SIM5360 GPIO Application Note

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Version History

Date	Version	Description of change	Author
2014-02-12	V0.01	New version	
2014-02-13	V0.02	Modify the description for GPIO	
2014-04-25	V0.03	Modify the description for SPI UART switch	

Scope

This document describes how to use GPIO supplied by SIMCOM SIM5360 modules. This document can be used for SIMCom SIM5360 modules.

1 Introduction

This document will depict the usage of GPIO functions supplied by SIMCom SIM5360 module. User can get useful information about the SIMCom SIM5360 Module's GPIO function quickly through this document.

Each GPIO can be used as:

1. General Purpose Input/Output pin.
2. Interrupt pin
3. Special function pin.

2 Usage

2.1 GPIO supplied by SIM5360

Currently the following pins can be used as GPIO on SIM5360:

Name	Index	Alternate Function	Default
PCM_DIN	0	GPIO/ISR/PCM	interrupt [LEVEL/LOW]
STATUS_LED	1	GPIO/ISR/Status led	Status led
PCM_SYNC	2	GPIO/ISR/PCM	GPIO [IN]
PCM_CLK	3	GPIO/ISR/PCM	GPIO [OUT/LOW]
RF_SWITCH	4	GPIO/ISR/RF switch	RF Switch
PCM_OUT	5	GPIO/ISR/PCM	GPIO [OUT/LOW]
KEYPAD_4	6	GPIO/ISR/KEYPAD	KEYPAD
KEYPAD_3	7	GPIO/ISR/ KEYPAD	KEYPAD
KEYPAD_2	8	GPIO/ISR/ KEYPAD	KEYPAD
KEYPAD_1	9	GPIO/ISR/ KEYPAD	KEYPAD
KEYPAD_0	10	GPIO/ISR/ KEYPAD	KEYPAD
KEYSENSE4_N	11	GPIO/ISR/ KEYPAD	KEYPAD
KEYSENSE3_N	12	GPIO/ISR/ KEYPAD	KEYPAD
KEYSENSE2_N	13	GPIO/ISR/ KEYPAD	KEYPAD
KEYSENSE1_N	14	GPIO/ISR/ KEYPAD	KEYPAD
KEYSENSE0_N	15	GPIO/ISR/ KEYPAD	KEYPAD
UART_CTS	33	GPIO/ISR/CTS	GPIO(OUTPUT/LOW)
UART_RFR	34	GPIO/ISR/RFR	GPIO(OUTPUT/LOW)
UART_DTR	35	GPIO/ISR/DTR/WAKEUP_ME/DTR_SLEEP	GPIO(OUTPUT/LOW)
UART_DCD	36	GPIO/ISR/DCD	UART_DCD
UART_RI	37	GPIO/ISR/RI/WAKEUP_HOST/RI_2G_MODE	WAKEUP_HOST
SIM5360_GPIO40	40	GPIO/ISR/MODULE_POWER_STATUS	MODULE_POWER_STATUS
SIM5360_GPIO41	41	GPIO/ISR/WAKEUP_HOST	WAKEUP_HOST
SIM5360_GPIO42	42	GPIO/ISR	GPIO(OUTPUT/LOW)
SIM5360_GPIO43	43	GPIO/ISR/WAKEUP_ME	GPIO(OUTPUT/HIGH)
SIM5360_GPIO44	44	GPIO/ISR	GPIO(OUTPUT/LOW)
I2C_SCL	50	GPIO/I2C_SCL	I2C_SCL
I2C_SDA	51	GPIO/I2C_SDA	I2C_SDA
SPI_CS	60	GPIO/SPI_CS	SPI_CS
SPI_CLK	61	GPIO/SPI_CLK	SPI_CLK
SPI_MISO	62	GPIO/SPI_MISO	SPI_MISO
SPI_MOSI	63	GPIO/SPI_MOSI	SPI_MOSI

Table 1 GPIO supplied by SIM5360

2.2 GPIO functions

Currently the following Functions can be used by special GPIO on SIM5360 module:

Function Name	Index	Comment
FUNC_STATUS_LED	1	Only STATUS_LED pin can use such function
FUNC_WAKEUP_ME	2	Only UART1_DTR pin can use such function
FUNC_WAKEUP_HOST	3	Only UART1_RI pin can use such function
FUNC_PCM	4	PCM_DIN, PCM_SYNC, PCM_CLK,PCM_OUT pins can use such function
FUNC_UART	5	UART_XXX pins can use such function
FUNC_KEYPAD	7	KEY_XXX pins can use such function
FUNC_RF_CONTROL	9	Only RF_SWITCH pin can use such function
FUNC_UART_DCD	10	Only UART_DCD pin can use such function
FUNC_FLOW_CTL	11	UART1_CTS, UART1_RFR can use such function
FUNC_WAKEUP_ME by GPIO43	12	wake up module by GPIO43
FUNC_WAKEUP_HOST by GPIO41	13	wake up host by GPIO41
FUNC_POWER_UP_STATUS	14	show power status of the module by GPIO40
FUNC_UART_SLEEP	18	Refer "SIM5360_Sleep_Mode_Application_Note_V0.01 .DOC"
FUNC_SPI	19	SPI Bus Function
FUNC_I2C	20	I2C Bus Function
FUNC_UART2	21	Second UART Function

Table 2 Functions supplied by SIMCom SIM5360 module

Note:

1) Since each function has its own pin so user can't set another pin to this function.

2) Once a function is enabled user must disable such function first if user wants to use the special pin as GPIO.

1) FUNC_STATUS_LED

This function is used to control the Network Status LED; and only STATUS_LED pin can use such function, the led status is like this:

LED Status	Module Status
Always On	Searching Network/Call Connect
200ms ON, 200ms OFF	Data Transmit
800ms ON, 800ms OFF	Registered network
Off	Power off / Sleep

Example1:

AT+CGFUNC=1, 1 //enable this function.

Example2:

AT+CGFUNC=1, 0 //disable this function.

AT+CGDRT=1, 1 //configure STATUS_LED pin as an output GPIO

Please refer to the Hardware Design guide for more detail.

2) FUNC_WAKEUP_ME

This function is used to wakeup SIM5360 module by host; and only UART1_DTR pin can use such function, this pin acts as an interrupt source in this mode, and user can configure the trigger condition(high/low, level/edge).

Example1:

AT+CDTRISRMD=0, 1 //set high level trigger condition

AT+CGFUNC=2, 1 //enable the WAKEUP_ME mode

Example2:

AT+CGFUNC=2, 0 //disable this function.

AT+CGDRT=35, 1 //configure STATUS_LED pin as an output GPIO

Note:

1. Host needs to supply this signal for about 12ms and then reset it, if not reset, SIM5360 module will trigger the interrupt all the time, and crashed finally.

2. This function is just to be compatible with old version. We recommend to use function FUNC_UART_SLEEP instead.

3) FUNC_WAKEUP_HOST

This function is used to wakeup host by SIM5360 module; and only UART1_RI pin can use such function, In this function, this pin will be pulled down when some given conditions (incoming call, SMS, URC) are satisfied.

Example:

AT+CGFUNC=3, 1 //enable the WAKEUP_HOST mode

NOTE:

1. User must use +CFGRI to enable the RI indicating function for URC condition, otherwise RI pin has no change even if URC reported.

2. User needs to use +CRIRS to reset the RI pin to high after host device has been waken up, or the RI pin will stay low.

4) FUNC_PCM

This function is used to enable PCM hardware interface; PCM_DIN, PCM_SYNC, PCM_CLK, PCM_OUT pins together use such function. In this function, user can connect a codec to this hardware interface.

Example:

AT+CGFUNC=4, 1 //enable hardware PCM interface

5) FUNC_UART

Reserved

6) FUNC_KEYPAD

This function is used to enable keypad hardware interface; KEY _XXX pins together use such function.

Example:

AT+CGFUNC=7, 1 //enable hardware camera interface

7) FUNC_RF_CONTROL

This function is used to control SIM5360 module to enter into or exit from the Flight mode; only RF_SWITCH pin can use such function.

Low Level	Flight Mode: RF is closed.
High Level	Normal Mode: RF is working.

Example:

AT+CGFUNC=9, 1 //enable this function

8) FUNC_UART_DCD

This function is used to enable the DCD pin as a standard UART DCD function; Only UART_DCD pin can use such function.

Example:

AT+CGFUNC=10, 1 //enable this function

9) FUNC_FLOW_CTL

This function is used to enable the standard UART hardware flow control mode; UART1_CTS, UART1_RFR together use such function.

Example:

AT+CGFUNC=11, 1 //enable this function

10) FUNC_WAKEUP_ME by GPIO43

This function is the same as FUNC_WAKEUP_ME but just use GPIO43 instead of DTR;

Example:

AT+CGFUNC=12, 1 //enable this function

NOTE: This function is just to be compatible with old version. We recommend to use function FUNC_UART_SLEEP instead.

11) FUNC_WAKEUP_HOST by GPIO41

This function is the same as FUNC_WAKEUP_HOST but just use GPIO41 instead of RI;

Example:

AT+CGFUNC=13, 1 //enable this function

12) FUNC_POWER_UP_STATUS

This function is used to notify host if SIM5360 module is powered up successfully, only GPIO40 can use such function. This pin will stay high if SIM5360 module is start-up successfully.

Example:

AT+CGFUNC=14, 1 //enable this function

13) FUNC_UART_SLEEP

This function is used to indicate SIM5360 module to sleep/wakeup the UART interface, only UART_DTR pin can use such function, Please refer to SIMCom_3G_Sleep_Mode_Application_Note for more detail.

Example:

AT+CGFUNC=18, 1 //enable this function

14) FUNC_SPI

This function is used to enable SPI hardware interface; SPI_CS, SPI_CLK, SPI_MISO, SPI_MOSI pins together use such function. In this function, user can connect a SPI interface device to this hardware interface.

Example:

AT+CGFUNC=19, 1 //enable hardware SPI interface

15) FUNC_I2C

This function is used to enable I2C hardware interface; I2C_SCL, I2C_SDA pins together use such function. In this function, user can connect a I2C interface device to this hardware interface.

Example:

AT+CGFUNC=20, 1 //enable hardware I2C interface

16) FUNC_UART2

This function is used to enable Second UART, because Second UART pins and SPI pins is multiplexed, so

AT+CGFUNC=21, 1 // enable Second UART,SPI will be disable, AT+CGFUNC=19 is 0

AT+CGFUNC=21, 0 // disable Second UART, it will be enable SPI function, AT+CGFUNC=19 change to 1

2.3 Example

Example1: If one needn't status led function, then one can use STATUS_LED pin as GPIO or interrupt source. Now we use this pin as an output GPIO:

1) AT+CGFUNC=1, 0 //close such function, only disable the function can this pin be used As GPIO
2) AT+CGDRT=1, 1 //set this pin to output
3) AT+CGSETV=1, 1 //set this pin to high value

Example2: If one wants to use PCM_DIN as an interrupt pin:

1) AT+CGFUNC=4, 0 //disable PCM interface

3) AT+CGISR=0, 0, 1 //set interrupt trigger condition and start this interruption.

When the interruption happened, the following URC will be sent to host. And also LUA task will be notified.

```
GPIO[0] Interrupt Alarm!value:0
```

Appendix

A Related Documents

SN	Document name	Remark

B Terms and Abbreviations

Abbreviation	Description

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