A company of SIM Tech

SIMCOM WCDMA Wireless Module

SIM52xx_Camera_Application

Document Title:	SIM52xx Camera Application Note
Version:	1.01
Date:	2011-08-26
Status:	Release
Document Control ID:	AN SIM52xx Camera Application Note_V1.01

General Notes

SIMCom offers this information as a service to its customers, to support application and engineering efforts that use the products designed by SIMCom. The information provided is based upon requirements specifically provided to SIMCom by the customers. SIMCom has not undertaken any independent search for additional relevant information, including any information that may be in the customer's possession. Furthermore, system validation of this product designed by SIMCom within a larger electronic system remains the responsibility of the customer or the customer's system integrator. All specifications supplied herein are subject to change.

Copyright

This document contains proprietary technical information which is the property of SIMCom Limited., copying of this document and giving it to others and the using or communication of the contents thereof, are forbidden without express authority. Offenders are liable to the payment of damages. All rights reserved in the event of grant of a patent or the registration of a utility model or design. All specification supplied herein are subject to change without notice at any time.

Copyright © Shanghai SIMCom Wireless Solutions Ltd. 2011

Contents

Contents..... 3
Version history..... 4
1. Introduction..... 5
2. Scope of the document..... 5
3. Overview..... 5
4. Camera hardware interface..... 7
4.1 PIN define of camera interface..... 7
4.2 Digital sensor..... 7
4.3 Analog sensor..... 8
4.4 Layout guide..... 9
5.1 Camera parameter setting..... 10
5.1.1 Set parameter commands..... 10
5.1.2 Set parameter in video call..... 10
5.2 Take picture and recording..... 11
5.2.1 Take picture and recording commands..... 11
5.2.2 Typical samples..... 11
5.3 Make video call..... 12
5.3.1 Call commands..... 12
5.3.2 Call result codes..... 13
5.3.3 Typical samples..... 14
6. Analog sensor (AT8856) AT command..... 27
7. Pin function switch between camera interface and GPIO..... 28
8. Camera related commands detail..... 28

SIMCOM CONFIDENTIAL FILE

Version history

Date	Version	Description of change	Author
2010-11-12	01.00	Origin	Zhanghui
2010-08-26	01.01	Delete SIM5210 description	Libing

SIMCOM CONFIDENTIAL FILE

1. Introduction

SIM52XX provides a camera module interface for supporting camera and video phone functions. This document describes how to use the camera of WCDMA wireless module of SIMCom. (SIM52XX represents the series which is stated below.)

2. Scope of the document

This document is intended for the following versions of the SIMCom modules

•SIM5215

•SIM5216

•SIM5218

CAM_D0 and CAM_D1 are only defined in SIM5218. In other WCDMA modules of SIMcom, these 2 pins are reserved.

3. Overview

Camera driver:

Support sensor driver and maximal size:

OV2640 (2.0 Megapixel)

Support picture UXGA (1600*1200) and video QVGA (320*240), 15fps, Digital Sensor

OV7670 (0.3 Megapixel)

Support picture VGA (640*480) and video QVGA (320*240), 15fps, Digital Sensor

OV7725 (0.3 Megapixel)

Support picture VGA (640*480) and video QVGA (320*240), 15fps, Digital Sensor, Wide-angle lens or Night shot lens

OV7690 (0.3 Megapixel)

Support picture VGA (640*480) and video QVGA (320*240), 15fps, Digital Sensor

AK8856 (0.3 Megapixel)

Support picture VGA (640*480) and video QVGA (320*240), 15fps, Analog Sensor

Camera function:

Take picture of JPEG format

Record video of MP4 format

Parameter setting: dimension, fps (frame per second), rotation, night shot mode, white balance, brightness, zoom

Video call function:

SIMCOM CONFIDENTIAL FILE

Base on 3G-324M over 64kbps bidirectional Circuit-Switched Data.

H.245 Control Protocol for reliable transmission.

Only support one video call.

Support for AMR audio codec:

12.2kbps rate is transmitted, and all AMR rates can be received.

Support for MPEG-4 video codec:

QCIF is the only size supported for TX and RX, and up to 15fps video transmission.

DTMF (User Input Indication as string) in H.245 control protocol.

Support for three video sources:

Live camera

JPEG/BMP Image

Movie Clip

Different audio input device in video call.

Recording far-end and near-end video simultaneously in video call.

Far-end video loop back function.

Switch between general Video Call and 64kbps Circuit-Switched Data.

Different video frame rates – high quality or high motion profile.

Video rotation (180 degrees, mirror vertically/ horizontally) in video call.

Set zoom, white balance and brightness in video call

NOTE:

1. Video Call application is working in UMTS network.
2. Camera is necessary for Video Call application (except 64kbps Circuit-Switched Data).
3. Some products without general Video Call, but can support 64kbps Circuit-Switched Data. (Please refer to related documents for each product.)

SIMCOM CONFIDENTIAL FILE

4. Camera hardware interface

4.1 PIN define of camera interface

The camera module interface consists of the following:

■ 10 bit data bus for the pixel data information

■ Horizontal and vertical synchronization signals

■ 2 wire I2C bus as a control path between the SIM52XX module device and the camera module

This table shows the pins define of camera interface; CAM_D0 and CAM_D1 are only defined in SIM5218. In other WCDMA modules of SIMCOM, these 2 pins are reserved.

Pin	Name	Function
14	CAM_D0	Bit 0 of RGB video component output (Only for SIM5218)
55	CAM_D1	Bit 1 of RGB video component output (Only for SIM5218)
15	CAM_D2	Bit 2 of RGB or YUV D0 video component output
54	CAM_D3	Bit 3 of RGB or YUV D1 video component output
16	CAM_D4	Bit 4 of RGB or YUV D2 video component output
53	CAM_D5	Bit 5 of RGB or YUV D3 video component output
17	CAM_D6	Bit 6 of RGB or YUV D4 video component output
52	CAM_D7	Bit 7 of RGB or YUV D5 video component output
18	CAM_D8	Bit 8 of RGB or YUV D6 video component output
51	CAM_D9	Bit 9 of RGB or YUV D7 video component output
19	CAM_HSYNC	Video horizontal line synchronization signal
50	CAM_VSYNC	Vertical sync output
21	CAM_CLK	master clock input
49	CAM_PCLK	Pixel clock output
48	CAM_RESET	Master reset input, active low
47	IIC_SDA	Serial interface data input and output
46	IIC_SCL	Serial interface clock input
20	GND	Ground
22	CAM_STANDBY	Power-down mode selection “0”=Normal mode, “1”=Power-down mode

4.2 Digital sensor

We have tested several kinds of digital sensors, such as OV2640, OV7670， OV7725, OV7690. So when one will select the sensor module, one should contact us for confirming whether SIM52XX can support this sensor.

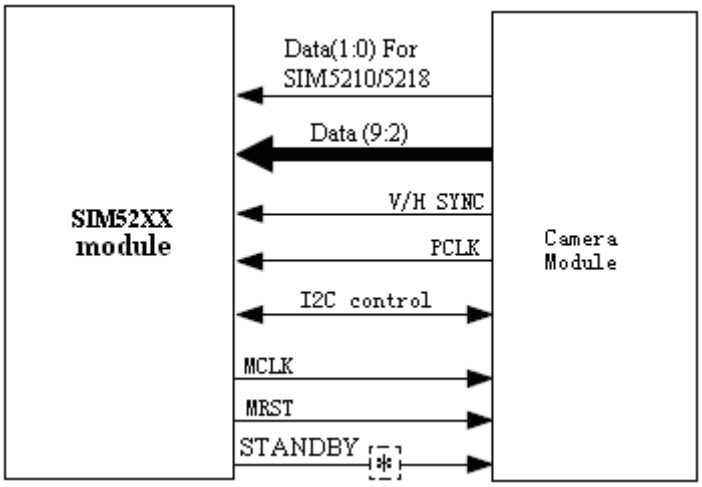
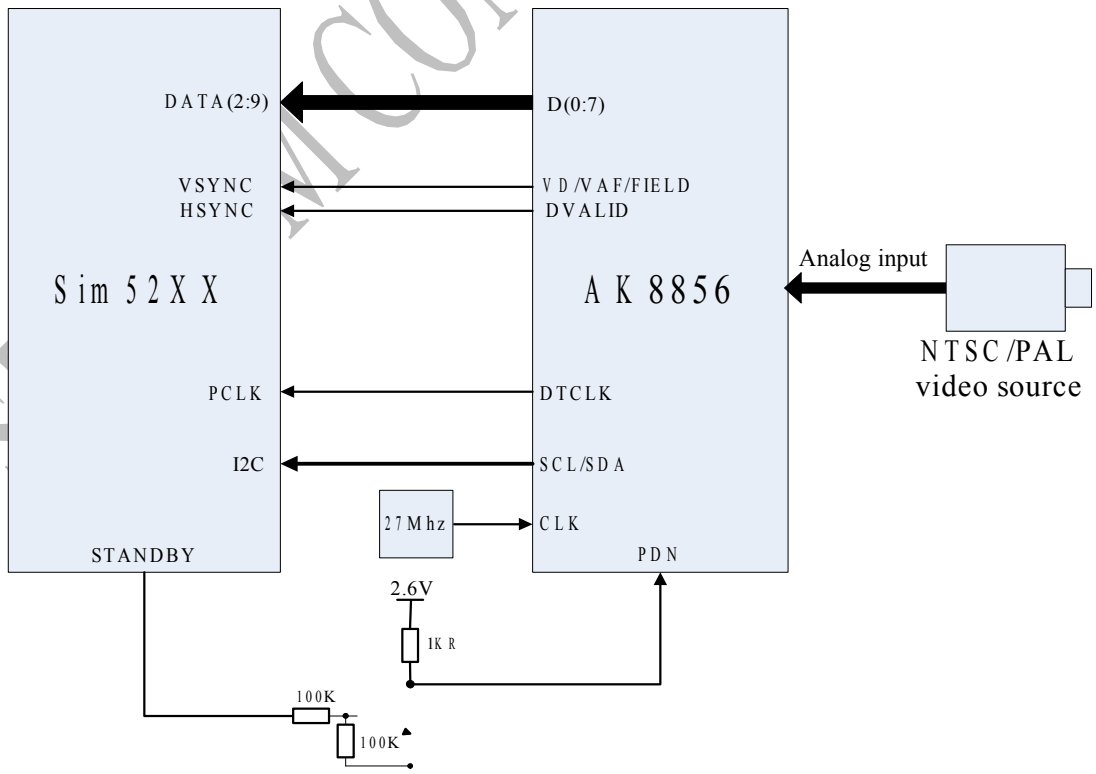


Figure 1: Digital camera module interface

* CAM_STANDBY: Power-down mode selection "0"=Normal mode, "1"=Power-down mode

4.3 Analog sensor

SIM52XX can support both digital and analog sensor (NTSC or PAL composite signals output), YUV and RGB data format. When using analog sensor you needs to use AK8856 (currently we supported) to decode NTSC or PAL composite signals into digital data first and then transmit the digital data into camera interface. (AK8856 can decode NTSC or PAL composite video signals into digital video data, and with AK8856 you can use analog sensor as video source). Software must be adjusted when use other kinds of sensors. Customer can contact us and give us your request. The power supply of the sensor should be supplied by customer.



SIM CONFIDENTIAL FILE

Figure 2: Camera module interface with analog sensor

NOTE：STANDBY pin of SIM52XX is used to control the powering down or on of camera module. So when one designs application circuit, one should pay attention to the polarity of STANDBY. Default polarity of SIM52XX is shown below:
LOW: normal operation
HIGH: power-down
In Figure 2, the polarity of AK8856 power down is contrary to that of SIM52XX STANDBY, so one must use a NPN triode to reverse the polarity of SIM52XX and connect AK8856.

4.4 Layout guide

The data and clock lines of camera are sensitive for the capacitors. Generally the capacitance of the ESD component is too large; if those ESD components are put on to the parallel line then the signal will fade a lot. In order to improve the ESD performance, some 10pF capacitor can be put on data and clock lines for ESD. If one wants to choose smaller capacitance ESD component, it should be smaller than 10pF.

It is suggested that data and clock lines of camera try to keep the same length, and they should routine together, and be far away from Vbat and RF signals. Because Vbat and RF signals may disturb the data and clock lines. Also the clock and data lines should be away from other analog signals for example audio.

SIMCOM CONFIDENTIAL FILE

5. Camera software application

5.1 Camera parameter setting

5.1.1 Set parameter commands

AT+CCAMSETD

Set camera dimension

AT+CCAMSETF

Set camera FPS (frame per second)

AT+CCAMSETR

Set camera rotation

AT+CCAMSETN

Set camera night shot mode

AT+CCAMSETWB

Set camera white balance

AT+CCAMSETB

Set camera brightness

AT+CCAMSETZ

Set camera zoom

AT+CWIIC

Write values to register of IIC device

5.1.2 Set parameter in video call

AT+CCMASETWB, AT+CCAMSETB, AT+CCAMSETZ can be set in video call.

If setting rotation in video call, must write value to register direct. The setting value is different in different sensor:

OV7670

AT+CWIIC=0X42, 0X1E, 0X07, 1 (normal)

AT+CWIIC=0X42, 0X1E, 0X1B, 1 (mirror vertically)

AT+CWIIC=0X42, 0X1E, 0X2B, 1 (mirror horizontally)

AT+CWIIC=0X42, 0X1E, 0X3B, 1 (rotation with 180 degrees)

OV7725

AT+CWIIC=0X42, 0X0C, 0X00, 1 (normal)

AT+CWIIC=0X42, 0X0C, 0X80, 1 (mirror vertically)

AT+CWIIC=0X42, 0X0C, 0X40, 1 (mirror horizontally)

AT+CWIIC=0X42, 0X0C, 0XC0, 1 (rotation with 180 degrees)

OV2640

AT+CWIIC=0x60, 0xFF, 0x01, 1

NOTE: OV2640 must set 0xFF to value 0x01 before setting rotation value

AT+CWIIC=0x60, 0x04, 0x2A, 1 (normal)

AT+CWIIC=0x60, 0x04, 0x5A, 1 (mirror vertically)

SIMCOM CONFIDENTIAL FILE

AT+CWIIC=0x60, 0x04, 0xAA, 1 （mirror horizontally）

AT+CWIIC=0x60, 0x04, 0xDA, 1 （rotation with 180 degrees）

AT+CWIIC=0X60, 0XFF, 0x00, 1

0V7690

AT+CWIIC=0X42, 0X0C, 0X56, 1 （normal）

AT+CWIIC=0X42, 0X0C, 0XD6, 1 （mirror vertically）

AT+CWIIC=0X42, 0X0C, 0X16, 1 （mirror horizontally）

AT+CWIIC=0X42, 0X0C, 0X96, 1 （rotation with 180 degrees）

5.2 Take picture and recording

5.2.1 Take picture and recording commands

AT+CCAMS

Start camera

AT+CCAME

Stop camera

AT+CCAMTP

Take picture

AT+CCAMEP

Save picture

AT+CCAMRS

Start video record

AT+CCAMRP

Pause video record

AT+CCAMRR

Resume video record

AT+CCAMRE

Stop video record

5.2.2 Typical samples

5.2.2.1 Camera takes picture

AT+CCAMS

OK

AT+CCAMSETD=320,240

OK

AT+CCAMTP

OK

AT+CCAMEP

C:/Picture/20080420_120303.jpg

OK

AT+CCAME

OK

SIMCOM CONFIDENTIAL FILE

5.2.2.2 Camera record video

```
AT+CCAMS
OK
AT+CCAMSETD=176,144
OK
AT+CCAMSETF=0
OK
AT+CCAMRS
C:/Video/20080420_123003.mp4
OK
AT+CCAMRP
OK
AT+CCAMRR
OK
AT+CCAMRE
OK
AT+CCAME
OK
```

5.3 Make video call

5.3.1 Call commands

This section only lists Video Call related commands. Please refer to AT command document to get detailed descriptions.

AT+VPSOURCE

Select TX video source for Video Call and it is only effective on current or next Video Call.

Three video sources are supported: Live Camera (default), JPEG/BMP Image, and Movie Clip.

NOTE Between URC "VPACCEPT" (or command +VPANSWER) and URC "VPCONNECTED", this command can not be emitted.

AT+VPRECORD

Control if recording far-end and near-end RX video into MP4 files or not.

MP4 file name is generated automatically basing on Real Time Clock, so it is recommended that Real Time Clock is set correctly by command +CCLK after power on.

NOTE Between URC "VPACCEPT" (or command +VPANSWER) and URC "VPCONNECTED", this command can not be emitted.

AT+VPMAKE

Originate a Video Call after TX source is selected.

If the command is processed successfully, URC "VPACCEPT" will be returned, and until URC "VPCONNECTED" TX video source can not be changed.

SIMCOM CONFIDENTIAL

AT+VPANSWER

Answer an incoming Video Call after URC "VPINCOM" is reported regularly.

NOTE Between the first "VPINCOM" and this command, the host can select TX video source or if recording far-end and near-end video into MP4 files.

AT+VPEND

End the active Video Call, and stop recording RX video if that is ongoing.

In addition, this command can reject an incoming Video Call.

AT+VPDTMF

Send DTMF (User Input Indication) in active Video Call.

AT+VPLOOP

Loop back RX video frames to remote side in active Video Call.

It is recommended that command's parameter is 8 or above, for the limited capability of UE.

Essentially, TX video source is Static Image when this application is active, and after cancel the application, TX video source will be switched to Live Camera.

AT+VPSM

Switch call mode between general Video Call and 64kbps Circuit-Switched Data.

In general Video Call mode, URC "VPINCOM" is present for an incoming Video Call, and commands +VPMAKE, +VPANSWER and +VPEND are available.

In 64kbps Circuit-Switched Data mode, command +VPMAKE is forbad. For an incoming call, URC "RING" is present, and commands ATA/ATH are available. After command ATA answers the incoming call, the series port will be switched to Data Mode, and data is sent to host. The host can use command +++ to switch the series port to Command Mode and then use command ATH to end the call. In this case, command ATO is forbad. For Circuit-Switched Data call origination, refer to commands ATD and +CBST.

The call mode can be switched only when Video Call application is in idle state.

AT+VPQLTY

Choose High Quality (5fps) or High Motion Profile (15fps) for Video Call.

This command can be used only when Video Call application is in idle state, and the setting is available until power off.

NOTE 1.Video Call commands need that USIM card is present, and make sure UE is in UMTS network.

2. For commands +VPSOURCE, +VPRECORD and +VPLOOP, the values are default after URC "VPEND" is present. For commands +VPSM and +VPQLTY, the value are not changed until reboot or power off.

5.3.2 Call result codes

In this section, some Unsolicited Result Codes for Video Call are present. The host should process all theese URCs correctly.

SIMCOM CONFIDENTIAL FILE

VPINCOM <number>

Indicate an incoming Video Call in general mode.

<number> is caller's mobile number.

This indication will be present per six seconds until the call is answered or released. About automatic answering Video Call, refer to commands +AUTOANSWER and ATS0.

Command +CLCC can be used to get more information about the call.

VPACCEPT

Indicate that Video Call is in the process of being set up.

After this URC is present, commands +VPSOURCE and +VPRECORD are not available, until "VPCONNECTED" or "VPEND" are present.

VPRINGBACK

Indicate that remote side is located and ringing.

VPSETUP

Indicate that Video Call is set up end-to-end.

VPCONNECTED

Indicate that video protocols are set up and Video Call is connected. After this URC, the host can switch TX video source and start recording far-end and near-end video.

VPEND[: <seconds>]

Indicate that Video Call has ended.

<seconds> is the duration of Video Call, from "VPCONNECTED" to "VPEND" and the unit is in second.

MISSED_VIDEO_CALL: <datatime>,<number>

Indicate that an incoming Video Call is missed, and UMTS network has released the call.

<datatime> denotes when this indication is present, and the format is YY/MM/DD,HH/MM/SS, where characters indicate year (two last digits), month, day, hour, minute, second.

<number> is caller's mobile number.

VPRXDTMF: <dtmf>

Indicate that a User Input is received from remote side.

<dtmf> is DTMFs (User Input Indication) with double quotes from remote side, which is sent as an H.245 User Input Indication message (base string) and consisted of (0-9, *, #).

5.3.3 Typical samples

5.3.3.1 Call Origination with Live Camera

```
AT+VPSOURCE=1
OK
AT+VPMAKE=18602102222
```

SIMCOM CONFIDENTIAL FILE

VPACCEPT

OK

VPRINGBACK

VPSETUP

VPCONNECTED

AT+CLCC

+CLCC: 1,0,0,1,0,”18602102222”,129

OK

AT+VPEND

OK

VPEND: 200

5.3.3.2 Call Origination with Static Image

AT+FSCD=C:/Picture

+FSCD: C:/Picture/

OK

AT+FSLS

+FSLS: FILES:

PIC_1.JPG

PIC_2.JPG

OK

AT+VPSOURCE=2,”PIC_1.JPG”

OK

AT+VPMAKE=18602102222

VPACCEPT

OK

VPRINGBACK

VPSETUP

VPCONNECTED

```
AT+CLCC
+CLCC: 1,0,0,1,0,”18602102222”,129

OK
AT+VPEND
OK

VPEND: 200
```

5.3.3.3 Call Origination with Movie Clip

```
AT+FSCD=C:/Video
+FSCD: C:/Video/

OK
AT+FSLS
+FSLS: FILES:
MOVIE_1.MP4
MOVIE_2.MP4

OK
AT+VPSOURCE=3,”MOVIE_1.MP4”
OK
AT+VPMAKE=18602102222
VPACCEPT

OK

VPRINGBACK

VPSETUP

VPCONNECTED
AT+CLCC
+CLCC: 1,0,0,1,0,”18602102222”,129

OK
AT+VPEND
OK

VPEND: 200
```

5.3.3.4 Call Origination with Video Recording

```
AT+FSCD=C:/VideoCall
```

```
+FSCD: C:/VideoCall/

OK
AT+FSLS
OK
AT+VPRECORD=3
OK
AT+VPMAKE=18602102222
VPACCEPT

OK

VPRINGBACK

VPSETUP

VPCONNECTED
AT+CLCC
+CLCC: 1,0,0,1,0,”18602102222”,129

OK
AT+FSLS
+FSLS: FILES:
20100201_103026_f.mp4
20100201_103026_n.mp4

OK
AT+CCLK?
+CCLK: "10/02/01,10:35:52"

OK
AT+VPRECORD=0
OK
AT+VPEND
OK

VPEND: 200
```

5.3.3.5 Call Termination with Live Camera

```
VPINCOM 18602102222
VPINCOM 18602102222
AT+CLCC
+CLCC: 1,1,4,1,0,"18602102222",129
```

OK
AT+VPSOURCE=1
OK
AT+VPANSWER
OK

VPSETUP

VPCONNECTED
AT+CLCC
+CLCC: 1,1,0,1,0,"18602102222",129

OK

VPEND: 120

5.3.3.6 Call Termination with Static Image

VPINCOM 18602102222
VPINCOM 18602102222
AT+CLCC
+CLCC: 1,1,4,1,0,"18602102222",129

OK
AT+FSCD=C:/Picture
+FSCD: C:/Picture/

OK
AT+FSLS
+FSLS: FILES:
PIC_1.JPG
PIC_2.JPG

OK
AT+VPSOURCE=2,"PIC_1.JPG"
OK
AT+VPANSWER
OK

VPSETUP

VPCONNECTED
AT+CLCC

```
+CLCC: 1,1,0,1,0,"18602102222",129

OK

VPEND: 120
```

5.3.3.7 Call Termination with Movie Clip

```
VPINCOM 18602102222
VPINCOM 18602102222
AT+CLCC
+CLCC: 1,1,4,1,0,"18602102222",129

OK
AT+FSCD=C:/Video
+FSCD: C:/Video/

OK
AT+FSLS
+FSLS: FILES:
MOVIE_1.MP4
MOVIE_2.MP4

OK
AT+VPSOURCE=3,”MOVIE_1.MP4”
OK
AT+VPANSWER
OK

VPSETUP

VPCONNECTED
AT+CLCC
+CLCC: 1,1,0,1,0,"18602102222",129

OK

VPEND: 120
```

5.3.3.8 Call Termination with Video Recording

```
VPINCOM 18602102222
VPINCOM 18602102222
AT+CLCC
+CLCC: 1,1,4,1,0,"18602102222",129
```

```
OK
AT+FSCD=C:/VideoCall
+FSCD: C:/VideoCall/

OK
AT+FSLS
OK
AT+VPRECORD=3
OK
AT+VPANSWER
OK


VPSETUP


VPCONNECTED
AT+CLCC
+CLCC: 1,1,0,1,0,"18602102222",129

OK
AT+FSLS
+FSLS: FILES:
20100201_111216_f.mp4
20100201_111216_n.mp4

OK
AT+CCLK?
+CCLK: "10/02/01,11:18:20"

OK
AT+VPRECORD=0
OK

VPEND: 120
```

5.3.3.9 Switch Video Source in Active Call

```
AT+VPSOURCE=1
OK
AT+VPMAKE=18602102222
VPACCEPT


OK


VPRINGBACK
```

VPSETUP

VPCONNECTED
AT+CLCC
+CLCC: 1,0,0,1,0,”18602102222”,129

OK
AT+FSCD=C:/Picture
+FSCD: C:/Picture/

OK
AT+FSLS
+FSLS: FILES:
PIC_1.JPG
PIC_2.JPG

OK
AT+VPSOURCE=2,”PIC_1.JPG”
OK
AT+FSCD=C:/Video
+FSCD: C:/Video/

OK
AT+FSLS
+FSLS: FILES:
MOVIE_1.MP4
MOVIE_2.MP4

OK
AT+VPSOURCE=3,”MOVIE_1.MP4”
OK
AT+VPSOURCE=1
OK
AT+VPEND
OK

VPEND: 200

5.3.3.10 Video Recording in Active Call

AT+FSCD=C:/VideoCall
+FSCD: C:/VideoCall/

OK

AT+FSLS

OK

AT+VPRECORD=0

OK

AT+VPMAKE=18602102222

VPACCEPT

OK

VPRINGBACK

VPSETUP

VPCONNECTED

AT+CLCC

+CLCC: 1,0,0,1,0," 18602102222",129

OK

AT+VPRECORD=1

OK

AT+FSLS

20100201_131646_f.mp4

OK

AT+VPRECORD=0

OK

AT+VPRECORD=2

OK

AT+FSLS

+FSLS: FILES:

20100201_131646_f.mp4

20100201_131858_n.mp4

OK

AT+VPRECORD=0

OK

AT+VPRECORD=3

OK

AT+FSLS

+FSLS: FILES:

20100201_131646_f.mp4

20100201_131858_n.mp4

```
20100201_132208_f.mp4
20100201_132208_n.mp4

OK
AT+VPRECORD=0
OK
AT+VPEND
OK

VPEND: 520
```

5.3.3.11 DTMFs in Active Call

```
AT+VPSOURCE=1
OK
AT+VPRECORD=0
OK
AT+VPMAKE=18602102222
VPACCEPT

OK

VPRINGBACK

VPSETUP

VPCONNECTED
AT+VPDTMF="1"
OK

+VPRXDTMF: 1
AT+VPDTMF="*"
OK

+VPRXDTMF: *
AT+VPDTMF="1234"
OK

+VPRXDTMF: 1234
AT+VPEND
OK

VPEND: 120
```

5.3.3.12 Loop Back Far-end Video in Active Call

```
AT+VPSOURCE=1
OK
AT+VPRECORD=0
OK
AT+VPMAKE=18602102222
VPACCEPT

OK

VPRINGBACK

VPSETUP

VPCONNECTED
AT+VPLOOP=8
+VPLOOP: 8

OK
AT+VPLOOP=255
OK
AT+VPLOOP=12
+VPLOOP: 12

OK
AT+VPLOOP?
+VPLOOP: 12

OK
AT+VPEND
OK

VPEND: 360
AT+VPLOOP?
+VPLOOP: 255

OK
```

5.3.3.13 64kbps Circuit-Switched Data

```
AT+VPSM=1
+VPSM: 1

OK
```

```
RING

RING
AT+CLCC
+CLCC: 1,1,4,1,0,"18602102222",128

OK
ATH
OK

RING

RING
AT+CLCC
+CLCC: 1,1,4,1,0,"18602102222",128

OK
ATA
CONNECT 115200
… …
+++
OK
… …
ATH
OK

AT+VPSM=1
+VPSM: 1

OK
AT+CBST=134,1,0
OK
ATD18602102222
BUSY

ATD18602102222
CONNECT 115200
… …
NO CARRIER
```

5.3.3.14 Video Quality and Motion Profile

```
AT+VPSOURCE=1
OK
```

AT+VPQLTY=15

OK

AT+VPMAKE=18602102222

VPACCEPT

OK

VPRINGBACK

VPSETUP

VPCONNECTED

AT+CLCC

+CLCC: 1,0,0,1,0,”18602102222”,129

OK

AT+VPEND

OK

VPEND: 200

AT+VPQLTY=5

OK

AT+VPMAKE=18602102222

VPACCEPT

OK

VPRINGBACK

VPSETUP

VPCONNECTED

AT+CLCC

+CLCC: 1,0,0,1,0,”18602102222”,129

OK

AT+VPEND

OK

VPEND: 180

5.3.3.15 Video Mirror and Rotation

```
AT+VPSOURCE=1
OK
AT+VPMAKE=18602102222
VPACCEPT


OK


VPRINGBACK


VPSETUP


VPCONNECTED
AT+CLCC
+CLCC: 1,0,0,1,0,”18602102222”,129

OK
AT+CWIIC=0x42,0x1E,0x1B,1
OK
AT+CWIIC=0x42,0x1E,0x07,1
OK
AT+CWIIC=0x42,0x1E,0x2B,1
OK
AT+CWIIC=0x42,0x1E,0x07,1
OK
AT+CWIIC=0x42,0x1E,0x3B,1
OK
AT+CWIIC=0x42,0x1E,0x07,1
OK
AT+VPEND
OK

VPEND: 160
```

6. Analog sensor (AT8856) AT command

AT+CCAMMD

Switch the AK8856 mode:

The command is used to switch the chip AK8856's working mode between **PAL** and **NTSC**, if you have an analog sensor of **PAL** or **NTSC** connected to AK8856 then you can use the command to set AK8856 working under the appropriate mode. The parameter is saved which means the system will recover to the latest mode if the module resets. The default mode is **NTSC**.

AT+CCAMCHL

Select the input channel of AK8856:

This command is used to select the valid input channel of AK8856, since AK8856 supports 2 input channels, so one must select the right channel first. Default channel is 1.

7. Pin function switch between camera interface and GPIO

AT+CCGSWT

This command is used to switch the function between camera interface and general GPIO, if your project has no camera subsystem existed then you can use this AT command to use camera interface as general GPIO, there are total 14 pins of this type.

NOTE If you configure such pins to general GPIO mode then you can use GPIO AT command to configure these GPIOs, like direction, value.

CAMERA INTERFACE	<————>	GENERAL GPIO NUMBER
HSYNC		GPIO6
VSYNC		GPIO7
PCLK		GPIO8
STDBY		GPIO9
DATA0 (only for SIM5218)		GPIO10
DATA1 (only for SIM5218)		GPIO11
DATA2		GPIO12
DATA3		GPIO13
DATA4		GPIO14
DATA5		GPIO15
DATA6		GPIO16
DATA7		GPIO17
DATA8		GPIO18
DATA9		GPIO19

8. Camera related commands detail

Camera related commands detail please refer to SIM52XX AT Command Set.

SIMCOM CONFIDENTIAL FILE

Contact us:

Shanghai SIMCom Wireless Solutions Ltd.

Add: Building A，SIM Technology Building，No.633，Jinzhong Road，Changning District, Shanghai,P. R. China 200335

Tel: +86 21 3235 3300

Fax: +86 21 3235 3301

URL: www.sim.com/wm

SIMCOM CONFIDENTIAL FILE