Application Note
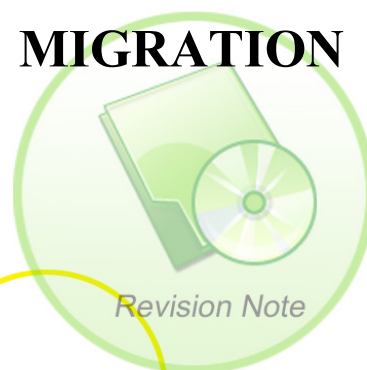
SIM5360 TO SIM7600 Series MIGRATION GUIDE

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Revision History

Data	Version	Description of change	Author
2019-08-16	1.00	Original	Honggang Ma

1 Introduction

This document is targeted for customers to understand the differences between the SIM7600 and SIM5360. Users can use SIM7600 or SIM5360 module to design and develop applications quickly.

2 Pin Configuration

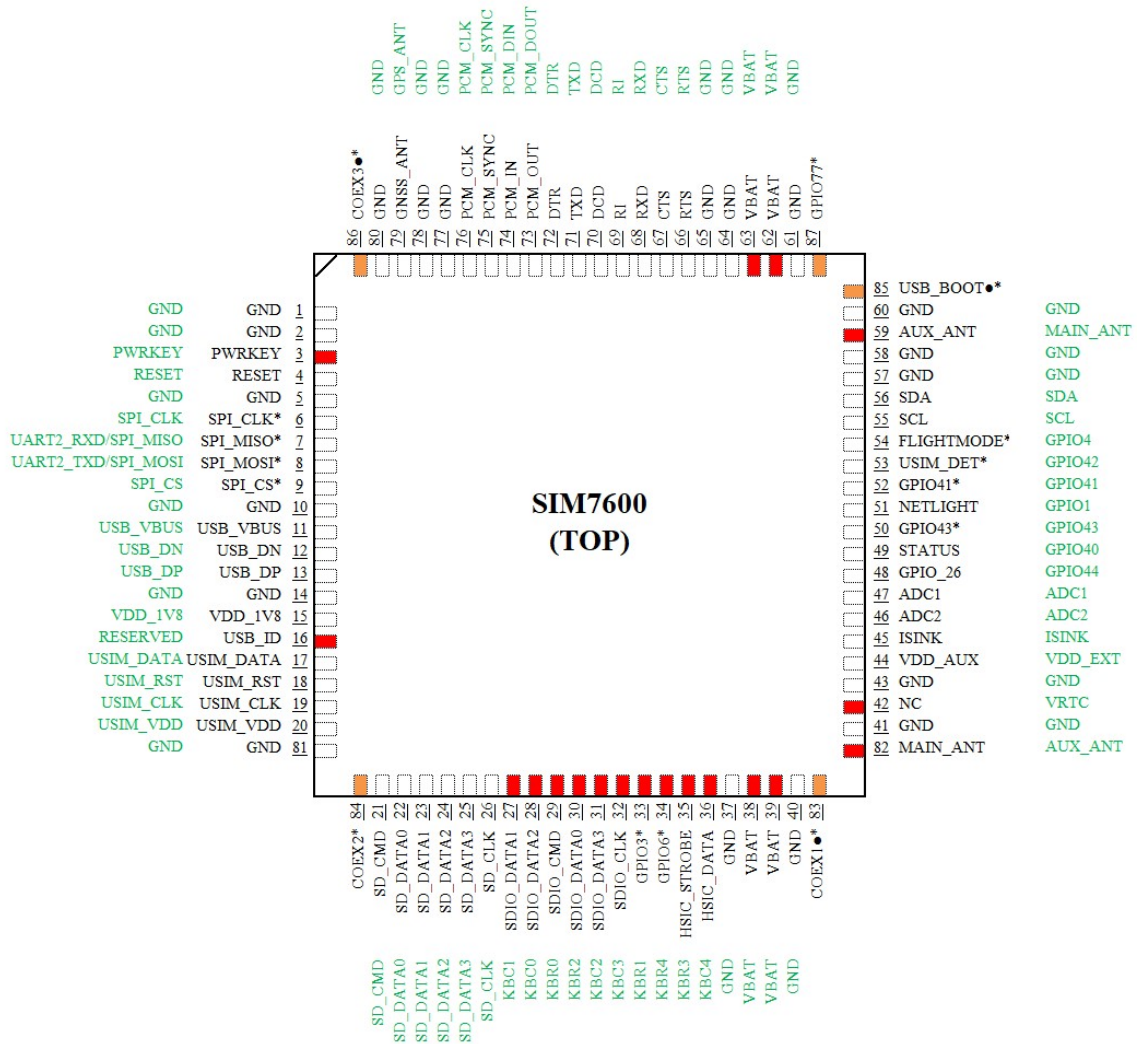The following figure shows the pin assignment of SIM7600 and SIM5360.

Figure 1: SIM7600 and SIM5360 Pin Assignment

NOTE:

1. The pin names of SIM5360 are marked with green color.

2. There are some differences of pin assignment between SIM7600 and SIM5360, marked with red color.

3. SIM7600 has 6 more pins than SIM5360 marked with orange color.

Table 1: The Differences of Pin Assignment in SIM7600 and SIM5360

Pin No.	SIM7600 Pin name	SIM5360 Pin name	Description
3	PWRKEY	PWRKEY	SIM7600: 0.8V when the VBAT appears. SIM5360: 1.8V when the VBAT appears.
16	USB_ID	RESERVED	SIM7600: USB_ID for OTG usage SIM5360: RESERVED
27	SDIO_DATA1	KBC1	SIM7600: SDIO can work with wifi module; also can be used as GPIO or keypad interface.(need software support) SIM5360: keypad interface.
28	SDIO_DATA2	KBC0	
29	SDIO_CMD	KBR0	
30	SDIO_DATA0	KBR2	
31	SDIO_DATA3	KBC2	
32	SDIO_CLK	KBC3	
33	GPIO3	KBR1	SIM7600: GPIO SIM5360: keypad interface.
34	GPIO6	KBR4	
35	HSIC_STROBE	KBR3	SIM7600: HSIC interface (need software support) SIM5360: keypad interface.
36	HSIC_DATA	KBC4	
38	VBAT	VBAT	SIM7600: power for the whole module SIM5360:power for the BB part
39	VBAT	VBAT	
42	NC	VRTC	SIM7600: no connection SIM5360:backup battery interface
59	AUX_ANT	MAIN_ANT	SIM7600: auxiliary antenna SIM5360:main antenna
62	VBAT	VBAT	SIM7600: power for the whole module SIM5360:power for the RF part
63	VBAT	VBAT	
82	MAIN_ANT	AUX_ANT	SIM7600: main antenna SIM5360: auxiliary antenna
83	COEX1	/	SIM7600: GPIO
84	COEX2	/	SIM7600: GPIO
85	USB_BOOT	/	SIM7600: GPIO Can be used as force USB boot interface.
86	COEX3	/	SIM7600: GPIO
87	GPIO77	/	SIM7600: GPIO

3 Recommended Footprint

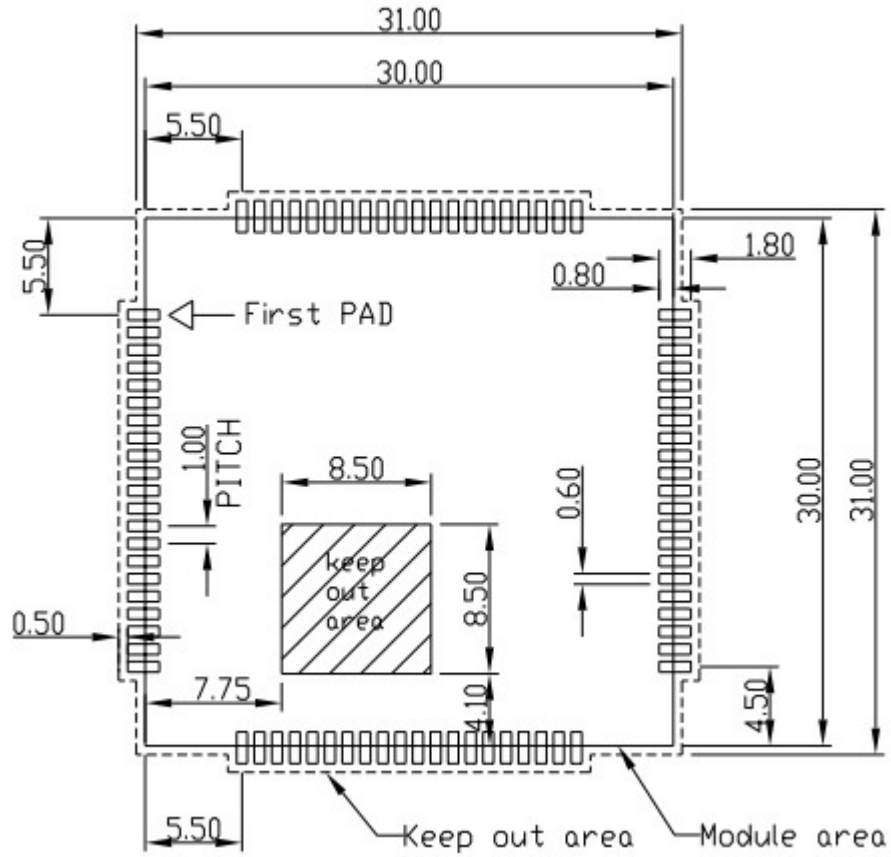The recommended footprints of SIM7600 and SIM5360 are different; see the following figures for the detail.

Figure 2: SIM5360 footprint recommendation (Unit: mm)

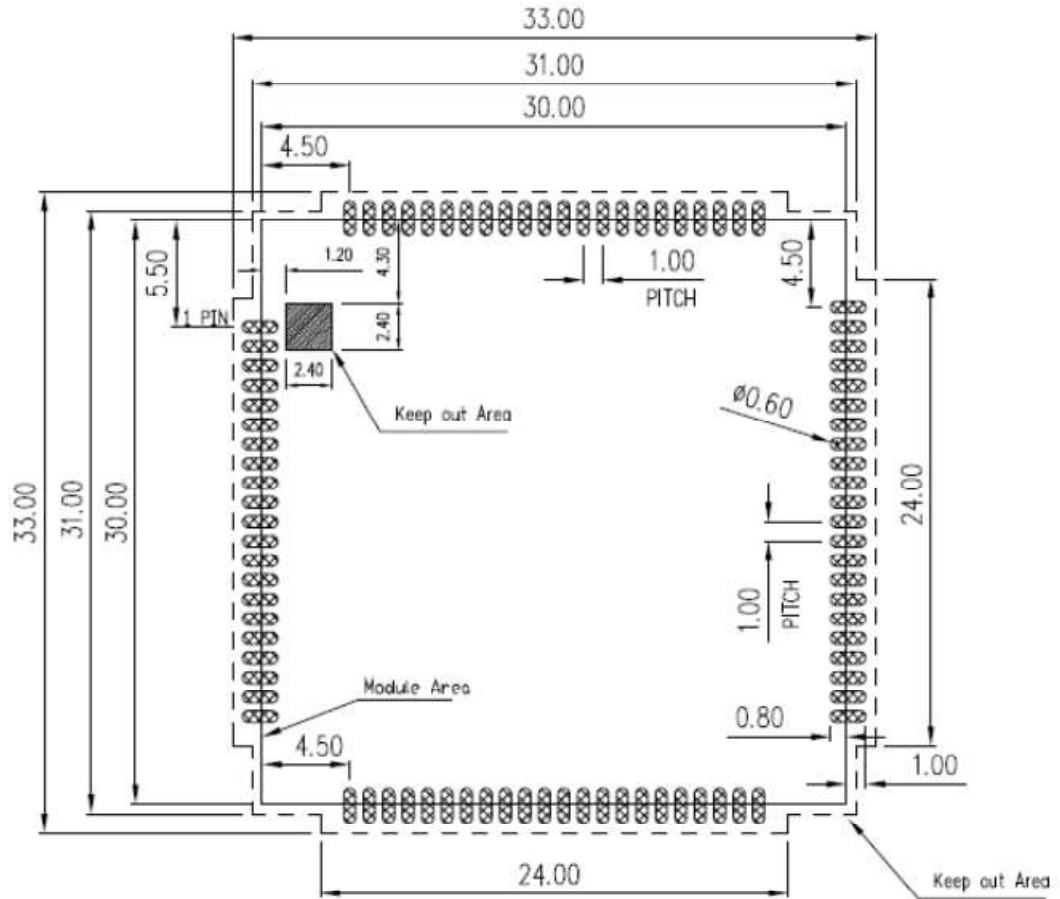Recommended PCB
footprint ourline
(Unit:mm)

Figure 3: SIM7600 footprint recommendation (Unit: mm)

4　Hardware Reference Design

The following chapters describe compatible design of SIM7600 and SIM5360 on main functionalities.

4.1　Power Supply

The power supply pins of SIM7600 include four VBAT pins (pin 62&63, pin 38&39). VBAT directly supplies the power to RF circuit and baseband circuit. Customer can only power pin38 and pin39, or can only power pin62 and pin63, for the four pins are connected inside the module.

The SIM5360 also has four VBAT pins, but customer must power all four pins together.
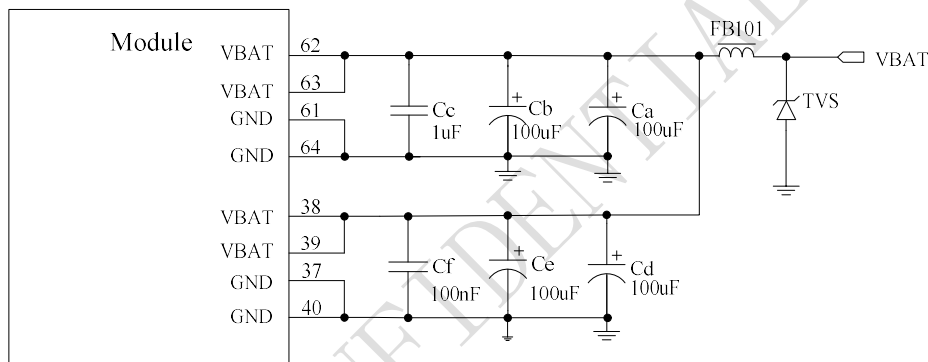

Figure 4: Power input Reference Circuit of SIM7600 and SIM5360

Note: The Cd, Ce, Cb, Cc and Cf are recommended being mounted for SIM7600, but the Ca, Cb ,Ce, Cc and Cf for SIM5360.

The following figure is the reference design of +5V input power supply. The designed output for the power supply is 3.8V, here a linear regulator can be used.
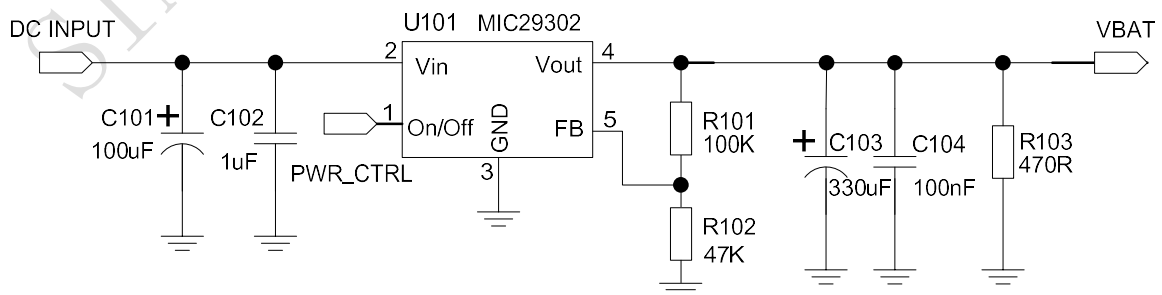

Figure 5: Reference circuit of the LDO power supply

In addition, in order to get a stable power source, it is suggested to use a TVS diode of which working

voltage is more than 5V, see the HD document for the recommend parts.

4.2 USB Interface

The USB interface of SIM7600 and SIM5360 module are compliant with the USB2.0 specification as USB device. The following circuit is the reference design of USB interface.
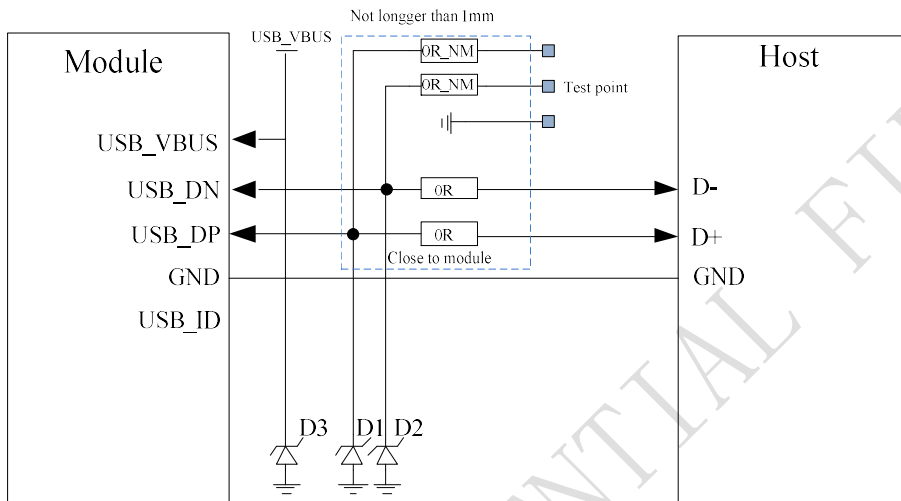

Figure 6: USB interface

Note: As SIM7600 is peripheral (USB device), please keep USB_ID pins open.
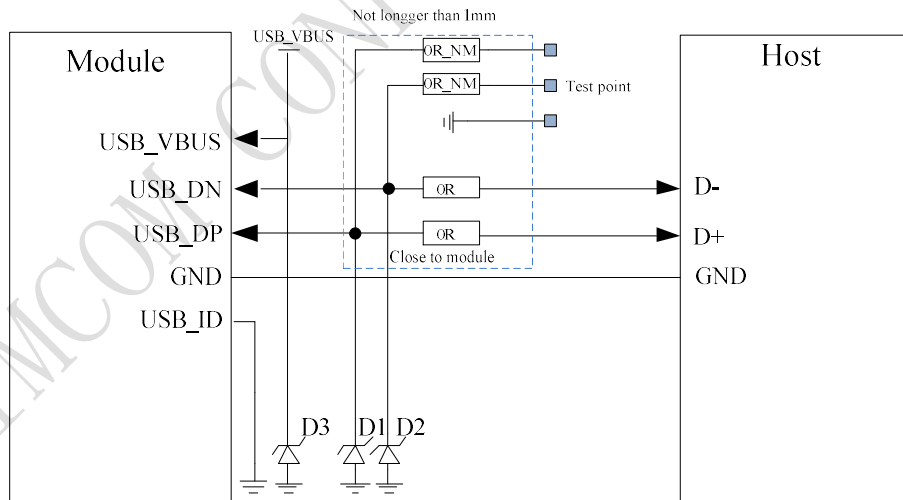

Figure 7: USB interface

Note: As SIM7600 is USB host, please connect USB_ID to GND directly with less than 10Ohm impedance to ground.

Anyway, ESD protection component with low load capacitance value is recommended, such as ON SEMI (www.onsemi.com) ESD9L5.0ST5G.

4.3   Network Status Indication

The GPIO1 on SIM5360 and NETLIGHT pin on SIM7600 can be used to drive a network status indicator LED. The following circuit is the reference design.
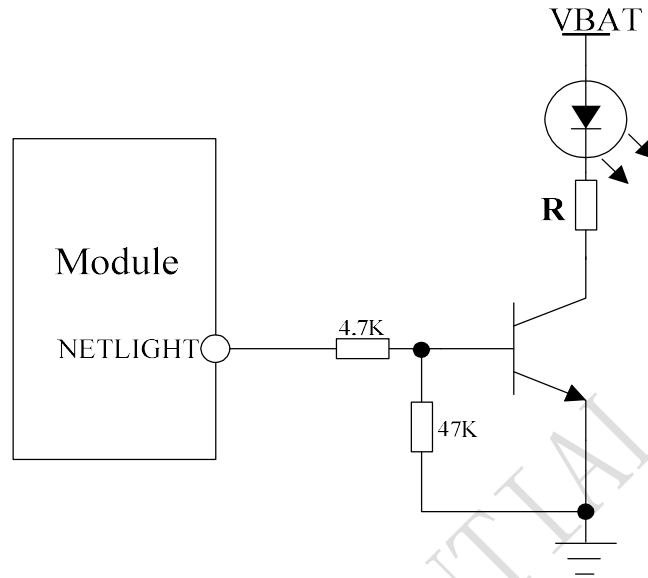

Figure 8: Application circuit

4.4   Power on/off circuit

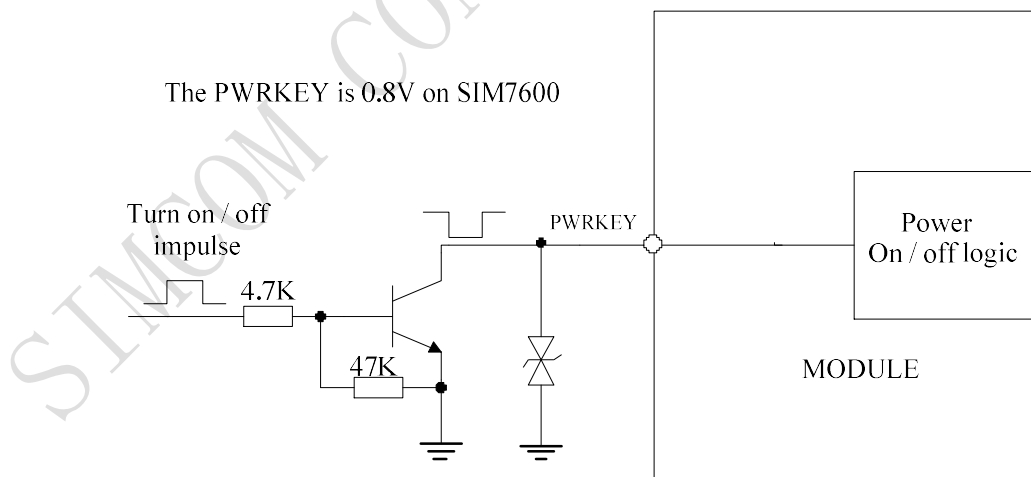The following circuit is a reference design for SIM7600 and SIM5360 power-on/off circuit.

Figure 9: Power on/off circuit

NOTE: The high voltage of PWRKEY is 0.8V on SIM7600, and SIM5360 is 1.8V.

4.5 USIM Interface

The USIM provides the required subscription verification information to allow the mobile equipment to attach to a GSM or UMTS network. Both 1.8V and 3.0V SIM Cards are supported.

It is recommended to use an ESD protection component such as ST (www.st.com) ESDA6V1W5.
The following circuit is a reference design for SIM7600 and SIM5360 USIM circuit.
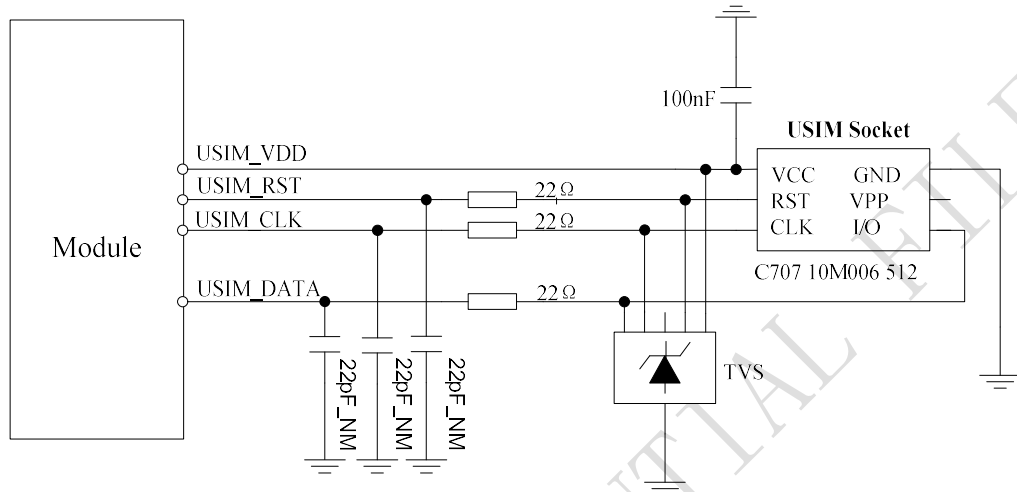

Figure 10: USIM interface reference circuit

4.6 UART Interface

A level shifter should be used if user's application is equipped with a 3.3V UART interface. The level shifter TXB0108RGYR provided by Texas Instruments is recommended. The reference design of the TXB0108RGYR is in the following figures.
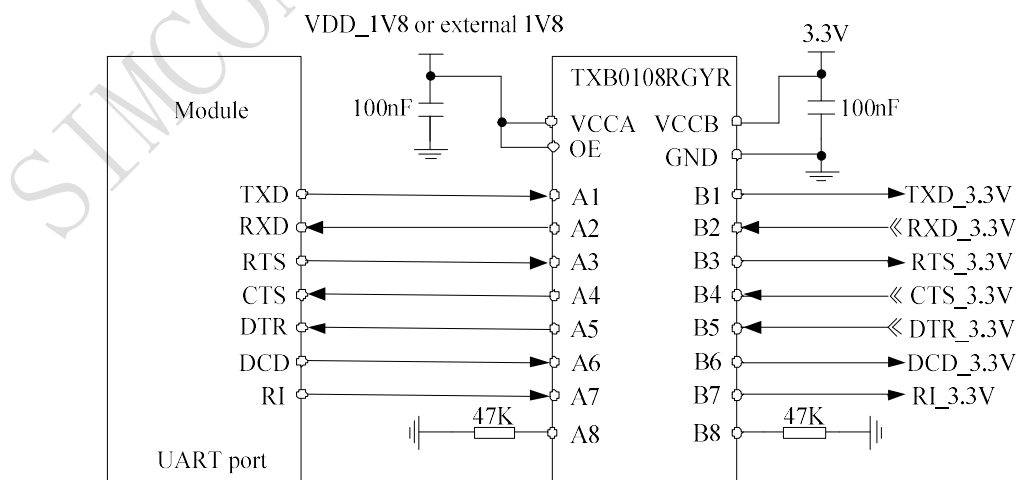

Figure 11: Reference circuit of level shift

4.7 3G/4G RF Interface

SIM7600 and SIM5360 provide antenna interfaces about 3G/4G. Customer's antennas should be located in the host board and connected to module's antenna pad through micro-strip line or other types of RF trace and the trace impedance must be controlled by 50Ω.

SIM7600 provides main antenna and aux antenna, and SIM5360 only provide main antenna.

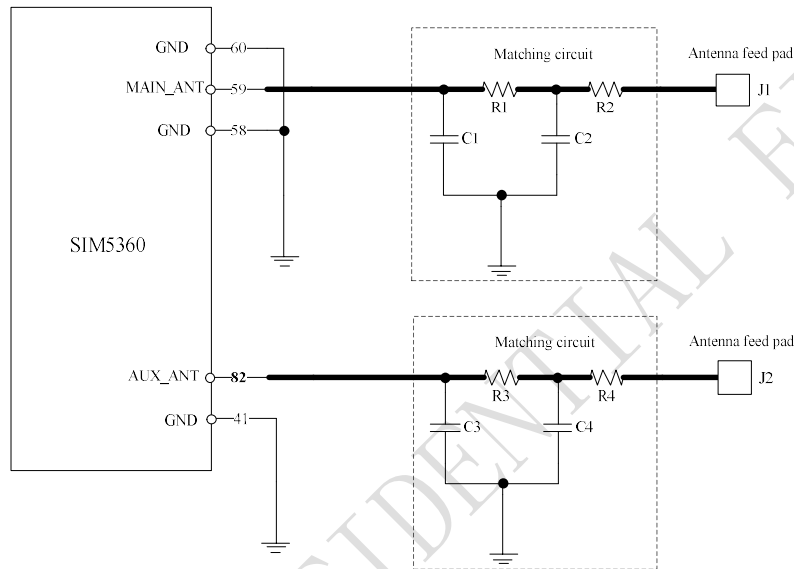The following circuit is a reference design for SIM5360 RF antenna circuit

Figure 12: SIM5360 main antenna matching circuit

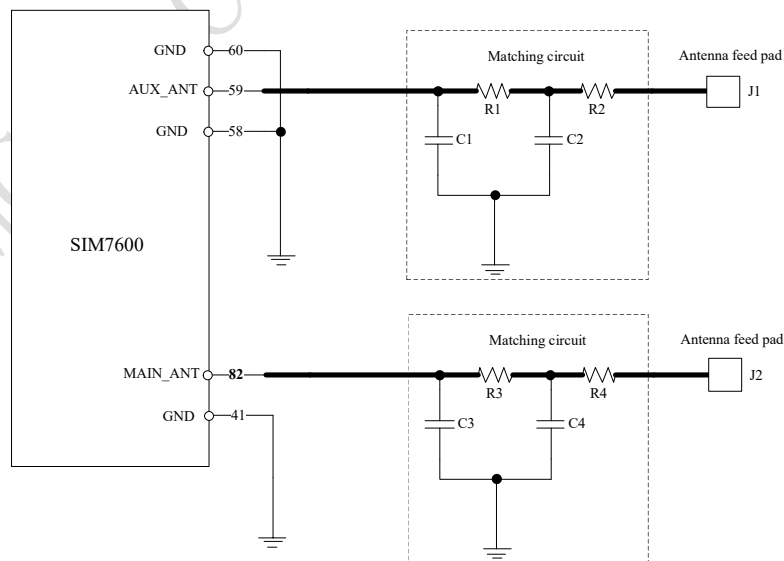The following circuit is a reference design for SIM7600 RF antenna circuit.

Figure 13: SIM7600 Antenna matching circuit

Note: The main and auxiliary antennas of SIM7600 and SIM5360 are different.

4.8 SDIO Interface

SIM7600 provides SDIO interface with clock rate up to 200 MHz and 1.8V voltage for WIFI solution, it can work with W58 module to provide Wi-Fi solution. The wifi function need software support. SIM5360 provides keypad interface relevantly.
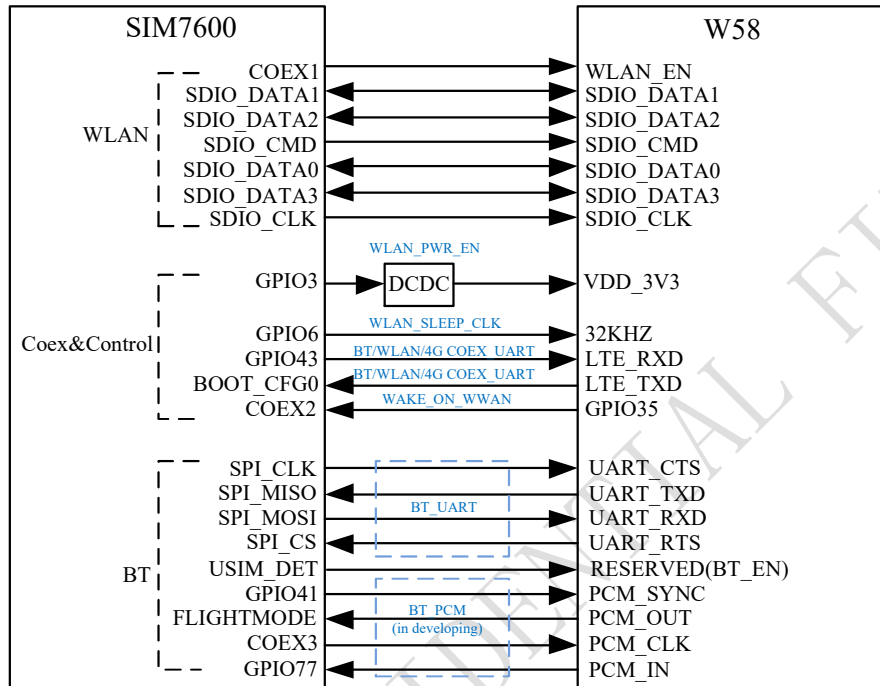

Figure 14: SIM7600 WIFI solution

4.9 SDC Interface

SIM7600 and SIM5360 provide a SDC/MMC interface, it compatible with SDC 3.0, SIM7600 also support eMMC v4.5.
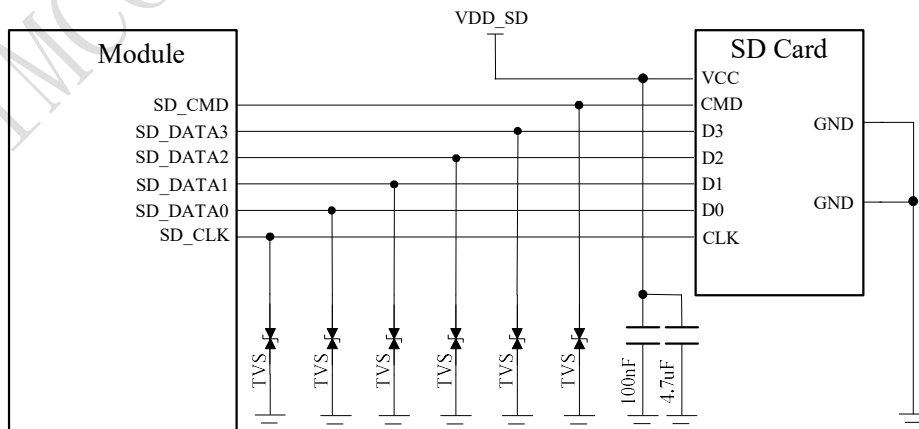
Figure 15: SDC interface for SD card

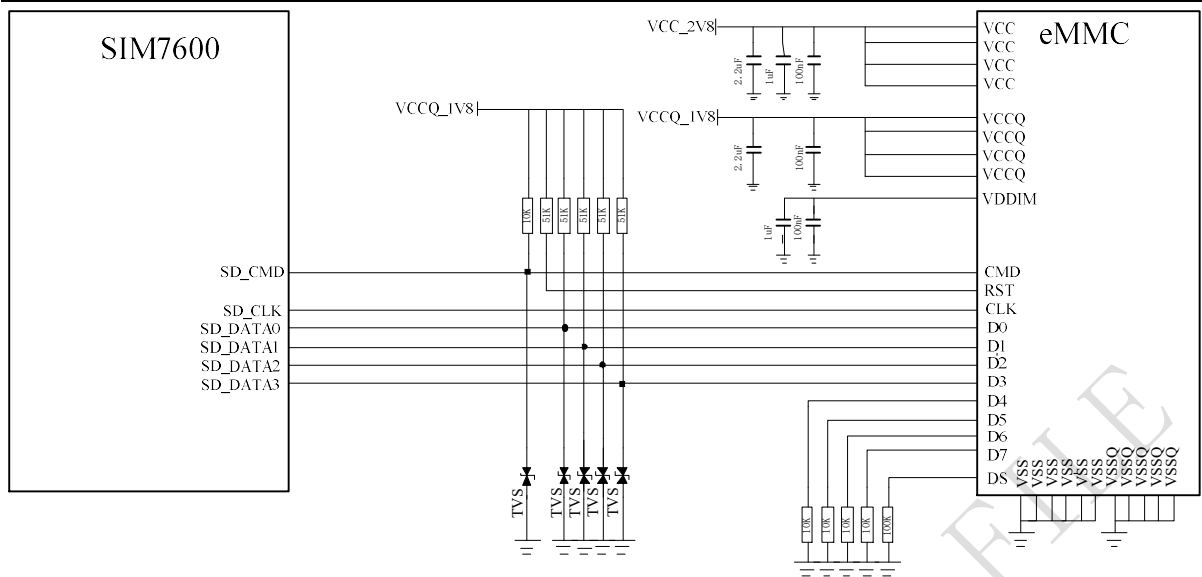Figure 16: SIM7600 SDC interface for eMMC

4.10 Dedicated Pins for SIM7600

SIM7600 provides 5 new GPIO pins for extended application.

Table 2: Dedicated Pins Description for SIM7600

Pin name	Pin No.	Function
COEX1	83	These pins can be used as GPIO after the module boot up.
COEX2	84	
USB_BOOT	85	
COEX3	86	
GPIO77	87	

5   Appendix

5.1   Related documents

Table 3: Related documents

SN	Document name	Remark
[1]	SIM7600_Hardware_Design	SIM7600 Hardware Design Document
[2]	SIM5360_Hardware_Design	SIM5360 Hardware Design Document

5.2   Terms and Abbreviation

Table 4: Terms and Abbreviations

Abbreviation	Description
ESD	Electrostatic Discharge
GSM	Global Standard for Mobile Communications
I2C	Inter-Integrated Circuit
PCB	Printed Circuit Board
PCS	Personal Communication System, also referred to as GSM 1900
RF	Radio Frequency
RTC	Real Time Clock
Rx	Receive Direction
SIM	Subscriber Identification Module
SPI	serial peripheral interface
UART	Universal Asynchronous Receiver & Transmitter
VSWR	Voltage Standing Wave Ratio
NC	Not connect
EDGE	Enhanced data rates for GSM evolution
HSDPA	High Speed Downlink Packet Access
HSUPA	High Speed Uplink Packet Access
WCDMA	Wideband Code Division Multiple Access
USIM	Universal subscriber identity module
UMTS	Universal mobile telecommunications system
SMPS	Switch Mode Power Supply
KBC	Keypad Button Column
KBR	Keypad Button Row

Smart Machine Smart Decision

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