

Industrial PC Android 6.0 OS on iMX6Q User Manual

For iMX6Q Products

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Android 6.0 OS

Android 6.0 OS User Manual

Chipsee

This manual is used to provide users with a fast guide of Chipsee Industrial Computers (Abbreviated as IPC) about Android 6.0 OS development. Through this manual, users can quickly understand the hardware resources; users can build a complete compilation of Android development environment; users can debug Android 6.0 OS via serial, USB OTG and Internet.

Revision	Date	Author	Description
V1.0	2021-12-30	Randy	Initial Version

SUPPORTED BOARDS:

CS10600F070 CS10768F097 CS12800F101 CS10768F121 CS10768F121-U CS10768F150 CS12102F170 CS14900F190 CS19108F215

PREBUILT FILES PACKAGE:

Prebuilt files for the various industrial PCs can be found in the OS Downloads. Below are the links to the prebuilt files for each industrial PC model.

- CS10600F070
- CS10768F097
- CS12800F101
- CS10768F121
- CS10768F121-U
- CS10768F150

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- CS12102F170
- CS14900F190
- CS19108F215

System Features

Feature	Comment
System	Android 6.0

Preparation

You will need to prepare the following items before you can start using the Prebuilt Files Package to re-flash the system.

Power Supply Unit (PSU) with the appropriate voltages, as follows:

- These products: CS10768F121, CS10768F121-U, CS10768F150, CS12102F170, CS14900F190, and CS19108F215 requires a 15V to 36V power adapter.
- These products: CS10768F097 and CS12800F101 product needs a 12V to 36V power adapter.
- The CS10600F070 product needs a 6V to 36V power adapter.

Hardware Requirements

- Chipsee Industrial PC
- PSU according to the instructions above
- USB-to-serial or other serial cable for debugging
- USB A-A cable (used only if the hardware configured as OTG)
- Windows 7 PC
- TF Card (at least 4GB) and card reader

Software Requirements

- Android 6.0 OS Prebuilt Files Package (from the link above)
- Android Studio 2.3.3 for Windows
- Android USB driver (for Windows)
- MFGTools_Kernel3.14.52

Getting Started and Tests



Throughout this section, the user can use both the pre-built Android 6.0 image files and the MFGTools software to burn files to the system, boot system and perform necessary software and hardware test.

Boot Switch Configuration

CS-IMX6 has a boot configuration select switch, as shown on the figure below. You can use the boot select switch to change between three modes, namely

- TF Card
- eMMC Boot
- Download

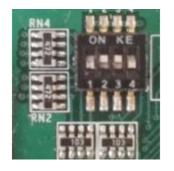


Figure 173: Boot Mode Setup

SW Mode	1	2	3	4
TF Card	1	0	0	0
еММС	1	1	0	1
Download	0	1	1	0

Table 44 Boot Configuration Selection

Prepare Manufacturing Tool and Image

The manufacturing tool, referred to as MFGTools, is a tool that runs on a Windows PC. You can use it to download pre-built images to the eMMC on a Chipsee board. The tools directory contains the tar.gz file.

MFGTool	Windows download tool
Kernel Image	emmc-flash/emmc/boot-imx6q.img
U-boot Image	emmc-flash/emmc/u-boot-imx6q.imx

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MFGTool	Windows download tool
Recovery Image	emmc-flash/emmc/recovery-imx6q.img
Android File System	emmc-flash/emmc/system.img
Android Logo	emmc-flash/emmc/xxx.bmp
Industrial Computer	One
USB OTG Cable	One
12V-2A power adapter	One

Downloading Images

Chipsee IPC supports booting from an integrated eMMC or an external TF Card (also known as the micro SD card). Booting from the external TF Card allows flashing the system OS.

Downloading Images by using MFGTool

Chipsee IPC supports booting from an integrated eMMC.

CONFIGURING MFGTOOL

To configure MFGTool, follow these steps:

- Unzip Mfgtools_Kernel3.14.52_V1.0.rar file.
- Open the extracted folder Mfgtools_Kernel3.14.52_V1.0 and edit cfg.ini file.

名称	修改日期	类型	大小
🐌 Drivers	2016/9/18 17:18	文件夹	
퉬 Profiles	2016/9/18 17:18	文件夹	
💼 cfg.ini	2016/10/26 16:27	配置设置	1 KB
MfgTool.log	2016/10/27 14:19	文本文档	30 KB
MfgTool2.exe	2015/10/26 12:42	应用程序	1,950 KB
🚳 MfgToolLib.dll	2015/10/26 12:42	应用程序扩展	2,190 KB
🛍 UICfg.ini	2015/10/26 12:42	配置设置	1 KB

Figure 174: Extracted folder content

• In the cfg.ini file, ensure the name variable is set to eMMC-Android, as shown on the figure below.

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cfg.ini - 记事本	ζ
文件(E) 编辑(E) 格式(Q) 查看(V) 帮助(H)	
[profiles] chip = Linux	*
[platform] board = SabreSD	
[LIST] name = eMMC-Android	Ŧ
٠	
第8行,第8列	зđ

Figure 175: Cfg.ini file

COPY IMAGE TO ANDROID DIRECTORY

Follow these steps to copy image to Android directory:

- Unzip prebuilt-imxv1-csXXXXfXXXvX-android6-emmc-YYYYMMDD.tar.gz file. The extracted folder will contain these files: boot-imx6q.img, recovery-imx6q.img,, system.img, and u-boot-imx6q.imx. The logo file, android6_xxx.bmp, is located in the emmc-flash/emmc directory.
- Copy the files listed above from the extracted folder to *Mfgtools_Kernel3.14.52_V1.0\Profiles\Linux\OS Firmware\files\android* directory.

	▶ « Mfgtools_Kernel3.14.52 ▶ Profiles ▶	Linux 🔸 OS Firmwar	e ▶ files ▶ androi	d 🗸 🕹
	包含到库中▼ 共享▼ 刻录 新建式	文件夹		
	名称	修改日期	类型	大小
ł	💼 boot-imx6q.img	2017/7/7 12:08	好压 IMG 压缩文件	9,222 KB
:	💼 recovery-imхбq.img	2017/7/7 12:09	好压 IMG 压缩文件	9,958 KB
E	💼 system.img	2017/7/7 12:09	好压 IMG 压缩文件	377,798 KB
	📄 u-boot-imx6q.imx	2017/7/7 12:16	IMX 文件	431 KB

Figure 176: Extracted folder with files

USING MFGTOOL

- 1. Connect a USB OTG cable from a Windows PC to the USB OTG port on the IPC.
- 2. Change the boot select configuration to 0 1 1 0, as shown on the figure below.

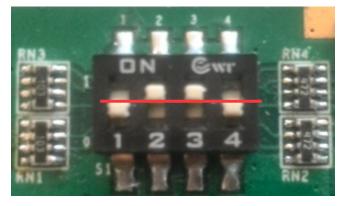


Figure 177: Boot Switch Config

- 3. Connect a 12V-2A power adapter to the IPC and power ON.
- 4. On your Windows PC, open the Mfgtools-Rel-XXX_XXXXX_MX6Q_UPDATER_VXX directory and run the MfgTool2.exe file, as shown on the figure below.

→ Wfgtools_Kernel3.14.52 →	▼ ∳	覺素 Mfgtools_Ke	ernel3.14.52 👂
五 打开 刻录 新建文件夹			:= • 🔟 🔞
名称	修改日期	类型	大小
🛿 🔑 Drivers	2016/9/18 17:18	文件夹	
🛿 🌗 Profiles	2016/9/18 17:18	文件夹	
👔 efg.ini	2016/10/26 16:27	配置设置	1 KB
	2016/10/27 14:19	文本文档	30 KB
MfgTool2.exe	2015/10/26 12:42	应用程序	1,950 KB
MfgToolLib.dll	2015/10/26 12:42	应用程序扩展	2,190 KB
🗿 UICfg.ini	2015/10/26 12:42	配置设置	1 KB

Figure 178: Run MfgTools2.exe file

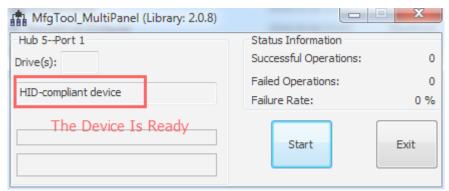


Figure 179: Prepare to start



If you get a message saying *No Device Connected*, check the USB-OTG cable to ensure it is ready.

Hub 5Port 1	Status Information	
Drive(s):	Successful Operations:	
No Device Connected	Failed Operations: Failure Rate:	(
Check The OTG	Start	Exit

5. Click on Start button to download the Image.

Hub 5Port 3	Status Information	
Drive(s):	Successful Operations:	0
	Failed Operations:	0
Loading Kernel.	Failure Rate:	0 %
	Stop	Exit
	Status Information	• X
Hub 5Port 3	Status Information	• ×
Hub 5Port 3 Drive(s): I:	Status Information Successful Operations:	
	Status Information	0

Figure 181: Loading Kernel and Formatting rootfs partition

Note	
If you are using a Window 7 PC, you will receive a prompt that asks you to format the disk. Please ignore cancel it.	e or
F Microsoft Windows	
You need to format the disk in drive I: before you can use it.	
Do you want to format it?	
Format disk Cancel	

6. When the process is complete, you click the Stop button to stop downloading Image and exit.

MfgTool_MultiPanel (Library: 2.0.8)		
Hub 5Port 1	Status Information	
Drive(s): I:	Successful Operations:	1
	Failed Operations:	0
Done	Failure Rate:	0.00 %
	Stop	Exit

Figure 182: Download Image is finished

Downloading Images by using the TF card

Follow the steps below to download images onto the eMMC by using the TF Card:

- 1. Copy the Prebuilt Files Package to a Linux environment (such as Ubuntu 14.04).
- 2. Insert the SD card into your computer. If you are using virtual machines, please ensure the SD card is mounted to the Linux operating system.
- 3. Confirm the SD card mount point, /dev/sdX (e.g., /dev/sdc or /dev/sdb, be sure to use the right one). In a Linux system, you can use the command below to find out what X is.

\$ sudo fdisk —l

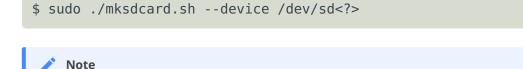
- 4. Copy the prebuilt-imxv1-csXXXXfXXXvX-android6-emmc-YYYYMMDD.tar.gz to somewhere(such as \$HOME) on the Ubuntu PC.
- 5. **Extract the** prebuilt-imxv1-csXXXXfXXXvX-android6-emmc-YYYYMMDD.tar.gz

```
$ tar -xzvf prebuilt-imxv1-csXXXXXfXXXvX-android6-emmc-YYYYMMDD.tar.gz
```

6. Go to the folder

\$ cd prebuilt-imxv1-csXXXXfXXXvX-android6-emmc-YYYYMMDD

7. Use the following command to flash the Android 6.0 OS to the SD card



• sd<?> means the SD card mount point, (e.g., /dev/sdc or /dev/sdb) in Ubuntu system.

• The recommended SD card should be Sandisk Class4 level SD card or above.

- 8. The bootable SD Card is now ready. Power OFF the industrial PC and insert the SD Card.
- 9. Set the switch S1 to TF card boot mode. (refer to **Boot Switch Configuration** above)
- 10. Connect the industrial PC to PC via COM1. Power ON the IPC.
- 11. After 20 minutes, if the LED on industrial PC stays lit, flashing is completed. Using COM1, you can also find this message >>>>> eMMC Flashing Completed <<<<<< which indicates that the system image was downloaded correctly to the eMMC.</p>

12. Power OFF and set the switch S1 to eMMC boot mode. (refer to **Boot Switch Configuration** above)

Booting Android OS And Test(Using 7inch as example)

The first time you start Android 6.0 OS on the industrial PC will take a little time. But after the first time, Android 6.0 OS will start quickly. It is a successful start if you see the Android 6.0 OS desktop such as the one shown in the figure below:



Figure 183: Android Desktop Screen

SD Test

The IPC supports SD card hot-plug. The figure below shows the message when you plug the SD card into IPC. The IPC will mounts the SD Card to */mnt/media_rw/* and */storage/* directory.

root@sabresd_6dq:/ # mmc1: host does not support reading read-only switch. assuming write-enable. mmc1: new high speed SDHC card at address 59b4 mmcblk1: mmc1:59b4 SSO8G 7.40 GiB mmcblk1: p1 p2 FAT-fs (mmcblk1p1): volume was not properly unmounted. Some data may be corrupt. Please run fsck.

Figure 184: Serial Message

USB Flash Disk Test

The USB Flash Disk is like the SD Card. The IPC mounts the USB Flash Disk to /mnt/ media_rw/ and /storage/ directory.

```
usb 1-1.2: new high-speed USB device number 4 using ci_hdrc
usb 1-1.2: New USB device found, idvendor=05e3, idProduct=0736
usb 1-1.2: New USB device strings: Mfr=3, Product=4, SerialNumber=2
usb 1-1.2: Product: USB storage
usb 1-1.2: Manufacturer: Generic
usb 1-1.2: SerialNumber: 000000000272
usb-storage 1-1.2:1.0: USB Mass Storage device detected
scsi1 : usb-storage 1-1.2:1.0
scsi 1:0:0:0: Direct-Access Generic STORAGE DEVICE 0272 PQ: 0 ANSI: 0
sd 1:0:0:0: [sda] 15529984 512-byte logical blocks: (7.95 GB/7.40 GiB)
sd 1:0:0:0: [sda] Write Protect is off
sd 1:0:0:0: [sda] No Caching mode page found
sd 1:0:0:0: [sda] Assuming drive cache: write through
sd 1:0:0:0: [sda] Attached SCSI removable disk
```

Figure 185: USB flash disk test

Network Test

The network uses DHCP to get IP Addresses. You can use the **ethernet app** to set a static IP, to check the obtained IP from the router, and to set the proxy.

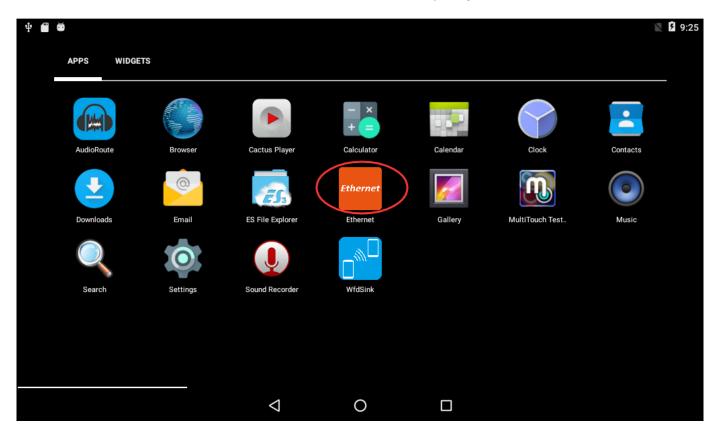
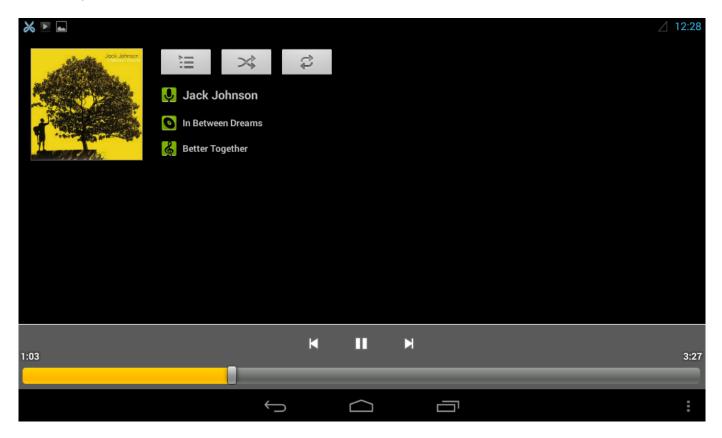


Figure 186: Ethernet App

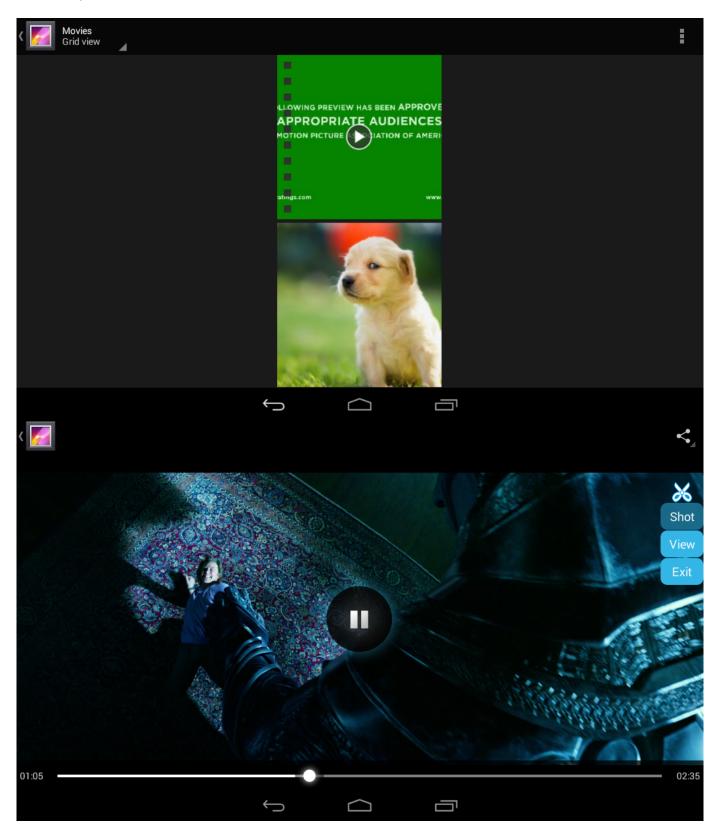
Sound Card Test

Please open an audio file to test the Sound Card.



Video Test

Please open a video file to test the Video.



HDMI Test

You can reference this document, **IMX6Q U-boot Setting HDMI Output For Android.pdf**, to learn about performing HDMI tests.

Note

HDMI does not support hot-plug. The sound comes from the HDMI monitor, neither the speaker nor the headset on board.

WIFI Test

You must ensure the IPC has an SDIO Wi-Fi module integrated before performing the Wi-Fi test. If the IPC has an SDIO Wi-Fi Module, you can connect to the Wi-Fi and open a browser to test.

ADB Test

Android 6.0 OS enables USB Debug by default.

You just need to insert the OTG cable into the IPC, and allow USB debugging.

Also, you can use the ADB tool in the tools directory to test the ADB.

• Unzip it to the root directory of your Windows PC (Drive C), as shown on the figure below.

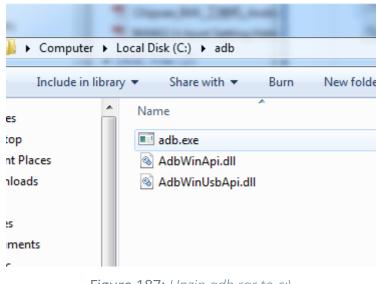


Figure 187: Unzip adb.rar to c:\

• You need to add path of the ADB directory to system's environment variable. Follow the steps described in the figures below to set the environment variable.

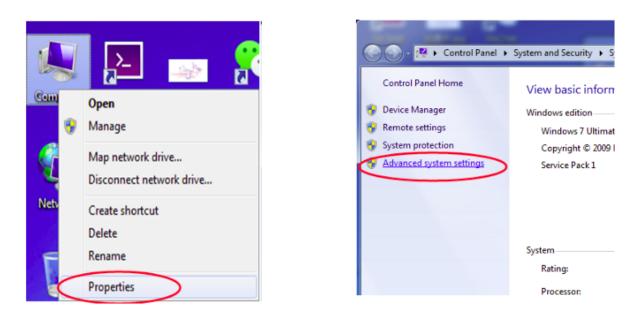


Figure 188: Open Advance system settings

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Booting Android OS And Test(Using 7inch as example)

System Properties	Environment Varia	ables
Computer Name Hardware Advanced System Protection Remote	User variables f	or admin
You must be logged on as an Administrator to make most of these changes.	Variable	Value
Performance	TEMP	%USERPROFILE%\AppData\Local\Temp
Visual effects, processor scheduling, memory usage, and virtual memory	тмр	%USERPROFILE%\AppData\Local\Temp
Settings		New Edit Delete
User Profiles		Deere Deere
Desktop settings related to your logon	System variable	5
Settings	Variable	Value
Contra and Decement	NUMBER_OF_	
Startup and Recovery	OS	Windows NT
System startup, system failure, and debugging information	Path	C:\Program Files\Java\jdk1.8.0_91\bin; >
	PATHEXT	.COM;.EXE;.BAT;.CMD;.VBS;.VBE;.JS; *
Settings		New Edit Delete
Environment Variables		OK Cancel
OK Cancel Apply		

Figure 189:	Open and	edit the	**Path* s	ystem	variable*
-------------	----------	----------	-----------	-------	-----------

Edit System Variable	×
Variable <u>n</u> ame: Variable value:	Path \birr:C: \adb;C: \Program Files (x86) \Skype \P
variable <u>v</u> alue;	OK Cancel

Figure 190: Add path of the ADB directory to the **Path** system variable

• Open the command-prompt on Windows and enter this command *adb* version , as shown on the figure below. The process is successful, if the command-prompt displays the version number of ADB.



Figure 191: ADB tool is working

• Connect the USB-OTG cable from the Windows PC to IPC. You will get a message Allow USB debugging?. Please select Always allow from this computer and click Ok.



Figure 192: Enable USB debugging

You can list the devices attached to the Windows PC with this command.

\$ adb devices	
C:\Users\admin>adb devices List of devices attached 0123456789ABCDEF device	

Figure 193: Checking devices attached

You can install an android app from the Windows PC onto the IPC with this command.

```
$ adb install XXX.apk
```



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Booting Android OS And Test(Using 7inch as example)

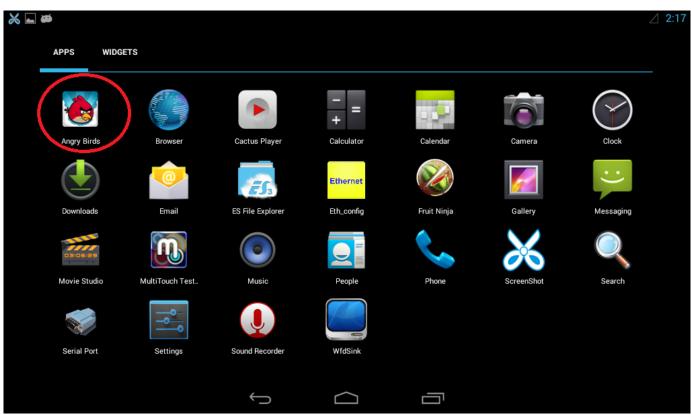


Figure 194: Install android app

Touch Screen Test

Run **MultiTouch** Tester App.

The screen will show the number and position of the touch point when touching the screen.



- Resistive screen expansion board only supports single-touch, and capacitive screen expansion board supports five-point touch as described in the figure below.
- The 21.5", 19", and 17" capacitive screen supports a ten-point touch.

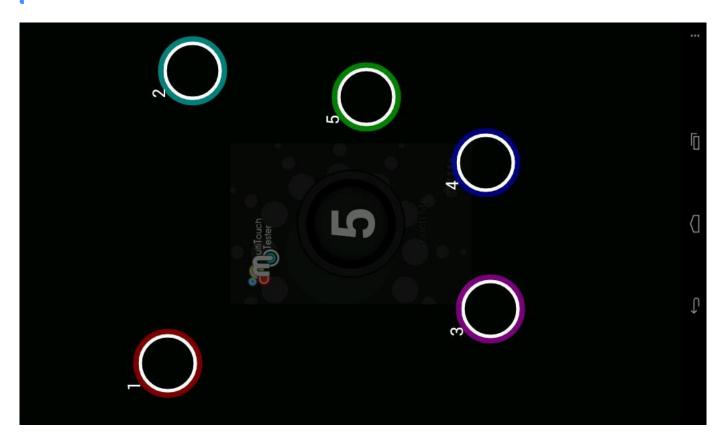


Figure 195: Touch screen test (Capacitive touch)

Serial Test

There are five serial ports on the Chipsee IPC: 2 x RS232 and 3 x RS485 (can be customised). Refer to the table below for the available serial device nodes.

Ports	Device Node
COM1(RS232, Debug)	/dev/ttymxc0
COM2(RS485)	/dev/ttymxc1
COM3(RS232)	/dev/ttymxc2
COM4(RS485)	/dev/ttymxc3
COM5(RS485)	/dev/ttymxc4

Table 45 Serial Ports Nodes on the System

note	
If you use COM2(RS485), you can't use Bluetooth because COM2(RS485) share pin with Bluetooth.	

You can install the **SecureCRT** or **Putty** software on a Windows 7 PC to test the serial ports by following these steps:

- Connect COM1 on industrial PC board to Windows 7 PC.
- Run Serial Port API App to communicate with Windows 7 PC, as shown on the figure below.

X • *			⊿ 2:24
Serial Port			
	Setup		
	Console		
	Loopback		
	About		
	Quit		
Ċ	\Box	Ū	

					⊿ 🚺 12:11
Seri	al port setup				
		Device			
	Device	ttyGS3 (g_serial)			
	Baud rate	ttyGS2 (g_serial)			
		ttyGS1 (g_serial)			
		ttyGS0 (g_serial)			
		ttymxc3 (IMX-uart)			
		ttymxc2 (IMX-uart)			
		ttymxc1 (IMX-uart)	ĿŞ		
		ttymxc0 (IMX-uart)			
			Cancel		
		\bigcirc	\Box		

Figure 196: Serial settings

• Push the button with the label "Send 01010101", you will see something on the Windows 7 PC that looks similar to the figure below.

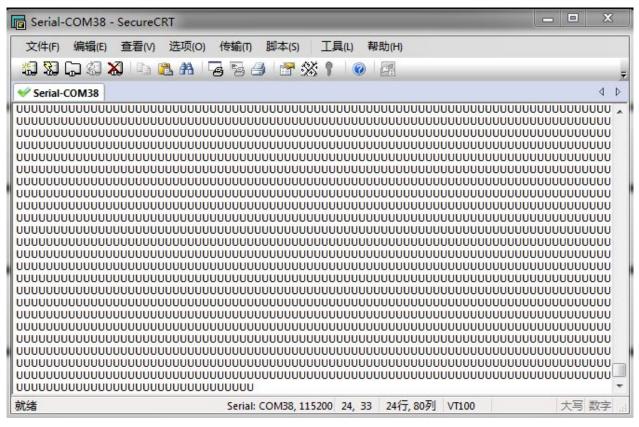


Figure 197: Serial send test

• Push the button with the label "Console", to send whatever you like as shown on the figure below.

هم Serial Port API sample	3:37
Chipsee serial test!	
Emission	

Figure 198: Serial receive test

GPIO

For the **CS12800F101** IPC, there are 8 GPIO ports that you can set as output or input with LOW as 0V; the HIGH as 3.3V.

Please check the **GPIO Connector** section in CS12800F101 to know the position of the GPIO Connector. Refer to the table below for the available GPIO nodes on system.

For the **CS10600F070** IPC, there are 8 GPIO ports that you can set as output or input with LOW as 0V; the HIGH as 3.3V.

Please check the **GPIO Connector** section in CS10600F070 to know the position of the GPIO Connector. Refer to the table below for the available GPIO nodes on system.



GPIODemo		
	OUTPUT GPIO	
GPI01(/dev/chipsee-gpio1)	GPIO2(/dev/chipsee-gpio2)	
GPIO3(/dev/chipsee-gpio3)	GPIO4(/dev/chipsee-gpio4)	
	INPUT GPIO	
GPIO5(/dev/chipsee-gpio5)	GPIO6(/dev/chipsee-gpio6)	
GPI07(/dev/chipsee-gpio7)	GPIO8(/dev/chipsee-gpio8)	

Figure 199: GPIODemo app

MODIFY LOGO

This system supports changing the logo by yourself. There are two ways:

- Replace the logo file in prebuilt images packages, and download images.
- Change the logo without downloading images.



Logo file is one 32bpp, format is bmp.

Method 1 - Downloading images

Replace the *prebuilt-xxx/emmc-flash/emmc/logo.bmp* and reference Prepare Manufacturing Tool and Image and Downloading Images by using MFGTool to flash the image.

Method 2 - Don't Download Images

We will use **MFGTools** and the **Logoflasher** apps to change the logo.

Use MFGTools to Change LOGO

- Replace the logo.bmp file in *Mfgtools-K31452-V1.0\Profiles\Linux\OS Firmware\files\ubuntu* with your customised logo file.
- Open and edit the *Mfgtools-K31452-V1.0\cfg.ini* file and set the name variable to eMMC-Android-Logo as shown below.

Cfg.ini - 记事本	
文件(E) 编辑(E) 格式(O) 查看(V) 帮助(H)	
[profiles] chip = Linux	A
[platform] board = SabreSD	
[LIST] name = eMMC-Android-Logo	
[variable] display = 1024600	
	Ŧ
	Þ
	第 10 行 , 第 11 列

PIN Number	GPIO Number	Devices File	Direction
3	gpio106	/dev/chipsee-gpio7	IN
4	gpio30	/dev/chipsee-gpio3	OUT

Booting Android OS And Test(Using 7inch as example)

PIN Number	GPIO Number	Devices File	Direction
6	gpio95	/dev/chipsee-gpio6	IN
7	gpio87	/dev/chipsee-gpio4	OUT
8	gpio29	/dev/chipsee-gpio1	OUT
9	gpio28	/dev/chipsee-gpio2 OUT	
11	gpio94	/dev/chipsee-gpio5 IN	
12	gpio130	/dev/chipsee-gpio8 IN	

Table 46 CS12800F101 P18

PIN Number	GPIO Number	Devices File Direction	
21	gpio106	/dev/chipsee-gpio7 IN	
22	gpio29	/dev/chipsee-gpio1 OUT	
23	gpio30	/dev/chipsee-gpio3	OUT
24	gpio28	/dev/chipsee-gpio2 OUT	
27	gpio95	/dev/chipsee-gpio6 IN	
28	gpio94	/dev/chipsee-gpio5	IN
29	gpio87	/dev/chipsee-gpio4 OUT	
30	gpio130	/dev/chipsee-gpio8 IN	

Table 47 CS10600F070V1 P21

PIN Number	GPIO Number	Devices File	Direction
21	gpio29	/dev/chipsee-gpio1 OUT	
22	gpio106	/dev/chipsee-gpio7 IN	
23	gpio28	/dev/chipsee-gpio2	OUT
24	gpio30	/dev/chipsee-gpio3 OUT	
27	gpio130	/dev/chipsee-gpio8 IN	
28	gpio87	/dev/chipsee-gpio4	OUT
29	gpio94	/dev/chipsee-gpio5 OUT	
30	gpio95	/dev/chipsee-gpio6 IN	

Table 48 CS10600F070V2 P21

📋 cfg.ini - 记事本	x
文件(E) 编辑(E) 格式(Q) 查看(V) 帮助(H)	
[profiles] chip = Linux	*
[platform] board = SabreSD	
[LIST] name = eMMC-Android-Logo	
[variable] display = 1024600	
*	Ŧ

Figure 200: Logo Modify with MFGTool

Use Logoflasher to Change Logo

You can get the Logoflasher file and use these tools to make one bootable TF card. Follow the steps below to change logo

• Use the following commands to make bootable TF card.



- Put your custom logo file in the first partition **boot-flash** directory on the TF Card.
- Set boot mode to **TF card**. You can reference **Boot Switch Configuration**.
- Power ON the IPC. If you see this message, >>>>> eMMC Flashing Completed <<<<<<, you are done:

Android 6.0 system debug in Windows

In this section, we will discover how to view the Android 6.0 system via the serial port and debug the system via USB OTG.

Also, we will discover how to install and uninstall applications via USB OTG.

The following operation is under the Windows 7 x64 environment, similar to other Windows platforms.

View Android 6.0 system via the serial port

Install the **SecureCRT** or **Putty** software on a Windows 7 PC to view the Android 6.0 system via the serial ports.

Follow these steps to view Android 6.0 system via the serial port:

- Connect COM1 on the industrial PC board to Windows 7 PC.
- Open the SecureCRT or Putty software on the Windows 7 PC and configure it as shown on the figure below.

Session Options - RS232-L	eft(COM4)			×
Category Category Connection Conn	eft(COM4) Serial Og Port: Baud rate: Data bits: Parity: Stop bits:	COM4 115200 8 None 1	 Flow Control DTR/DSR RTS/CTS XON/XOFF 	
Log File Printing Advanced Xmodem/Zmodem	Serial brea	ak 100	milliseconds	
			OK	Cancel

Figure 201: SecureCRT configuration

• Power ON the industrial PC. You will see the serial output information as shown on the figure below.

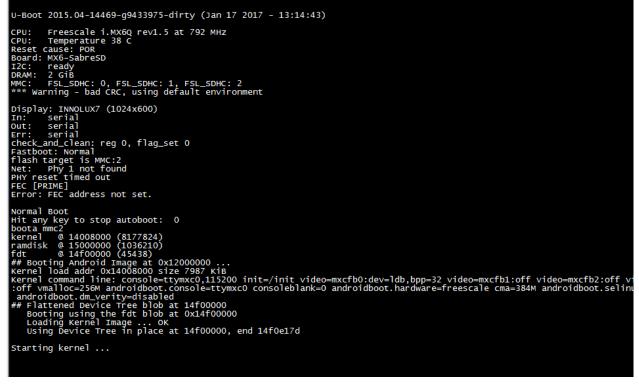


Figure 202: Serial output information

• You can communicate with the system when system boot is complete.

Adb connect via USB OTG

Please refer to the ADB Test chapter to learn how to set the ADB, how to install an app via ADB, and how to debug with ADB.

You can use the following command to log in to the board and communicate with it.

> adb shell

C: Wsers \Chipsee \adb shell
shell@sabresd_6dq:/ \$ su
root@sabresd_6dq:/ # ls
1s
acct
cache
charger
config
d data
data da favilta unan
default.prop dev
device
file_contexts
fstab.freescale
init
init.chipsee.sh
init.environ.rc
init.freescale.i.MX6DL.rc
init.freescale.i.MX6Q.rc
init.freescale.i.MX6QP.rc
init.freescale.rc
init.freescale.usb.rc
init.rc
init.recovery.imx6.rc
init.trace.rc
init.usb.configfs.rc
init.usb.rc
init.zygote32.rc

Figure 203: ADB Shell

Use ADB command to install user APP

Use the adb command to install an Android App: for example SogouInput.apk. If there is a **SUCCESS** message, as shown on the figure below, then the app installation was successful.

```
> adb install SogouInput.apk
```

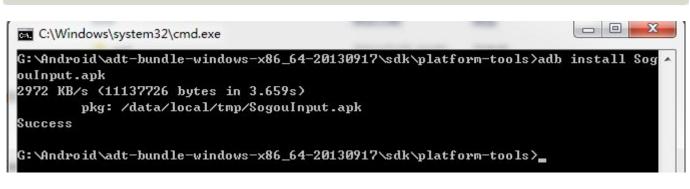


Figure 204: Install App

Use ADB command to uninstall user APP

Use adb command to uninstall an Android app: for example AngryBirds.apk. Follow these commands to uninstall an app.

```
> adb shell pm list packages
> adb uninstall com.rovio.angrybirds
```

• The *pm list* command gets the full name of the app, as shown on the figure below.

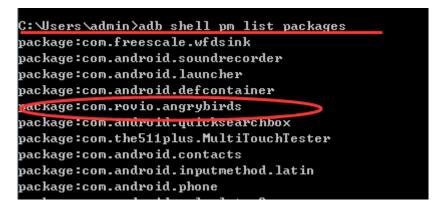


Figure 205: Uninstall user app

- The uninstall command uninstalls the app from the Android system.
- Delete the apk file for the app by using these commands:

```
> adb shell
# cd /system/app/
# ls
# rm Browser.apk
```

Use ADB command to uninstall default APP

Use adb command to uninstall an Android app: for example *Email.apk*. Follow these commands to uninstall a default app.

> adb shell		
\$ su su		
<pre># cd /system/app cd /system/app</pre>		

rm Email.apk

C:\Users\admin>adb shell shell@sabresd_6dq:/ \$ su su root@sabresd_6dq:/ # cd /system/app cd /system/app root@sabresd_6dq:/system/app # rm Email.apk_

Figure 206: Uninstall default app

Use ADB command to uninstall default APP

Use adb command to transport files between the industrial PC and Windows 7 PC.

• Transfer file from the industrial PC to Windows 7 PC using *adb pull* command.

> adb pull <pathTo_file_on_board> <pathTo_store_file_on_PC>

• Transfer file from the Windows 7 PC to the industrial PC using *adb* push command.

> adb push <pathTo_file_on_PC> <pathTo_store_file_on_board>

For example, copy <ADT>\sdk\platform-tools\chipsee.txt from Windows PC to IPC:

> adb push chipsee.txt /chipsee.txt

Copy /testFile.txt from IPC to Windows PC:

> adb pull /testFile.txt testFile.txt

Adb connect via internet

1. The Ethernet port on the industrial PC and the host machine (Windows 7 PC) should connect to the network. Check Ethernet configuration for the industrial PC using the command below.

<pre># netcfg</pre>	J	
lo	UP	127.0.0.1/8 0x00000049 00:00:00:00:00:00
can0	DOWN	0.0.0/0 0x0000080 00:00:00:00:00:00
eth0	UP	192.168.6.176/24 0x00001043 1e:ed:19:27:1a:b3

2. If the industrial PC's Ethernet is not configured, configure the Ethernet using the ifconfig / netcfg command as shown below.

netcfg eth0 dhcp

3. Configure the ADB Daemon to use an Ethernet connection using the setprop command, as shown below.

setprop service.adb.tcp.port 5555

4. If the network is configured successfully using the steps above, then Restart service adbd on the Windows 7 PC.

```
# stop adbd
# start adbd
```

5. On the host machine (Windows 7 PC) use the following commands to establish the adb connection.

```
$ adb kill-server
$ adb start-server
$ adb connect :5555
```

6. Verify the device connectivity, by executing the following commands. If connected, find the device name listed as ``IPADDRESS:PORT``.

\$ adb devices List of devices attached 192.168.6.176:5555 device 7. An example of using the adb command to install software for Android. Make sure the "**".apk file is at the current folder, and export the adb path.

• Use the argument -s to assign the device to use over the internet.

\$ adb -s 192.168.1.117:5555 install "**".apk

Android App Development

In this section, we will introduce the development of an Android app with Android Studio on Windows. We assume that the USB is OTG model and the driver is already installed. (See Adb connect via USB OTG)

Example — Develop a HelloWorld Program

1. Start a new Android Studio project

👳 Welcome to Android Studio			
	Android Studio Version 2.3.3		
	🔆 Start a new Android Studio project		
	🔁 Open an existing Android Studio project		
	🖊 Check out project from Version Control 🗸		
	💕 Import project (Eclipse ADT, Gradle, etc.)		
	💅 Import an Android code sample		
		🏶 Configure 👻 G	iet Help 👻

Figure 207: New Project

2. Configure your new project

💮 Create New Project	P H IS F ADCO Adds: Adds	
New Android St	Project	
Configure your	r new project	
Application name:	HelloWorld	
<u>C</u> ompany domain:	chipsee.com	
Package name:	com.chipsee.helloworld	
	Include C++ support	
Project location:	D:\share\WORK\Develop_Sources\Android\temp\HelloWorld	
	Previous <u>N</u> ext Cancel Finish	

Figure 208: Project Configuration

3. Select the form factors your application will run on

👧 Create New Project	unco Autor Autor Autor Autor Autor summer summer autors	×
Target Android D	evices	
Select the form factors your app	will run on	
Different platforms may require separate SD	Ks	
Phone and Table	at .	
_		
Minimum SDK	API 16: Android 4.1 (Jelly Bean)	
	Lower API levels target more devices, but have fewer features available. By targeting API 16 and later, your app will run on approximately 99.2% of the devices	
	that are active on the Google Play Store.	
	Help me choose	
🗌 Wear		
Minimum SDK	API 21: Android 5.0 (Lollipop)	2
□ TV		
Minimum SDK	API 21: Android 5.0 (Lollipop)	2
Android Auto		-
	Previous Next	Cancel Finish
L		

Figure 209: App form factor

4. Select one Empty Activity

Add an Activit	y to Mobile	Addr. Addic, Addic	Addition of the second second	
Add No Activity	e : Basic Activity	Eottom Navigation Activity	← Empty Activity	Fullscreen Activity
Google AdMob Ads Activity	Google Maps Activity	← :	Master/Detail Flow	Navigation Drawer Activity
	Googie Maps Activity	Login Activity	Master/Detail How	Navigation Drawer Activity Next Cancel Finish

Figure 210: Add Activity

5. Customize the Activity

Create New Project	he Activity	
÷	Creates a new empty activity	
	Activity Name: MainActivity	
	Generate Layout File Layout Name: activity_main Backwards Compatibility (AppCompat)	
Empty Activity		
	The name of the activity class to create	
	Previous Next Ca	ancel <u>F</u> inish

Figure 211: Customize Activity

6. Develop the App

HelloWorld - [D:\share\WORK\Develop_Sources\Android\temp\HelloWorld] - [app\src\main\res\Jayout\activity_main.xml - Android Studio 2.3.3	
Edit View Navigate Code Analyze Befactor Build Run Iools VCS Window Help	
田 Ø ダ か み ① 内 ヘ 泉 ゆ ゆ ヘ 🕻 🖙 pp 🔹 ト キ 体 ቡ 🖬 🗮 💈 🕞 👗 ?	Q
HelloWorld) 🕞 app) 🗂 src) 🛅 main) 😋 res) 🗈 layout) 😣 activity_main.xml)	
🗊 Project 🔹 😳 💠 🕸 🕹 🕸 thity, main.xml × 😢 MainActivity.java ×	
🔻 🔀 HelloWorld DAshare\WORK\Develop_Sources\Android temp\HelloWorl Paiette 🔍 🕸 [+ 🕞 🖬 🕼 🖉 - 🗋 Nexus 4- 🗯 36- 🔍 AppTheme 🌚	Language- 🕀- Properties Q 🚅 🕸- 🗠
► D.gradle	
All BetWay > Diskee Wdgets Wdgets > Diske Wdgets Toglitation >> Disked Containers Toglitation >> Disked Containers Programmers >> Dispende properties ProgressBar Holicontal) >> padrew bat Doogle - SeakBar (Discrete) >> padrew bat Doogle - SeakBar (Discrete) >> betting-grade AppCompet RatingBar	
Component Tree Component Tree * N ConstraintLayout * TreetView - "Helio World? B	He war
8	
Design Text	
🙊 Messages 🗐 Terminal 🛛 🗸 & Android Monitor 👒 TODO	Event Log II Gradie Consol
adle build finished in 3s 702ms (2 minutes ago)	n/a n/a Context: <no context=""> Ta</no>

Figure 212: App Development Interface

7. Run app on target IPC

				🖹 🛿 3:36
HelloWorld				
		Hello World!		
	\triangleleft	0		

Figure 213: HelloWorld Program

Note
If the USB is not configured as an OTG model, you can copy and install the file HelloWorld.apk from the project folder HelloWorld/bin/, or install the HelloWorld.apk via the internet (See Adb connect via internet).

For more resources about Android development, visit these links:

https://developer.android.com/guide/index.html https://developer.android.com/develop/ index.html http://developer.android.com/support.html http://blog.apptopia.com/androiddevelopment-forums/ http://androidforums.com/application-development/

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