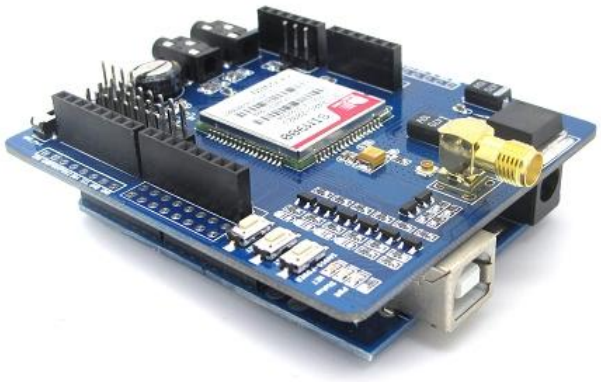
IComSat v1.1

-SIM900 GSM/GPRS shield

Overview



IComsat is a GSM/GPRS shield for Arduino and based on the SIM900 Quad-band GSM/GPRS module. It is controlled via AT commands (GSM 07.07 ,07.05 and SIMCOM enhanced AT Commands), and fully compatible with Arduino / Iteaduino and Mega.

Features

- Quad-Band 850/900/1800/1900MHz
- GPRS multi-slot calss 10/8
- GPRS mobile station class B
- Compliant to GSM phase 2/2+
- Class 4 (2W@850/900MHz)
- Class 1 (1W@1800/1900MHz)
- Control via commands (GSM 07.07, 07.05 and SIMCOM enhanced AT Commands)
- Short message service
- Free serial port selection
- All SIM900 pins breakout
- RTC supported with Super Cap
- Power on/off and reset function supported by Arduino interface

Specifications

PCB size	77.2mm X 66.0mm X 1.6mm
Indicators	PWR, status LED, net status LED
Power supply	9~20V, compatible with Arduino
Communication Protocol	UART
RoHS	Yes

Electrical Characteristics

Specification	Min	Type	Max	Unit
PowerVoltage(Vlogic)	4.5	5	5.5	VDC
Power Voltage(Vsupply)	9	-	20	VDC
Input Voltage VH:	4.5	5	5.5	V
Input Voltage VL:	-0.3	0	0.5	V
Current Consumption(pulse)	-	-	2000	mA
Current Consumption(Continues)			500	mA
Baud rate		9600		bps

Hardware

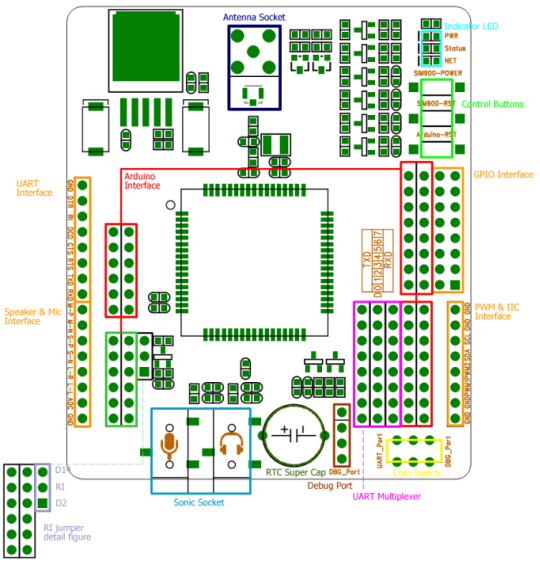


Figure 1 Top Map

Interface	Pin	Description
GPIOs	1	VDD*
	2	GND
	3	GPIO1
	4	GPIO2
	5	GPIO3
	6	GPIO4
	7	GPIO5
	8	GPIO6
	9	GPIO7
	10	GPIO8
	11	GPIO9
	12	GPIO10
	13	GPIO11
	14	GPIO12
	15	GND
	16	VDD*
UART	1	GND
	2	DTR
	3	RI
	4	DCD
	5	CTS
	6	RTS
	7	TXD
	8	RXD
IIC&PWM	1	GND
	2	GND
	3	IIC_SCL
	4	IIC_SDA
	5	PWM2
	6	PWM1
	7	GND
	8	GND
Debug_Port	1	GND
	2	PERKEY
	3	DBG_RXD
	4	DBG_TXD

VDD* = 3.0V

Note1: the operation level of the port is 3.0V

Installation

UART Multiplexer (For free UART connection setting)

You can use the jumper to connect the TXD and RXD pins on SIM to any pins of Arduino D0 – D7.

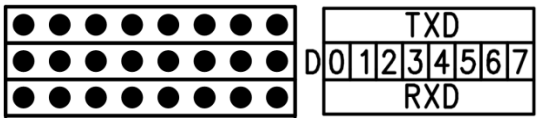


Figure 3 UART Multiplexer

When using the connection as Figure 4, the SIM900 connect to the ATMega328 chip on board.

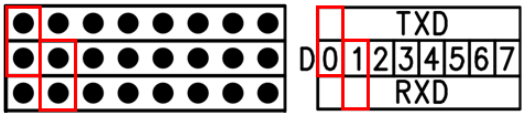


Figure 4 Connect the Arduino board

When you using the connection as Figure 5, the SIM900 connect with the FT232RL chip, and the FT232RL connect to PC by USB. Whit this configuration you can use the serial software on PC to control or configure the SIM900 module.

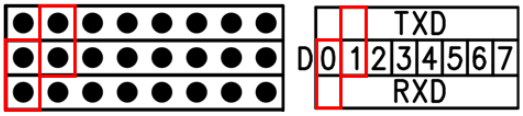


Figure 5 Connect the UART Interface as FT232

Except the 2 configurations above, you can connect the TXD and RXD to any other pins from D0-D1, and using the software-serial library to control the SIM900 moudle.

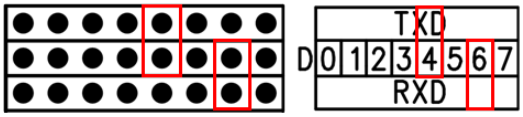


Figure 6 an example for software-serial connection

Com Switch

There is a com switch for selecting the communicate port to UART port or Debug port of SIM900 module as the following figure 7. When connect to the SIM900 debug port, the UART multiplexer just can be set as Figure 4 or 5.

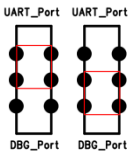


Figure 7-a Figure7-b

RI Behavior Output

There is a Jumper for configuration of RI, one to connect D2, another to connect D14.

Status	RI response
Standby	High

Voice call	The pin is changed to low. When any of the following events occur, the pin will be changed to high: (1) Establish the call (2) Hang up the call
Data call	The pin is changed to low. When any of the following events occur, the pin will be changed to high: (3) Establish the call (4) Hang up the call
SMS	The pin is changed to low, and kept low for 120ms when a SMS is received. Then it is changed to high.
URC	The pin is changed to low, and kept low for 120ms when some URCs are reported. Then it is changed to high.

The behavior of the RI pin is shown in the following figure when SIM900 module is used as a receiver.

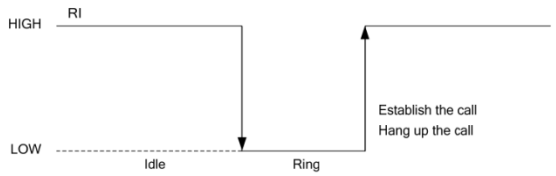


Figure 8 RI behavior of voice calling as a receiver

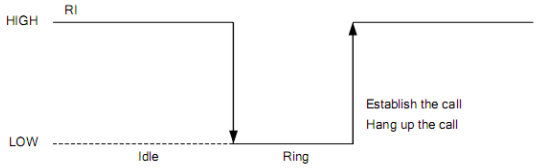


Figure 9 RI behaviors of data calling as a receiver

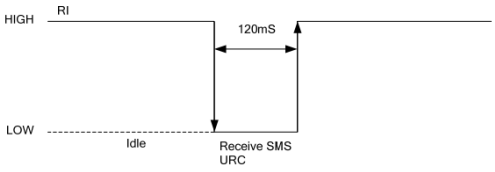


Figure 10 RI behavior of URC or receive SMS

When the IComSat is used as caller, the RI will remain high.

Indicator LED and Buttons:

NETSTATUS: The status of the NETSTATUS LED is listed in following table:

Status	Description
Off	SIM900 is not running
64ms On/800ms Off	SIM900 not registered the network
64ms On/3000ms Off	SIM900 registered to the network
64ms On/300ms Off	GPRS communication is established

STATUS: Power status of SIM900.

PWR: Power status of IcomSat.

SIM900-POWER: After the IcomSat power on, you need to press the SIM900-POWER button for a moment to power on

the SIM900 module. The pin 9 of Arduino interface is connecting to PWRKEY, and a high pulse with 400us wide can power on/off it.

Sim900-RST: Reset the SIM900. The D8 of Arduino interface is connecting to RESRT of SIM900, and a high pulse with 400us wide can power on/off it.

Arduino-RST: Reset the Arduino.

Software Notes:

1. User must wait URC "CALL READY"(with fixed baud rate) then you can operate SIM card when user powers on the module, or can use AT+CCALR to inquire the states of "CALL READY"
2. When user meets error 512 or 515, First user should check if operate SIM card before "CALL READY", and second should check if memory of SIM card is full.

Revision History

Rev.	Description	Release date
v1.0	Initial version	2011-5-27
v1.1	Add the RI description, and fix some typo	2011-7-22
v1.2	Update for IComsat v1.1	2012-1-17
V1.3	Add Software Notes	2012-04-21
V1.4	Fix a description error	2014-03-20