

SB35 SoM and EVB introduction

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Ver.: 1.1

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Outline

- EVK Pack Overview
- Hardware introduction
 - SOM specification
 - Outline and pin definition
 - Accessories assemble
 - UART debug port setting
- Software and design document introduction
 - Software refresh(Use flash_tool)
 - Reference resource (BSP & Documents)
- EVB HW and SW status

EVK PACK OVERVIEW



Evaluation Kit: Boards & Accessories



Box



SB35 SoM + Carrier board



HARDWARE INTRODUCTION



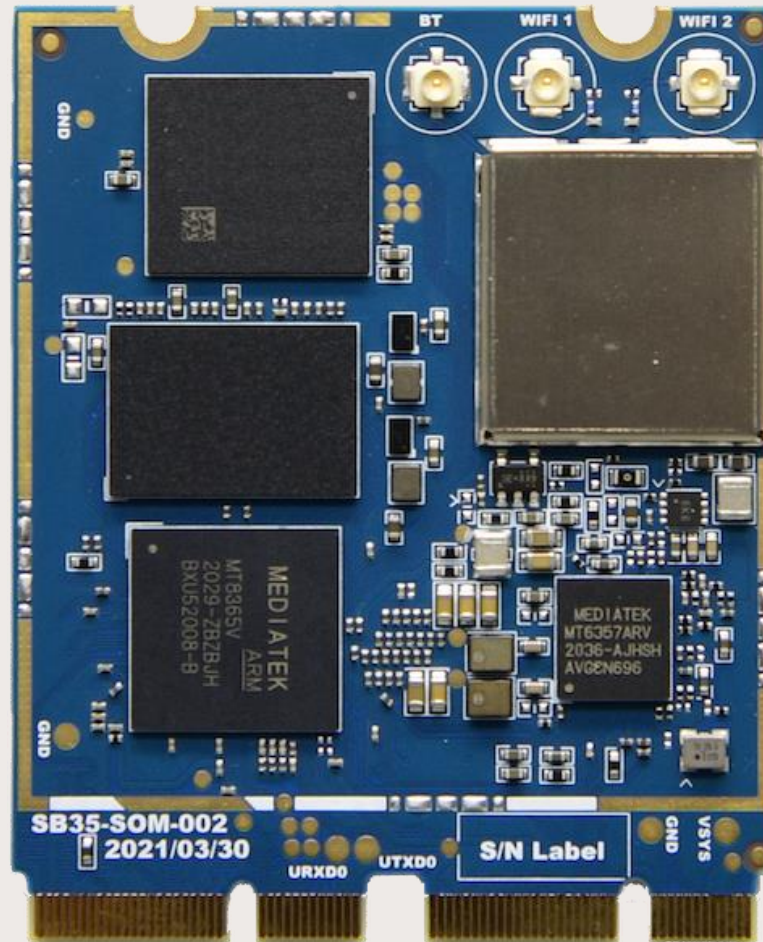
SB35 SoM Specifications 1/2

Specifications		Note
SOM	SB35	
Main Chip	i350/MT8365	
MPU	Cortex-A53 x4 @2.0GHz	
GPU	Arm Mali-G52 MC1	
Vision DSP	Tensilica VP6 (624MHz@0.8V and 400MHz@0.7V)	
RAM	LPDDR4x 2GB or 4GB	
Flash	eMMC, 16GB or 32GB	
Wireless Connectivity	MT7663	
WiFi	802.11 a/b/g/n/ac MIMO	
Bluetooth	BT 5.1	
Display Interface		
LCD	MIPI DSI, 4 lane , up to 2400x1080	
HDMI	NA	
Camera Interface	MIPI-CSI, 4 data lanes x2, 13MP	
Wired Connectivity		
USB Host	USB2.0 Host	
USB OTG	USB2.0 OTG	
Ethernet	NA	can perform Ethernet fucntion by USB to Ethernet bridge chip

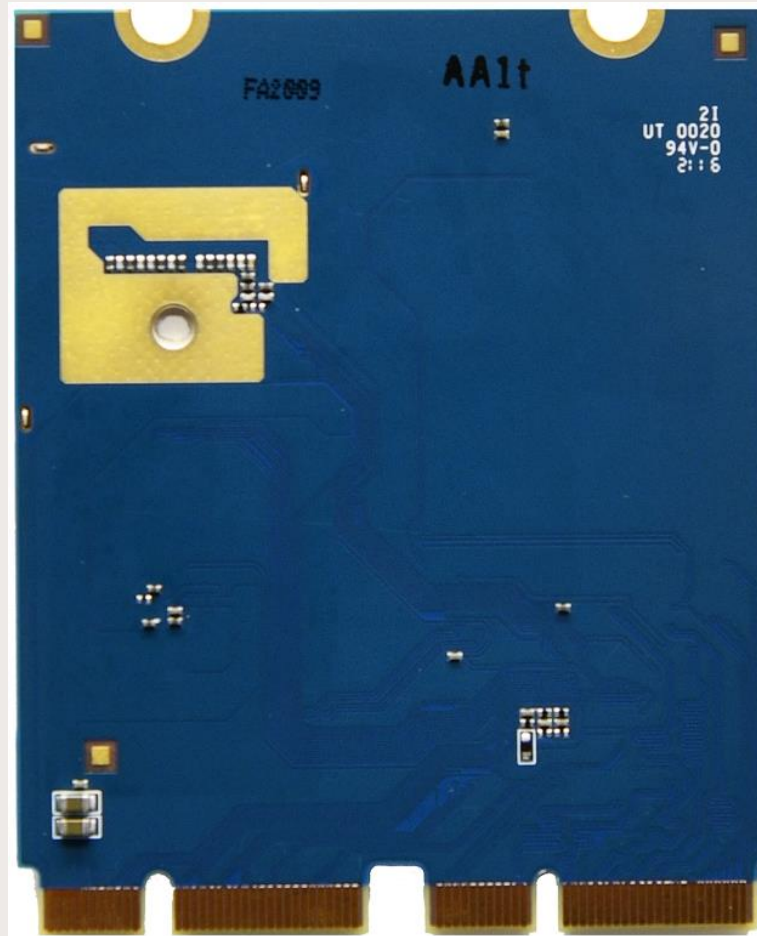
SB35 SoM Specifications 2/2

Specifications		Note
Audio Interface		
I2S	x2	
D-MIC	2 channel	
Earphone	R/L channel output, microphone input	
Other Interface		
I2C	X3	
SDIO	X1	
PWM	x2 max.	
SPI	x1	
UART	X2	UART0 is config as debug port by default
keys	2x2 key matrix	
ADC	x1	
GPIO	Shared with other interfaces, total pin count depends on the pin configuration	
Debug Interface		
JTAG	x1	Through M.2 interface
UART	x1	UART0 through M.2 interface
Interface voltage Level	1.8V	
Power supply	3.40V~5.00V, 3.8V typical	
Dimension	~ 45mm x 55mm	
Intrface Connector		
Main	M.2 E-key x2	
Optional	NA	

SB35 illustration (Top)



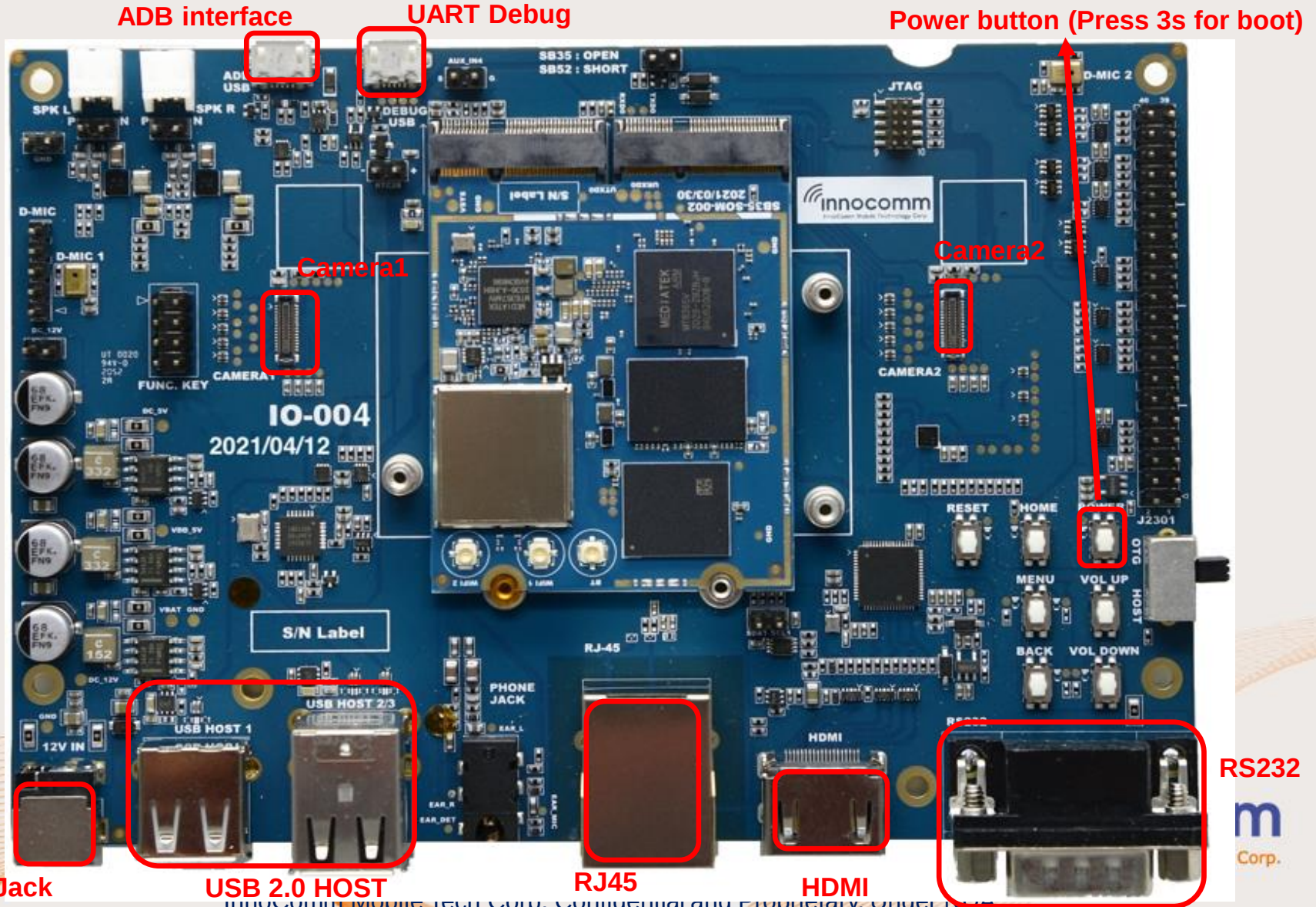
SB35 illustration (Bottom)



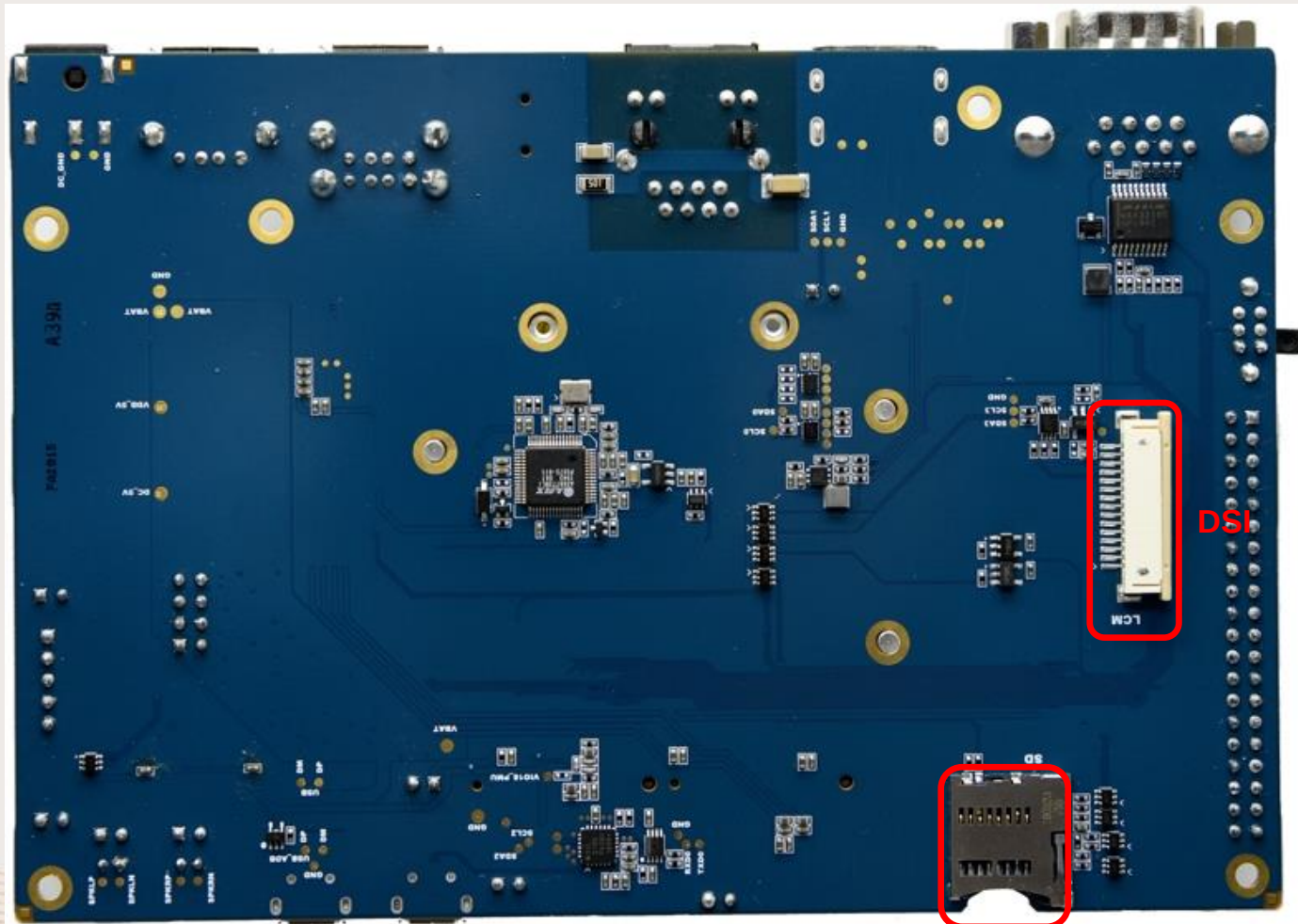
SB35 SoM Pin Define

SB35 Pin Function	M.21	SB35 Pin Function	SB35 Pin Function	M.22	SB35 Pin Function
SYSRSTB	1 2	VSYS	AVSS28_AUD	1 2	VLDO28_PMU
PWRKEY	3 4	VSYS	GND	3 4	GPIO20
VIO28_PMU	5 6	VSYS	RXD0	5 6	DISP_PWM
GND	7 8	VSYS	TXD0	7 8	DISP_TE
GND	9 10	GND	FCHR_ENB	9 10	GPIO21
AUXIN4	11 12	VBUS	IDDIG	11 12	GPIO2
GPIO13	13 14	VRTC28_PMU	GPIO14	13 14	GPIO1
GPIO7	15 16	I2S0_MCK	GPIO15	15 16	GPIO7
UCTS1	17 18	I2S0_BCK	DSI_D2N	17 18	GPIO151
SDA3	19 20	I2S0_LRCK	DSI_D2P	19 20	DSI_D3N
SCL3	21 22	I2S0_DI	DSI_D1N	21 22	DSI_D3P
MIC_MICBIAS0	23		DSI_D1P	23	
DMIC0_DAT1	33 32	SPI_CS	DSI_D0N	33 32	DSI_CKP
DMIC0_CLK	35 34	SPI_CK	DSI_D0P	35 34	DSI_CKN
DMIC0_DAT0	37 36	SPI_MI	RDN3_0	37 36	CAM_CLK0
AU_REFN	39 38	SPI_MO	RDP3_0	39 38	RDN2_0
AU_HPR	41 40	URTS1	RDN1_0	41 40	RDP2_0
AU_HPL	43 42	GPIO4	RDP1_0	43 42	RCP_0
GND	45 44	I2S3_MCK	RDN0_0	45 44	RCN_0
MIC_MICBIAS1	47 46	I2S3_LRCK	RDP0_0	47 46	GND
AU_VIN1_P	49 48	I2S3_BCK	GND	49 48	RDN3_1
AU_VIN1_N	51 50	I2S3_DO	VCAMA_PMU	51 50	RDP3_1
ACCDET	53 52	KPROW0	VCAMD_PMU	53 52	RDN2_1
HP_EINT	55 54	URXD1	VCAMIO_PMU	55 54	RDP2_1
GND	57 56	UTXD1	GPIO12	57 56	GPIO6
USB_DM_P0	59 58	KPCOL0	RCP_1	59 58	GND
USB_DP_P0	61 60	KPROW1	RCN_1	61 60	MSDC1_INSI
GND	63 62	KPCOL1	GND	63 62	VMCH_PMU
USB_DM_P1	65 64	SDA2	CAMCLK1	65 64	MSDC1_CMD
USB_DP_P1	67 66	SCL2	GND	67 66	MSDC1_CLK
GND	69 68	GPIO16	RDN1_1	69 68	MSDC1_DAT0
SDA1	71 70	GPIO123	RDP1_1	71 70	MSDC1_DAT1
SCL1	73 72	GPIO124	RDN0_1	73 72	MSDC1_DAT2
VIO18_PMU	75 74	GPIO125	RDP0_1	75 74	MSDC1_DAT3

Evaluation Board illustration

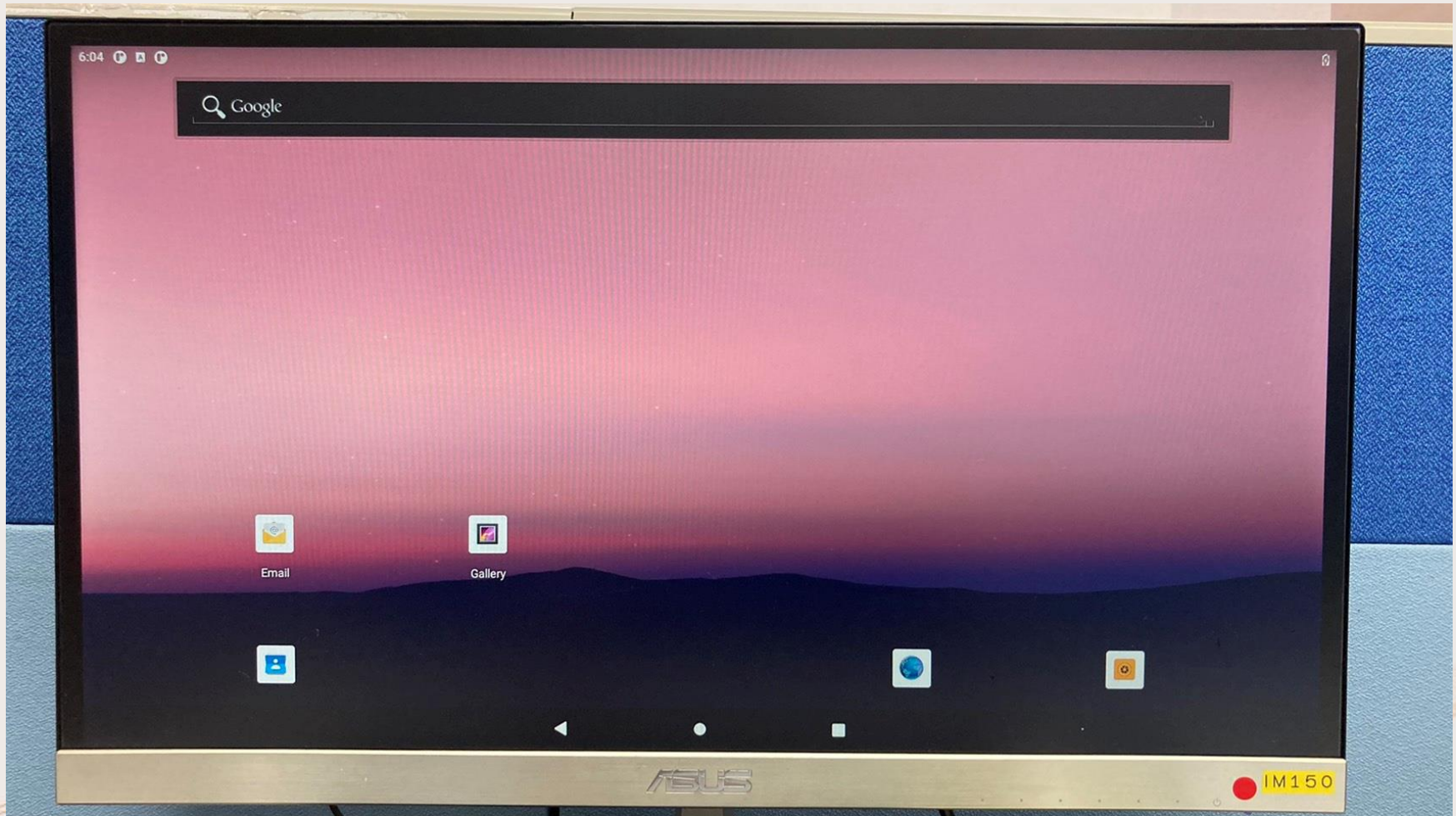


Evaluation Board illustration

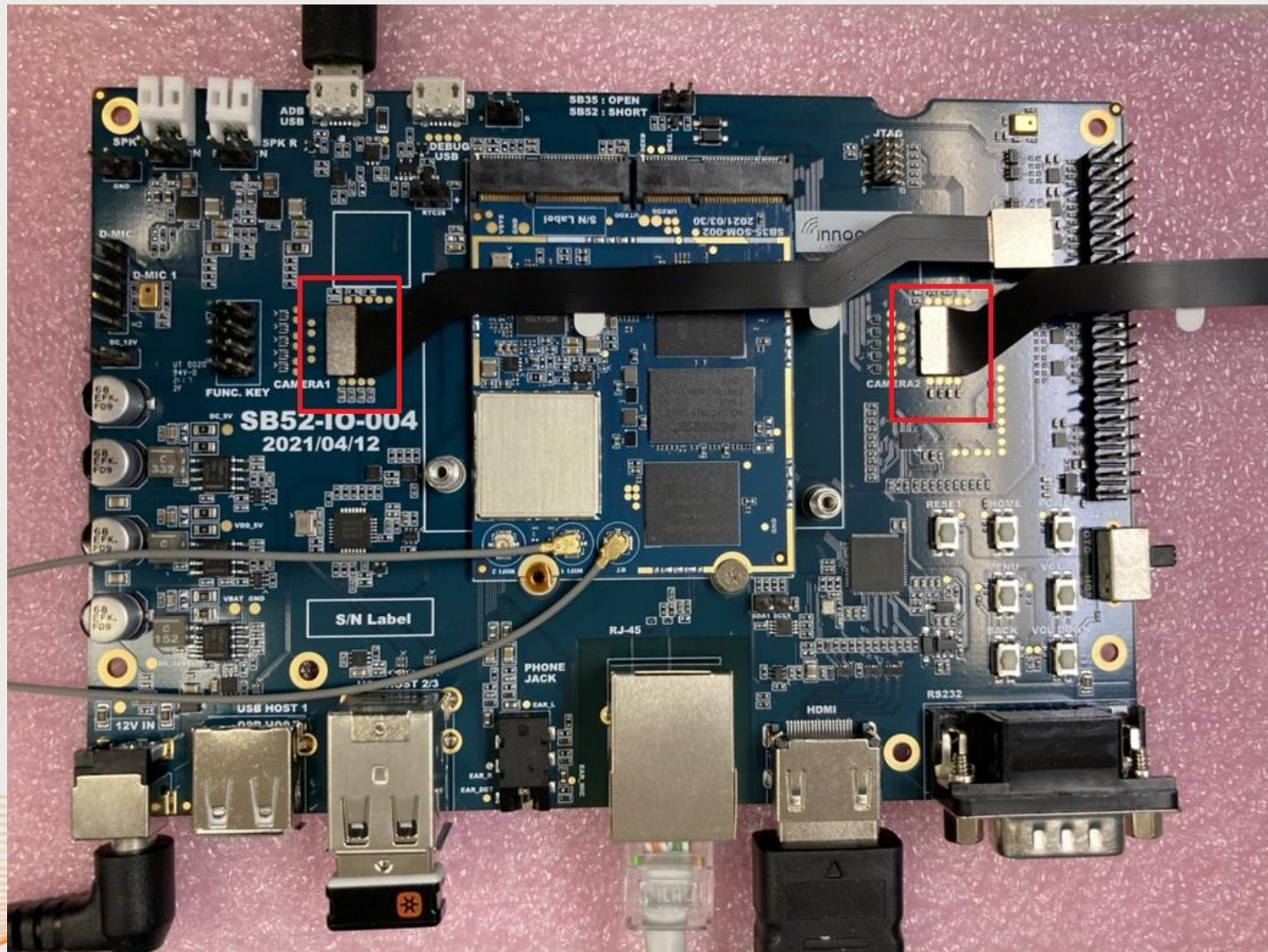


SD Card

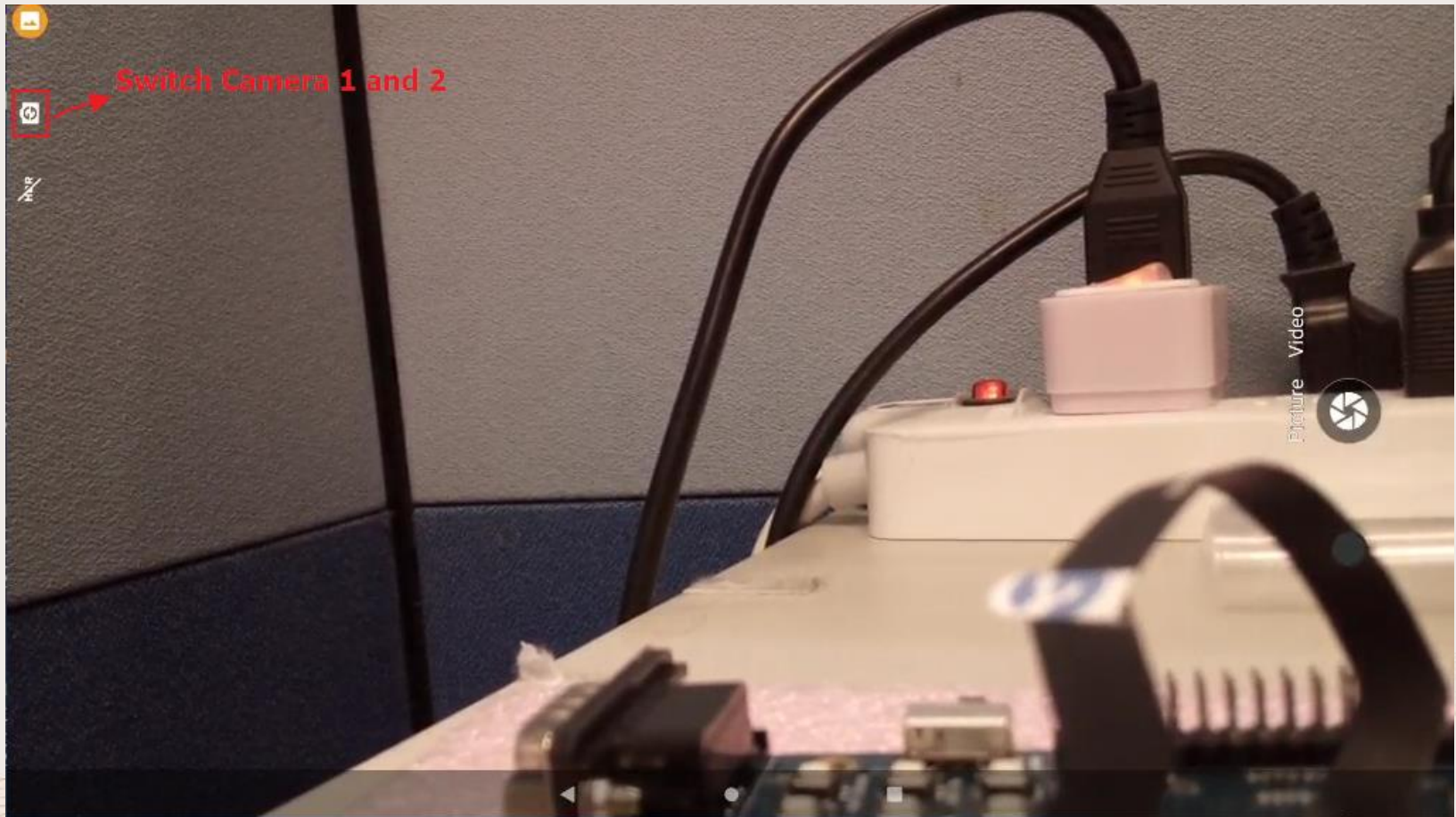
HDMI Display



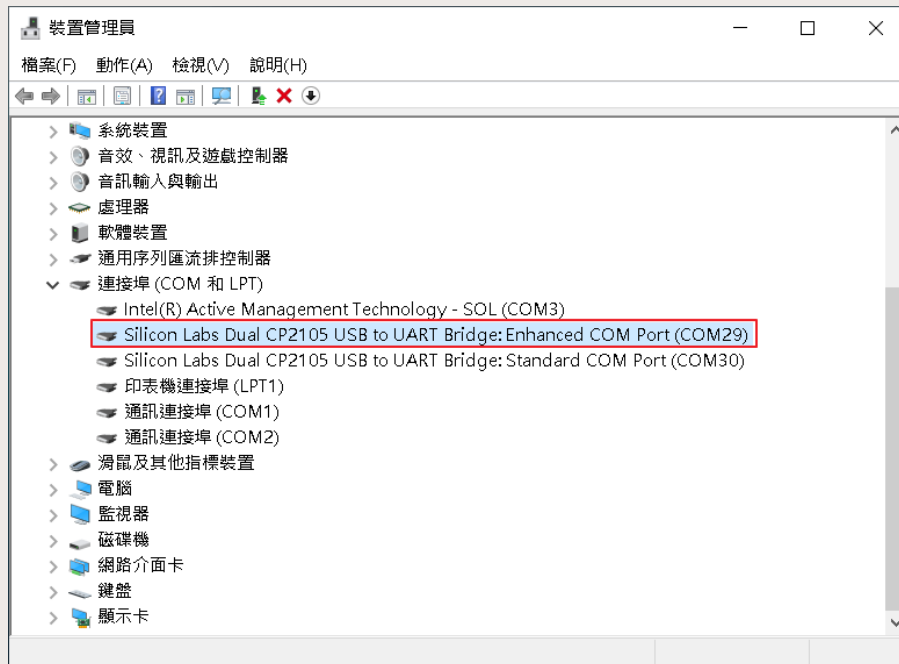
Assemble EVB with Camera 1 and 2



Switch Camera in Android Camera app



UART debug port setting



Port:	COM29
Speed:	921600
Data:	8 bit
Parity:	none
Stop bits:	1 bit
Flow control:	none

UART debug terminal

```
COM29 - Tera Term VT
File Edit Setup Control Window Help
[ 1093.877627] <7>.(7)[116:mdrt_thread][MDRT_ADC] trig_prd=31, rdy_time=1, MDRT_OUT=17
[ 1094.533655] <7>.(7)[116:mdrt_thread][MDRT_ADC] trig_prd=32, rdy_time=1, MDRT_OUT=17
[ 1094.926462] <7>.(7)[116:mdrt_thread]AUXADC ADC15 = 0x0
[ 1094.927110] <7>.(7)[116:mdrt_thread]AUXADC ADC16 = 0x0
[ 1094.927756] <7>.(7)[116:mdrt_thread]AUXADC ADC17 = 0x8011
[ 1094.928434] <7>.(7)[116:mdrt_thread]AUXADC ADC31 = 0x8011
[ 1094.929121] <7>.(7)[116:mdrt_thread]AUXADC MDRT_0 = 0x8040
[ 1094.929810] <7>.(7)[116:mdrt_thread]AUXADC MDRT_1 = 0x12b
[ 1094.930488] <7>.(7)[116:mdrt_thread]AUXADC MDRT_2 = 0x4
[ 1094.931144] <7>.(7)[116:mdrt_thread]AUXADC MDRT_3 = 0x1f
[ 1094.931810] <7>.(7)[116:mdrt_thread]AUXADC MDRT_4 = 0x1
[ 1094.932471] <7>.(7)[116:mdrt_thread]RG_AUXADC_CK_PDN = 0x0, RG_AUXADC_CK_PDN_HWEN = 0x1
[ 1094.933606] <7>-(7)[0:swapper/7][name:spm&]Power/swap CNT(soidle3,rgidle): [0] = (0,0), [1]
= (0,0), [2] = (0,0), [3] = (0,0), [4] = (0,0), [5] = (0,0), [6] = (0,0), [7] = (0,0),
[ 1094.933616] <7>-(7)[0:swapper/7][name:spm&]Power/swap soidle3_block_cnt: [by_frm] = 0, [by_
cpu] = 0, [by_srr] = 1636, [by_ufs] = 0, [by_tee] = 0, [by_clk] = 0, [by_des] = 0, [by_dis] =
0, [by_pwm] = 0, [by_pll] = 0, [by_boot] = 0,
[ 1094.933620] <7>-(7)[0:swapper/7][name:spm&]Power/swap soidle3_block_mask: 0x00000000, 0x000
00000, 0x00000000, 0x00000000, 0x00000000, 0x00000000,
[ 1094.933623] <7>-(7)[0:swapper/7][name:spm&][resource_req_block] user: 0x4, 0x0
[ 1095.386242] <1>.(1)[106:dlpt_notify_thr][MDRT_ADC] OLD = 0x11, NOW = 0x11, CNT = 0
[ 1095.387583] <1>.(1)[106:dlpt_notify_thr]vbat_out_old=37360, vthr=696, T_curr=336, vbat_out=
37379
[ 1095.388761] <1>.(1)[106:dlpt_notify_thr]mt635x-auxadc mt635x-auxadc: name:BATADC, channel=0
, adc_out=0x588f, adc_result=3738
[ 1095.391823] <1>.(1)[106:dlpt_notify_thr]vbat_out_old=37370, vthr=696, T_curr=336, vbat_out=
37389
[ 1095.392963] <1>.(1)[106:dlpt_notify_thr]mt635x-auxadc mt635x-auxadc: name:BATADC, channel=0
, adc_out=0x5897, adc_result=3739
[ 1095.394372] <1>.(1)[106:dlpt_notify_thr][PBM] [ma_to_mw] 3739(mV) * 3376(mA) = 12622(mW)
[ 1095.395420] <1>.(1)[106:dlpt_notify_thr][DLPT_final] 3376,50,50,1,5500
```

SOFTWARE & DOCUMENT INTRODUCTION



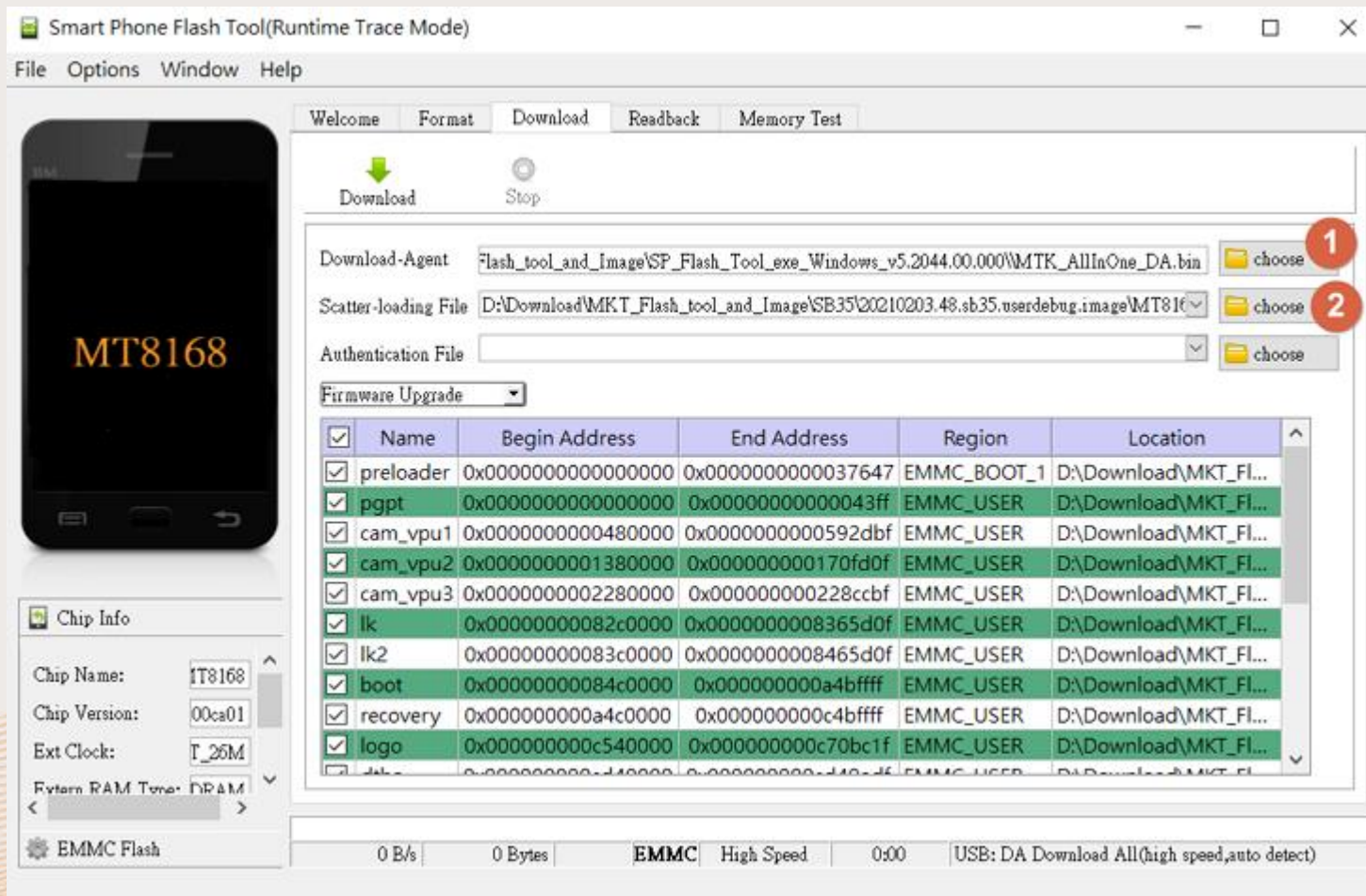
Software refresh(Use flash_tool)

- Install **Driver_Auto_Installer** and unzip **SP_Flash_Tool**
- Run **flash_tool.exe**

名稱	修改日期	類型	大小
codecs	2019/6/26 下午 0...	檔案資料夾	
imageformats	2019/6/26 下午 0...	檔案資料夾	
sqldrivers	2019/6/26 下午 0...	檔案資料夾	
Qt assistant.exe	2019/6/26 下午 0...	應用程式	1,181 KB
BromAdapterTool.ini	2019/6/26 下午 0...	組態設定	1 KB
console_mode.xsd	2019/6/26 下午 0...	XSD 檔案	28 KB
CustPT.ini	2019/6/26 下午 0...	組態設定	1 KB
DA_PL.bin	2019/6/26 下午 0...	BIN 檔案	13,619 KB
DA_PL_CRYPT020.bin	2019/6/26 下午 0...	BIN 檔案	13,619 KB
DA_SWSEC.bin	2019/6/26 下午 0...	BIN 檔案	3,962 KB
DA_SWSEC_CRYPT020.bin	2019/6/26 下午 0...	BIN 檔案	3,962 KB
dl_without_scatter.xml	2019/6/26 下午 0...	nRFgoStudio.nRF...	2 KB
download_scene.ini	2019/6/26 下午 0...	組態設定	1 KB
flash_tool.exe	2019/6/26 下午 0...	應用程式	10,293 KB
flashtool.qch	2019/6/26 下午 0...	QCH 檔案	6,432 KB
flashtool.qhc	2019/6/26 下午 0...	QHC 檔案	12 KB

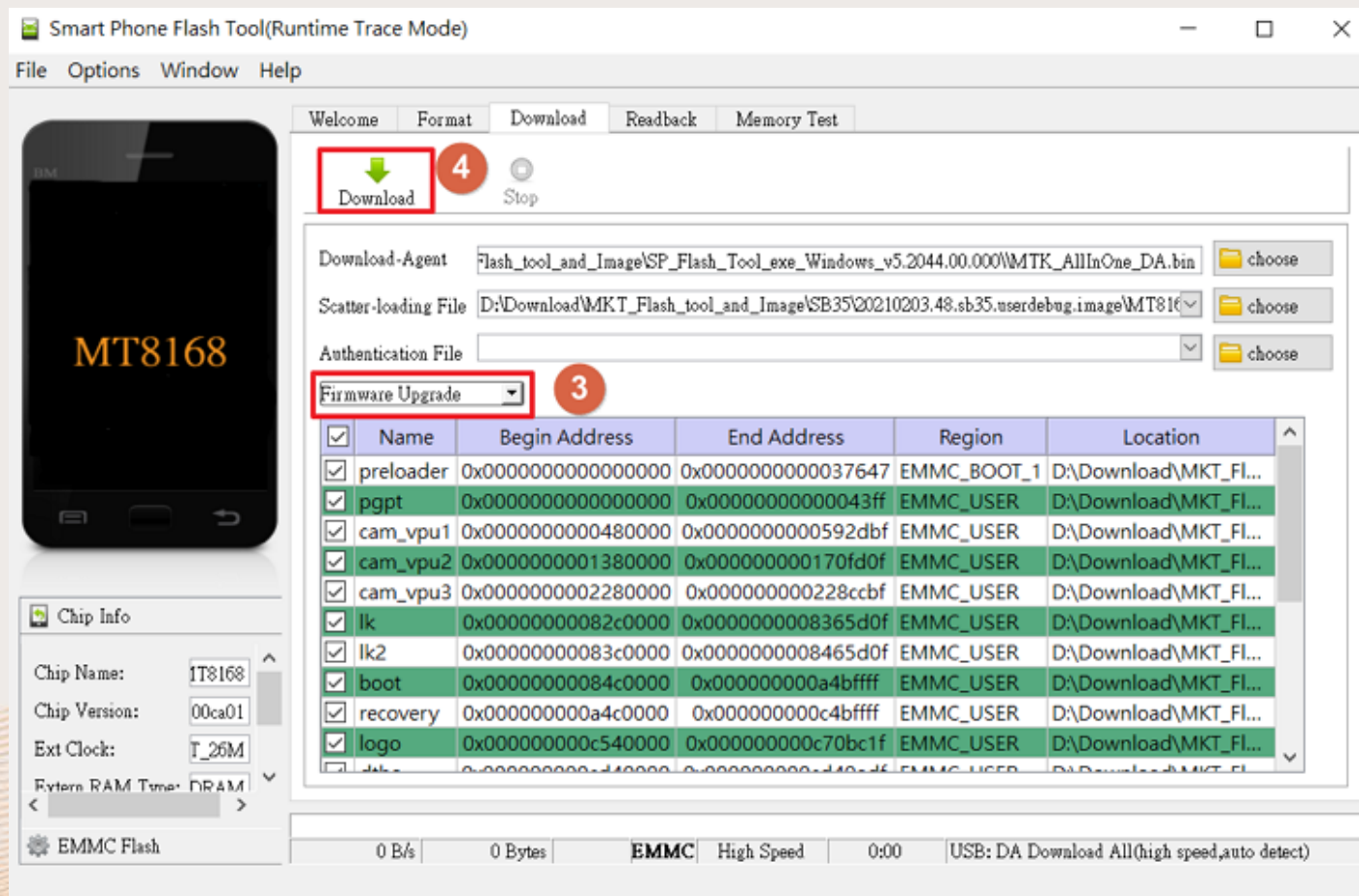
Software refresh(Use flash_tool)

- Follow steps in below to set flash tool **Download-Agent** and **Scatter file** for image.



Software refresh(Use flash_tool)

- Plug in Micro USB cable to OTG connector for download image from PC
- Select **Download Only** then **Power off**
- Click **Download** then **Power on**



Software refresh(Use flash_tool)

Smart Phone Flash Tool(Runtime Trace Mode)

File Options Window Help

Welcome Format Download Readback Memory Test

Download Stop

Download-Agent: Flash_tool_and_Image\SP_Flash_Tool_exe_Windows_v5.2044.00.000\MTK_AllInOne_DA.bin choose

Scatter-loading File: D:\Download\MKT_Flash_tool_and_Image\SB35\20210203.48.sb35.userdebug.image\MT8168 choose

Authentication File: choose

Firmware Upgrade

☒	Name	Begin Address	End Address	Region	Location
☒	preloader	0x0000000000000000	0x0000000000037647	EMMC_BOOT_1	D:\Download\MKT_Fl...
☒	boot	0x0000000000000000	0x000000000000043f	EMMC_USER	D:\Download\MKT_Fl...
☒	cam_vpu1	0x00000000000480000	0x00000000000592dbf	EMMC_USER	D:\Download\MKT_Fl...
☒	cam_vpu2	0x00000000000138000	0x00000000000170fdbf	EMMC_USER	D:\Download\MKT_Fl...
☒	cam_vpu3	0x00000000000228000	0x00000000000228ccbf	EMMC_USER	D:\Download\MKT_Fl...
☒	lk	0x00000000000082c000	0x00000000000365d0f	EMMC_USER	D:\Download\MKT_Fl...
☒	lk2	0x00000000000083c000	0x000000000008465d0f	EMMC_USER	D:\Download\MKT_Fl...
☒	boot	0x00000000000064c000	0x00000000000a4bfff	EMMC_USER	D:\Download\MKT_Fl...
☒	recovery	0x00000000000a4c000	0x00000000000c4bffff	EMMC_USER	D:\Download\MKT_Fl...
☒	logp	0x00000000000c54000	0x00000000000c70bfff	EMMC_USER	D:\Download\MKT_Fl...
☒	dtbo	0x00000000000c71000	0x00000000000c71000	EMMC_USER	D:\Download\MKT_Fl...

Chip Info

Chip Name: MT8168

Chip Version: 00ca01

Ext Clock: T_26M

Extern RAM Tester: DRAM

EMMC Flash

[super] Download Flash 27%

38.64M/s 490.00M EMMC High Speed 0:19 MediaTek PreLoader USB VCOM (Android) (COM6)

Software refresh(Use flash_tool)

Smart Phone Flash Tool(Runtime Trace Mode)

File Options Window Help

Welcome Format Download Readback Memory Test

Download Stop

Download-Agent flash_tool_and_Image\SP_Flash_Tool_exe_Windows_v5.2044.00.000\MTK_AllInOne_DA.bin choose

Scatter-loading File D:\Download\MKT_Flash_tool_and_Image\SB35\20210203.48.sb35.userdebug.image\MT816 choose

Authentication File choose

Firmware Upgrade

Download Ok

Name	Begin	Region	Location
preloader	0x00000000	EMMC_BOOT_1	D:\Download\MKT_Fl...
pgpt	0x00000000	EMMC_USER	D:\Download\MKT_Fl...
cam_vpu1	0x00000000	EMMC_USER	D:\Download\MKT_Fl...
cam_vpu2	0x00000000	EMMC_USER	D:\Download\MKT_Fl...
cam_vpu3	0x00000000002280000	EMMC_USER	D:\Download\MKT_Fl...
lk	0x000000000082c0000	EMMC_USER	D:\Download\MKT_Fl...
lk2	0x000000000083c0000	EMMC_USER	D:\Download\MKT_Fl...
boot	0x000000000084c0000	EMMC_USER	D:\Download\MKT_Fl...
recovery	0x0000000000a4c0000	EMMC_USER	D:\Download\MKT_Fl...
logo	0x0000000000c540000	EMMC_USER	D:\Download\MKT_Fl...

Chip Info

Chip Name: MT8168

Chip Version: 00ca01

Ext Clock: T_26M

Extern RAM Type: DRAM

EMMC Flash

[userdata] Download Flash 100%

15.01M/s 92.26K EMMC High Speed 0:58 MediaTek PreLoader USB VCOM (Android) (COM6)

Reference Resources: Documentation, Sources & Tools

Design Documentation:

- SB35_Android_User_Guide
- SB35_Flash_Tool_Download_Guide
- SB35_SOM_Datasheet
- SB35 Development Kit Hardware User Guide
- SB52_SB35_CARRIER BOARD SCHEMATIC(R003)

Flash tool & Source code:

- Driver_Auto_Installer_EXE_v5.1632.00.zip
- SP_Flash_Tool_exe_Windows_v5.2044.00.000.zip
- SP_Flash_Tool_exe_Linux_v5.2044.00.100.zip
- SB35.200.tar.xz.zip

Software Reference Development Guide

- SB35_Android_User_Guide

This tutorial guides developers how to build Android 11 with the SB35 board. It provides manuals for:

1. Setting up a Linux® OS build machine.
2. Building SB35 Android system images.
3. Downloading the images to SB35 development board.

- For more information about building the Android platform, please check <https://source.android.com/setup>

Flash Tool User Guide

- SB35_Flash_Tool_Download_Guide

This tutorial guides developers how to download the images using MediaTek flash tool to SB35 development board.

Hardware Datasheet

- SB35_SOM_Datasheet

This document gives you a better idea about SB35, MTK i350 System-on-Module hardware specification. In this document, it covers high level CPU specification, pin assignment, architecture, block diagram and interface description.

SB35EVK Hardware User Guide

- SB35-SOM-Development-Kit-Hardware-User-Guide

SB35 SOM development kit is composed of a SB35 SOM and a carrier board. This user guide will introduce Carrier's IO and connector pin define.

SB35 EVK Carrier Board Schematic

- SB52_SB35_CARRIER BOARD SCHEMATIC(R003)

For customer reference SB35 carrier board circuit design.

EVB HW & SW Status

Hardware

- Only support HDMI display now.
- Don't support HDMI audio output.

Software

- Operation System: Android 11
- Not support Linux(Yocto) now.
- Google Play Store is not included & APK can be installed manually.

Camera module vendor information

OV8856

CMOS 8-megapixel (3264x2448) Image Sensor

Supplier Contact Window:

Rick Chen

香港瑞晶光电科技有限公司

HONGKONG RICHTEK PHOTO-ELECTRONICS LIMITED

珠海市彩韵电子科技有限公司

ZHUHAISHI CAIYUN ELECTRONICS CO.,LTD

Tel:+86-756-6290870

Mobile Phone: +8613726229313 +886 931683305

E-mail: rickchen@richtek-hk.com

Certification

The expected certification is as follows: CE FCC



Support Pack

- Download center: documentation
 - Member Registration: <http://www.innocomm.com/en/getaquote.aspx>
 - Documents Available : <http://www.innocomm.com/download.aspx>
 - Module specification
 - EVB (carrier board) Hardware manual and schematic (by request)
 - Android User Guide and Flash Tool Download Guide
- Free Support
 - FAE SW & HW consult fae@innocomm.com
 - Carrier board schematics for reference. Design consultant.
 - Peripherals QVL list (Display, camera module, antenna...)
 - Technical Forum <http://forum.innocomm.com>
 - Android & Linux BSP for all. Source code release.
 - Module 2D/3D file
- Others Support Service
 - Please contact with innocomm@innocomm.com

APPENDIX



History

Version	Date	By	Change Description
1.0	2021/6/1	Lion Wang	1st initial version
1.1	12/12/21	Lion Wang	Update not support Linux(Yocto) and HDMI Audio output ..