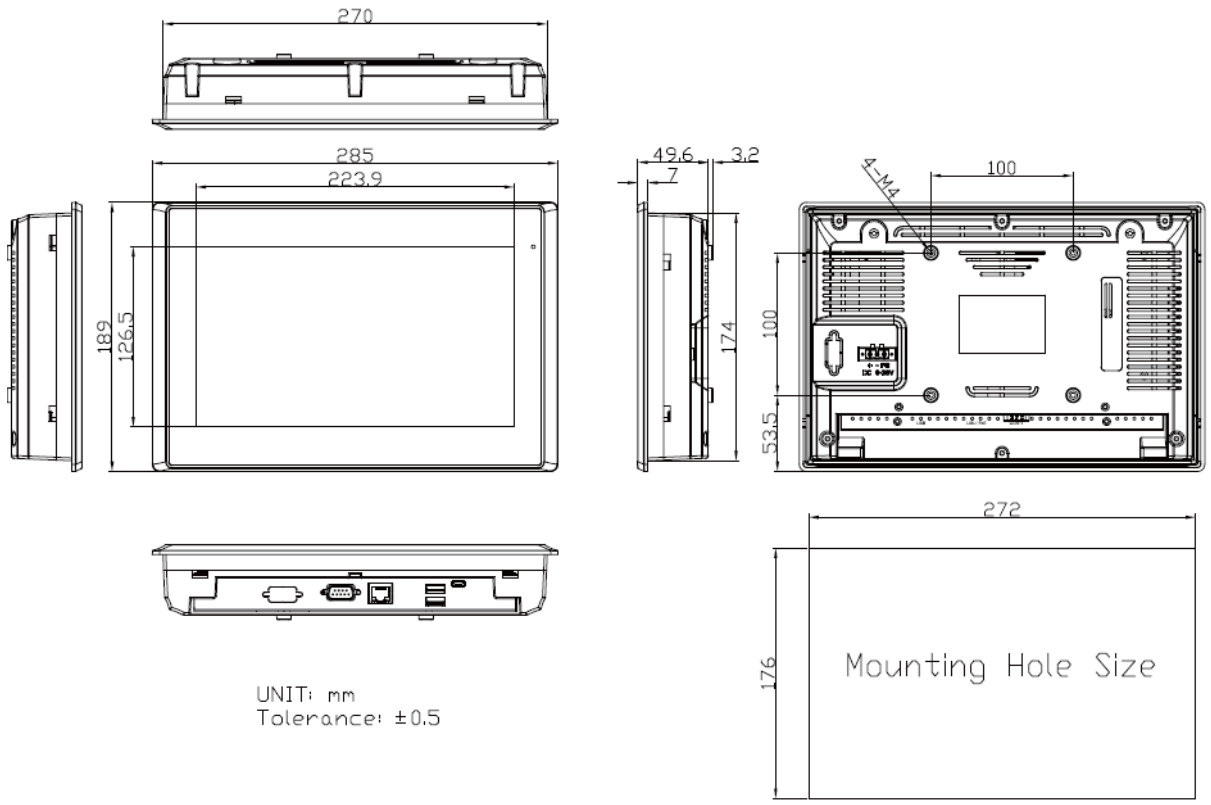


Figure 1.3: Dimensions of ARMPAC-610(P)

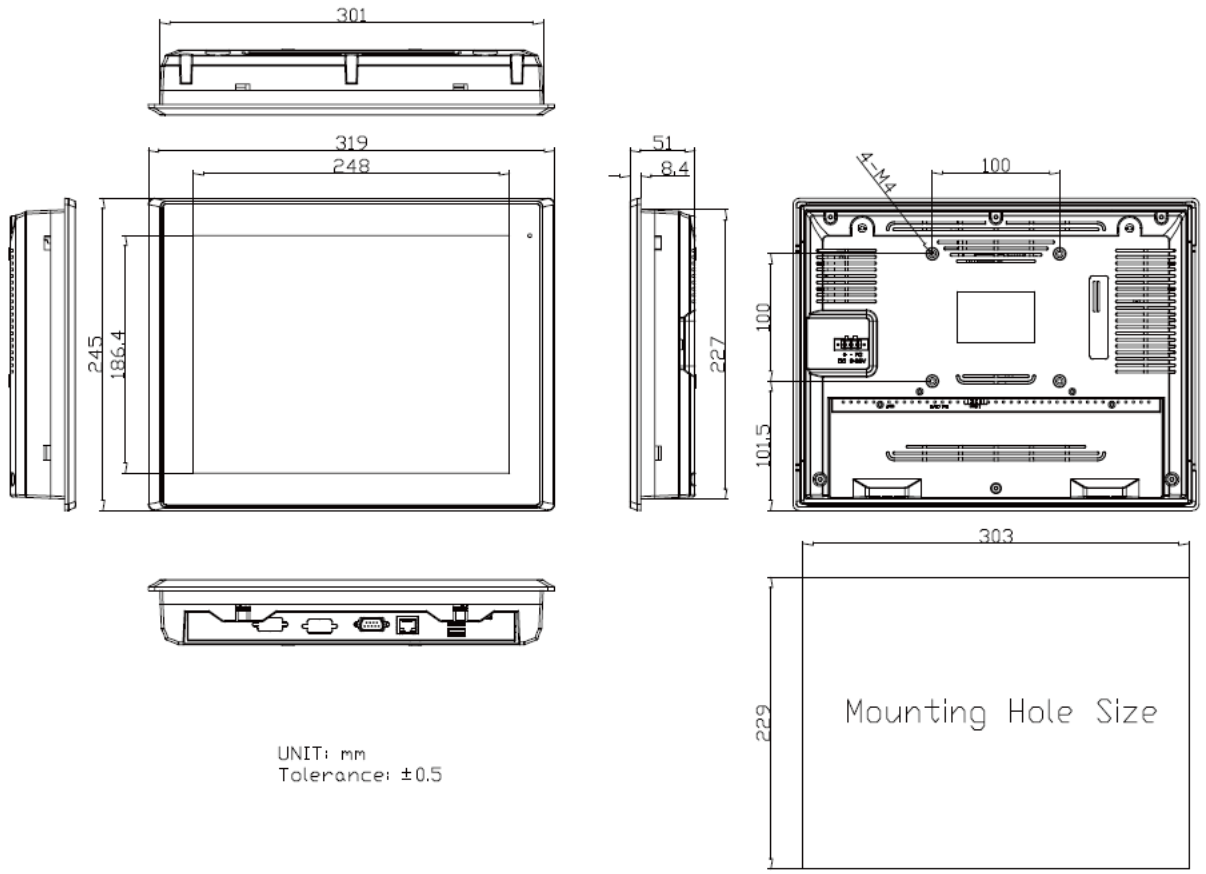


Figure 1.4: Dimensions of ARMPAC-612(P)

1.4 Brief Description of ARMPAC-6XX

There are 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 Freescele i.MX6 DualLite/Quad (option) ARM Cortex A9 processor, 1GB DDR3 onboard memory, and 4GB eMMC NAND flash onboard. ARMPAC-6XX series is DC 9~36V wide range power input and IP66 compliant front panel. The 7”, and 8” model can be VESA 75 x 75 mounted, and 10.1”, 12.1” can be VESA 100 x 100 mounted. The chassis color are pantone cool gray 11C for plastic design in 7”, 8”, 10.1”, and 12.1”. Optional projected capacitive touch screen supports 7H anti-scratch surface is ideal for use as PC-based controller for industrial automation & factory automation.

Figure 1.7: Front View of ARMPAC-6XX Series

Figure 1.8: Rear View of ARMPAC-6XX Series

1.5 VESA Mounting

The ARMPAC-6XX 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.

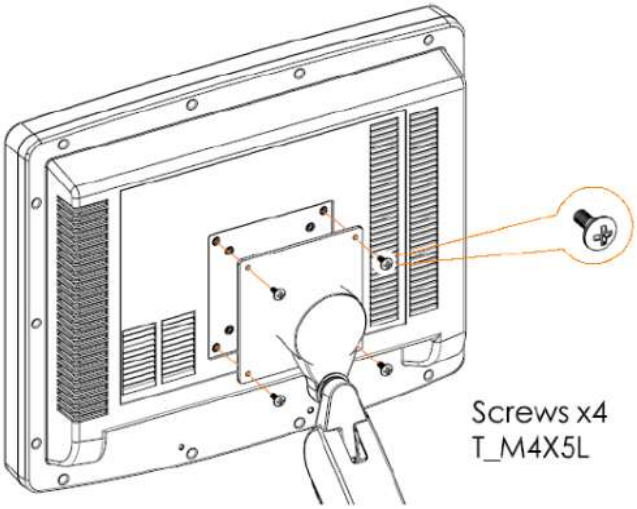


Figure 1.9: ARMPAC-6XX Series VESA Mounting

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.

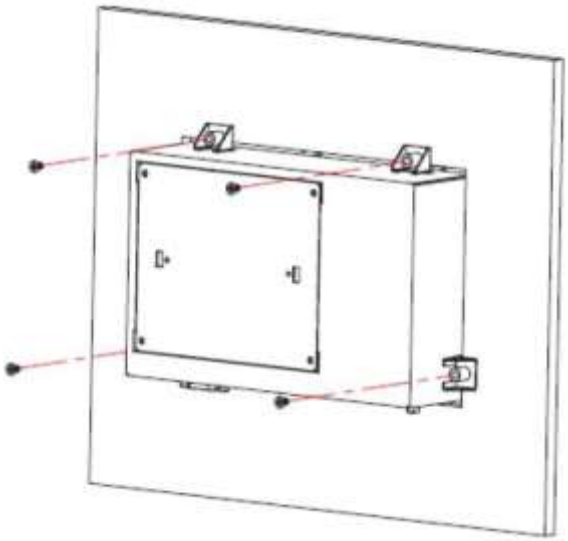


Figure 1.10: ARMPAC-6XX Series Panel Mounting

Chapter 2 Hardware

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).

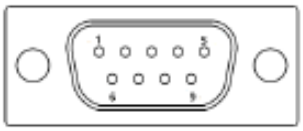
4. MIO1:

(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_BL0	19	20	VCC_BL0

11. LVDS2:

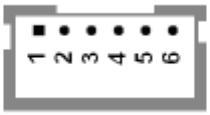
(1.25mm Pitch 2*10 Connector, DF13-20DP-1.25V), For 18/24-bit LVDS1 output connector.

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

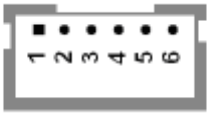
13. BT1:

(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:

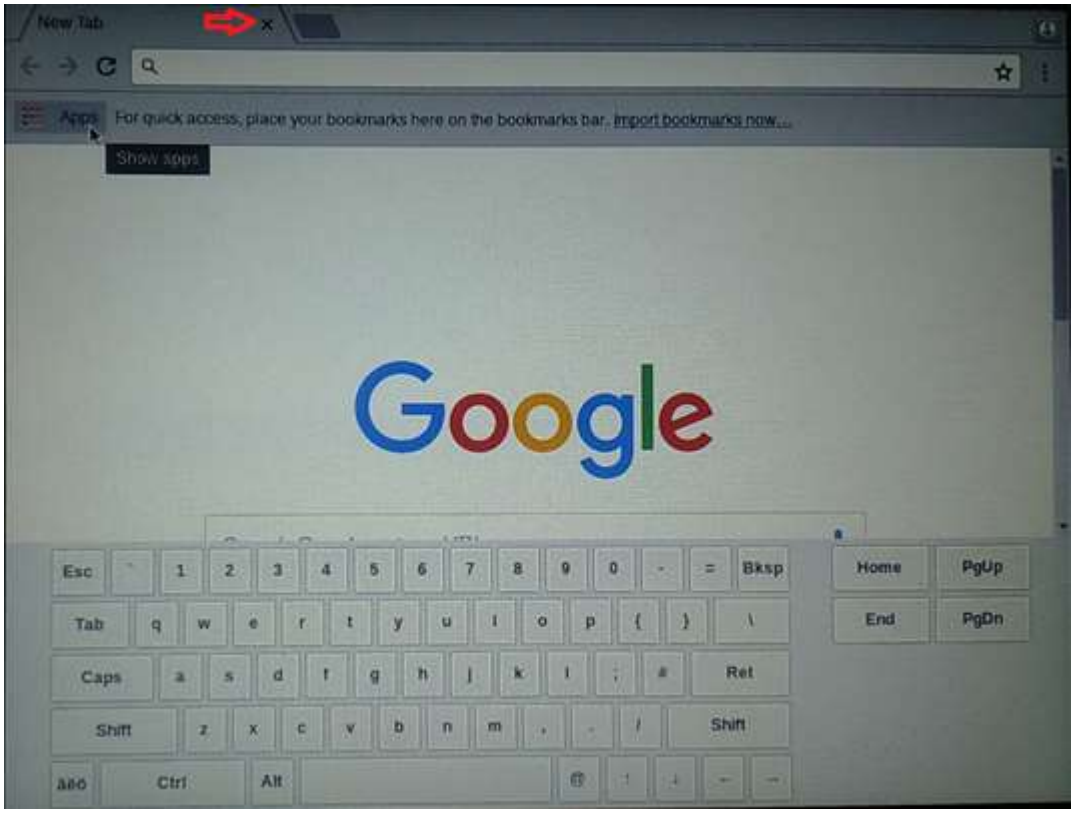
Dial Switch, it is used to select the voltage for BKLT_CTRL1 and BKLT_EN_OUT1.

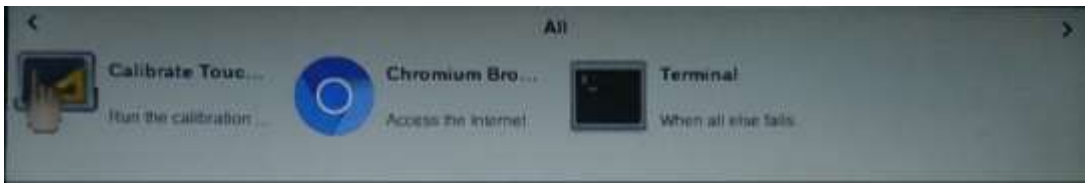
SW3 Pin#	Function	Function
1-4	Close	Open(default)
	BKLT_CTRL0 = 3.3V	BKLT_CTRL0 = 5V
2-3	Close	Open(default)
	BKLT_EN_OUT0 = 3.3V	BKLT_EN_OUT0 = 5V

Chapter 3 Software images

3.1 Update Linux for SBC-7112

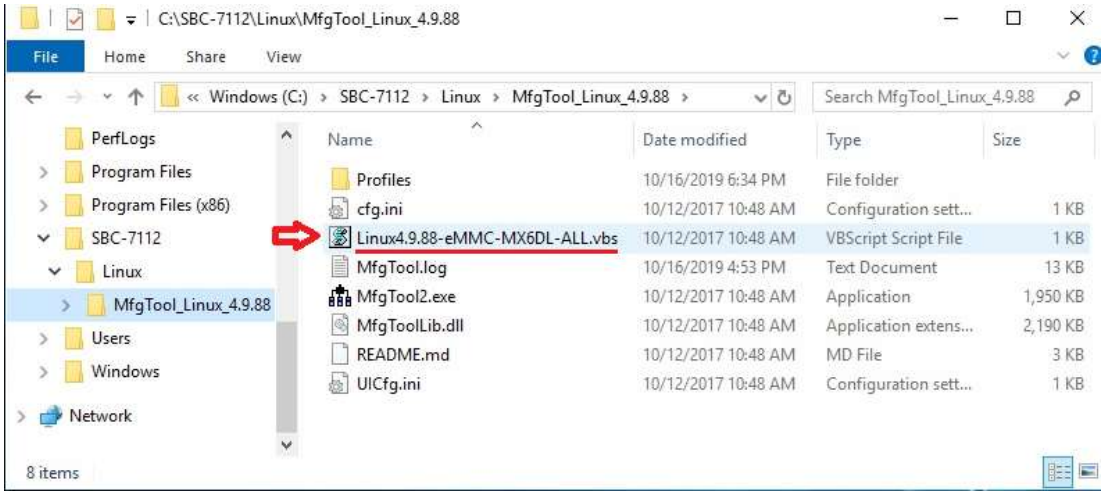
1. Close Chromium Browser and return to desktop, then select the “Terminal” APP.



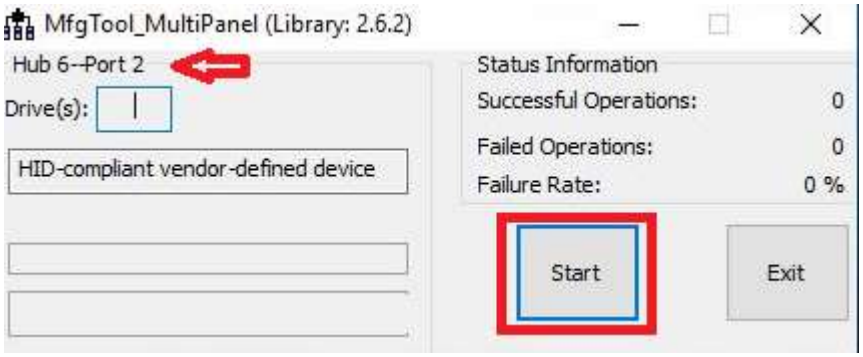


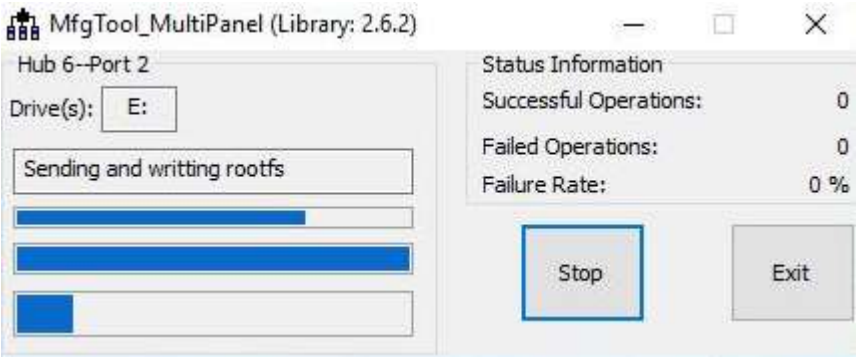
2. Key-in below command to erase the EMMC data (change to Download Mode).

3. Connect Micro USB Cable from SBC-7112 to your desktop/laptop and run update tool “Linux 4.9.88-eMMC-MX6DL-ALL.vbs”.

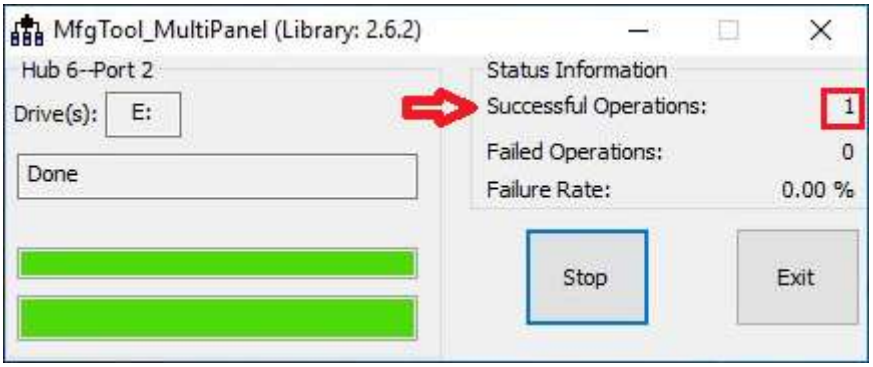


4. It will show up “Hub X--Port Y” on the upper left side if USB cable has been connected well, and then click “Start” to update Linux Firmware

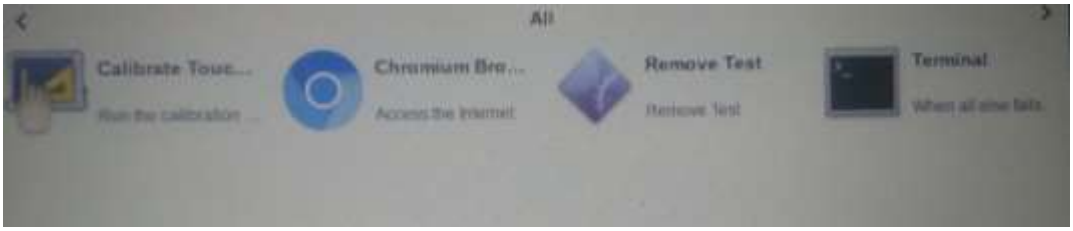




5. When you finish updating, the screen will show the increasing counting numbers of “Successful Operations”. Click “Stop” and “Exit” then reset machine.

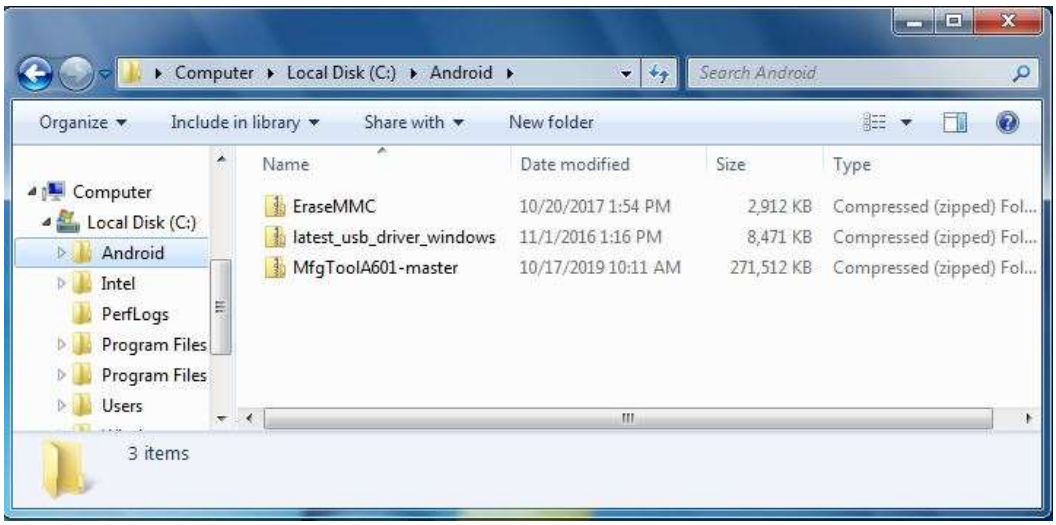


6. Linux 4.9.88+Chromium Browser have been updated successfully!!



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 for Windows 7)**

   The USB driver should be connected to VITAM-6XX device

2. **File2: EraseMMC.zip**

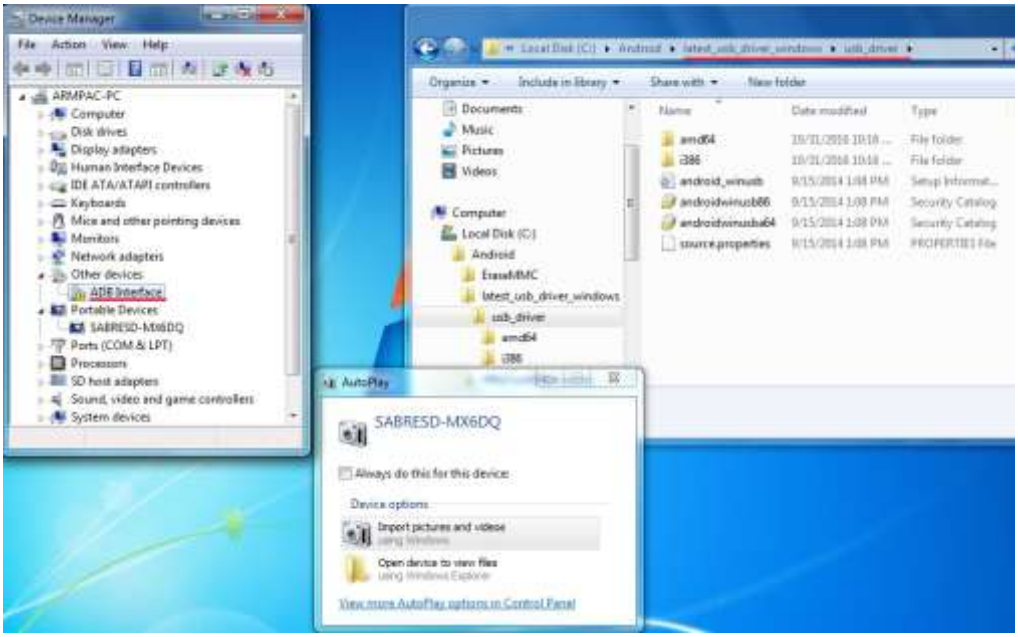
   Erase all data on Flash and switch to download mode before updating Android firmware.

3. **File3: MfgtoolA601_master.zip**

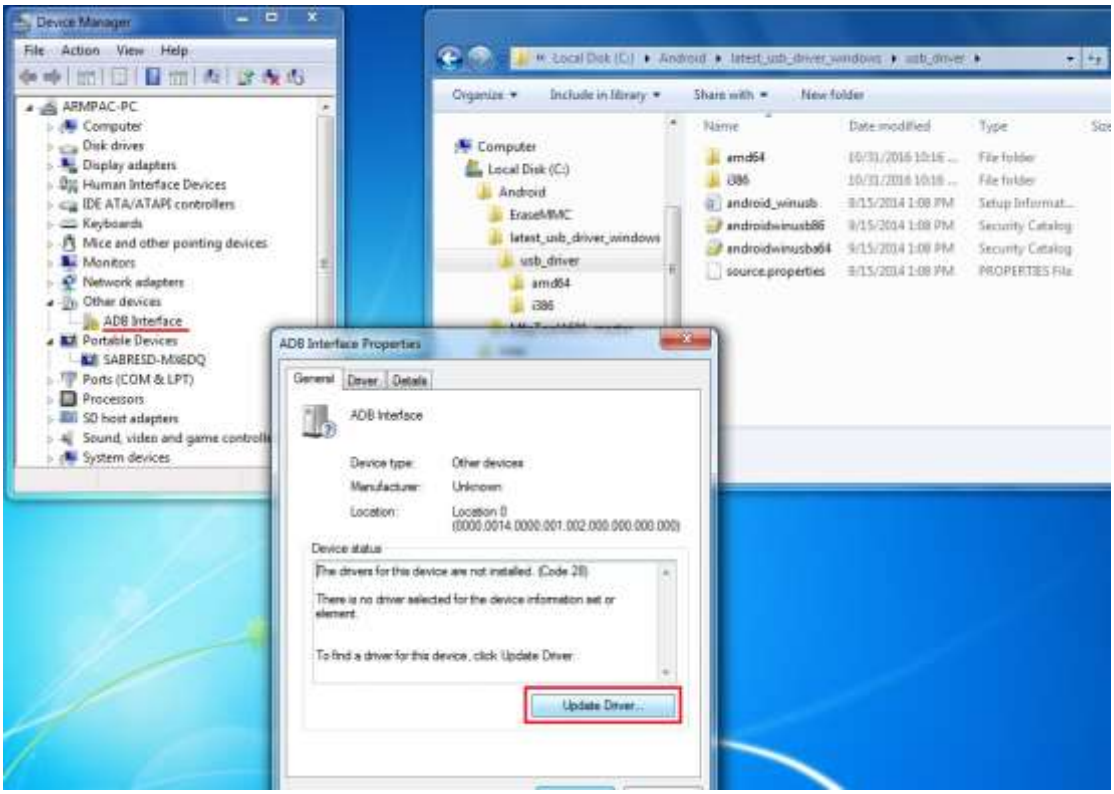
   Update Android Firmware & update utility

Step 1. → File1: latest_usb_driver_windows.zip (ADB Interface Driver for Windows 7)

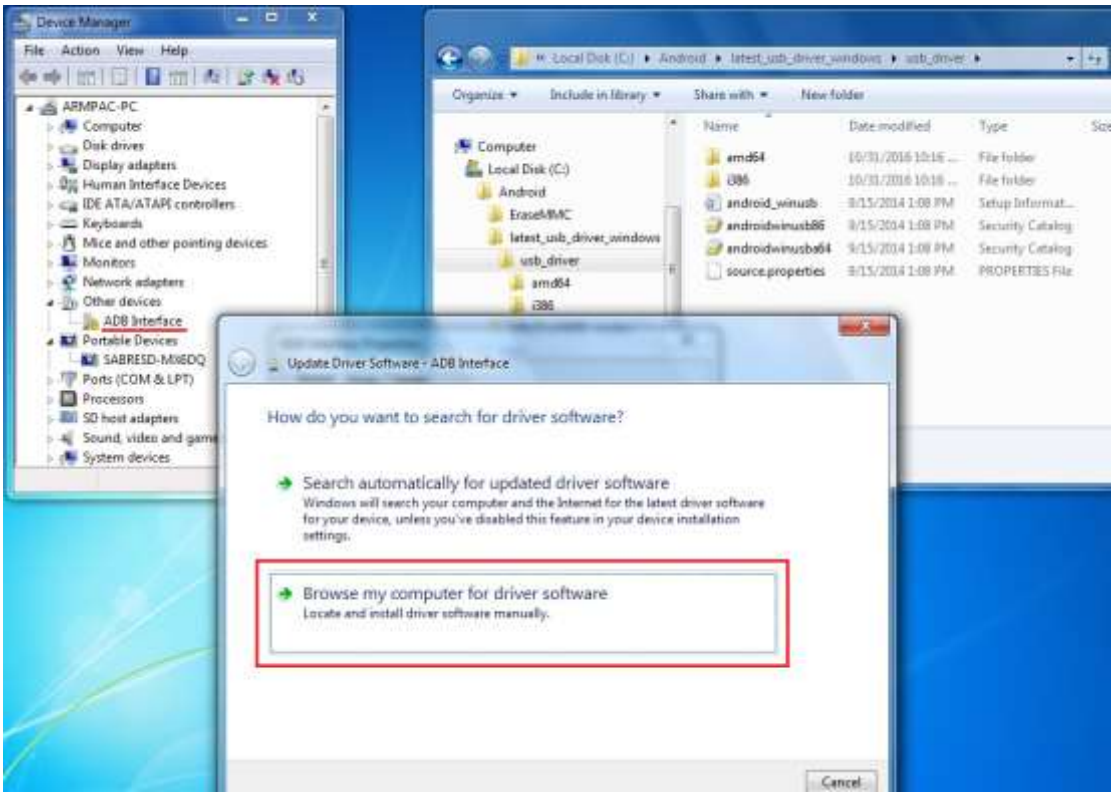
1) Install ADB Interface Driver for Windows 7. (laster_usb_driver_windows.zip).



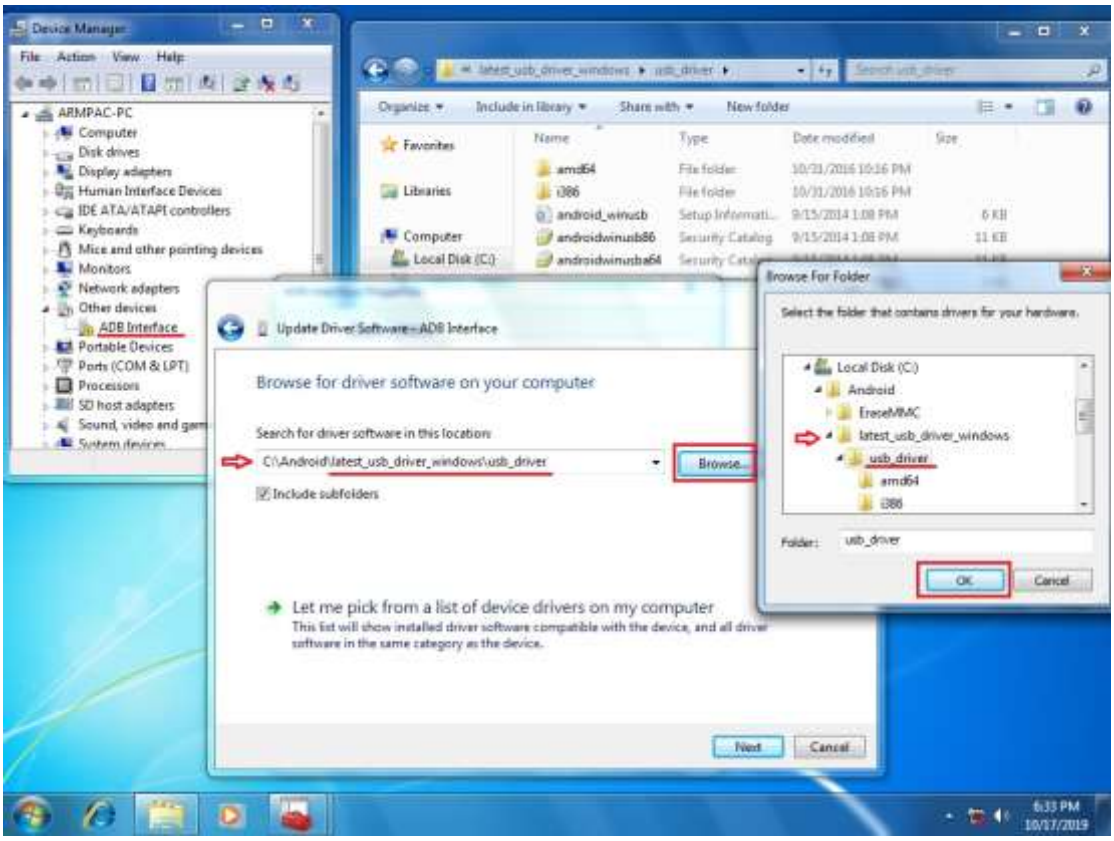
2) Double click “ADB Interface” to “Update Driver”.



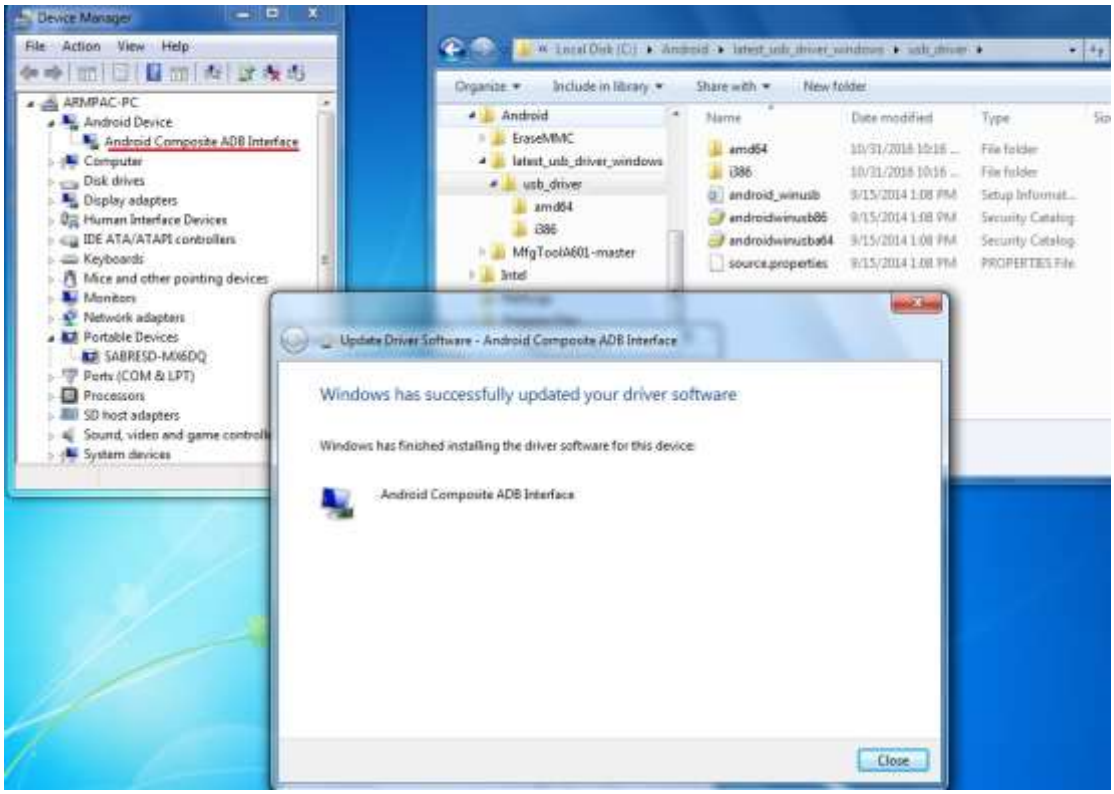
3) Select “Browse my computer for driver software” to locate and install driver software.



4) Click “Browse” to \lastest_usb_driver_windows\usb_driver\.



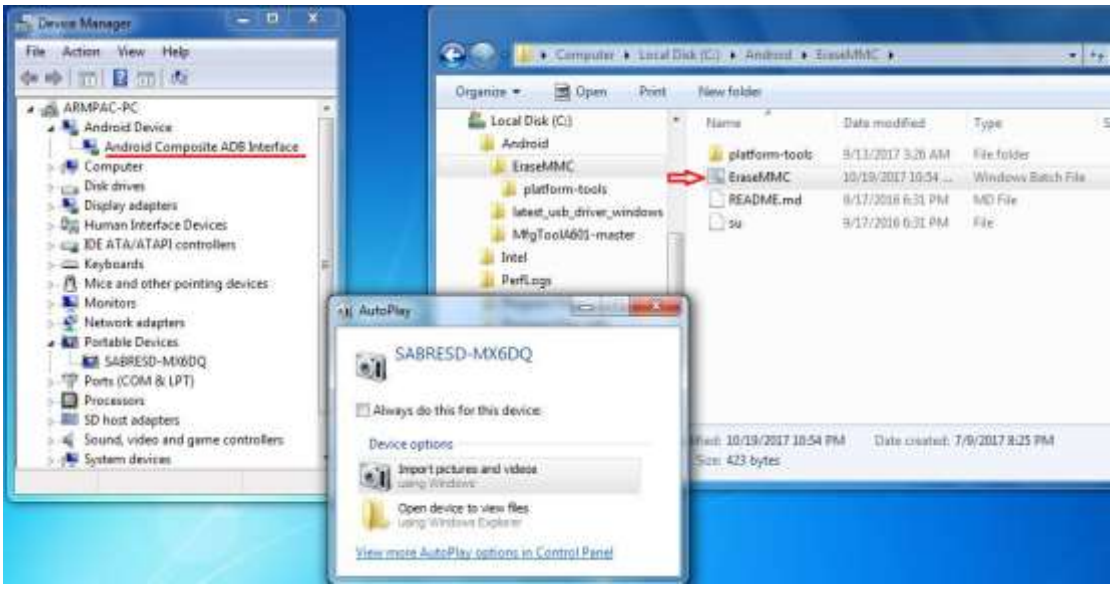
5) Click “Close” to complete the driver installation.



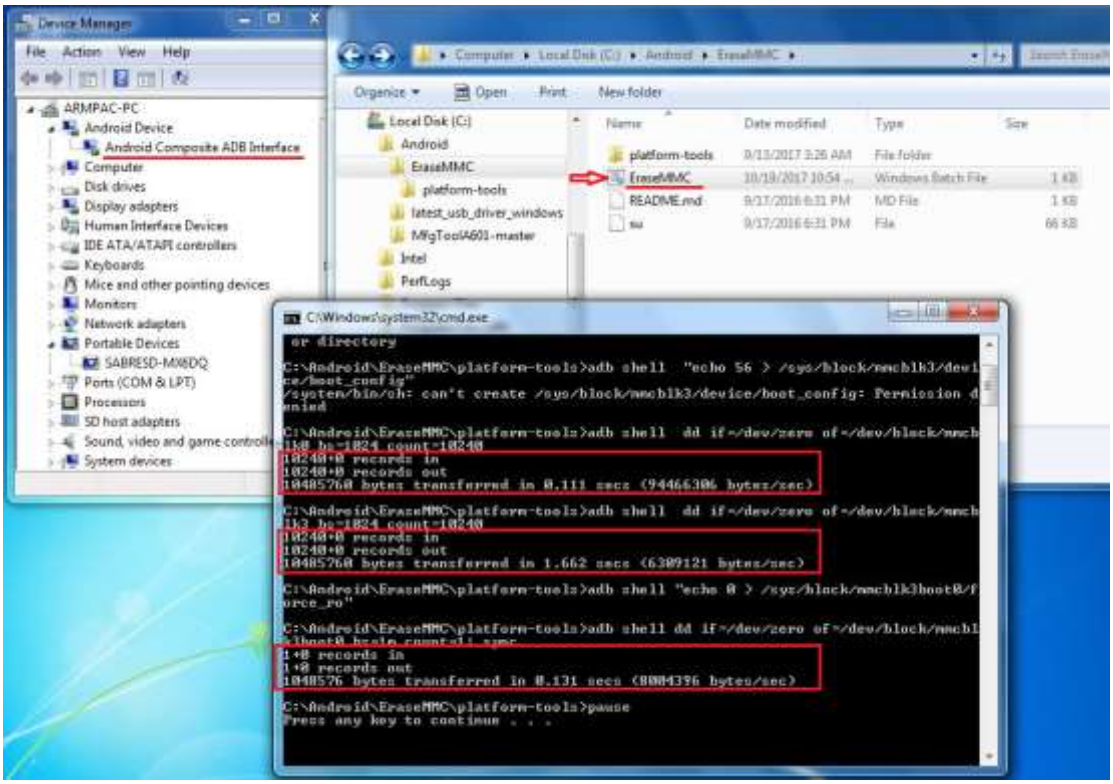
PS: Windows 10 OS Please skip step 1.

Step 2. → File2: EraseMMC.zip

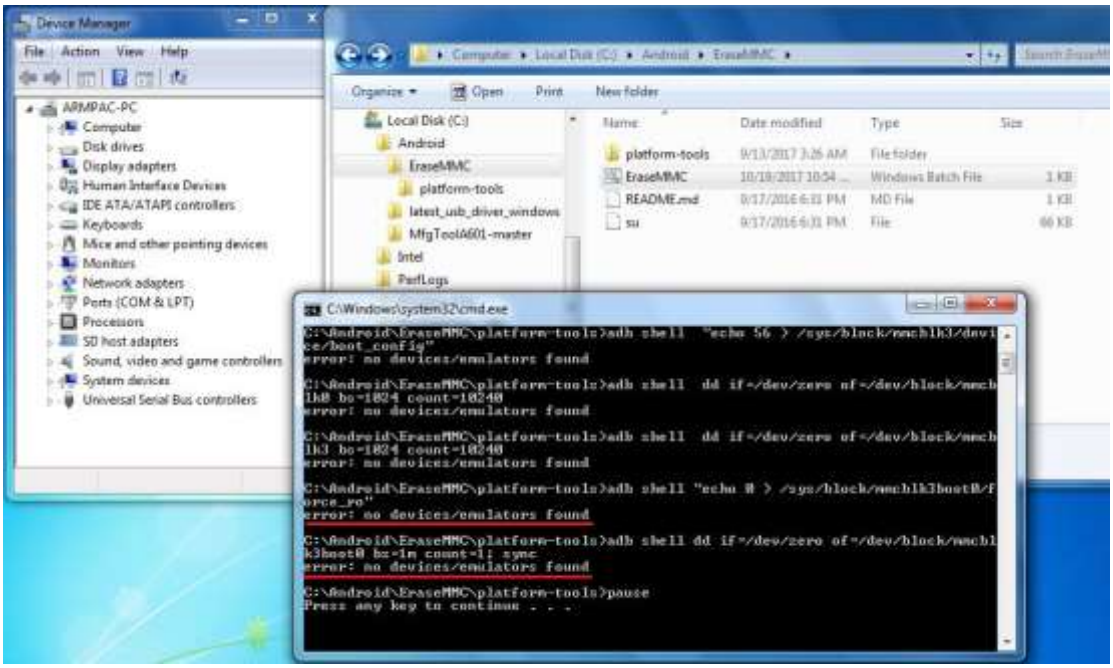
1) Switch to Download mode (Erase all data on Flash) via “EraseMMC.bat”.



2) It switches to Download Mode when the screen shows like the picture below, and then you can reset the machine ARMPAC-6XX.

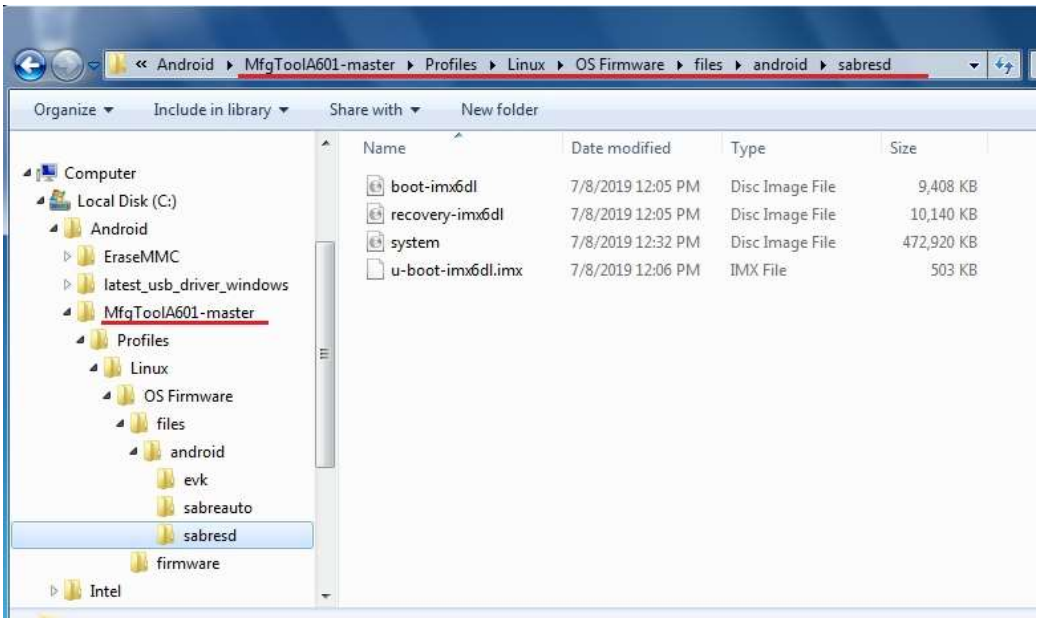


- There will be error message as shown like below picture if the USB hasn't been connected well.



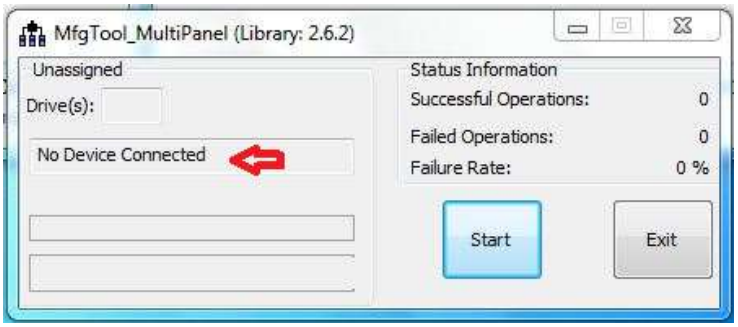
Step 3. → File3: MfgToolA601-master.zip

1) Copy all images files include boot-imx6dl.img & recovery-imx6dl.img & system.img & u-boot-imx6dl.imx into "sabresd" folder as below.
   \MfgToolA601-master\Profiles\Linux\OS Firmware\files\android\sabresd\



2) Run “Android6.0.1-eMMC-MX6DL-ALL.vbs” 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.