

AIB-IMX6A

BOX System with NXP i.MX6

Quick Reference Guide

1st Ed – 13 April 2020

Copyright Notice

Copyright © 2020 Avalue Technology Inc., ALL RIGHTS RESERVED.

FCC Statement



THIS DEVICE COMPLIES WITH PART 15 FCC RULES. OPERATION IS SUBJECT TO THE FOLLOWING TWO CONDITIONS:

(1) THIS DEVICE MAY NOT CAUSE HARMFUL INTERFERENCE.

(2) THIS DEVICE MUST ACCEPT ANY INTERFERENCE RECEIVED INCLUDING INTERFERENCE THAT MAY CAUSE UNDESIRE 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.

Copyright Notice

Copyright © 2020 Avalue Technology Inc., ALL RIGHTS RESERVED.

No part of this document may be reproduced, copied, translated, or transmitted in any form or by any means, electronic or mechanical, for any purpose, without the prior written permission of the original manufacturer.

Disclaimer

Avalue Technology Inc. reserves the right to make changes, without notice, to any product, including circuits and/or software described or contained in this manual in order to improve design and/or performance. Avalue Technology assumes no responsibility or liability for the use of the described product(s), conveys no license or title under any patent, copyright, or masks work rights to these products, and makes no representations or warranties that these products are free from patent, copyright, or mask work right infringement, unless otherwise specified. Applications that are described in this manual are for illustration purposes only. Avalue Technology Inc. makes no representation or warranty that such application will be suitable for the specified use without further testing or modification.

CONTENT

1. Getting Started	4
1.1 Safety Precautions	4
1.2 Packing List	4
1.3 System Specifications	5
1.4 System Overview.....	7
1.4.1 Rear View.....	7
1.4.2 Right View	7
1.5 System Dimensions.....	8
2. Hardware Configuration	9
2.1 AIB-IMX6A connector mapping	10
2.1.1 Serial port 1 connector (COM1).....	10
2.1.2 Serial port 2 connector (COM2).....	10
2.1.3 Serial port 3 connector (COM3).....	11
3. Software User Guide	12
3.1 Build and install U-boot & Kernel image for ACP-IMX6POS.....	13
3.1.1 Requirements.....	13
3.1.2 Setting Up the Standalone Cross-Development Environment.....	13
3.2 Get U-boot & Kernel source code and Compiler.....	13
3.2.1 Get U-boot & Kernel source code.....	13
3.2.2 Compiler U-boot & Kernel image	14
3.3 Flash U-boot & Kernel image to eMMC or MicroSD	15
3.3.1 Flash U-boot & Kernel image to eMMC	15
3.3.2 Get MFG tool	17
3.3.3 Flash OS to eMMC by MFG tool.....	17
3.3.4 Flash OS to SD card by MFG tool	19

1. Getting Started

1.1 Safety Precautions

Warning!



Always completely disconnect the power cord from your chassis whenever you work with the hardware. Do not make connections while the power is on. Sensitive electronic components can be damaged by sudden power surges. Only experienced electronics personnel should open the PC chassis.

Caution!



Always ground yourself to remove any static charge before touching the CPU card. Modern electronic devices are very sensitive to static electric charges. As a safety precaution, use a grounding wrist strap at all times. Place all electronic components in a static-dissipative surface or static-shielded bag when they are not in the chassis.

1.2 Packing List

- 1 x AIB-IMX6A



If any of the above items is damaged or missing, contact your retailer.

1.3 System Specifications

Component	
Mother Board	<ul style="list-style-type: none"> ACP-IMX6POS-B1
CPU	<ul style="list-style-type: none"> NXP i.MX6 Cortex-A9 Quad 1GHz CPU
CPU Cooler	<ul style="list-style-type: none"> E1961213015000R , Heatsink for CPU 41*41*20mm AL A1
EMMC	<ul style="list-style-type: none"> 8GB eMMC
RAM	<ul style="list-style-type: none"> 2GB DDR3L RAM
Operating System	<ul style="list-style-type: none"> Linux Yocto
External I/O	
DC	<ul style="list-style-type: none"> DC Jack x1
LED	<ul style="list-style-type: none"> Power LED cable (Red) x1 Signal LED cable (Blue) x1
Micro USB	<ul style="list-style-type: none"> Micro USB x1 (For OTG)
USB	<ul style="list-style-type: none"> Double USB 2.0 x1
HDMI	<ul style="list-style-type: none"> HDMI x1
Lan	<ul style="list-style-type: none"> Giga Lan x2 (Lan1 MSZ9031RNK) (Lan2 Intel I210)
COM	<ul style="list-style-type: none"> COM x3 -COM1/2 on board-DB9 (RS232/422/485) -COM3 Cable-DB9 (RS232)
Debug	<ul style="list-style-type: none"> Debug Port x1 -Debug Cable-DB9 (Female)
Micro SD Window	<ul style="list-style-type: none"> Micro SD Socket x1
Mechanical	
Power Type	<ul style="list-style-type: none"> DC 12~24V
Power Connector Type	<ul style="list-style-type: none"> DC Jack with lock
Dimension	<ul style="list-style-type: none"> 226mm x 121.35mm
Chassis	<ul style="list-style-type: none"> NCT Chassis (Black color)
Weight	<ul style="list-style-type: none"> 0.3Kg
Color	<ul style="list-style-type: none"> Black
Fanless	<ul style="list-style-type: none"> Yes
OS Support	<ul style="list-style-type: none"> Linux Yocto
Reliability	
EMI Test	<ul style="list-style-type: none"> CE/FCC Class B
Dust and Rain Test	<ul style="list-style-type: none"> TBC

AIB-IMX6A

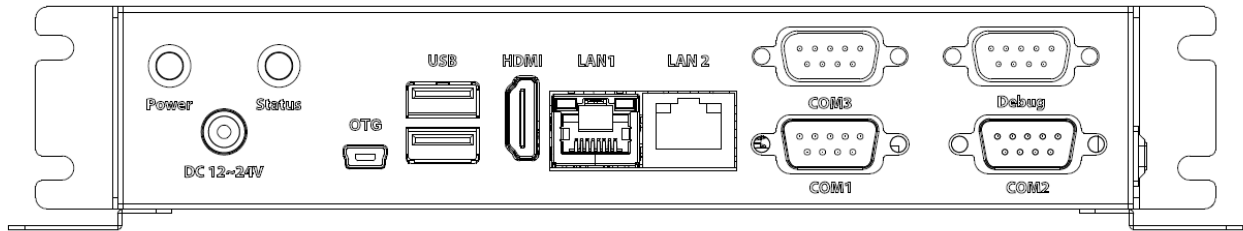
Random Vibration Operation	<ul style="list-style-type: none"> 1. PSD: 0.00454G²/Hz , 1.5 Grms 2. operation mode 3. Test Frequency : 5-500Hz 4. Test Axis : X,Y and Z axis 5. 30 minutes per each axis 6. IEC 60068-2-64 Test:Fh 7. Storage : eMMC
Random vibration test (Non-operation)	<ul style="list-style-type: none"> 1 Test Acceleration : 2G 2 Test frequency : 5~500 Hz 3 Sweep : 1 Oct/ per one minute. (logarithmic) 4 Test Axis : X,Y and Z axis 5 Test time :10 min. each axis 6 System condition : Non-Operating mode 7. Reference IEC 60068-2-6 Testing procedures
Package vibration test	<ul style="list-style-type: none"> 1. PSD: 0.026G²/Hz , 2.16 Grms 2. Non-operation mode 3. Test Frequency : 5-500Hz 4. Test Axis : X,Y and Z axis 5. 30 min. per each axis 6. IEC 60068-2-64 Test:Fh
Mechanical Shock Test	<ul style="list-style-type: none"> 10Grms, IEC 60068-2-27, Half Sine, 11ms
Package drop test	<ul style="list-style-type: none"> 1 One corner , three edges, six faces 2 ISTA 2A, IEC-60068-2-32 Test:Ed
Operating Temperature	<ul style="list-style-type: none"> -20°C ~ 50°C
Operating Humidity	<ul style="list-style-type: none"> 40°C 95% relative humidity, non-condensing
Storage Temperature	<ul style="list-style-type: none"> -20°C ~ 70°C



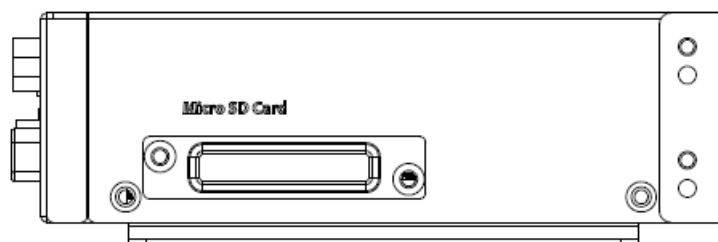
Note: Specifications are subject to change without notice.

1.4 System Overview

1.4.1 Rear View



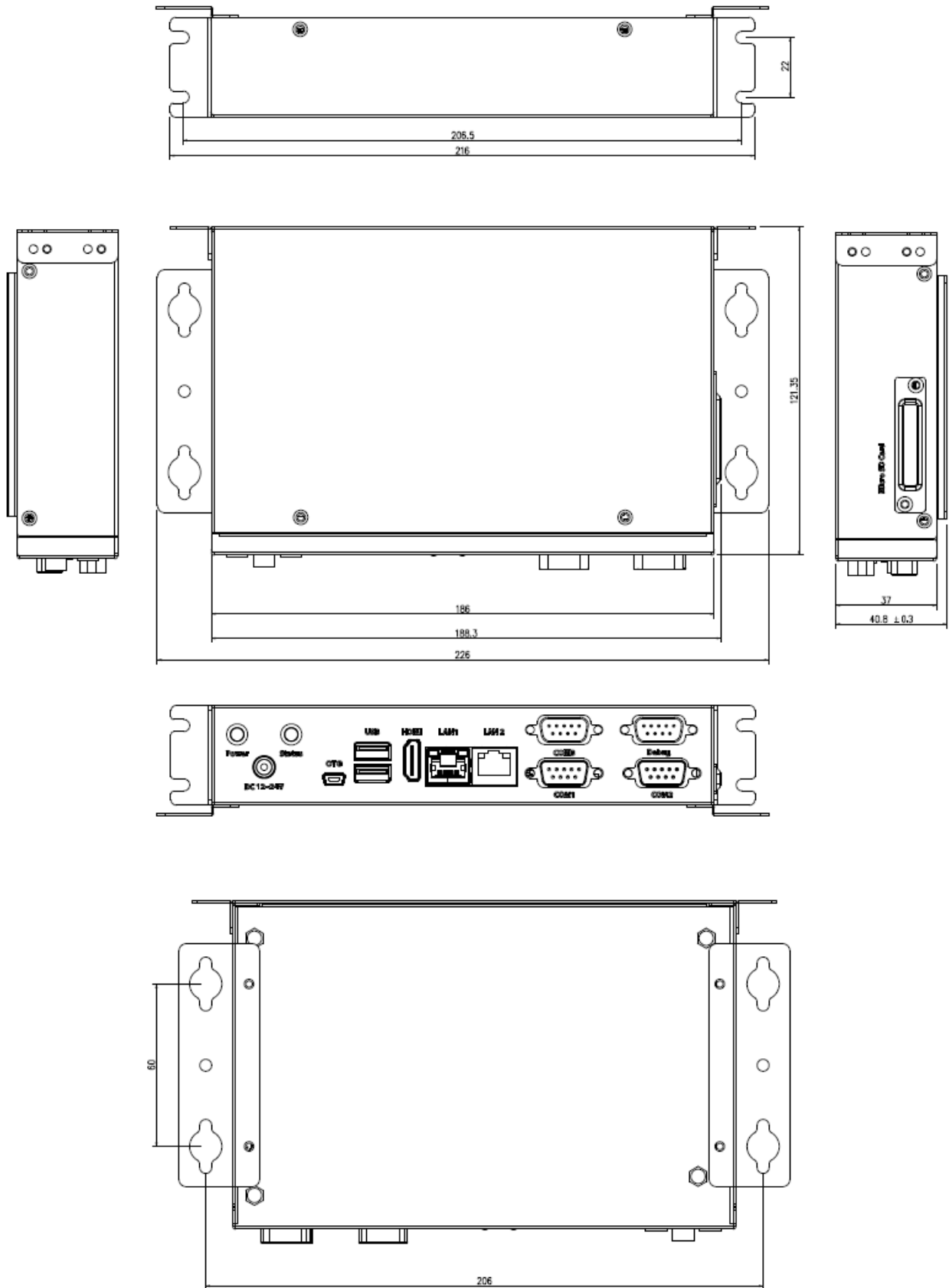
1.4.2 Right View



Connectors

Label	Function	Note
DC 12~24V	DC Power-in connector	
Power	System Power indicator	
Status	Power Signal indicator	
OTG	Micro USB connector	
USB	Double USB2.0 connector	
HDMI	HDMI connector	
LAN1/2	RJ-45 Ethernet 1/2	
COM1/2/3	Serial port 1/2/3 connector	D-sub 9-pin, male
Debug	Debug port	
Micro SD Card	Micro SD Socket	

1.5 System Dimensions



(Unit: mm)

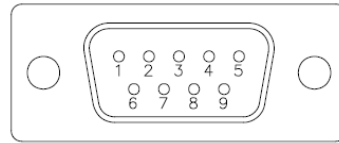
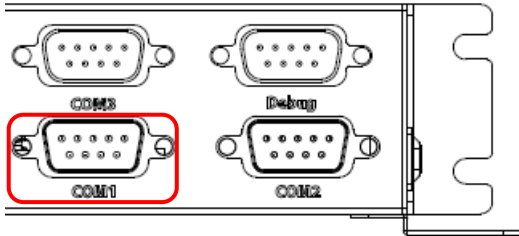
2. Hardware Configuration

For advanced information, please refer to:

- 1- ACP-IMX6POS-B1 User's Manual

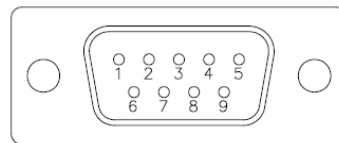
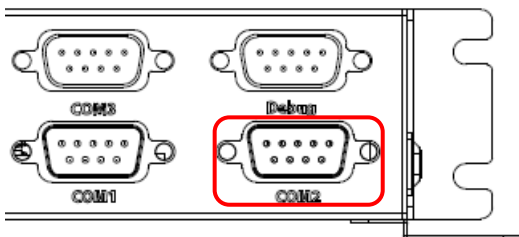
2.1 AIB-IMX6A connector mapping

2.1.1 Serial port 1 connector (COM1)



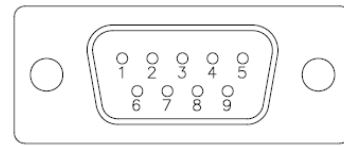
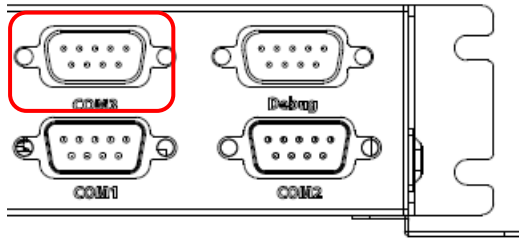
Signal	PIN	PIN	Signal
NDCDA#_485_422TX-	1	6	NC
NRXDA_485_422TX+	2	7	NRTSA#
NTXDA_422RX+	3	8	NCTSA#
NDTRA#_422RX-	4	9	NRIA#
GND	5		

2.1.2 Serial port 2 connector (COM2)



Signal	PIN	PIN	Signal
NDCDB#_485_422TX-	1	6	NC
NRXDB_485_422TX+	2	7	NRTSB#
NTXDB_422RX+	3	8	NCTSB#
NDTRB#_422RX-	4	9	NRIB#
GND	5		

2.1.3 Serial port 3 connector (COM3)



Signal	PIN	PIN	Signal
NC	1	6	NC
COM3_RXD	2	7	COM3_RTS#
COM3_TXD	3	8	COM3_CTS#
NC	4	9	COM3_RI_A
GND	5		

3. Software User Guide

3.1 Build and install U-boot & Kernel image for ACP-IMX6POS

3.1.1 Requirements

Requirements for the set up of the standalone cross-development environment:

- x86 host system (64-bit)
- recommended free disk space: 25 GB
- recommended memory size: 8 GB
- Ubuntu 14.04 (64-bit)

3.1.2 Setting Up the Standalone Cross-Development Environment

Here you can find instruction to setup development environment for Android source code for ACP-IMX6POS and the way to install it on eMMC. With this guideline, user will be able to setup the system easily and test all the functions with the system.

3.1.2.1 Perform a standard Ubuntu 14.04 (64-bit) installation.

3.1.2.2 Install additional packages:

```
$ sudo apt-get install gawk wget git-core diffstat unzip texinfo gcc-multilib \
build-essential chrpath socat libstd1.2-dev
```

```
$ sudo apt-get install libstd1.2-dev xterm sed cvs subversion coreutils texi2html \
docbook-utils python-pysqlite2 help2man make gcc g++ desktop-file-utils \
libgl1-mesa-dev libglu1-mesa-dev mercurial autoconf automake groff curl lzop asciidoc
```

```
$ sudo apt-get install u-boot-tools
```

3.2 Get U-boot & Kernel source code and Compiler

3.2.1 Get U-boot & Kernel source code

Please connect Avalue FAE to get source code.

AIB-IMX6A

3.2.2 Compiler U-boot & Kernel image.

Please unzip the source code in your computer and enter to U-boot & Kernel source code folder.

```
jerry@AE-RISC:~/project/Jerry/IMX6/FSL-Kernel$ ls
fsl  kernel  u-boot
```

Enter to “u-boot“ folder and type “./run.sh -j4” start to compiler u-boot.

```
jerry@AE-RISC:~/project/Jerry/IMX6/FSL-Kernel/u-boot$ ls
api          common      disk        examples    lib          MAKEALL     net         scripts
arch        config.mk   doc         fs          lib_arm     Makefile    post        snapshot.commit
board       cpu        drivers     include     lib_generic mkconfig    README     test
boards.cfg  CREDITS    dts        Kbuild     Licenses    nand spl    run.sh     tools
```

```
jerry@AE-RISC:~/project/Jerry/IMX6/FSL-Kernel/u-boot$ ./run.sh -j4
```

After compiler finish, there is the “out” folder would be created in u-boot source code folder.

```
jerry@AE-RISC:~/project/Jerry/IMX6/FSL-Kernel/u-boot$ ls
api          common      disk        examples    lib          MAKEALL     net         run.sh      tools
arch        config.mk   doc         fs          lib_arm     Makefile    out         scripts
board       cpu        drivers     include     lib_generic mkconfig    post        snapshot.commit
boards.cfg  CREDITS    dts        Kbuild     Licenses    nand spl    README     test
```

You can find the u-boot image in out folder.

```
jerry@AE-RISC:~/project/Jerry/IMX6/FSL-Kernel/u-boot/out$ ls
arch      disk      fs          Makefile    source      tools      u-boot_e9697imx60br_emmc.imx  u-boot.map
board     drivers  include     net         System.map u-boot     u-boot.imx                    u-boot.srec
common    examples lib         scripts     test        u-boot.bin u-boot.lds
```

Enter to “kernel” folder and type “./run.sh -j4” start to compiler kernel.

```
jerry@AE-RISC:~/project/Jerry/IMX6/FSL-Kernel/kernel$ ls
arch      CREDITS    drivers     include     Kbuild     lib         mm          REPORTING-BUGS  scripts  tools
block     crypto     firmware    net         Kconfig    MAINTAINERS net         run.sh          security  usr
COPYING   Documentation fs          ipc         kernel     Makefile    README     samples         sound    virt
```

```
jerry@AE-RISC:~/project/Jerry/IMX6/FSL-Kernel/kernel$ ./run.sh -j4
```

After compiler finish, there is the “out” folder would be created in Kernel source code folder.

```
jerry@AE-RISC:~/project/Jerry/IMX6/FSL-Kernel/kernel$ ls
arch      Documentation  init      lib          out         scripts  virt
block     drivers        ipc      MAINTAINERS  README     security
COPYING   firmware       Kbuild   Makefile     REPORTING-BUGS  sound
CREDITS   fs             Kconfig  mm           run.sh      tools
crypto    include        kernel   net          samples     usr
```

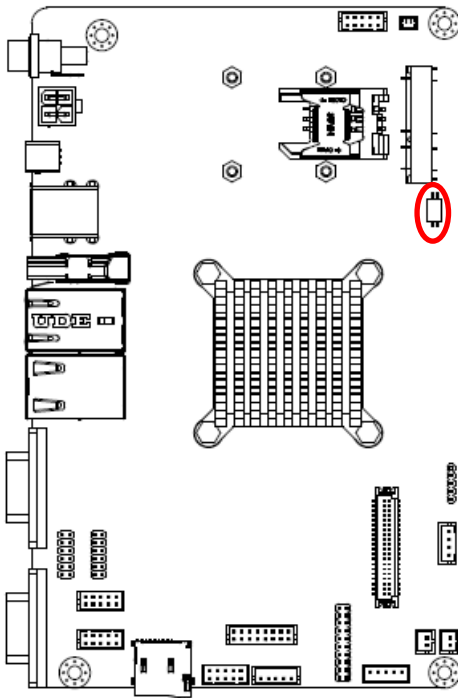
You can find the kernel image in out folder.




```
jerry@AE-RISC:~/project/Jerry/IMX6/FSL-Kernel/kernel/out$ ls
arch      e9697imx6e2r.dtb  init      modules      net         usr
block     e9697imx6e3r.dtb  ipc       modules.builtin  scripts     vmlinux
crypto    firmware          kernel    modules.order   security    vmlinux.o
drivers   fs                lib       Module.symvers  sound      zImage_e9697imx60br
e9697imx60br.dtb  headers          Makefile  mx6dlpos.dtb   source
e9697imx6e1r.dtb  include          mm        mx6qpos.dtb    System.map
```

3.3 Flash U-boot & Kernel image to eMMC or MicroSD

3.3.1 Flash U-boot & Kernel image to eMMC

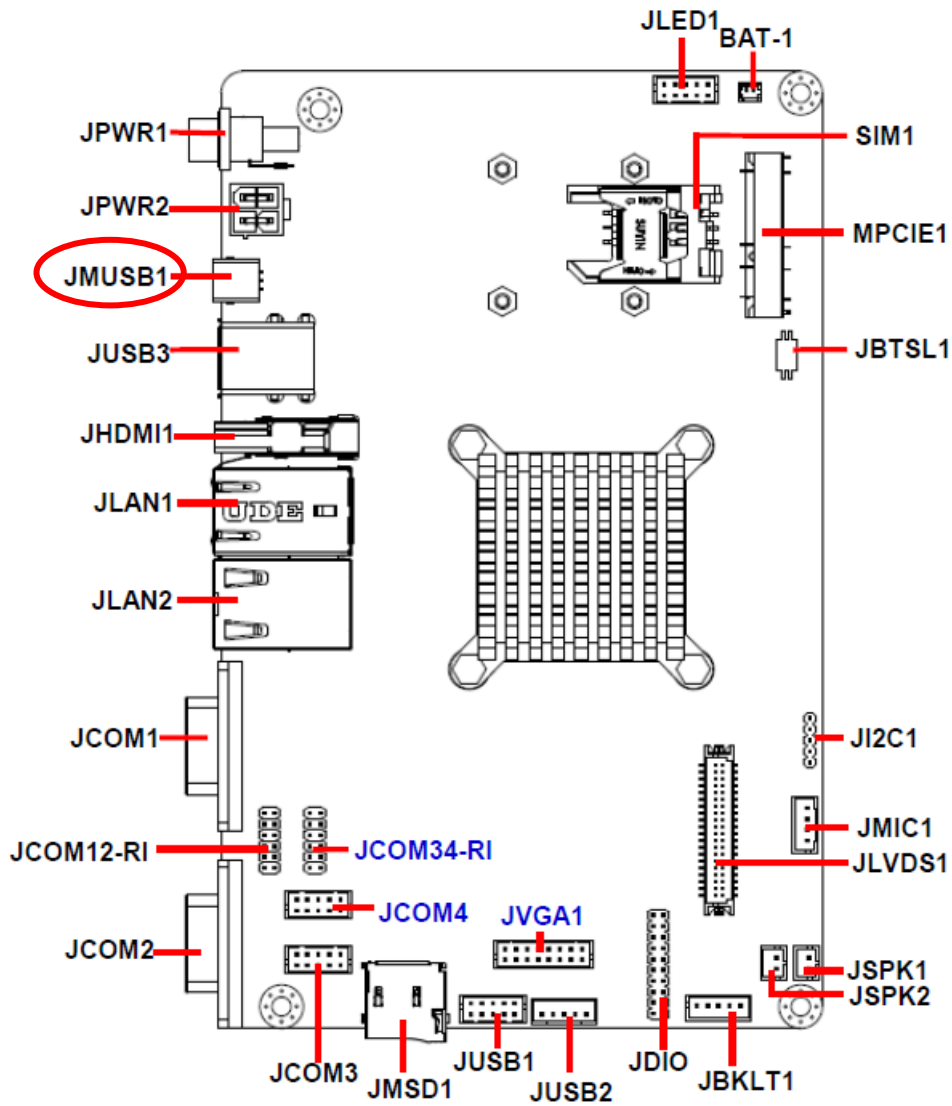
3.3.1.1 Set the jumper to OTG mode



Mode	Description
	OTG load
	eMMC boot
	SD boot

AIB-IMX6A

3.3.1.2 Connect ACP-IMX6POS-B1 to computer through JMUSB1 by mini USB.



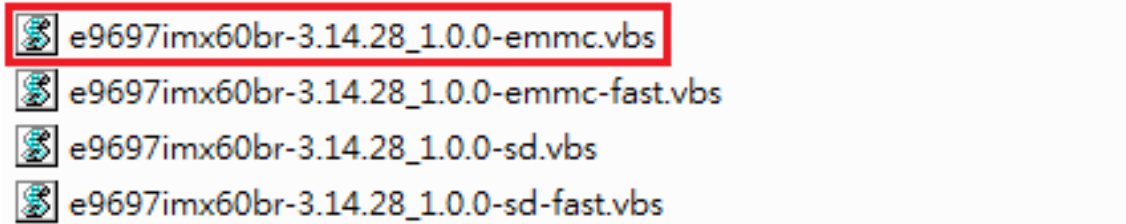
3.3.2 Get MFG tool

Please connect Avalue FAE to get MFG tool.

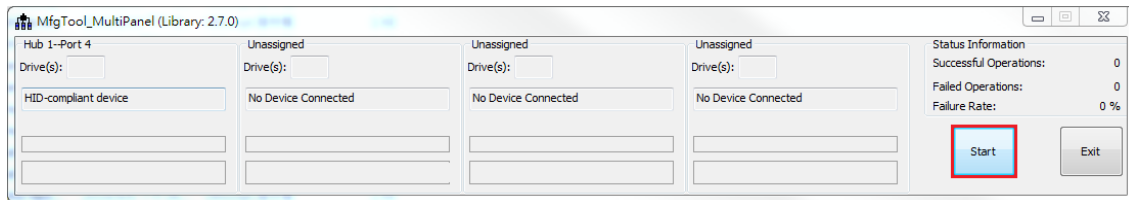
3.3.3 Flash OS to eMMC by MFG tool

3.3.3.1 Execute vbs file

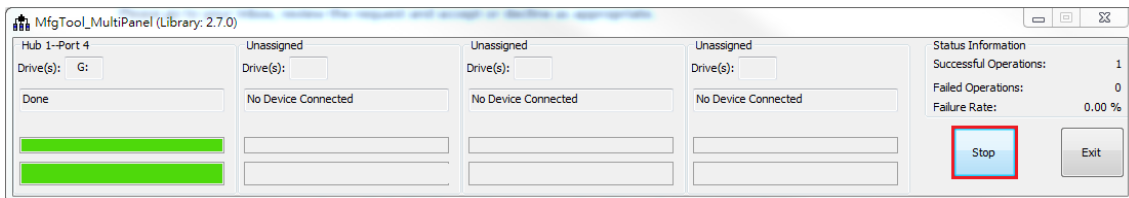
Please enter to MFG-Tools\vbs and execute xxxxxxxxxxx-3.14.28_1.0.0-emmc.vbs.



After execute xxx-emmc.vbs, please press “Start” to start flash OS.



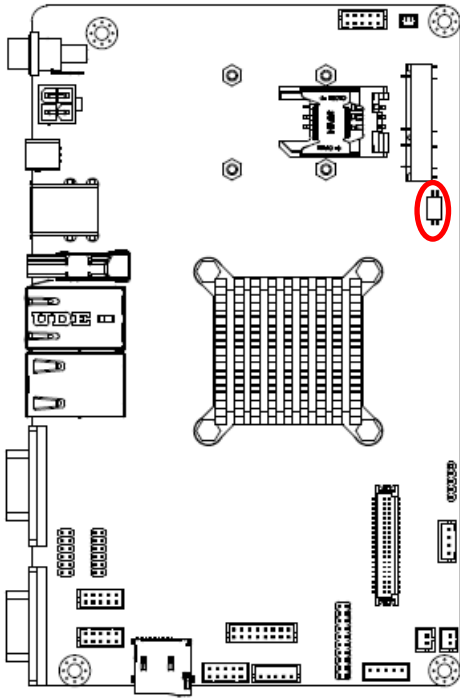
After flash finish, please press “Stop”.






AIB-IMX6A

3.3.3.2 Boot to OS from eMMC

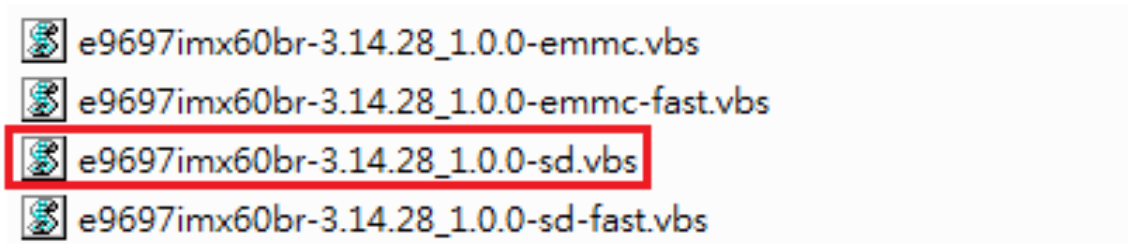
Set the jumper to “eMMC boot” and power on to boot to OS.



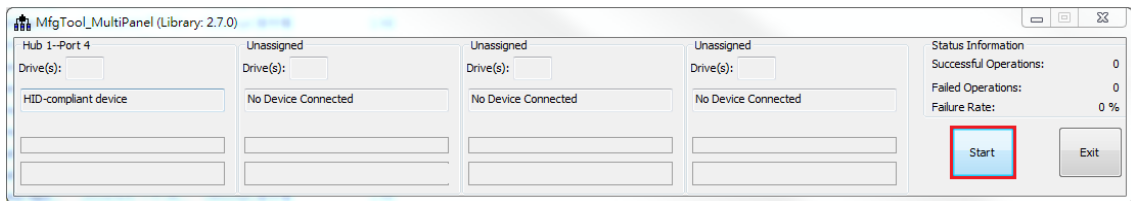
Mode	Description
 21 on	OTG load
 21 on	eMMC boot
 21 on	SD boot

3.3.4 Flash OS to SD card by MFG tool

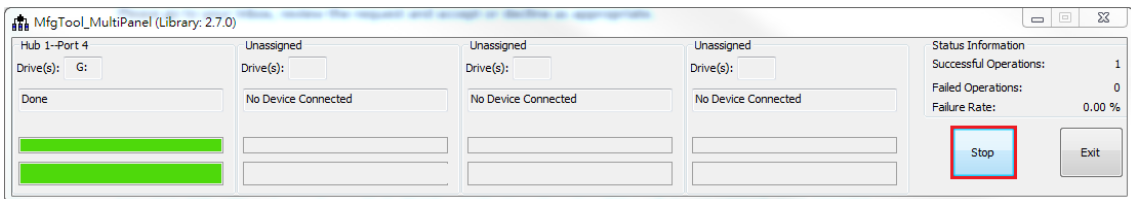
3.3.4.1 Please enter to MFG-Tools\vbs and execute xxxxxxxxxxxx-4.1.15_1.0.0-sd.vbs.



After execute xxx-emmc.vbs, please press “Start” to start flash OS.



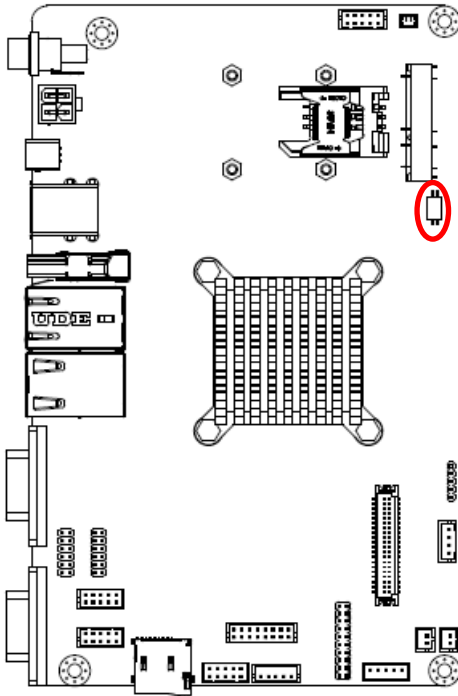
After flash finish, please press “Stop”.






AIB-IMX6A

3.3.4.2 Boot to OS from SD card

Set the jumper to “SD boot” and power on to boot to OS.



Mode	Description
 21 on	OTG load
 21 on	eMMC boot
 21 on	SD boot

