



## GSM/GPRS Modem TTL (5V)

### User Manual



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**rhydoLABZ.com**



GSM/GPRS Modem-TTL (5V) from rhydoLABZ is built with Tri-band GSM/GPRS engine, works on frequencies EGSM 900 MHz, DCS 1800 MHz and PCS 1900 MHz. It is very compact in size and easy to use as plug in module. The Modem is coming with 5V TTL interface, which allows you to connect directly to 5V microcontroller/Arduino. The baud rate is configurable from 9600-115200 through AT command. The GSM/GPRS TTL Modem is having internal TCP/IP stack to enable you to connect with internet via GPRS. It is suitable for SMS as well as DATA transfer application in M2M interface.

You need only two wire (Tx,Rx) except Power supply to interface with microcontroller/Arduino. The built in Switching Power supply allows you to connect wide range unregulated power supply. Using this modem, you can send SMS, data and read SMS through simple AT command.

## FEATURES

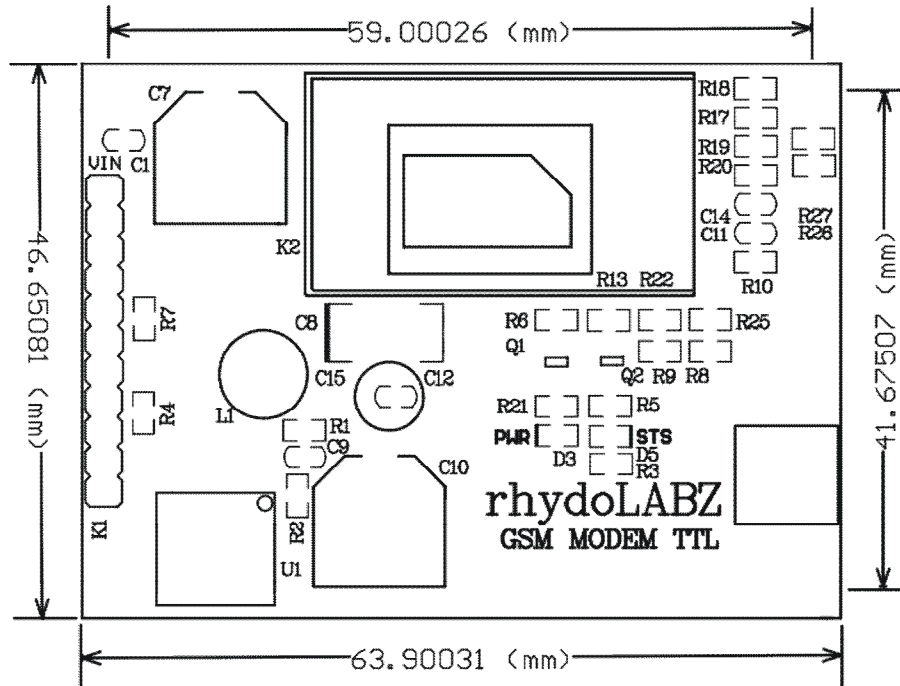
- High Quality Product (Not hobby grade)
- Plug and Play Module
- Tri-Band GSM/GPRS 900/ 1800/ 1900 MHz
- 5V TTL interface for direct connection with MCU/Arduino
- Configurable baud rate
- SMA connector with GSM Antenna.
- Built in SIM Card holder.
- Built in Network Status LED
- Inbuilt Powerful TCP/IP protocol stack for internet data transfer over GPRS.
- Standard 2.54mm Connector Pitch
- Switch ON/OFF Pin at connector
- Status LED Pin at connector
- Hardware Flow controlling pins available at connector

## SPECIFICATIONS

- Tri-Band GSM/GPRS 900/ 1800/ 1900 MHz
- GPRS multi-slot class 10
- Compliant to GSM phase 2/2+
- Class 4 (2W@ 900 MHz)
- Class 1 (1W@ 1800/1900MHz)
- Built in Powerful TCP/IP
- Data Specifications
- GPRS Class 10 - max 85.6 kbps (downlink)
- Coding scheme 1, 2, 3, 4
- CSD up to 14.4 kbps
- PPP Stack
- Non transparent mode
- Normal operation temperature: -20 °C to +55 °C
- Input Voltage: 9-12VDC



## DIMENSIONS



## DC CHARACTERISTICS/RATINGS

Parameter	Input / Output	Specification		Unit
		Minimum	Maximum	
Supply Voltage - VIN	Input	8	15	V
Current Consumption	--	250	1000	mA
Supply Voltage - V <sub>2</sub>	Input	3	6	V
Receive Pin - RXD	Input	3.3V when V <sub>2</sub> = 3.3V 5V when V <sub>2</sub> = 5V		V
Transmit Pin - TXD	Output	3.3V when V <sub>2</sub> = 3.3V 5V when V <sub>2</sub> = 5V		V
Power Key	Input	2	6	V
Status Led	Output	4	6	V
RTS	Input/ Output	3.3V when V <sub>2</sub> = 3.3V 5V when V <sub>2</sub> = 5V		V
CTS	Input/ Output	3.3V when V <sub>2</sub> = 3.3V 5V when V <sub>2</sub> = 5V		V

**PIN DESCRIPTION**

PIN	PIN NAME	DETAILS
VIN	Power Supply	Power Supply Input -12V DC
GND	Ground	Ground level of Power Supply
V-2	Power Supply -2	TTL Interface Voltage Input
RXD	Receive	Receives data based on the TTL Level – Usually connected to the Tx pin of the microcontroller
TXD	Transmit	Outputs data based on the TTL Level – Usually connected to the Rx pin of the microcontroller
RTS	Request to send	Enables RTS Flow Control (Shorted with CTS using 100 Ohm resistor-R4).
CTS	Clear to send	Provides CTS Flow Control (Shorted with RTS using 100 Ohm resistor-R4).
STS-LED	Status Led	Open Collector for connecting the status led externally
PWR-KEY	Power Key	Pin for Module On/Off externally using microcontroller I/O pin – Shortened to ground by default

**VIN** : This pin is used to power up the GSM Modem. The pin supports voltages from 8V to 15V DC. The typical supply is 12V DC.

**V-2** : The power supply to this pin specifies the TTL voltage level. If the modem has to be interfaced with a 5V microcontroller, the supply input to this pin should be 5V DC and if the modem has to be interfaced with a 3V3 microcontroller, the supply input to this pin should be 3.3V DC.

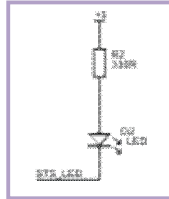
**RXD and TXD** : These pins are the receive and transmit pins of the GSM Modem. For interfacing with microcontrollers, these pins have to be connected to the Tx and Rx pin of the microcontroller. The voltage level on these pins varies with respect to the voltage input to the V-2 pin.

**RTS** : This pin is used to enable the hardware flow control. By default, this pin is shorted with CTS pin using a 100  $\Omega$  resistor. This resistor is marked R4 in the PCB. You have to remove resistor R4 for implementing hardware flow control with the microcontroller.

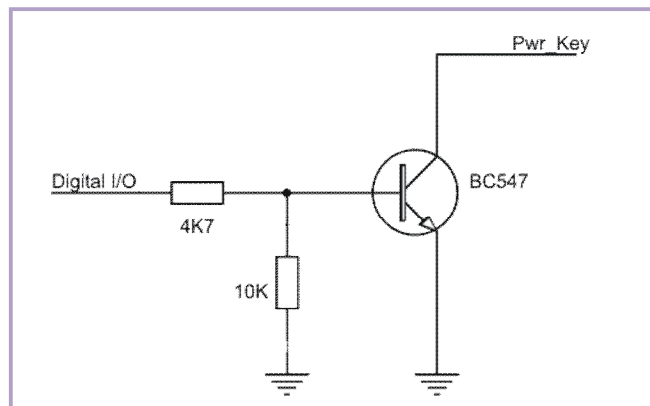


**CTS** : This pin is used to provide the hardware flow control. By default, this pin is shorted with RTS pin using a 100  $\Omega$  resistor. This resistor is marked R4 in the PCB. You have to remove resistor R4 for implementing hardware flow control with the microcontroller.

**STS-LED** : If you want to connect an external Led to view the status of the GSM Modem, you can use this pin. The connection circuit is given.



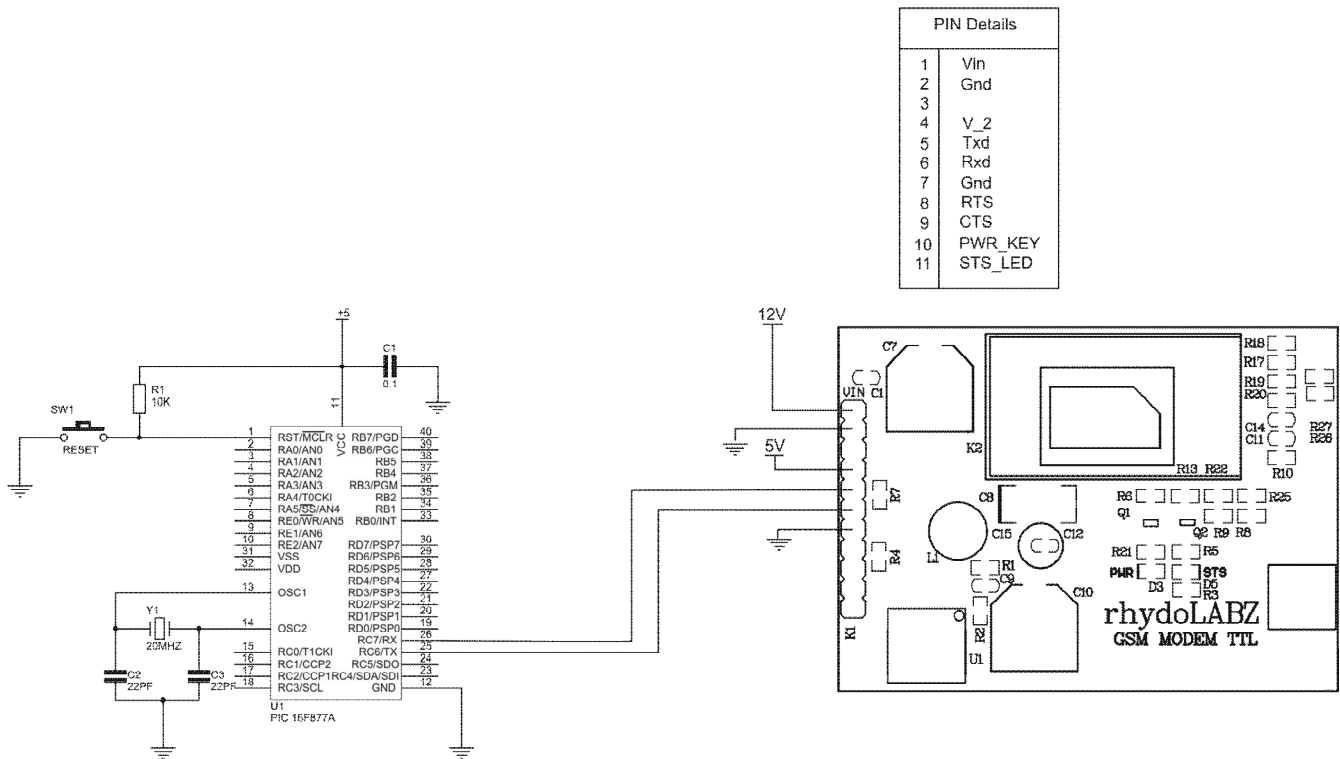
**PWR-KEY**: This pin can be used to On/Off the GSM modem externally from the microcontroller without disconnecting the power supply. This pin is shorted to the ground by default. The connection circuit is given for using this pin.



## INTERFACING THE GSM MODEM

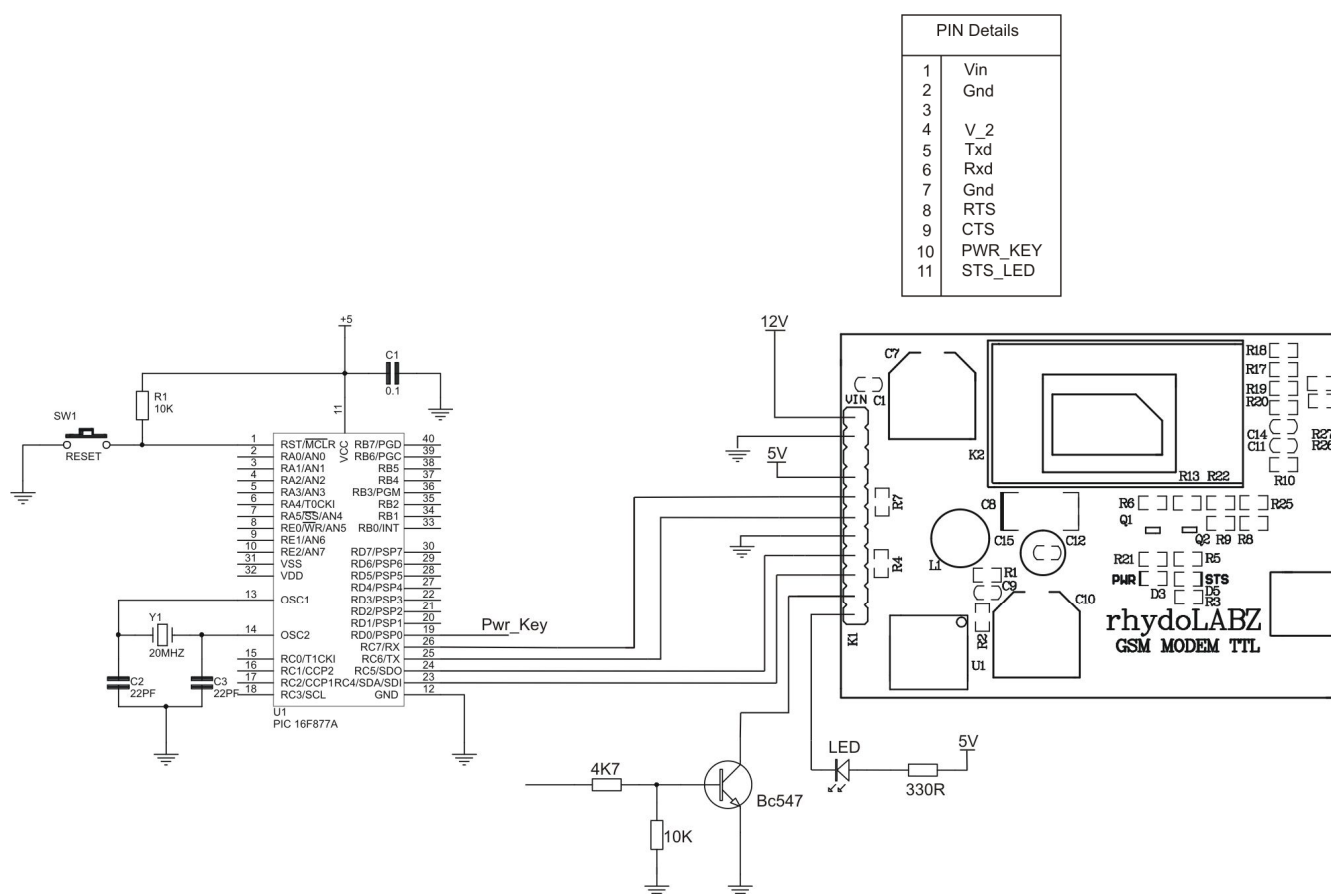
### Circuit – 1

#### ➤ Interfacing Gsm Modem to 5V microcontroller



### Circuit - 2

- *Interfacing Gsm Modem to 5V microcontroller with RTS/CTS hardware flow control, external Power Key and external status Led*





## GETTING STARTED

### **Insert SIM card**

Open the SIM cardholder. After inserting the SIM card, lock the holder.

### **Connect Antenna**

Screw the RF antenna on the RF cable output provided. (if not connected)

### **Connect the Pins**

Connect the GSM modem as per the circuit diagram provided and power it up.

### **Network Led**

The Network Led indicates the various status of GSM module eg. Power on, network registration & GPRS connectivity. When the modem is powered up, the status led will blink every second. After the Modem registers in the network (takes between 10-60 seconds), led will blink in step of 3 seconds. At this stage you can start using Modem for your application.

### **Baud rate**

The Baud rate supported by the modem is between 9600 and 115200. Make sure the host system is set to the supported baud rate.

- *The modem automatically sets to the baud rate of the first command sent by the host system after it is powered up. So there is no need for setting the baud rate using commands.*
- *Before You Start using the modem, please make sure that the SIM card you inserted support the needed features and there is enough balance in SIM.*





## **Testing with a PC**

1. Connect the GSM Modem to a PC Com port using a MAX-232 level conversion circuit or TTL-RS-232/TTL-USB convertor and Power it Up.
2. Create a HyperTerminal (Windows tool for serial port communications) window with Baudrate 9600 and connect it to the ComPort to which GSM is connected.
3. Type any AT command in the HyperTerminal window and you could see the modem responding by sending "OK".

### **Terminal Window on PC where GSM Modem is connected**

```
AATT
OK
AATTEE00
OK
AT+CMGF=1
OK
AT+IPR?
+IPR: 0
OK
```

Connected 0:26:12    ANSIW    9600 8-N-1    SCROLL    CAPS    NUM    Capture    Print echo



## BASIC COMMANDS FOR SMS

The Modem is controlled by the host controller using **AT** (Attention) Commands.

The format of an AT command from the HOST to the module shall be: **< AT command><cr> <lf>**

The format of the OK code from the module to the HOST shall be: **OK**

The format of the ERROR code from the module to the HOST shall be: **+CME ERROR: <err>**

COMMAND	<b>AT\r\n</b>
DESCRIPTION	Check whether communication is established
RESULT CODE	OK

COMMAND	<b>ATE0\r\n</b>
DESCRIPTION	Echo Off
RESULT CODE	OK

COMMAND	<b>AT+CMGF = 1\r\n</b>
DESCRIPTION	Switch to text mode
RESULT CODE	OK

COMMAND	<b>AT+CMGS="Mobile Number"\r\n</b>
DESCRIPTION	Send SMS to the Mobile Number
RESULT CODE	>

COMMAND	<b>AT+CMGR=Sms Number\r\n</b>
DESCRIPTION	Read the SMS with message index number stored in the SIM card
RESULT CODE	+CMGR:"REC UNREAD", "+919349750763", "0", "0", "10/05/21,10:09:38+00" Message Data

COMMAND	<b>AT+CMGD= Sms Number \r\n</b>
DESCRIPTION	Delete the SMS with message index number stored in the SIM card
RESULT CODE	OK

**Note :** **<cr><lf>** corresponds to Carriage Return and Line Feed (ie \r\n or 0x0d, 0x0a)  
Detailed AT Command set is given as a separate document.

**SAMPLE CODE – FOR INTERFACING WITH MICROCONTROLLER**

/\* This program module sends an SMS from the modem to a prefixed number \*/

```
void main()
{
    SerialPortInit();          /* Serial Communication – 9600-N-8-1 */

    Send2Gsm("AT\r\n");        /* Transmit AT to the module – Module sends OK */
    DelayS(2);                 /* 2 sec delay */

    Send2Gsm("ATE0\r\n");      /* Echo Off */
    DelayS(2);                 /* 2 sec delay */

    Send2Gsm("AT+CMGF=1\r\n"); /* Switch to text mode */
    DelayS(2);                 /* 2 sec delay */

    Send2Gsm("AT+CMGS=\"+919447367176\"\r\n"); /* Send SMS to a cell number */
    DelayS(2);                 /* 2 sec delay */

    Send2Gsm("TEST DATA FROM RhydoLABZ-COCHIN"); /* Input SMS Data */
    SerialTx(0x1a);            /* Ctrl-Z indicates end of SMS */
    DelayS(2);                 /* 2 sec delay */

    while(1);
}
```

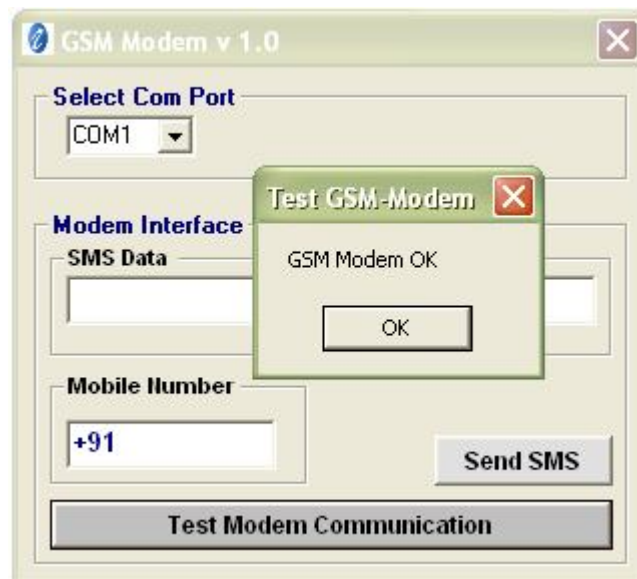
**Function Description**

SerialPortInit – Module to initialize serial communication parameters  
 Send2Gsm -- Module to transmit a string of data through Serial Port  
 SerialTx – Module to transmit a byte through serial port



## PC INTERFACE SOFTWARE FOR GSM MODEM

- Download setup file from [www.rhydolabz.com/documents/gps\\_gsm/gsm\\_modem.zip](http://www.rhydolabz.com/documents/gps_gsm/gsm_modem.zip)
- Install the setup file in your PC. Once the installation is completed, open the application from StartMenu-Programs-Rhydolabz-GSM Modem.
- Connect the GSM Modem to a PC Com port using a MAX-232 circuit or TTL-RS-232/TTL-USB and Power it Up.
- Select the Comport\* (in the application software) to which GSM modem is connected and Press the “Connect” button.
- Click on the button “Test Modem Communication”. If the connection is OK, the software displays “GSM Modem OK”.
- If you want to send an SMS to another mobile using the modem, type the SMS data and Mobile Number (Add Country code as prefix) and click “Send SMS” button.



\* If the comport number to which the modem is connected does not appear in the software, re-assign the Comport to an available one.(Can be done in Device Manager- Comport-Properties)



## TECHNICAL SUPPORT

If you are experiencing a problem that is not described in this manual, please contact us. Our phone lines are open from 9:00 AM – 5.00 PM (*Indian Standard Time*) Monday through Saturday excluding holidays. Email can be sent to [support@rhydolabz.com](mailto:support@rhydolabz.com)

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