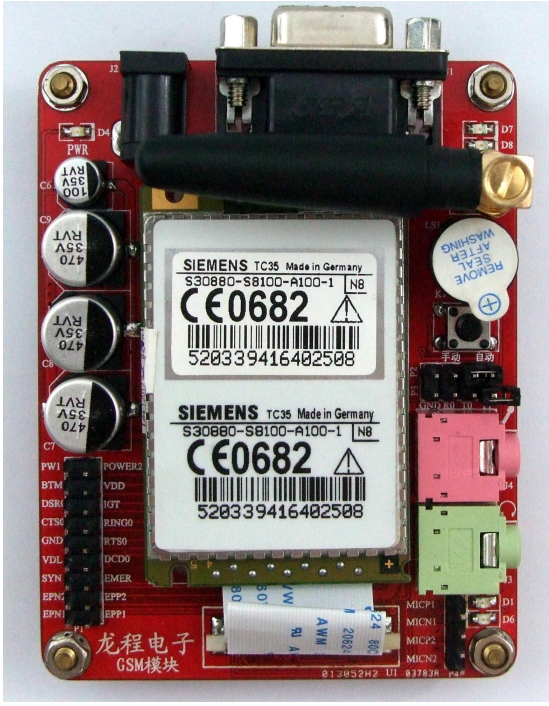
# TC35 GSM
# Development Board




# User's Manual

## V1.0

# Sep 2012

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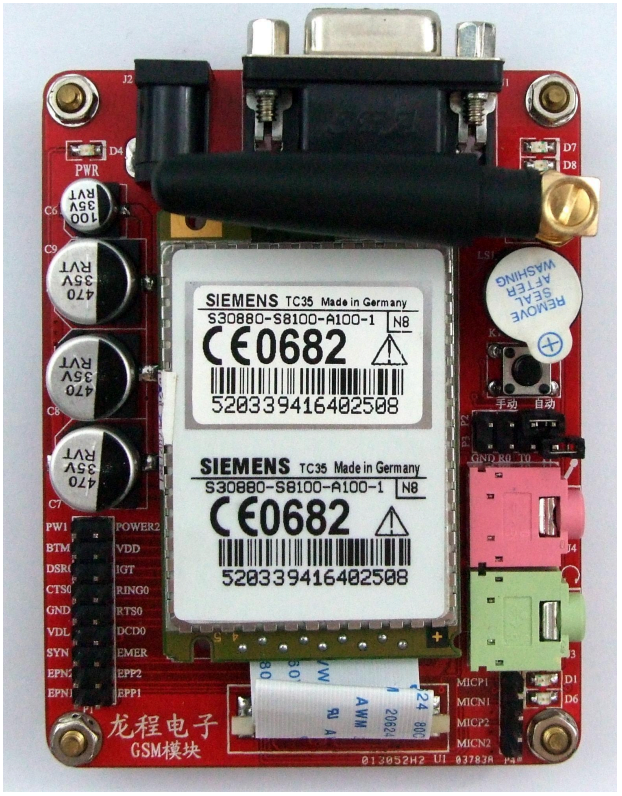
## 1. INTRODUCTION AND OVERVIEW

GSM is known as Global System Of Mobile Communication. It is being used as standard for nowadays in our cell phone. Over 200 countries and 2 billions people are using it as a phone today. GSM would work any place as long as the signal/network is available. Most likely it is operate in 900MHz to1800MHz band. This GSM Development Board use Siemens TC35 GSM module as the central working unit. It comes with following features:

- Siemens TC35 GSM module on board
- Support 900/1800/1900 MHz GSM Tri band.
- Uses AT Command Set.
- SIM card holder/socket ready
- Ready with SMA antenna for better signal reception and transmission
- SMS (text) and voice communication is ready.
- Single board solution.
- Power with 7-15VDC.
- Ready with UART (**2.65V** TTL) and RS232 (COM Port) serial interface.
- Serial Interface, Baudrate: 9600bps, 8-1-N
- On board 3.5mm earphone jack and mic jack
- On board buzzer as sound indicator.
- 5 LED act as indicator with different modes.

## 2. PACKING LIST

Please check the parts and components according to the packing list. If there are any parts missing, please contact us at sales@cytron.com.my immediately

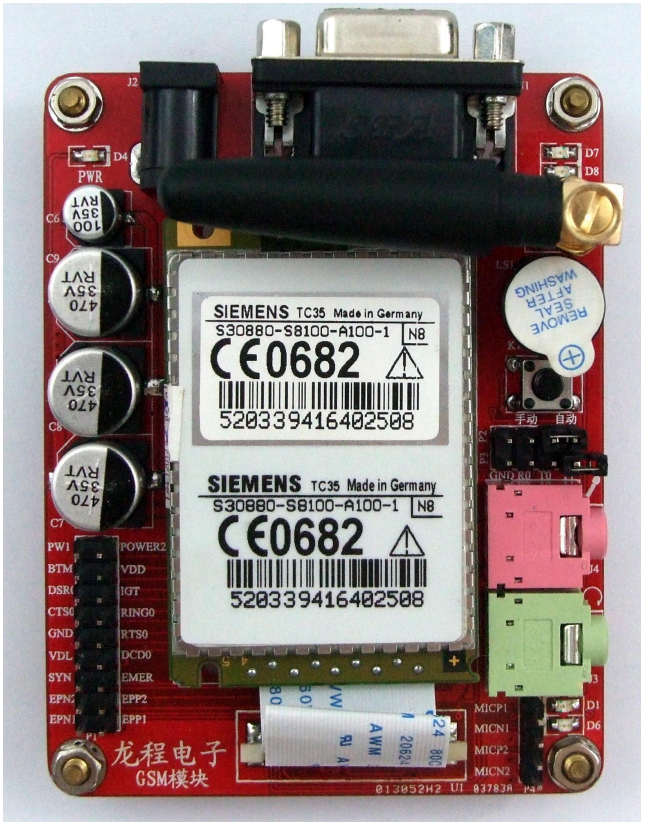



1. 1 Unit of TC35 GSM Modem

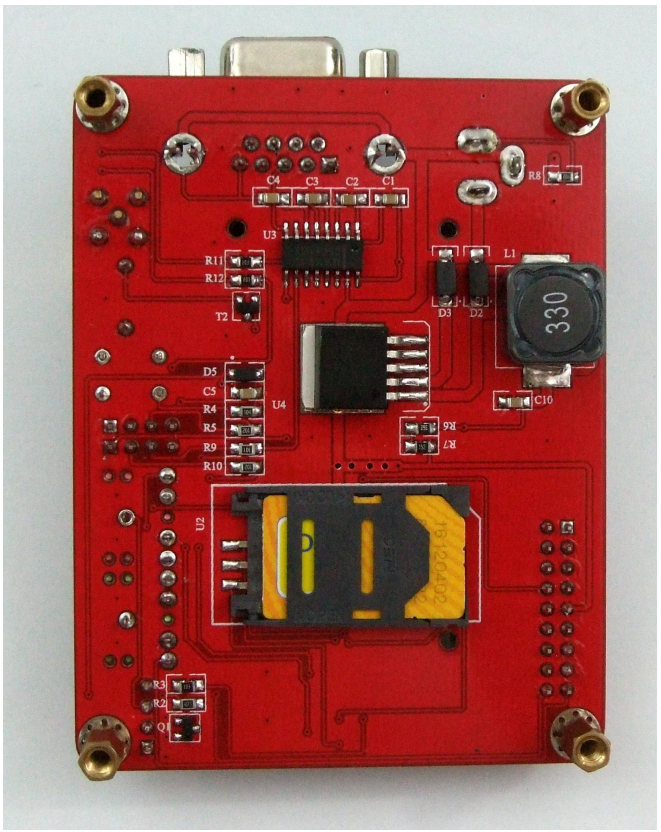
Optional/Recommended Items: (Please get it separately from Cytron online store)

- AC to DC Adatper, 12V, 2A - To power the GSM Board.
- Serial Extension Cable - To connect COM to Computer.
- RS232 converter -To convert RS232 to UART port.
- UC00A or UC00B - To offer UART from USB port of computer or laptop.
- LC04A, logic level shifter for proper logic shifter if 5V UART is uses for interface.

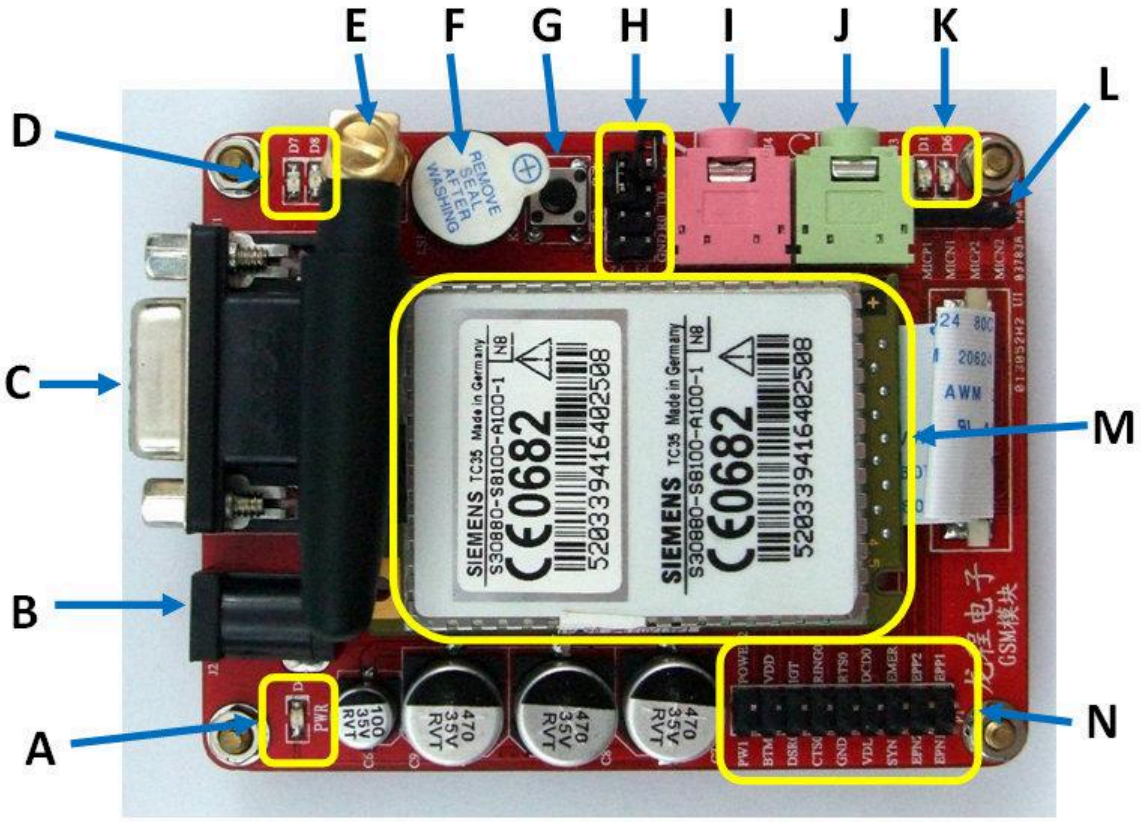
## 3. BOARD LAYOUT




**Top View**



**Bottom View**




A - Power Indicator LED

B - DC Barrel Jack/socket, Power input for TC35 GSM Development Board. 7- 15VDC.

C - DB9 for RS232 communication, female.

D - UART activity indicator LEDs. D7 is connected to transmit pin of TC35, activate low. D8 is connected to receive pin of TC35, activate low.

E - Antenna, to improve the signal strength of modem.

F - Buzzer, to offer sound indicator when there is incoming call.

G - Push button, offer manual input for network search.

H - Two set of header pin for external interface, P2 and P3.
P2 is IGT configuration, automatic search for available network or manual search.
P3 is UART pins. R0 refer to TC35's transmit pin, it should be connected to microcontroller's UART receiver. T0 refer to TC35's receive pin, it should be connected to microcontroller's UART transmit pin. T1 is connected to on-board MAX232 TTL receive pin. If DB9 (RS232) port is needed, please ensure jumper is connecting both T0 and T1. Please take note that the R0 and T0 pin is 2.65V TTL logic, a proper logic

converter is needed to interface to 3.3V or 5V UART pin.

I - 3.5mm Mic input socket (audio input).

J - 3.5mm Headphone socket (audio output).

K - Mode LED indicators.
LED D1 is connected series with Buzzer, which will indicate incoming call, or the "Ring".
LED D6 is connected to Sync of TC35 modem. 500ms ON and 500ms OFF to indicate the TC35 is initializing, yet to be ready. When it blink in 75ms ON and 3 seconds OFF rate, this mean the TC35 modem is ready to be used.

L - Extended pin for Mic input from TC35 module.

M - TC35 GSM Module.

N - Extended pin from TC35 GSM Module. Please do not supply power via these pins.

## 4. PRODUCT SPECIFICATION

TC35 GSM Development Board is designed to offer start-up platform to integrate GSM capability. It uses serial communication for interface between the board and host system such as computer or microcontroller. However, please do take note that **UART TTL level for the GSM board is 2.65V**, not the common 5V or 3.3V.

Absolute Maximum Rating

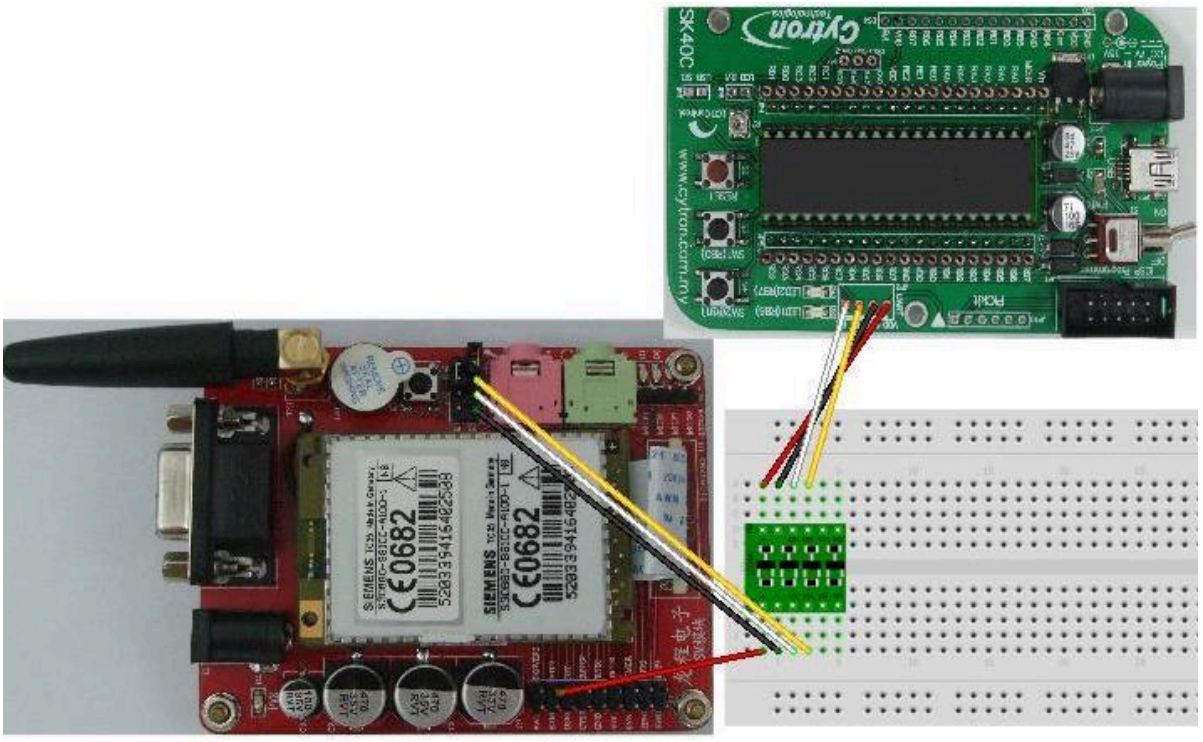
| Symbol | Parameter | Min | Max | Unit |
|---|---|---|---|---|
| Vin | Input Supply to GSM Board (DC) | 7 | 15 | V |

## 5. HARDWARE INTERFACE

TC35 GSM Development Board can be interface with microcontroller or computer. There should be only 1 type of interface at a time.

### 5.1 TTL UART interface

If you like to interface this GSM board with microcontroller, you can refer to the following diagram. Please ensure T1 and T0 pins are not not shorted by removing the jumper. T1 and T0 are located at 'H' in the product layout. This GSM board can be interface to any microcontroller that have UART, example, Arduino, PIC16F877A, PIC18F4550, Basic Stamp, mBed, many more.




The above diagram shows the interface from TC35 GSM development board to SK40C via a proper level shifter. Please take note that TC35 GSM development board will still need to be power from external adapter. Once the hardware interface is ready, you can start writing codes for it.

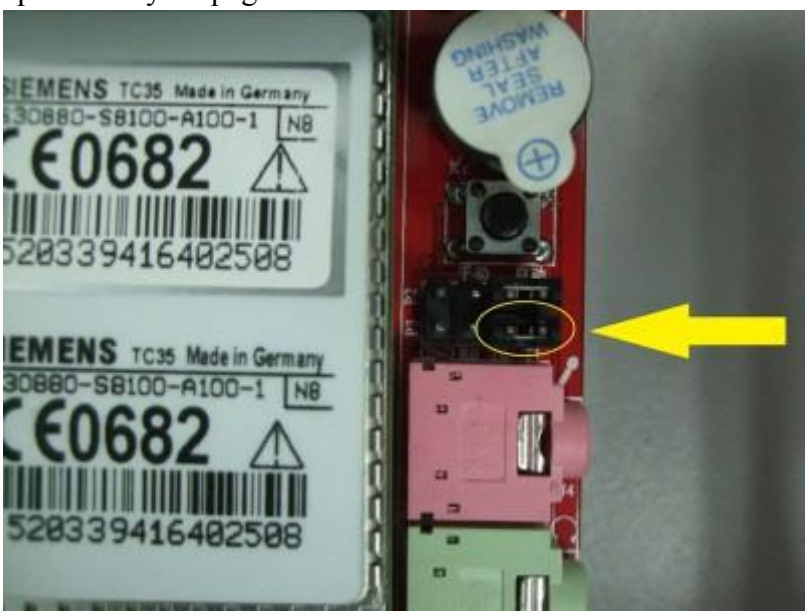
**Interface, from TC35 GSM Development Board to LC04A to SK40C's UART**

| TC35 | LC04A LV | LC04A HV | SK40C |
|---|---|---|---|
| VDD (2.90V) | + | + | VDD 5V |
| GND | - | - | GND |
| R0 | LT1 | HT1 | RX |
| T0 | LR1 | HR1 | TX |

### 5.2 RS232 to Computer

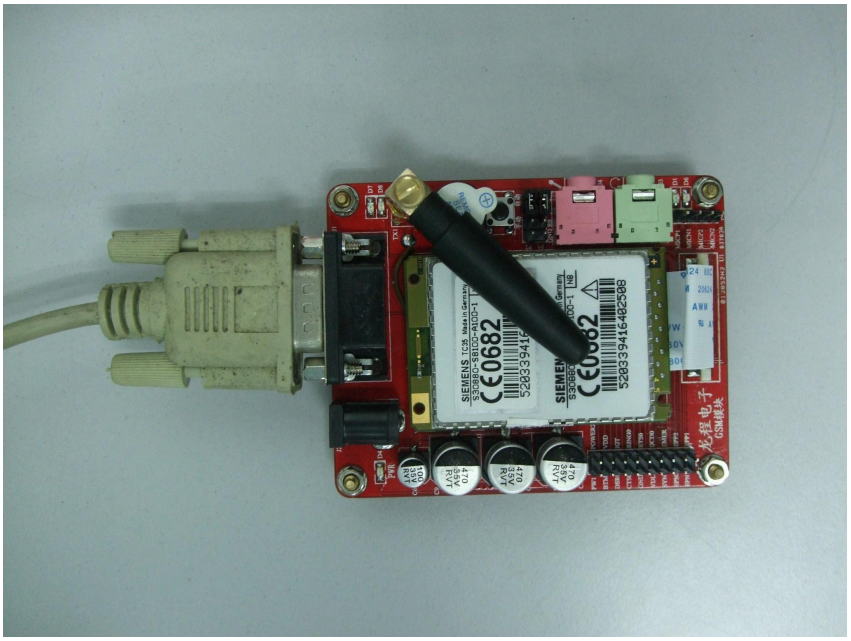
Interface to computer might be a good way to start and to study the working condition of TC35 GSM development board. To do so, please make sure the jumper must connect pin

T0 and T1, this is to enable the usage of DB9 (RS232). T0 and T1 pin is located at 'H', please refer to product layout page.

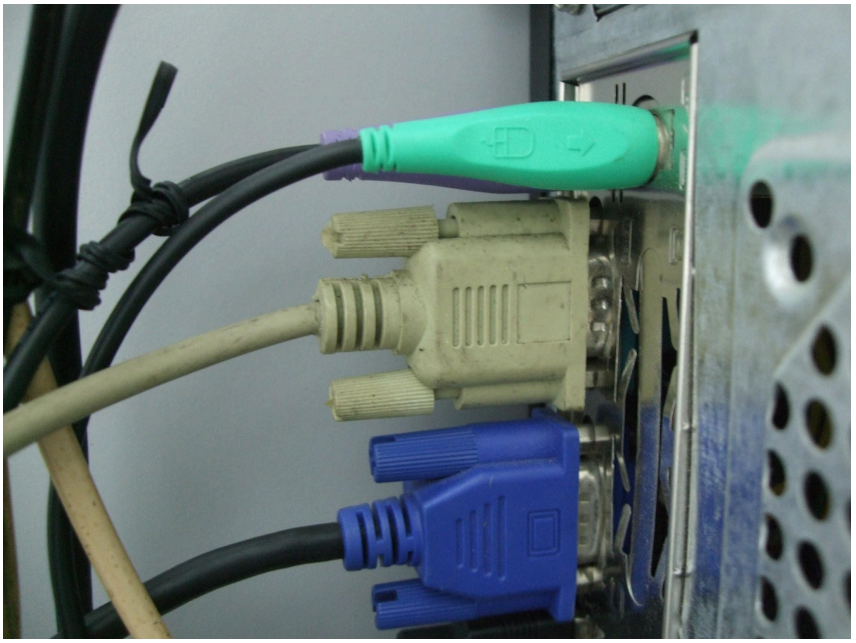



### 5.2.1 Using Serial Extension Cable

Now, you can connect the GSM board to computer. Easiest method is to get a serial extension cable and connect it to computer COM port.



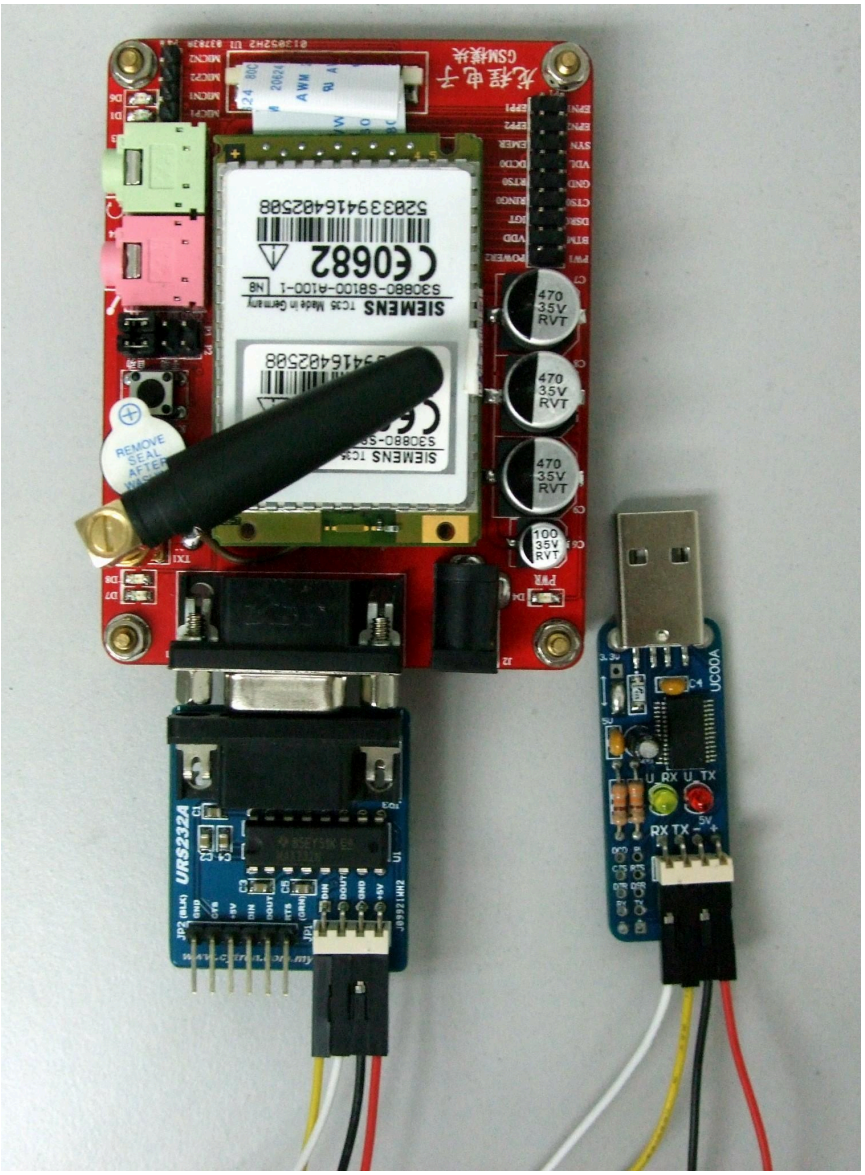
Connection using DB9 to TC35



Connection of the serial cable to computer's COM port, not VGA port.

### 5.2.2 Using UC00A for laptop

Most of laptop does not come with COM port (DB9) anymore. Alternatively, you can use UART to RS232 converter and UC00A for the connection to USB port on your laptop. Please take note, you will still need to connect T0 and T1 at 'H' to use the DB9 of GSM development board. Again, the TC35 GSM modem will still need to be powered using external adapter.




| URS232A | UC00A |
|---|---|
| 5V | 5V |
| GND | GND |
| TX | RX |
| RX | TX |

## 6. GETTING STARTED(PROTOCOL)

You can choose to trigger the connection manually or automatically. You can configure it using jumper located at 'H' under product layout page. Please remember to insert a proper SIM card with available credit. The SIM card holder is located under the board, check the product layout. When TC35 GSM Development Board is being powered up, the power indicator LED will illuminate.

After 1 to 2 seconds, LED D6 at the bottom right part will also light on. It shows the operation modes of the GSM module:
a. LED is ON for 600ms and OFF for 600ms mean:

- SIM card not inserted
- The GSM is searching for service example MAXIS, Celcom signal

b . LED is ON for 75ms and OFF for 3 second mean:

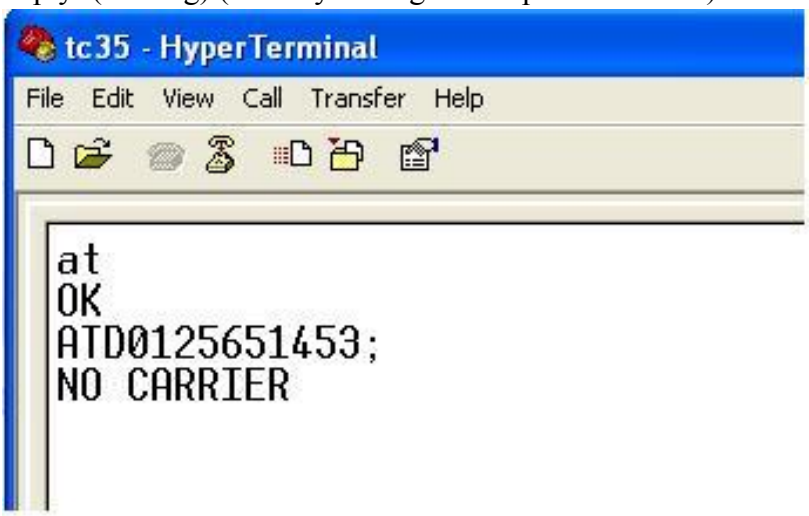
- The GSM has successfully read the SIM card and registered itself with the service provider, you can start using it.

After the TC35 GSM Development board is ready, you can start sending command to use it. No matter which interface you select to connect to the GSM board, the command is the same. Here we are showing the example using HyperTerminal, the TC35 GSM Development board is connected to computer.

The setting of HyperTerminal: 9600bps, 8-1-N, No Flow Control.

MAKING CALL
1st
Send: AT<enter>
Reply: AT

2nd
Send: ATD<phone number>; <enter>  (note that ; is a must to making call)
Reply: (nothing) (actually calling to that phone number)



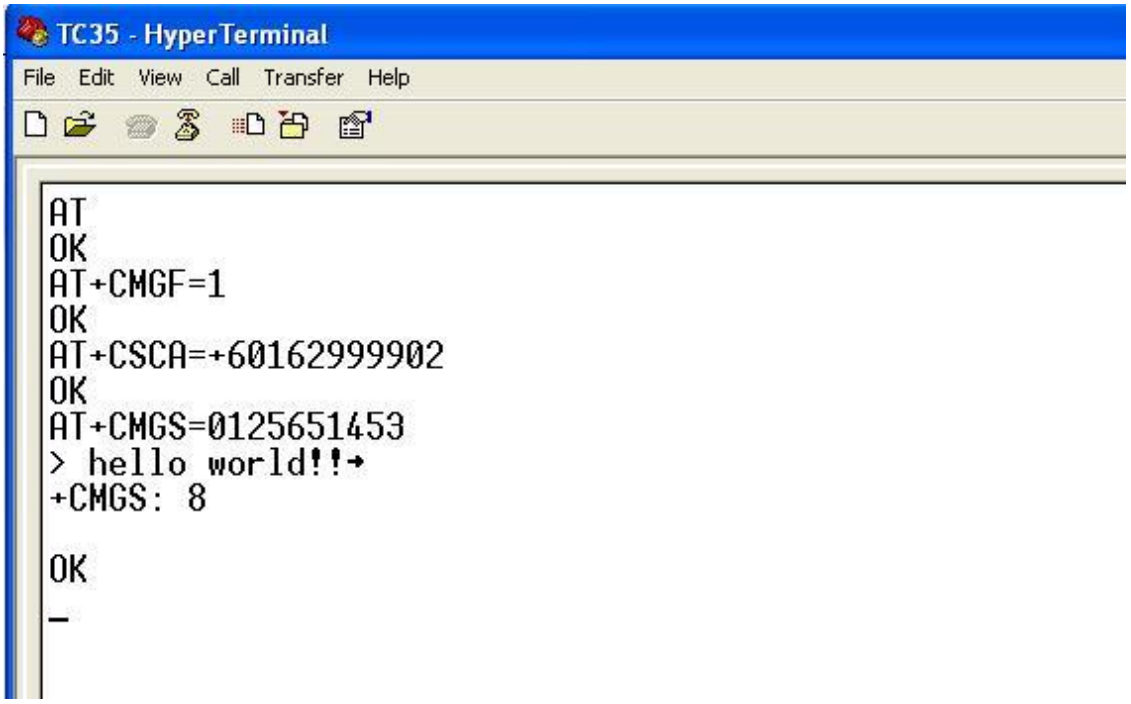

SENDING SMS
1st
send: AT<enter>
Reply: AT

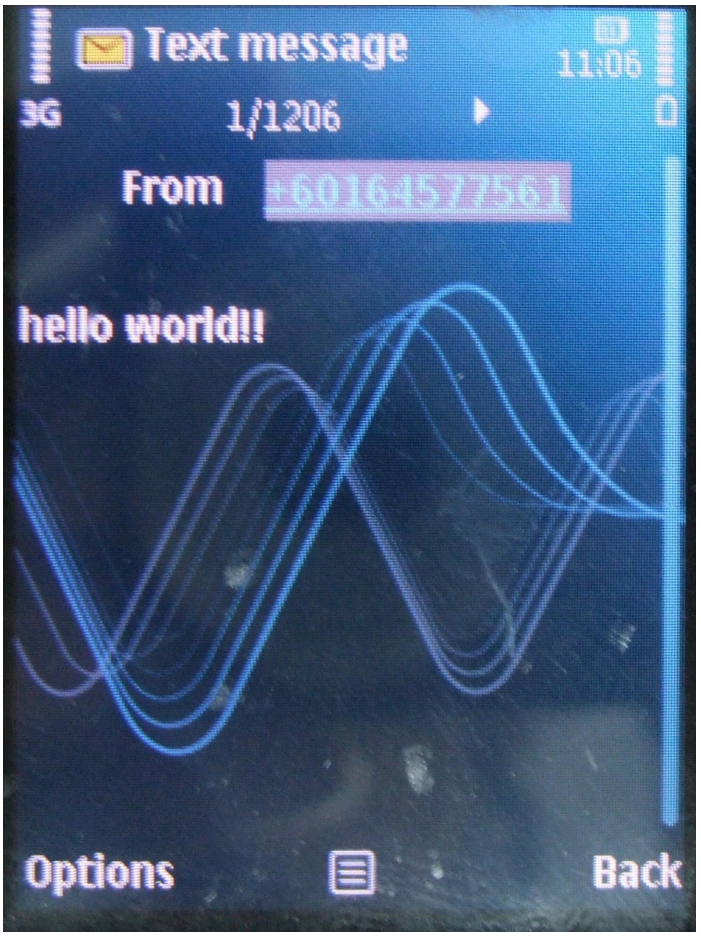
2nd:
Send: AT+CMGF=1<enter>
Reply;AT+CMGF=1  (SWITCH TO TEXT MODE)

3rd
Send: AT+CSCA=<messengers services center number> <Enter>
Reply: AT+CSCA=<messengers services center number>(set number)

4th
Send: AT+CMGS=<target number><enter>
Reply: AT+CMGS=<target number> (target phone number)
Reply: >

5th
key in the messenger u want and send by sending as ending 0x1A(ctrl+z)
Reply: +CMGS: XXX

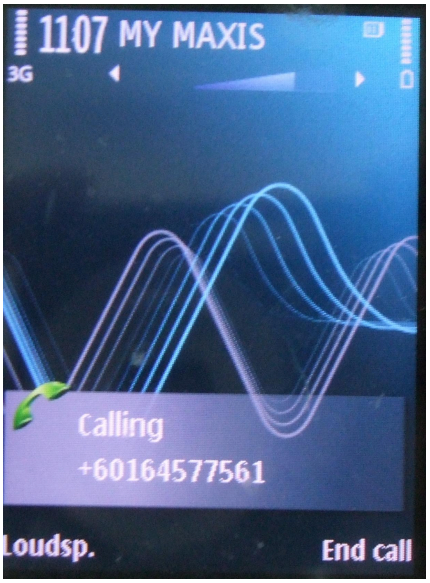


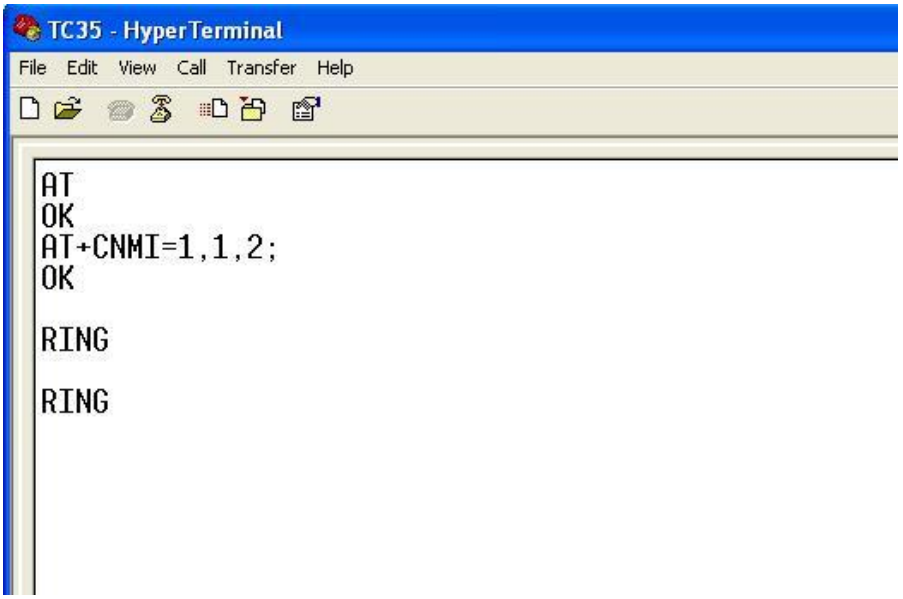



WAITING CALL AND SMS
1st
send: AT<enter>
Reply: AT

2nd
Send: AT+CNMI=1,1,2;<enter>
Reply: AT+CNMI=1,1,2;
THEN WAIT ….....

3rd
if call receive : RING accept call ATA; reject call ATH:
if messenger receive: +CMTI: XXXX read messenger: refer project 4;

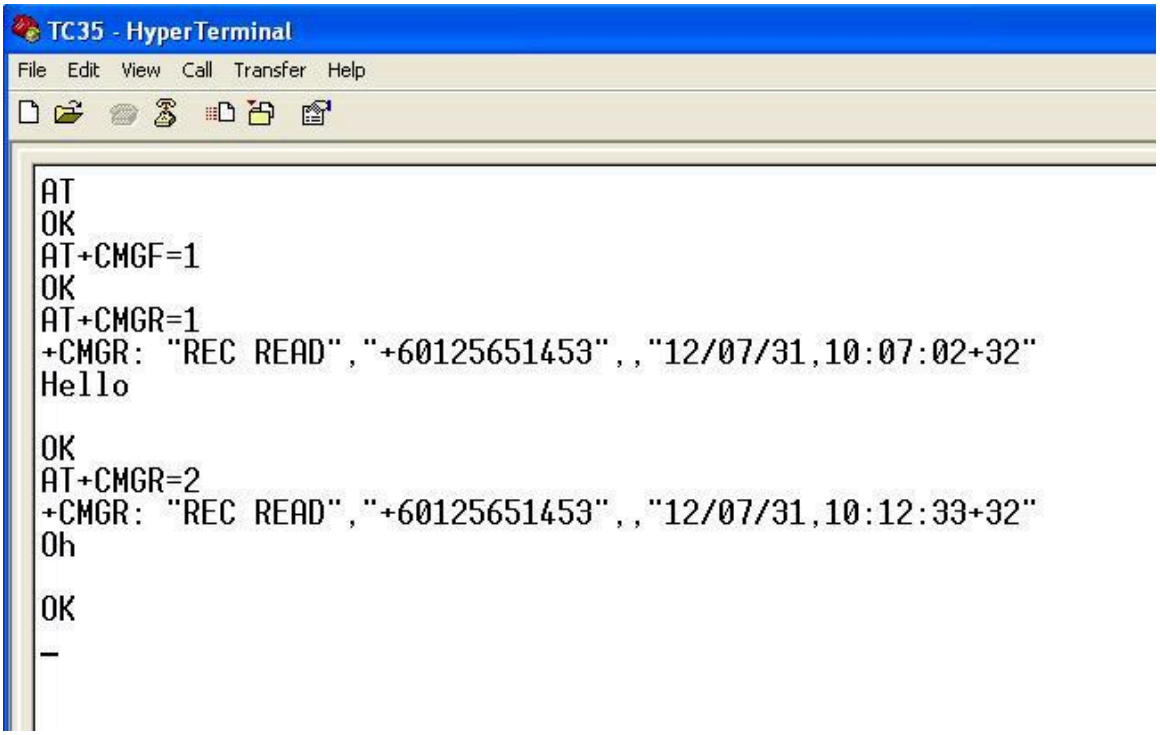


READING SMS
1st
Send: AT<enter>
Reply: AT

2nd
Send: AT+CMGF=1<enter>
Reply;AT+CMGF=1 (SWITCH TO TEXT MODE)

3rd
Send: AT+CMGR=N(N=which messenger)
Reply: AT+CMGR=N
Reply; FULL SET OF MESSENGER RECEIVE



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